Impact of Psychosocial Intervention on Adherence and Prognosis in Patients undergoing Coronary Artery Bypass Grafting

A thesis submitted during March 2016 to the Centre for Health Psychology, School of Medical Sciences, University of Hyderabad, in partial fulfilment of the requirements for the award of the degree of

Doctor of Philosophy in Psychology

by

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To my parents who gave me this dream, and who have been unconditionally fuelling its fulfilment. Indeed, I am blest to witness miracles everyday in these two persons.

CERTIFICATE

This is to certify that the thesis entitled, “Impact of Psychosocial Intervention on Adherence and Prognosis in Patients undergoing Coronary Artery Bypass Grafting”, submitted by MS. MARLYN THOMAS, bearing Regd. No. 12CPPH02, in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy in PSYCHOLOGY is a bonafide work carried out by her under my supervision and guidance which is a plagiarism-free thesis.

The thesis has not been submitted previously, in part or in full, to this University or any other University or Institution for the award of any degree or diploma.

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DECLARATION

I, MARLYN THOMAS, hereby declare that this thesis entitled, "Impact of Psychosocial Intervention on Adherence and Prognosis in Patients undergoing Coronary Artery Bypass Grafting", submitted by me under the guidance and supervision of PROF. MEENA HARIHARAN, is a bonafide research work which is also free from plagiarism. I also declare that it has not been submitted previously, in part or in full, to this University or any other University or Institution for the award of any degree or diploma. I hereby agree that my thesis can be deposited in Shodganga/INFLIBNET.

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ABSTRACT

Coronary Artery Bypass Grafting (CABG) is an invasive surgical procedure for patients with Coronary Artery Disease. Given the intensity of pain, dependency and medical protocols during the period of CABG, patients tend to experience psychological distress which may lower their adherence and prognosis after surgery. This research study examined the impact of psychosocial intervention, facilitated in conjunction with standard hospital treatment, on adherence and prognosis in patients undergoing CABG. Using a pretest-posttest non-equivalent control groups design, three groups of patients were compared. The first group received the Programme for Affective and Cognitive Education (PACE) intervention, the second was given the Relaxation intervention, and the third formed the Control group with standard hospital treatment only. The participants were assessed using Hospital Anxiety and Depression Scale, Multidimensional Scale of Perceived Social Support, Locus of Control checklist for CABG, Adherence Scale for Cardiac Patients, and Biopsychosocial Prognosis Scale for CABG. A sample of 300 participants was sequentially assigned to the three groups (100 in each) in the order of PACE, Relaxation, and Control. The interventions were administered twice to the participants. They were also given the intervention CD or DVD, to be used for reinforcement after discharge. A day before CABG, the pre-surgery assessment was carried out to measure psychological distress, perceived social support and health locus of control. Following this on the same day, the PACE and Relaxation groups received their respective intervention. CABG was performed the next day as per schedule. A day before discharge from hospital (pre-discharge phase), the PACE and Relaxation groups received the second part of their respective intervention. All participants were followed up for six weeks after discharge. Psychological distress was assessed during participants' first and second medical reviews, while adherence and prognosis were measured at the second medical review. A sub-sample of 100 participants was followed up five months after discharge as part of the assessment of prognosis. Semi-structured interviews were individually conducted with a sub-sample of 15 participants to gain deeper insight into their feelings, experiences, and opinions. Results showed that the PACE group had the highest adherence and prognosis as well as the highest reduction in psychological distress from pre-surgery to second review assessments. The Control group had the lowest adherence and prognosis as well as the lowest reduction in psychological distress from pre-surgery to second review assessments. Further, the study attempted to trace the pathway between interventions, adherence and prognosis. By means of pathway modelling using multiple linear regression analyses, adherence was found to be independently and positively predicted by the PACE intervention, the Relaxation intervention and perceived social support, and negatively predicted by psychological distress at second review. The PACE intervention was the only positive independent predictor of prognosis, while psychological distress before surgery, psychological distress at second review and female gender were negative independent predictors. Thematic analysis of qualitative data indicated three themes in participants' experiences: relief through psychosocial intervention, differential impact of psychosocial interventions, and finding solace in interaction and assessment. The results consistently indicated that psychosocial intervention, namely PACE, was effective in optimising adherence and prognosis after CABG, primarily by reducing psychological distress prior to surgery and during convalescence. The indispensability of integrating psychosocial care into CABG alongside biomedical treatment is the key conclusion. Implications, strengths, and limitations of the study are also discussed.

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"And I have learned that if you want to be immortal, don't count on your work to achieve immortality." (Robert J. Sternberg)

It is overwhelming when a stalwart such as Prof. Sternberg concedes this existential angst after 1000-odd publications and over a dozen honorary doctorates. In my own modest way, I have similarly come to understand that the relationships I encountered with the extraordinary people named below made the journey through this course and time of life a worthy undertaking.

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This thesis carries a contribution from each of you. I hope that I have done justice to our efforts in tying up the ends.

(MARLYN THOMAS)

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LIST OF ABBREVIATIONS

ABC (model)	Activating agent, Beliefs, Consequences
ADSCAP	Adherence Scale for Cardiac Patients
BIPROSCAB	Biopsychosocial Prognosis Scale for CABG
CABG	Coronary Artery Bypass Grafting
CAD	Coronary Artery Disease
CD	Compact Disc
DORSCAP	Doctor's Rating Scale of CABG Prognosis
DREAM	Diet, Relaxation, Exercise, Attitude and Motivation
DVD	Digital Video Disc
EFA	Exploratory Factor Analysis
HADS	Hospital Anxiety and Depression Scale
HBM	Health Belief Model
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
HLM	Heart–Lung Machine
HSCL	Hopkins Symptom Checklist
ICU	Intensive Care Unit
IMB (model)	Information–Motivation–Behavioural skills
LOCOCAB	Locus of Control checklist for CABG
MHLC–Form C	Multidimensional Health Locus of Control–Form C
MSPSS	Multidimensional Scale of Perceived Social Support
PACE	Programme for Affective and Cognitive Education
P+R	PACE+Relaxation
SCT	Social Cognitive Theory
SDT	Self-Determination Theory
SF-36	Short Form–36
STAI	State-Trait Anxiety Inventory
TPB	Theory of Planned Behaviour
TTM	Transtheoretical Model

Chapter I

Introduction

Chapter I

Introduction

Surgery is deemed an art for it requires intrusive access into the living human body to repair the damage and heal the person. Surgeons themselves conjecture that empathetic interaction with their patient during the period of surgery endows mutual benefits such as the superior recovery of the patient and the reduced need for post-operative medical attention (Bhattacharyya, 2003; Williams, 1956). Particularly as being witnessed with the onset and predominance of chronic non-communicable diseases, the fluidity between the mind and the body demands the departure from conventional surgical practice wherein the body is favoured over the mind for care needs (Emani & Binkley, 2010). The acute illness model is left baffled by the unique health profiles of individual patients, by the non-curative nature of medical treatments, by the contributions of non-clinical facets like lifestyle choices and stress, and by the need to partner with patients for daily health management in chronic conditions (Moss, 2003). This signifies that healthcare practice ought to be as much psychosocial as biomedical.

Engel's (1977) biopsychosocial approach regards illness and health as functions of bio-physical parameters (e.g., pathology) in conjunction with psychosocial characteristics (e.g., health beliefs and family support). Over the years, critics have contended that idealistic eclecticism, lack of testability and subjectivity over the dominance of one of the three paradigms (bio, psycho, social) in the biopsychosocial perspective render it unsuitable for practice (Asokan, 2009; Benning, 2015). Yet as a philosophy of integrated care, the biopsychosocial approach offers a theoretical vantage point to broaden and reform the prevailing reductionist system

(Borrell-Carrió, Suchman, & Epstein, 2004; Narayanan & Prabhakaran, 2012). As Dutta (2008) asserted, the biomedical pathway of existing treatments is simply organ-oriented. The patient with illness nonetheless witnesses the impact of and the impact on the psychosocial spheres of life besides the biological characteristics of illness. In addition, invasive medical procedures, namely surgery, are akin to traumatic instances that acutely burden the patients' psychological being (Bienvenu & Neufeld, 2011). Pertinently, the impact of such mental distress rolls back into unfavourable health outcomes despite concentrated medical care. The resultant stagnation of poor health and quality of life affirms that mental health figures as a crucial paradigm for an inclusive healthcare framework. It is becoming apparent that what medical fitness is to the feasibility of surgery, psychosocial fitness is to the success of surgery (Mitchell, 2005). This kindles the necessity of not merely appreciating the mind–body interdependency, but of also practising mind–body medicine wherein psychosocial support is integrated into the treatment portfolio (Astin, Shapiro, Eisenberg, & Forys, 2003). The need to extend such support to patients during the period of surgery is long due. This calls for translational research that practically evidences the significance of psychosocial care during the surgical period within the healthcare setting.

The state of contemporary surgical services is glaringly a far cry from the virtue of patient-centred care. The persistence of the reductionist biomedical venture, specifically in India, stems from an expectancy to uphold the ease and economy of functioning for both health providers and patients (Mehta, 2011). While this approach has profitably generated a niche for privatised healthcare and health tourism profile in the sub-continent (Connell, 2006), patients at the receiving end seldom achieve a faster pace in progressing from illness to wellness. A stark illustration of this paradox is the nature of outcomes in heart disease. Not only is heart disease prevalent on an epidemic scale among Indians, but the likelihood of its recurrence or relapse after treatment is also high (Kaul & Bhatia, 2010; Rissam, Kishore, & Trehan, 2001). The irony to be discerned is that the diagnostic capacity of Indian healthcare is commendable and far-reaching, yet much is amiss in its ability to heal.

The present study does not intend to discredit available health treatment schemes but aspires to demonstrate that evolving towards integrated care practice which addresses the mind and the body is possible and effective. This thesis is an effort to gather insight into redesigning the existing surgical package (Coronary Artery Bypass Grafting) offered to patients with Coronary Artery Disease in Indian healthcare, by adding psychosocial intervention into the biomedical repertoire during hospitalisation and testing its efficacy in terms of patients' adherence and prognosis.

In order to understand what *Coronary Artery Bypass Grafting* (CABG) is, it is essential to know about Coronary Artery Disease (CAD). CAD in India has emerged as a trending matter for comment and research in the last decade. There are approximately 32 million Indians suffering from CAD, while about 80% of the urban population demonstrates at least two risk factors to develop CAD (Kaul & Bhatia, 2010; Sekhri *et al.*, 2014). The disease costs India an estimated loss of 20 disability-adjusted life years per 1,000 persons (Mackay & Mensah, 2004). In monetary terms, the loss India suffered from heart disease, Stroke and Diabetes was said to amount to 54 billion United States dollars (approximately 3,662 billion Indian rupees) in the bygone year of 2015 (Abegunde & Stanciole, 2006). CAD has therefore been identified as the foremost cause of mortality and morbidity, as well as an impediment to the growth of national economics and productivity (Chauhan & Aeri, 2013; Sekhri *et al.*, 2014). The aetiology of CAD is not simplistic either. It results from inadequate blood being delivered to the heart for its nourishment and functioning. Coronary arteries, located on the exterior walls of the heart, are blood vessels dedicated to supply oxygenated blood to the heart muscle (University of Minnesota, 2013). Through constant exposure of the endothelium (inner lining of coronary arteries) to substances such as cholesterol in the blood stream of the coronary artery over time, inflammation (immune response to the substances) results. Chronic inflammation prompts atherosclerosis, viz., the clotting or blocking in coronary arteries which in turn disrupts, restricts or slows down blood flow. This can lead to the weakening (ischemia) or tissue damage (myocardial infarction) of the affected sections (American Heart Association, 2015; Paoletti, Gotto, & Hajjar, 2004; Versari, Daghini, Virdis, Ghiadoni, & Taddei, 2009). Although the essential pathogenesis of CAD is atherosclerosis, behavioural and psychosocial factors have been touted as constituting the cause of atherosclerosis (Hamer, Molloy, & Stamatakis, 2008). Sedentary living, smoking, forms of emotional distress, and social isolation are a few exemplary psycho-behavioural influences that hasten atherosclerosis, besides biological risks such as family history of CAD and co-morbidities (Brodziak & Brewczyński, 2013; NHS Choices, 2014; Rozanski, Blumenthal, & Kaplan, 1999). It has thus grown vital to empirically document the psychosocial status of patients with CAD.

Consider the landmark Framingham Heart Study (Dawber, 1980) which commenced in the year 1948 with over 5,000 participants from the Framingham community in Boston (United States of America) and which continues to date with its third generation cohort sample (Framingham Heart Study, 2016). It laid ground for the conceptualisation and measurement of multi-factorial risks in the development of CAD (Aronowitz, 1998). By identifying the increase in blood pressure and cholesterol levels as an important factor triggering CAD, the necessity of lifestyle modification (physical activity, smoking cessation, and healthy eating) for the prevention or stabilisation of CAD was heralded. The dynamics of human behaviour and decision-making in this matter had to be dealt with, as a result. This led to a large volume of research studies perusing behavioural approaches for risk factor amendment (Molinari, Bellardita, & Compare, 2006). Psychology itself was ensnared by the philosophy of behaviourism until the 1970s (Roediger, 2004). Over the years however, attention has also been drawn to the substantial role of the individual's mental state in cardiac health. Beginning with the description of the iconic yet contested Type–A personality among those already diagnosed with heart disease (Friedman & Rosenman, 1960) to the recognition of everyday stressors such as work–life imbalance, low social support, depression, anxiety and hostility in the normal population that went on to develop cardiac problems (Albus, 2010), the association between psychosocial factors and cardiac health through physiological and behavioural pathways that endanger the heart has been confirmed. What remains to be done, particularly in India, is to work on these factors through integrated intervention to help reform the overall health outcomes of cardiac patients.

State-of-the-art biomedical technology has been harnessed to address the life-threatening condition of CAD through comprehensive diagnostic facilities and accessible invasive treatments. CABG has gained momentum in this regard. When blocking occurs in a number of coronary arteries or a main coronary artery, the need for grafting arises. In this technique, a blood vessel from another site in the body is transplanted onto the heart to create a substitute route for the circulation of blood in that part of the heart. The new vessel graft is sewed onto the blocked coronary artery on the heart to enable blood to bypass the block, i.e., when the blood flowing through the coronary artery reaches the point of the block it diverts into the grafted vessel for uninterrupted flow. The surgical method of grafting and bypassing blocked coronary arteries is called CABG (Stanford Health Care, 2015). The first successful CABG in human beings was reported by Goetz, Rohman, Haller, Dee, and Rosenak (1961). The era of CABG in India is credited to have been ushered in by the surgeon, K. M. Cherian, in the year 1976. Available statistics reveal the vast prevalence of CABG which is said to constitute nearly 60% of open heart surgeries performed in India (Padmavati, 2004). Four decades from its onset in the country, scientific efforts continue worldwide to increase surgical precision, lessen the time and reduce the cost of CABG. As a result, the treatment has become increasingly mechanistic although the patient and her or his experience of illness are dynamic and multi-factorial (World Health Organization, 2007). Despite technological advancements, the fact remains that CABG involves the most vital organ of the human body, the very cognizance of which is sufficient to trigger distress in the patient.

It is only natural for patients of CABG to perceive intense burden and pressure of their illness. Studies that explored the phenomenological experience of cardiac patients through their drawings of their condition reported trends of the heart being depicted at the centre, and of the heart being severely damaged (Broadbent, Petrie, Ellis, Ying, & Gamble, 2004; Guillemin, 2004). The extent of damage was additionally found to correlate with tangible consequences such as the speed for return to work, anxiety about one's condition, use of health services, uptake of activity, and beliefs about recovery (Broadbent *et al.*, 2004; Broadbent, Ellis, Gamble, & Petrie, 2006). What patients think and feel during the experience of CAD and its treatment are not meant to be ignored by health professionals. Endorsing and addressing these feelings and experiences, which for the patient may be 'real', demands minimum time and optimum skills in communication by the health professional. Increasingly, researchers are citing the quality of communication between the doctor and the patient as a catalyst in the diagnostic situation. The doctor's skill to empathetically and non-technically disclose details about the disease, treatment and potential outcomes, while gently handling the patients' reactions and constructively preparing a plan of care has been argued to determine the patient's cooperation, adjustment, adherence behaviour, recovery and prognosis (Agarwal, Agarwal, Nag, Chakraborty, & Ali, 2011; Ranjan, Kumari, & Chakrawarty, 2015; Swain, Hariharan, Rana, Chivukula, & Thomas, 2015). From this initial contact itself, the basis for biopsychosocial care is grounded.

The typical hospitalisation protocol for CABG in India involves in-patient admission, clinical investigations, pre-operative visits by doctors (Anaesthesiologist, Cardiologist, and/or Cardiothoracic Surgeon), physiotherapeutic and dietary recommendations for hospital stay, physical preparation (shaving and disinfection), transfer to Cardiothoracic operation theatre, 3–6 hour operation, transfer to Intensive Care Unit (ICU), transfer to ward or room by the second or third post-operative day, post-surgery dietary and physiotherapeutic counselling, post-surgery clinical investigations, discharge from the hospital, and out-patient follow-up visits (Rao, 2014; Wockhardt Hospitals, n.d.). Professional psychological assessment or counselling has not yet earned a slot in this comprehensive routine of care. Patients in India count on the sensitivity and empathy from medical, nursing or allied medical professionals to be able to deal with the period of hospitalisation, given the absence of expert psychological support (Rehin & Raveendran, 2014; Samina, Qadri, Tabish, Samiya, & Riyaz, 2008; Tandon, 2013). However, the doctor–patient ratio in India being as low as 1:1,700 reduces the duration of consultation (found to be a meagre 1–1.5 minutes) and makes it challenging to establish a purposeful and compassionate doctor–patient relationship (Coarasa, Das, & Hammer, 2014; Sinha, 2011). These abysmal standards of partial health delivery persist despite overwhelming evidence of psychosocial risks and maladaptive outcomes in patients going for CABG. Care ought to be holistic since the period of hospitalisation as well as the post-discharge phase of CABG demand patients' participation in the process of convalescence.

The crucial element in the patient's contribution to her or his recovery refers to the behaviour of *adherence*. It is defined as the extent to which a patient follows the agreed recommendations concerning pharmacological and behavioural strategies provided by health professionals. The process of adherence therefore is multi-dimensional, involving medication intake as well as lifestyle modification in the form of diet management, physical activity and symptom monitoring (World Health Organization, 2003). The term 'compliance' runs on similar lines; however, it is deemed obsolete for contemporary use as it connotes passive obedience rather than shared agreement regarding the prescribed advice, and confines largely to medication use (Fox, 1998; Gould & Mitty, 2010).

Adherence can be a challenging practice. It demands discipline, time and effort on part of the patient, even when experiencing symptoms of illness or recovering from an invasive procedure. In such circumstances, clarity about the adherence regimen, as well as support from professionals and significant others can be advantageous (Yehle, Chen, Plake, Yi, & Mobley, 2012). Particularly after complex surgery such as CABG, poor knowledge about each medication, use of multiple doses and pills, and increased expenses prompt the risk of non-adherence (Sengstock, Vaitkevicius, Salama, & Mentzer, 2012). It is important for patients to realise that in order to halt the disease progression, they must continually consume medication for a long duration even after the major surgical treatment. Although much emphasis is theoretically placed on adherence, efforts to educate and train patients to simultaneously practise adherence in various domains (particularly, lifestyle modification) lack attention in healthcare settings. The World Health Organization (2003) stressed that effective interventions to improve adherence have greater impact than specialised biomedical treatments. This reiterates the significance of prioritising the healthcare's engagement with human behaviour on par with scientific advancement. When patients come to perceive adherence, through appropriate education and motivation from professionals, as a process of self-management which allows them to exercise control over their own health, they are more likely to follow the regimen (Evangelista & Shinnick, 2008; Falvo, 2011).

The dampening contributions of negative emotional states to a systematic pursuit of adherence must also be borne in mind. Across research investigations with patients admitted for myocardial infarction, those who had depression or anxiety during or after hospitalisation showed lower adherence to diet regulations, physical exercise, medication intake and risk behaviour control (Kuhl, Fauerbach, Bush, & Ziegelstein, 2009; Ziegelstein *et al.*, 2000). Accordingly, when the goal of an intervention is to enhance adherence, an attempt may be made to work on two sets of factors: knowledge and skills necessary for adherence, as well as negative emotional states which hinder adherence. This way, when adherence is assessed as an outcome, it reveals not merely the progress of the patient, but also the success of health providers' efforts in subduing the barriers and boosting the potential for adherence.

The level of adherence in turn affects patients' health status. In a 3.5-year-long study carried out on patients with Heart Failure, depression and medication adherence independently predicted the risk of adversities such as hospitalisation, visit to emergency rooms and mortality. In addition, the combined presence of depressive symptoms and low medication adherence increased the risk of cardiac events by five fold, while those with either depressive symptoms or low adherence had 1.3 times the risk of adverse outcomes than patients with neither depression nor low adherence (Wu, Lennie, Dekker, Biddle, & Moser, 2013). The findings altogether hint at the complex and far-reaching interrelationships among emotional states, adherence, and health for cardiac patients. Nonetheless, adherence in patients who had CABG has to be broadly operationalised to include medication intake, as well as relatively challenging self-care practices such as lifestyle changes (diet, exercise, and health risk behaviours), and preventive strategies (symptom monitoring and regular medical consultation). Such a comprehensive understanding will reflect the particular situation after CABG when patients not only have to habituate themselves to the stringent lifestyle modification and medication requirements in their daily lives, but must simultaneously keep track of their post-surgery wound healing, complications, co-morbid markers (e.g., blood glucose level in Diabetes Mellitus) and review consultations (Griffo *et al.*, 2013; Pieper *et al.*, 2006). In sum, adherence is an important intermediary variable in the process of recovery as it is seen to be affected by emotional states on one hand, and further influences patients' health independently or through its interaction with emotional states.

Reinstatement of patients' health and well-being is an ideal yardstick of success in any healthcare (Clancy & Eisenberg, 1998). Every medical procedure or treatment is consequently judged by its outcome in terms of patients' health. For chronic diseases, the outcome is considered in terms of *prognosis*. Prognosis refers to the estimated course of the disease in future for a given patient, in light of the patient's characteristics in the present (Hilden & Habbema, 1987). It is a useful index to determine the efficacy of ongoing treatment and is informative with regard to whether a line of treatment ought to be continued, modified, or terminated (Abu-Hanna & Lucas, 2001). Prognostication of patients who already underwent CABG has traditionally involved the examination of mortality and morbidity. Increasingly, focus is thrust on additionally evaluating quality of life after surgery, which is inclusive of physical symptoms, psychological well-being and social functioning (Hawkes, Nowak, Bidstrup, & Speare, 2006). Medical prognosis which is given by the severity of disease and the success of surgical procedure is generally qualified ‘good’ after CABG. Yet, empirical research studies observed that patients demonstrated high distress, low physical functioning and slow return to work, which were unrelated to morbidity yet associated with quality of life. Analyses of patients’ psychosocial factors indicated persistent depressive symptoms and negative affect after returning home which then negatively predicted (or inhibited) their ability to engage in productive activity (Boudrez & De Backer, 2000; Goyal, Idler, Krause, & Contrada, 2005; Mallik *et al.*, 2005). It is arguable that medical prognosis deals with the status of the disease, while biopsychosocial prognosis concerns the overall functioning of the individual.

Wiesemann (1998) contended that medical professionals narrowly define prognosis in terms of the nature and prospects of the disease and its treatment options, and she recommended that prognosis must be reflective of individual characteristics and contexts such as age, dispositions, preferences and life circumstances. For an inclusive picture in the current study, prognosis is operationalised as an estimation of patients’ level of recovery of bio-physiological, psychological and social well-being after CABG. There is a growing trend of the use of patients’ reports of recovery and health status in research of chronic diseases (Ambresin, Chondros, Dowrick, Herrman, & Gunn, 2014; Pedersen *et al.*, 2011; Pincus & Castrejón, 2015). The aim of these pursuits is to quantify the intricate individual experiences, as the individual knows and perceives it best. While criticisms have been levelled that patient-reported information may be biased and mismatched with objective medical parameters, it also cannot be denied that medical test reports themselves are incomplete and reductionist to capture the individual's overall illness and recovery process and experience. The supporting premise for self-rated prognosis is that the medical diagnosis and treatment of the patient is initiated in the first place following the patient's report of symptoms (Baldwin, 2000). Prognosis too must be evaluated at the grassroots level (of patients) in order to accommodate the bio-physiological, psychological and social aspects of post-surgical health and recovery.

Psychosocial factors are key participants in the process of coping and recovery throughout the period of CABG. Psychological distress, perceived social support, and health locus of control prominently figure in scientific literature as being relevant (Fitzgerald, Tennen, Affleck, & Pransky, 1993; Herbegue, Lahidheb, Labbené, & Haouala, 2014; Lindsay, Smith, Hanlon, & Wheatley, 2001; Waight, Strodi, Sheridan, & Tesar, 2015). Patients awaiting CABG would typically have experienced an adverse cardiac event. For those who do not, serendipitously receiving the diagnosis of CAD (e.g., during a regular health check-up) is disturbing enough. Fear, anger, sadness, and undesirable behavioural changes (e.g., discontinuing one's daily activities) were observed among patients after they had been informed about their vulnerable heart condition (Cohn & Cohn, 1983). When further confronted by the impending need for CABG, the intensity and duration of negative affect gets amplified, such that patients encounter and exhibit unpleasant states of mind, identifiable as anxiety and depressive symptoms. Healthcare professionals refer to these as *psychological distress* (Drapeau, Marchand, & Beaulieu-Prévost, 2012).

Psychological distress is not simply a negative emotional state of the mind. Its constituents, i.e., anxiety and depression, involve cognitive and physiological components too. A state of tensed feelings, worrisome thoughts, and excitatory physical signs is called anxiety (American Psychological Association, 2016a). Depression refers to pervasive sadness and lack of motivation to engage in routine activities that may be accompanied by poor concentration, severe weight reduction or gain, lethargy, sleeplessness or oversleeping, heightened guilt and worthlessness, and suicidal ideation (American Psychological Association, 2016b). Therefore, a number of physiological functions are also disturbed in the face of anxiety or depression. The tripartite model of anxiety and depression (Clark & Watson, 1991) suggests that the modulation of negative affect, positive affect, and physiological hyper-arousal presents as symptoms of psychological distress. Negative affect relates to feelings of sadness, anger, guilt, fear, and worry. Conversely, feelings of enthusiasm, energy, happiness and pleasure characterise positive affect. Physiological hyper-arousal involves the sympathetic stress response (e.g., rapid heartbeat and breathing) and the activation of the hypothalamic–pituitary–adrenal axis for the release of stress hormones (corticotropin-releasing hormone, adrenocorticotropic hormone, and cortisol). Depression is characterised by high negative affect and low positive affect. Presence of high negative affect along with high physiological hyper-arousal is visible in anxiety. Further, cognitive biases and maladaptive thinking are rampant in anxiety and depression. These pertain to distortions in cognition such as selective processing, perseverative thinking, and catastrophising (Clerkin, Beard, Fisher, & Schofield, 2015; Hallion & Ruscio, 2011; Sorg, Vögele, Furka, & Meyer, 2012). The model also postulates the co-occurrence of anxiety and depressive symptoms, given the common feature of negative affect in both these cases. Psychological distress in medical patients may culminate in a double jeopardy.

For a cardiac patient, the constant physiological hyper-arousal of psychological distress aggravates pathological mechanisms in heart disease (Wulsin, 2012). The stress and impact of medical procedures and hospitalisation can cyclically burden the patient’s psychological state. Cognitive biases may also manifest as negative beliefs and decisions relating to one’s health (Allen *et al.*, 2012; Redelmeier, Rozin, & Kahneman, 1993). The behavioural choices of patients with anxiety and depression tend to be risky (e.g., uptake of smoking) or even complacent (e.g., avoidance of physical activity) in managing their health (Hamer *et al.*, 2008). In such a context, the interplay between affect, cognition and behaviour renders patients less capable of caring for themselves. Additionally, the physiological upheavals accompanying psychological distress can inhibit or delay the course of recovery, specifically wound healing after surgery (Lucas, 2011; Upton & Solowiej, 2010). This further reveals a lacuna in the comprehensiveness of healthcare: while the medical team engages a multitude of investigations and procedures to arrest the disease, the concomitant psychosocial issues are left unattended. The imbalance in care creates recovery outcomes that are deficient and not sustained (Hunter, 2008). The question that seeks empirical probing is whether reversing the negativity in affect and cognition can prevent the damage on health, and whether this can further impose a positive influence on health-protecting behaviour.

It may be challenged that psychological distress which is a reaction to CABG would dissipate when the stressor of surgery is over. Research findings however suggest otherwise. There seems to be a trend of decrease in the rates of anxiety and depression from pre-CABG to post-CABG assessments; however, the reduction is generally not significant particularly for depression (Krannich *et al.*, 2007; Stroobant & Vingerhoets, 2008). In a cross-sectional study (Kerper *et al.*, 2012) with 1,157 patients undergoing different types of surgery (peripheral; neuro, head and neck; abdomino-thoracic), approximately 17% of the sample expressed their interest for psychotherapy during the period of surgery. This group had significantly higher psychological distress when compared with those who did not express interest in psychotherapy. There was nonetheless no difference in the types of surgery for the two groups, suggesting that the prospect of any surgical procedure intimidates patients. Between 30% and 64% of patients interested in psychotherapy had clinically significant scores on anxiety and depression dimensions before surgery, and between 25% and 58% of these patients had clinically high scores on anxiety and depression dimensions even six months after surgery. Among patients not interested in psychotherapy, 6–32% had clinically significant anxiety and depressive dimension scores, and 7–31% had clinically high anxiety and depressive dimension scores six months later. Despite a large difference in the prevalence of clinical anxiety and depression between both groups of patients, there were no significant changes within groups across time in the prevalence of distress experienced between pre-surgery and 6-month follow-up assessments. It must be borne in mind that Kerper *et al.*'s (2012) study was concerned only with exploring trends in patients' interest for psychotherapy, and had not actually provided any psychological intervention. It nonetheless highlighted that the extent of unaddressed psychological distress is not temporal and transient in surgical patients. Yet, evidence is lacking about the evolution and role of psychological distress at different points in the surgical period ranging from admission for CABG until recovery at home. Identifying these trends bears consequence to theorise about and alter (through psychosocial intervention) the dynamic influence of psychological distress on health outcomes.

When dealing with medical patients, the concern is not so much with the clinical significance of anxiety and depressive disorders, based on the presence of respective necessary and additional symptoms that gives scores above the cut-off. Rather, the experience of a few symptoms itself is arguably taxing for the medical patient to warrant therapeutic psychological support, given the concomitant demands and burden of the co-morbid chronic medical illness and/or medical procedures. Cardiac patients may suffer from diagnosable generalised anxiety disorder and major depression, or non-clinical anxiety and depression for a prolonged period that would call for attention and care. The concept of psychological distress is comparable to mixed anxiety-depressive disorder or cothymia, which refers to a psychiatric diagnosis wherein anxiety and depressive symptoms co-exist but do not individually account for a disorder (Tyrer, 2001). The difference from psychological distress however may be in the duration of symptoms before diagnosis. Mixed anxiety-depressive disorder is identified if symptoms persisted for four weeks or more (Ballenger, 2000). On the other hand, psychological distress in patients typically reflects symptoms of anxiety and depression experienced in a shorter time-frame such as the preceding week in order to capture the mood state during the medical diagnosis and treatment (Zigmond & Snaith, 1983). The term ‘psychological distress’ is preferred for use in the present thesis in order to concur with the nomenclature used in studies with medical patients, particularly those with cardiac conditions.

The third paradigm in the biopsychosocial framework posits a consideration of social issues relevant to the patient. The rationale is that the experience of illness and treatment occurs in a social context which envelops the patient with an environment of relationships and an orientation of who is in control of the situation. Two constructs that relate to these aspects are perceived social support and health locus of control. *Perceived social support* relates to the individual's report or perception of the level of support that she or he receives from different interpersonal relationships such as family, friends, and significant other people (Zimet, Dahlem, Zimet, & Farley, 1988). According to Cobb (1976), social support causes one to feel loved, cared for, valued, esteemed and part of a group that appreciates communication and reciprocation. Conceptually, perceived social support is not simply based on the size of one's social group which pertains to the number of relationships that one has with other people (e.g., spouse, siblings, parents, and friends) who act as agents capable of offering support and resources to the individual (Barrera, 1986). This alludes to the truism that quality may not relate to quantity. In a comparative study of friendships for example, even though friends who lived in close proximity reported higher received support than friends who were physically separated by long distances, the two groups did not differ from each other with respect to perceived social support (Weiner & Hannum, 2012). Social support is closely related to well-being. Two major functions of social support include its direct impact and buffering effect. The direct impact contributes to well-being by satisfying the need for affiliation (Maslow, 1943; McClelland, 1961). The buffering effect plays a protective role by constituting a major external resource during times of stress (Takizawa *et al.*, 2006). Therefore, the construct of perceived social support is meaningful when the intention is to gauge the therapeutic benefits of interpersonal relationships in terms of health.

Diagnosis of CAD and medical advice for CABG can be considered major stressful events in life. The stress in this case may be traced back to a number of aspects such as inadequacy and confusion with regard to information, anxiety and apprehensions related to life risk, financial implications, loss of support-lending to one's family during the period of hospitalisation and thereafter, as well as loss of time and opportunities on one's professional front. India is at the helm of a socio-demographic revolution where family size is steadily shrinking, and the quality of relationships is under strain owing to pressures of time, work, distance and resources (Berkman, Sekher, Capistrant, & Zheng, 2012; Kumar, 2011). When a cardiac patient is identified in this milieu, low or poor quality perceived social support can be considered as a risk factor for having developed the condition (De Vogli, Chandola, & Marmot, 2007). Alternatively, high perceived social support may act as a protective factor that can aid in reinstating health despite illness (Umberson & Montez, 2010). In line with this logic, perceived social support has been identified as a proxy of the individual's potential to positively encounter such a challenge and survive it. Among patients with CAD, perceived social support can assume preventive and therapeutic roles during their treatment, hospitalisation and recovery (Burg *et al.*, 2005; Lee, Suchday, & Wylie-Rosett, 2012).

In the situation of illness, the patient's experiences are thus not private, but are also witnessed and managed by the people around (e.g., family and medical personnel). They attempt to control and contain the illness through their respective expertise. Wallston (1989) classified control as being veridical (actual) or perceived (belief). The patient's perception of who controls her or his health issues is captured by the construct of *health locus of control* (Wallston, Stein, & Smith, 1994). Primarily, locus of control is concerned with the attributions (explanations) that an individual makes for events in one's life. In context of the current study, attributions pertain to one's state of health, and hence health locus of control is the specific concept in question. Locus of control was derived from the 'Social Learning Theory' which indicated that an individual develops expectancies about what factor(s) influence an event. Repeated exposure to the relationship between events and factors affecting them reinforces the expectancy, thus causing the individual to learn the expectancy and recall it in future instances (Rotter, 1954). The reinforced expectancy is generalised across events and emerges as locus of control, commonly distinguishable as internal locus of control (responsibility of self) and external locus of control (responsibility of other people and fate factors). Locus of control is relatively stable and forms the common style of attribution the individual applies for her or his experiences (Lefcourt, 1982).

Illness is an event that robs the individual of natural control over one's body, abilities, and circumstances (Toombs, 1993). This however may lead to perceptions of internal health locus of control (e.g., that one is responsible for becoming ill or that one can overcome illness), or perceptions of external health locus of control (e.g., that it was one's destiny to develop illness) (Rotter, 1966). Health locus of control moves beyond the biomedical outlook, and illustrates the dynamic intrapersonal and interpersonal nature of beliefs regarding one's health. Researchers debate about which type of locus of control is best suited for patients' well-being. The larger consensus that internal locus of control is most positive for health has been contested, as sense of control cannot be uniform across different ages, situations and cultures for instance. External locus of control may in fact induce the readiness to follow the doctor's advice (called secondary control), rather than an illusory internal locus of control which leads one to do only what one believes is right (Rothbaum, Weisz, & Snyder, 1982). Different loci of control may perhaps influence different aspects of the disease and treatment. For example, internal locus of control may increase the likelihood of exercising, while locus of control in family may reduce the stress of illness. It thus appears reasonable to explore health locus of control in patients undergoing CABG to understand the effects of different loci of control on their coping with surgery, health management, and recovery.

The rationale for investigating perceived social support and health locus of control comes from the understanding that an individual's beliefs and perceptions impinge on her or his affect and behaviour. The 'ABC model' in psychotherapy posits that an Activating agent triggers Beliefs about it, which lead to emotional and behavioural Consequences in the individual (Ellis, 1962). In the instance of patients undergoing CABG, this model implies that their perceived social support and health locus of control during the period of surgery may influence their emotional adjustment and adherence. Psychosocial variables can thus interact with the process variables during treatment and may ultimately affect health outcomes. Research that examined multiple psychosocial variables (psychological distress, perceived social support, and health locus of control) in patients undergoing CABG currently seems unavailable. The simultaneous functioning and interaction of psychosocial factors needs to be explored in terms of their influence on psychological distress, adherence, and prognosis in patients subjected to CABG.

It is pressingly imperative to test the means of addressing patients' psychosocial concerns during CABG. *Psychosocial intervention* is an approach that seeks to address patients' psychological and social issues using psychosocial methods and theories (Forsman, Nordmyr, & Wahlbeck, 2011; Smith, 2012), inasmuch as medical treatment aims to treat physiological pathology. The endeavour meets the goal of integrated care such that psychosocial aspects are supported on par with the biological paradigm. In healthcare settings, psychosocial intervention involves a range of delivery methods such as psycho-education, psychotherapy, social support, skills workshops and relaxation for the purpose of modifying beliefs, affect and behaviour among patients and caregivers (Hodges *et al.*, 2011). These techniques offer the benefit of non-invasive and non-pharmacological management of psychosocial issues. A recent review reported that patients' preference for psychological intervention was three fold that of preference for medical treatment of psychiatric conditions (McHugh, Whitton, Peckham, Welge, & Otto, 2013). Moreover, the impact of both modalities (psychotherapeutic and pharmacological) for addressing anxiety and depression has not substantially differed (Hunsley, Elliott, & Therrien, 2013; Krysta, Krzystanek, Janas-Kozik, Klasik, & Krupka-Matuszczyk, 2015). Yet, the influence is not merely on mental health but also on overall well-being. Psychosocial intervention can trigger or enhance positive physiological changes. Effective wound healing which is essential for recovery from CABG has been found to improve when participants are subjected to psychosocial intervention during the invasive medical procedure period (Broadbent *et al.*, 2012; Weinman, Ebrecht, Scott, Walburn, & Dyson, 2008). Psychosocial intervention hence presents a cost-effective and therapeutic strategy for addressing the psychosocial concerns of medical patients and for easing their physiological recovery.

A variety of psychosocial interventions can be adapted for use with patients during CABG. The choice of intervention approach depends on the psychosocial needs of patients. Psychological distress is de facto the principal issue which garners attention. Interventions that primarily target psychological distress include relaxation techniques. Relaxation is a non-invasive method to create a pleasant state of mind that is antagonistic to the negative distress state of mind (van Dixhoorn & White, 2005). Pertinently, it counteracts the repercussions of physiological hyper-arousal in psychological distress. Relaxation promotes physiological and mental calmness through regular practice. Therefore, it is useful in the situation of CABG to alleviate emotional distress and stabilise physiological stress response.

Psycho-education, facilitated by professionals who can address patients' informational and emotional concerns, perpetuates expert knowledge and assurance to handle the situation. Fear of surgery and pain, lack of understanding about one's condition and surgical procedure, and apprehension about one's future have consistently been found to determine pre-surgery distress (Fathi *et al.*, 2014). These engender learning needs for patients so that positive health cognition through education can lower their distress. Patients also encounter isolation in their experience of heart disease and their wait for CABG despite having adequate social support (Sobel, 1995). Peer support is a form of non-familial social support from an experienced patient that is meant to extend empathetic guidance to new patients (Mead & MacNeil, 2005). It would be logical to combine expert and peer elements in a tailored psycho-educational intervention. For example, contemporary drug therapy for the prevention of cardiovascular ailments in high-risk patients involves the use of a 'poly-pill' which combines pharmacological ingredients that effectively and concurrently control multiple parameters such as blood pressure, cholesterol and clotting (Dabhadkar, Kulshreshtha, Ali, & Narayan, 2011). Correspondingly, a psycho-educational programme which consolidates professional and peer perspectives is a potential poly-pill for the psychosocial well-being of patients undergoing CABG.

The scope of psychosocial intervention can extend beyond improvement in mental health. When applied in healthcare settings, Detweiler-Bedell and colleagues recommend that interventions may be so-designed as to address the co-morbidity of psychosocial problems and physiological disease. This does not simply imply the pairing of disease-specific pharmacological therapy with psychosocial support in the intervention, but suggests the benefit of equipping patients through psychosocial intervention for the self-management of their disease (adherence) whilst addressing psychosocial problems (Detweiler-Bedell, Friedman, Leventhal, Miller, & Leventhal, 2008). Just as the medical team stalls the progression of atherosclerosis in heart disease, the patient should be assisted in maintaining the remission of atherosclerosis in the long run through practising adherence to secondary prevention measures. It is however unclear whether the impact of psychosocial intervention on health outcomes is a direct influence or a function of improved mental health. The way forward is to compare different psychosocial intervention approaches in order to empirically delineate the mechanism and strength of their impact.

The measurement of the impact of an intervention must extend further than clinical investigations of medical outcomes. Patient-reported outcomes are drawing scientific interest for their ability to reflect the healthcare user's experience and satisfaction regarding care and recovery. There is no dearth in the variety of tools available for use in a range of health settings and across patient groups. Yet, their use in the process of care within the healthcare practice is nearly absent (Nelson *et al.*, 2015). Reliance on informal conversation and anecdotes seems to be the mainstay for feedback and monitoring of patients' status in current settings. Moreover, medical decisions are typically based exclusively on disease-related outcomes (Vallish *et al.*, 2015). This not only prevents the quantification of patients' psychosocial outcomes, but also avoids the transparent documentation of data which may be referred to in future. It is arguable that inasmuch as it is vital to store medical information, a record of patients' psychosocial reports can add to the vigour and longevity of biopsychosocial care. This highlights in the first place the need for patient-centred research (Dang & Vallish, 2015) that considers patients' needs (e.g., health education), gathers their feedback (e.g., report of post-treatment quality of life), and further involves them in the delivery of care (e.g., peer support).

A decade ago, the need for ‘Behavioural Cardiology’ was voiced by the research community for collaborative cardiac care (Rozanski, Blumenthal, Davidson, Saab, & Kubzansky, 2005). This empirical field, largely West-centric, has been probing the psychosocial dimensions of heart disease. The consequent findings have not only uncovered the cardiac ramifications of psychosocial vulnerabilities as discussed earlier, but have also pointed towards engaging the protective and positive potential of psychosocial resources in preventing and treating CAD (Thomas, 2006). Rozanski (2014) proposed that a principal step in translating these recommendations into clinical practice would necessitate maturation into a tiered health delivery system. For Indian hospitals, adopting the biopsychosocial perspective will serve to professionally quantify and actively intervene in psychosocial issues alongside usual medical care. Evidence-based psychosocial support ought to be built into the delivery of health services. For this, empirical Behavioural Cardiology research that transpires in the healthcare setting is indispensible, in order to demonstrate the feasibility and outcomes of such practice.

Psychosocial support in the biomedical framework can be inducted at two levels that go hand in hand, i.e., assessment and intervention. Assessment can serve to screen surgery patients for psychosocial vulnerabilities, as well as to measure outcomes from the patient’s perspective. Psychosocial intervention for patients undergoing CABG can function as a powerful means to capitalise on patients’ psychological strengths and social support during the period of surgery. These can substitute the passive use of drugs for psychological distress. Much has been propagated in support of patient-centred care, yet it is undeniable that healthcare professionals hold the responsibility of educating and training patients towards exercising an active role in health management (Salmon & Hall, 2004). Through psychosocial intervention, healthcare providers may act as enablers and guides to patients during the critical hospitalisation period. In this manner, patients may be empowered with their personal psychosocial resources for optimal self-care.

The present thesis is a scientific account of the viability, mechanism, and effectiveness of psychosocial care (assessment and intervention) that was offered to patients during the hospitalisation phase for CABG. The purpose was to provide psychosocial intervention in addition to standard hospital treatment during the surgery period, and to assess the influence of the intervention on adherence and prognosis in patients subjected to CABG. In this regard, the roles of psychosocial factors (psychological distress, perceived social support, and health locus of control) in post-surgery outcomes were also analysed to evolve integrated models for prediction of adherence and prognosis. Two types of psychosocial intervention were involved—a conventional Relaxation technique (Guided Imagery) and a specialised psycho-educational programme (Programme for Affective and Cognitive Education, with the acronym PACE) for patients of CABG, facilitated by professional and peer experts. With the prospect of gathering evidence regarding the differential impact of these two psychosocial interventions when compared to biomedical treatment (standard hospital care), in respect of adherence and prognosis after CABG, the current patient-centred study embarked.

Chapter II

Review of Literature

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In this chapter, a comprehensive literature review in the form of description and critique of concepts and empirical findings related to the topic of this study is thematically put forward. The aim is to draw up an evidence-based theoretical frame that revises the traditional reductionist view of CABG as being a biomedical procedure, and situates a biopsychosocial conceptualisation of the experiences and outcomes of surgery. In so doing, the review attempts to rationalise the need for scientific research in the areas of psychosocial assessment and intervention within healthcare. The focus is on the participation and contributions of Health Psychology for this purpose, specifically in the Indian setting. The literature considered herein largely confines to publications related to cardiac disease and invasive medical procedures from the year 2000 until date. However, where it has been meaningful to peruse a historical perspective of a concept, sources dating earlier than the year 2000 have been referred to. This review begins with a descriptive account of the nature of the disease and method in CABG, proceeds to analyse the documented trends and state of affairs with respect to the care required and offered at the levels of patients and providers, and concludes with a road map for prospective research and practice.

Need for CABG

CABG is an increasingly popular surgical procedure performed on patients with CAD. To test for the presence of CAD, the patient usually undergoes Coronary Angiography. During this procedure, a catheter (tube) is passed through the arm or groin into the arteries, under local anaesthesia (for numbness in that area), so that a dye is released and x-rays are projected to view the quantity and extent of blockages (MedlinePlus, 2015). Based on the number of blood vessels that are blocked, CAD is primarily classified as single vessel disease, double vessel disease and triple vessel disease. In addition, aspects such as the type of vessel affected (main arteries or their branches) and status of left ventricular function (normal or dysfunctional) are considered in determining the severity of CAD and its management (Boden, 2004; Shah, Faheem, Shahzeb, Rafiullah, & Hafizullah, 2013). CAD results in meagre blood supply to the heart due to blockages and manifests symptomatically as angina (chest pain) alongside perspiration, shortness of breath, dizziness, radiating pain between jaws and back, and nausea. Asymptomatic cases are also possible, resulting in late clinical identification (Beaumont Health, 2016). The condition can be likened to a two-edged sword as it may reduce individuals' engagement in their daily activities in the presence of symptoms, or may lead to fatal myocardial infarction in silent CAD.

A diagnosis of CAD entails treatment by means of medical management, Angioplasty and/or CABG. Medical management includes drugs such as anti-platelets that hinder blood clotting in arteries, statins that reduce cholesterol, beta-blockers that lower blood pressure and slow down heart rate, and anti-anginal drugs that prevent chest pain. Coronary Angioplasty is a non-surgical procedure wherein a catheter with an inflatable balloon at its end is passed into the blocked artery to widen the plaque-filled arterial walls for better blood flow. At times, stents (metallic meshes) are inserted during Angioplasty to prevent the blood vessel from further narrowing (Mayo Clinic, 2015). Among patients for whom CAD is detected in its early stages, its spread is not yet severe or surgery is unsafe, medical management and/or Angioplasty will be typically preferred by the doctor. In general, CABG is advised in the treatment of a patient who has multiple vessel blocks (double or triple vessel disease) that could lead to myocardial infarction, who has already suffered myocardial infarction, whose main coronary arteries are blocked (particularly in single vessel disease), who has left ventricular dysfunction, or whose symptoms severely compromise her or his quality of life (National Heart, Lung, and Blood Institute, 2012a; Rosengart, de Bois, Chedrawy, & Vukovic, 2008). In sum, a patient advised for CABG typically is an instance of severe or high-risk CAD that already restricts or will prospectively restrain the individual from optimally experiencing her or his normal routine. Overall, the atmosphere of diagnosis and treatment of CAD is tense, owing to the use of invasive procedures throughout (Angiography combined with Angioplasty or CABG).

Picture of CABG in India

CAD among Indians is characterised by unusual attributes such as premature age (below 55 years for men and under 65 years for women), late presentation of the disease, multiple vessel disease, left ventricular dysfunction, diffusion of blocks, and occlusion of smaller arteries. Complex surgery is the first line of treatment in such cases, making CABG a leading option. The number of CABGs performed annually in India stood at 60,000 in the 2000–2010 decade (Kaul & Bhatia, 2010; Rissam *et al.*, 2001). A media report revealed a doubling of this figure soon after, such that 1.2 lakh CABGs had been performed in the year 2013 (Chaudhuri & Jayan, 2014). Such rapid rise in CABG numbers may be traced to the growing prevalence of CAD in the country inasmuch as 7–13% in urban areas and 2–7% in rural areas (Prabhakaran & Yusuf, 2010). Medical, research, and media personnel however allege that the surge in CABG cases stems from India’s contemporary socio-economic landscape. Their claim is not unfounded. For one, the cost of CABG is cheaper than that of Angioplasty in India whereby surgery is recommended as a long-term and economical treatment option (CADI Research Foundation, 2012). Secondly, low-income groups are able to freely access surgery as the cost is being borne by state governmental health schemes in Telangana, Andhra Pradesh, Tamil Nadu and Karnataka states since the year 2007 (Yellaiah, 2013). Other factors include the increased availability and utilisation of annual health check-ups, leading to more diagnoses and overuse of surgery even when unwarranted (Iyer, 2015; Nagarajan, 2014). All of the above trends have been argued to have cumulatively transformed the presence of CABG from a rarity to an everyday phenomenon in India. Although some of the above reports were substantiated by anecdotal evidence, awareness of these matters is deemed important to fathom the psychosocial state of patients undergoing CABG.

The cost of CABG, typically being 1.5–2 lakh rupees, is a liability for the middle class household whose average annual income is in the range of 2–10 lakh rupees (Chatterjee & Laxminarayan, 2013; Padmavati, 2004; Saxena, 2010). Additionally, the annual expense incurred on drugs for stable CAD (as would be the patient's status after CABG) is estimated to be ₹5,329/- if the patient has no co-morbidities, and ₹6,496/- if the patient has co-morbid Hypertension and Diabetes Mellitus (Gupta, Prakash, & Gupta, 2005). The burden is plausibly greater considering that patients may be out of regular income during the time of surgery. In fact, the costs borne by governmental schemes too are valid for a limited period, e.g., up to a year after CABG. Financial strain as a predictor of patients' distress around the period of CABG has been clearly documented (Parvan, Zamanzadeh, Dizaji, Shabestari, & Safaie, 2013; Theobald & McMurray, 2004). The patient awaiting surgery is made vulnerable from all quarters, not least the finances. It is beyond the scope of this review to analyse suitable solutions in this regard. Nevertheless, the point being driven home is that an Indian patient who is subjected to CABG generally witnesses distress that extends farther than the procedure of surgery. There is research evidence that has pointed out that psychological distress substantially predicts the level of prognosis after CABG (Thomas, Hariharan, & Rana, 2016). The call for offering in-hospital psychological support to patients from the time of admission through to their discharge is instituted.

Procedure of CABG

In order to comprehend the situation of a patient undergoing CABG, it is helpful to grasp at the outset a fundamental sketch of the technical process of surgery. The scenario before and during CABG as well as the patient’s post-surgical status are elucidated here.

CABG necessitates hospitalisation of the patient from at least a day before surgery. Medical investigations are carried out to evaluate the patient’s suitability for CABG that would be held on the following day. The patient is required to fast for up to eight hours before surgery. On the day of CABG, the patient is wheeled into the operating theatre. An intravenous line in the arm for supplying liquids and drugs, and catheters in the neck, wrist and bladder for monitoring internal functioning as well as collecting blood samples and urine are inserted. The patient is sedated with general anaesthesia (for complete loss of sensation and consciousness) by the Anaesthesiologist who continually monitors the patient’s vital signs (hear rate, respiratory rate, oxygen saturation in blood, and blood pressure) throughout CABG. Tubes linked to a ventilator are put in through the neck to support the patient’s breathing. Incisions are made by the Cardiothoracic Surgeon in the thigh–ankle portion of one or both legs to obtain the saphenous veins that serve as grafts for the heart. The length and number of incisions depend on the quantity of grafts required.

Removal of these vessels from the leg(s) does not generally disable the patient after CABG. The internal mammary artery in the chest is also preferred for grafting as it seldom becomes blocked even years after CABG. Occasionally, the radial artery in the wrist may be used as a graft. The chest is cut open by incising into the central breastbone (sternum) so that the heart is easily accessed. The heart is stopped during the procedure, and a Heart–Lung Machine (HLM) is engaged as a substitute. The HLM performs the circulation and purification of blood to and from the rest of the body while the heart is being operated upon. Grafts obtained from the legs, chest and/or wrists are then anastomosed (sewed onto the blocked arteries). The two ends of a graft are positioned and sutured before and after the blocked area respectively on the target artery. Instead of circulating through the blocked area, the blood now travels into the new graft which supplies it to the destination without the congestion of the blocked path. In this way, the blood bypasses the block in the artery through the grafted vessel. Once it is ascertained that the grafts are functioning correctly, the patient is detached from the HLM whereby the heart automatically re-starts beating as blood flows through it. The sternum is closed with the help of wires, and the skin over it is closed through suturing. Tubes are inserted into the chest and stomach to enable the draining of fluids and blood in those areas. The duration of CABG is 3–6 hours.

The patient is moved to the ICU to spend 2–3 days. Here, the vital signs are constantly monitored and the ventilator is connected until the patient starts breathing independently. Deep breathing and coughing are encouraged to prevent mucous build-up in the chest. Initially, the patient’s diet is in liquid form and is gradually stepped up to semi-solids. When the Cardiothoracic Surgeon deems it appropriate, the patient is shifted into the room or ward. A Physiotherapist trains the patient with suitable exercises, walking, and eventually stair climbing. The patient remains in the ward or room for another 3–4 days until discharge (John Hopkins Medicine, n.d.; National Heart, Lung, and Blood Institute, 2012b; NHS Choices, 2015a). The method of surgery explained above is of the conventional on-pump CABG. With medical advancement, less-invasive methods such as off-pump CABG (wherein, the heart continues to beat and the HLM is not used during surgery) and endoscopic CABG (wherein smaller incisions suffice) are also practised. However, the traditional on-pump CABG remains widely used (Dhiren, 2010; Shekar, 2006). The rate of success for on-pump CABG is 99% (Brown University, 2000).

On returning home from the hospital, the patient is required to continue the breathing exercises and walking. The advice given with respect to medicines and dietary intake must also be strictly adhered to. In addition, the patient must steer clear of tobacco and alcohol consumption. Aggressive control of co-morbidities such as Hypertension and Diabetes Mellitus is mandated. The surgical wounds are to be appropriately cleaned, and the patient must bathe as instructed. Exertion through driving, strenuous physical activities, and desk work is to be avoided for at least six weeks. Periodic consultations (after a week, a month, and so on) are scheduled with the concerned doctor during which the patient's wound healing, symptoms, status of the heart, quality of life, and level of adherence are reviewed. Most patients experience benign discomforts such as pain in the wound and muscles, exhaustion, mood swings, difficulties in sleeping and eating, and constipation during the month after CABG. However, in the event of infections, excessive pain or redness around sutures, pedal oedema (swelling of feet) or fever, the patient is advised to consult the doctor immediately (John Hopkins Medicine, n.d.; National Heart, Lung, and Blood Institute, 2012c; NHS Choices, 2015b).

It is apparent that CABG involves sophisticated surgery, and a good prognosis after the procedure is contingent upon professional multidisciplinary participation as well as intricate skill in handling the care of the patient. CABG thus figures as a major life event for patients and caregivers.

Adherence as Foundation of Prognosis in CABG

Despite its finesse, CABG is not a cure in itself for CAD (Piscatella, 2010). It does not address the process of atherosclerosis whereby blocks are formed in the arteries, but merely re-aligns the blood circulation path. This implies that the newly grafted vessels can as well get blocked, resulting in relapse and repeat invasive treatments. Secondary prevention wherein the process of atherosclerosis is slowed down or stopped becomes the primary cornerstone of care after CABG in order to sustain the benefits of surgery (Kulik *et al.*, 2015). It may be reiterated here that atherosclerosis is a product of a multidimensional pathology that is inclusive of physiological processes (e.g., lipid content, endothelial damage, and inflammatory processes), behavioural practices such as smoking and sedentary lifestyle, and psychosocial risk factors namely stress, anxiety, depression and social isolation (Luedemann *et al.*, 2002; Pogosova *et al.*, 2015; Singh, Mengi, Xu, Arneja, & Dhalla, 2002). Remedying each of these dimensions demands the active involvement of the patient after CABG so that the progress of CAD remains halted. Technological progress in medicine can account for hospital-related convalescence. Nonetheless, the long-term success of CABG is a function of the patient's adherence to the care regimen. The pursuit of adherence is especially tricky when its components extend beyond medication consumption to say, effortful physical activity and dietary changes. Yet, adherence is the only means for patients to attain recovery and sustain the recovered state, which in the case of CAD alludes to prevention of future blockages and maintenance of quality in longevity (Esselstyn, Gendy, Doyle, Golubic, & Roizen, 2014).

Achieving adherence is evidenced to be a psycho-behavioural process. An interventional study by Zarani and others (Zarani, Besharat, Sadeghian, & Sarami, 2010; Zarani, Besharat, Sarami, & Sadeghian, 2012; Zarani, Sarami, & Sadeghian, 2014) adopted the framework of Information–Motivation–Behavioural skills (IMB) theory (Fisher, Fisher, & Harman, 2003) to assess the role of psychologically intervened information, motivation, and behavioural skills in predicting variance in the adherence behaviour of post-CABG patients. The intervention group participants were involved in a 2-hour, 5-patients-per-group programme. The control participants received the standard hospital care only, which included supportive counselling. The intervention group was given detailed information on risk factors and adherence behaviours through educational films and handouts. Motivational interviewing was used to generate a practical plan of adherence. Behavioural skills were taught through discussions regarding self-administration of medicines, smoking cessation, stress management, and active lifestyle. Assessments were conducted at the baseline and a month later for all the participants. They had to complete measures of general adherence (referring to medication only) and specific adherence (lifestyle changes specific to cardiac patients) alongside a specially developed scale that assessed their knowledge about cardiac risk and protective factors, motivation for everyday adherence behaviours, and behavioural skills to carry out the adherence behaviours. Results showed that the intervention group scored significantly higher than the control group for general and specific adherence. Further, path analysis demonstrated that for general adherence, significant paths emerged between motivation and behavioural skills as well as between motivation and general adherence, and between behavioural skills and general adherence. In case of specific adherence, significant paths were found between information and specific adherence, between motivation and behavioural skills as well as between motivation and specific adherence, and between behavioural skills and specific adherence. The findings highlighted that information and motivation can be independently associated with adherence behaviours, irrespective of behavioural skills. The greater role of motivation relative to information underscores the magnitude of psychological variables in adherence.

Healthcare providers assume that providing information about self-care components fulfils their responsibility towards their patients. However, as the World Health Organization (2003) acknowledged, information is the necessary yet insufficient basis for adherence. Motivation, which consistently was the key predictor in Zarani *et al.*'s (2010, 2012, 2014) observations, cannot be left to be fetched by patients themselves as they are already under severe emotional toll. According to another study, the intention to comply with medication in patients who had undergone CABG and were motivated to be adherent was strongly associated with the actual intake if the patients had specifically planned when, how and where they would take the medicine as well as if they had planned the strategies to avoid forgetting to take the medicine (Pakpour *et al.*, 2014). Interventions aiming to increase adherence must consequently be psycho-educational in approach, i.e., directed to be informative as well as motivation-rousing so that patients plan and follow the recommendations.

Adherence for cardiac patients involves several behavioural modifications alongside medication intake. Accordingly, the factors influencing adherence are plenty in number, broadly classifiable under intrapersonal and interpersonal categories. A qualitative report on adherence among survivors of Stroke shed light on these aspects. Patients who demonstrated low adherence reported tendencies to forget consuming their medicine, as well as to deliberately avoid taking the medicine because they felt it was not of consequence, the doctor had not fully informed them about their condition or they did not trust the doctor's prescription. Contrarily, high scorers on adherence revealed their timely intake of medicine, a clear understanding of their health condition, trust in the use of medicine, and receipt of support from family and health providers (Chambers *et al.*, 2011). Similarly, in a qualitative exploration with patients who had undergone CABG a year before, the experience of surgery and detailed communication from health professionals was found to have urged the patients to reform their lifestyles by following the doctor's recommendation. However, the time lapse from CABG, unresponsive doctors and emotional problems due to the trauma of illness had influenced patients' non-adherence (Taebi, Abedi, Abbasszadeh, & Kazemi, 2014). The two studies using patients' perspectives indicated that intrapersonal determinants of adherence pertained to patients' health cognitions and affective states. Interpersonal factors such as the level of social support from significant others as well as health professionals were perceived to be instrumental or detrimental for sustaining one's adherence. Hence, the need to professionally assess and address patients' intrapersonal factors while fostering a constructive interpersonal collaboration has been argued to be the key to promoting adherence (Martin, Williams, Haskard, & DiMatteo, 2005; Stafford, Jackson, & Berk, 2008).

Cardiac Rehabilitation: Evolution from Biomedical to Biopsychosocial

Cardiac rehabilitation refers to the professionally supervised programme designed to boost the recovery of a patient after a cardiac episode that may include myocardial infarction, Angioplasty, and/or CABG. The programme aims at training for physical fitness, and over the years has expanded to include counselling and psycho-education for patients (Heart and Stroke Foundation, 2015). In its earliest form, cardiac rehabilitation primarily targeted increasing patients' physical activity. This was found to have a pronounced impact by reducing premature mortality in cardiac patients up to 25%, albeit without significant change in the rate of re-infarction or repeat heart attacks (Balady *et al.*, 1994). Given medical and pharmaceutical advancement, the impact of cardiac rehabilitation was considered modest when compared to the quick gains provided by high-success and low-risk surgery in conjunction with potent cardiac drugs. However, with heart disease remaining the leading cause of mortality worldwide till date and with healthcare becoming interdisciplinary, the impression that medico-pharmacological care is the single most effective strategy to manage CAD has been contested (Bath, Bohin, Jones, & Scarle, 2009; Mampuya, 2012). The World Health Organization (1993) insisted that cardiac rehabilitation had to be facilitated by a multidisciplinary team as a holistic intervention for all cardiac patients to reverse the pathological influences of their physical, mental, and social conditions so as to improve their overall quality of life.

Of interest is a meta-analytic review by Dusseldorp and others which categorically evidenced that intervention programmes which had not lessened emotional distress could not consequently reduce the rate of cardiac deaths and the recurrence of myocardial infarction (Dusseldorp, van Elderen, Maes, Meulman, & Kraaji, 1999). The current-day cardiac rehabilitation programme, as a result, has grown to be inclusive of evidence-based assessment, exercise training, dietary guidance, control of Hypertension, Diabetes Mellitus, weight, cholesterol and smoking, and psychosocial intervention (Kulik *et al.*, 2015). This transition in cardiac rehabilitation programmes, as will be explored next, reveals the biopsychosocial dynamics of adherence in cardiac self-care and further asserts the need for psychologically steeped assessment and intervention.

Cardiac rehabilitation programmes have been successfully prevalent in the West for over five decades, yet are nearly unheard of in India to date. Currently, there are around 50 cardiac rehabilitation centres in the country. In general, these are situated in private hospitals of metropolitan cities and require out-of-pocket payment. The modules confine to exercise training and nutritional counselling, catered by physiotherapists, dieticians and nursing professionals (Kulik *et al.*, 2015; Madan *et al.*, 2014). Such trends paint a dismal picture for India which is the highest contributor to the world's heart disease burden, and where the primary cause of mortality is cardiac disease (Goyal & Yusuf, 2006; Patel *et al.*, 2011). The probable reasons for the sparse availability and uni-dimensional structure of cardiac rehabilitation in the sub-continent may be limited resources, and pertinently the lack of diverse professional engagement in the healthcare system.

It is worthwhile to consider the few studies that have tested the practice of cardiac rehabilitation in India. A 5-day exercise-based rehabilitation programme administered to 15 patients who were admitted to a rural hospital for myocardial infarction was found to normalise the heart rate and blood pressure better and faster when compared with 15 control patients by the time of discharge (Babu, Noone, Haneef, & Narayanan, 2010). The study, although limited in its sample and areas of intervention, highlighted the feasibility of economically and non-invasively rehabilitating cardiac patients in a rural centre. Another programme aimed for the reduction of risk factors, modification of lifestyle, and practice of home-based aerobic exercises. Quality of life was measured through Short Form–36 (SF-36) at the time of enrolment and three months after the intervention. It was found that quality of life had significantly improved from the baseline for the intervention group compared with the controls (Milton, Maiya, & Kumar, 2008). The use of the SF-36 questionnaire alone however did not provide evidence on whether the intervention had served the originally identified goals of adherence to exercise, risk factor reduction, and lifestyle modification after the programme. The enhancement in quality of life could have been confounded by aspects not measured. Comprehensive assessment is essential to estimate the efficacy, workings, and cost-effectiveness of any intervention. Rajendran, Manoj, Karthikeyan, and Davis (2004) reported the use of a multifaceted programme at a private Indian hospital involving a number of modules and outcome measures. The project was entitled ‘DREAM’ to represent its intervention in the areas of ‘Diet, Relaxation, Exercise, Attitude and Motivation’ for 74 patients who had undergone CABG. The programme provided dietary guidance through counselling, handouts, and audiovisual presentation. Relaxation was taught through techniques of breathing, visualisation, and meditation that were to be practiced daily. Patients were trained in graded walking and exercises aimed at preventing pedal oedema and joint stiffness as well as enhancing lung function. For the attitude component, the facilitators aimed to change negative behavioural tendencies related to smoking, worries, anger, alcoholism, short temper, and anxiety or hurried nature. As regards motivation, the programme involved follow-ups every fortnight to offer patients reminders and clarify any doubts. Three months after the DREAM intervention, results revealed significant improvement in outcomes (i.e., levels of fasting blood glucose, total cholesterol, triglycerides, waist-to-hip ratio, body mass index and functional capacity) compared with the pre-operative values of the same. Interestingly, there was no exploration of the patients' psychological status. While the findings allude to the achievement of desired goals, these are limited by the design and execution. Firstly, the absence of a control group prevents a conclusive inference whether the positive changes observed were due to the concurrent surgical and medical treatment or exclusively because of the said intervention. Moreover, it is unclear as to whether there was involvement of a psychologist in facilitating the various components of the DREAM programme, particularly since the authors were doctors and physiotherapists. The non-involvement of psychologists remains a major shortcoming in most cardiac rehabilitation ventures (Bath *et al.*, 2009). The facilitation of psychological modules such as relaxation and counselling by non-psychologists can equate to imparting pseudo-remedies.

The services of mental health professionals in cardiac rehabilitation are indispensible for meticulous assessment as well. In one study (Sharif, Shoul, Janati, Kojuri, & Zare, 2012), a sample of 80 patients who had undergone CABG was equally and randomly allocated to the cardiac rehabilitation group and the control group respectively. Cardiac rehabilitation comprised bi-weekly sessions of education (regarding nutrition, weight management, stress control, and smoking cessation), exercise training, and relaxation. The modules were developed and/or facilitated by doctors, mental health nurses, and sports medicine specialists. The control group received a general pamphlet containing advice on diet, physical activity, and medication adherence. Based on the data collected through the use of State-Trait Anxiety Inventory (STAI) and Beck Depression Inventory, anxiety and depression were found to steadily reduce across time in the whole sample. Significant difference was noted between the groups in terms of post-intervention depression (up to two months after intervention), but not in case of anxiety. The benefits of the programme cannot be convincingly inferred given that the outcome measures were restricted to merely two psychological parameters (anxiety and depression), without consideration of other dimensions such as adherence which could also have been measured by a self-report scale. While the intervention was multidimensional, the assessment was rudimentary. Further, of the two aspects measured, anxiety was not found to significantly improve with intervention. The only psychological component of the programme was relaxation, possibly administered by the mental health nurses. The lack of intensive psychological support that can modify cognitions and behaviours along with affective states may have produced the conflicting results. These shortcomings reiterate the importance of the inclusion of psychologists for exhaustive assessment and intervention.

The participation of psychologists pertinently exerts the advantage of theoretical grounding for interventions used in cardiac rehabilitation. For instance, although the efforts of various researchers to popularise cardiac rehabilitation through the years have been well-placed, attendance in cardiac rehabilitation itself was low (30–50%) and seldom sustained (Balady *et al.*, 2011; Colbert *et al.*, 2015; Madan *et al.*, 2014). However, theories of Health Psychology were found to resolve this challenge. For instance, Wyer *et al.* (2001) applied Ajzen's (1991) Theory of Planned Behaviour (TPB) to create and uphold interest among patients with regard to a cardiac rehabilitation programme. In their sample of 87 participants who were hospitalised for myocardial infarction, 43 patients were randomised to the experimental group and 44 acted as controls. Letters addressed to the experimental group were scripted based on the principles of TPB (attitude, perceived subjective norm, and perceived behavioural control). The initial invitation letter stated that attending rather than not attending would lead to quicker and better recovery (attitude), that health professionals would deem it wise for a patient to attend the programme (perceived subjective norm), and that the patient's efforts would largely determine the success of such rehabilitation (perceived behavioural control). The control participants did not receive any letter. This was followed by the standard hospital formality for both groups wherein a nurse met all the patients for routine assessment and offered an invitation to the cardiac rehabilitation programme. The authors found that a significantly higher number of participants from the experimental group rather than the control group had enrolled in the programme. The authors provided a second letter to the experimental group to reinforce these participants' decision to join the programme. Based again on TPB, this letter encouraged participants by stating that their attendance would prompt recovery (attitude), would match the expectations of health professionals who strongly recommend cardiac rehabilitation (perceived subjective norm), and would help them make personal choices that would aid their rehabilitation (perceived behaviour control). As a result, significantly more number of participants from the experimental group than the control group attended the programme. The findings highlight the significance of generating the motivation to enrol and the will to attend intensive programmes such as cardiac rehabilitation. However, since no neutral letter of invitation was provided to the controls, it is difficult to pinpoint whether the framing of the experimental letter in accordance with the principles of TPB, or the presence of the letter itself had prompted the motivation and will. Further, participants from the control group had similar adherence rate (6–7 weeks) to the programme as the experimental group. The design thus falls short due to the absence of a placebo letter for the control group. Multi-group research designs can be enlightening with respect to the mechanism of the intervention. A recent study (Mosleh, Bond, Lee, Kiger, & Campbell, 2014) involved a factorial design such that there were two control groups, one that received a standard invitation and another which received the standard invitation along with a supportive leaflet providing information about what the cardiac rehabilitation schedule would include. In addition, there were two experimental groups, one which received a letter based again on Ajzen's (1991) TPB, and a second group which received this letter followed by the supportive leaflet. Results pointed out that the TPB-based letter rather than the standard invitation significantly improved attendance to the programme, regardless of the presence of the supportive leaflet. This study, unlike Wyer *et al.*'s (2001), visibly demonstrated that the content of the theory-based letter rather than the details of the programme (given in the supportive leaflet) was responsible for the increased attendance to cardiac rehabilitation. However, the continued adherence to the multi-session programme was not measured. Nonetheless, both the investigations underlined the benefits of motivating patients so that they chose to participate in cardiac rehabilitation.

Some research groups have published, a priori, the protocols for their ongoing intervention with cardiac patients, by giving details about the theory-guided components. One study (Rajati *et al.*, 2013) has chosen Bandura's (2001) framework of Social Cognitive Theory (SCT) for promoting physical exercise among patients with Heart Failure. According to SCT, the uptake and practice of a said behaviour is dependent upon the belief that one can undertake that behaviour (self-efficacy) as well as the belief that the particular behaviour will lead to a positive change (outcome expectation). In order to enhance these two perceptions, one-on-one education sessions and focus groups have been planned to enable patients to learn and discuss the possibilities, extent and advantages of exercising. The authors conjectured that these forums will dispel myths and resolve barriers to undertake and practise physical exercise. Another research investigation (Sher *et al.*, 2002) aiming to improve adherence through harnessing the relationship between cardiac patients and their respective partners has adopted Ryan and Deci's (2000) Self-Determination Theory (SDT) and Prochaska and Velicer's (1997) Transtheoretical Model (TTM). SDT proposes that behaviour can be enhanced if it is supported by intrinsic motivations of autonomy, competence, and relatedness. The study has aimed to incorporate sessions wherein couples are guided to adopt a relationship that supports the other to autonomously practise adherence. TTM argues that decisional balance (comparing pros and cons) is an essential component in the process of contemplating, preparing, and acting for behaviour change. In the study, decisional balance is consistently monitored to check for the nature of perceptions regarding exercise among patients. These principles are also being inculcated in the intervention with the couples groups (five couples and therapist) as they discuss about physical activity, diet, medication adherence, and general rehabilitation. The therapist moderates the discussion through the approach of Cognitive Behavioural Couples Therapy (Baucom, Shoham, Mueser, Daiuto, & Stickle, 1998) which aims to remedy the dysfunctional cognitions and behaviours in the relationship. A comparison group consisting of individuals without their partners (10 patients and therapist) would incorporate the discussion of issues such as physical activity, diet, medicine adherence, and general rehabilitation. While the applied efficacy of Rajati *et al.*'s (2013) and Sher *et al.*'s (2002) studies is yet to be established, it may be inferred that the comprehensive background of theoretical concepts has afforded them the opportunity to judiciously plan the intervention modules for specific goals through specific means.

Regardless of increasing comprehensiveness, the principal limitation of the cardiac rehabilitation protocol is that it commences, in general, after the event of CABG or hospitalisation. The pre-surgery, peri-operative and in-patient contexts, as will be discussed in the following sections, are densely challenging situations for the patient to independently cope with. It will become evident thereafter that any intervention must begin before CABG or at the time of admission to exert prophylactic effects through consistent biopsychosocial support and monitoring.

Psychosocial Influences on Experiences and Outcomes of CABG

CABG, like any surgery, can be understood as entailing a psychological invasion of the patient’s space and being. The decision, setting, duration, magnitude, expectations, and outcomes of surgery are imposed upon the patient (Whitsitt, 2009). A number of psychosocial variables naturally come into play for a patient undergoing surgery. In empirical research, the conceptualisation of these psychosocial entities must be on par with the scientific description of the bio-physiological nature of surgery. For, if CABG attempts to remedy the bio-physiological pathology, it is as vital to scientifically strategise about and intervene with the psychological disruption such surgery brings on. In their review, Hemingway and Marmot (1999) described that a measurement which identifies a possible relationship associating psychological phenomena with social environment and pathophysiological changes amounts to a psychosocial factor. This plainly sets down that the psychosocial factor must be quantifiable, psychologically defined, affected by social circumstances, and capable of altering bodily processes. Further, psychosocial factors were considered as taking effect either through direct influences on physiological processes, or secondarily through other variables that affect health. These guidelines are used herein to critically appreciate the role of psychosocial factors in CAD and CABG.

One review (Rosenberger, Jokl, & Ickovics, 2006) examined 29 studies that reported about the effect of psychosocial factors on the outcomes of various types of surgery (cardiac, orthopaedic, gynaecologic/urologic, gastrointestinal, and transplant).

The psychosocial aspects that were included were mood (e.g., anxiety, depression, perceived stress), attitude (e.g., locus of control, self-efficacy, optimism), social support (e.g., social activity, social isolation), coping (e.g., active and passive, information seeking and distracting), and personality (e.g., neuroticism, extroversion, ego strength). For surgery outcomes, pain and need for analgesics, surgical procedure and complications, duration of hospital stay, return to work and normal life, and clinical as well as self-rated physical recovery were considered. The findings showed that 40% of the identified surgical outcomes were predicted by mood such that negative mood states hindered recovery. Attitudinal factors predicted 64% of surgical outcomes, with the best prediction seen for return to normal life activities. Social support could explain 25% of surgical outcomes, particularly relating to physical recovery and survival in the long term. This was evidenced by all studies of cardiac surgery that were included by the reviewers. Coping was investigated by only five of the 29 studies, of which two reported significant impact on outcomes. With regard to personality, no conclusive findings were observed as only neuroticism was associated with poorer self-reported outcomes in urologic surgery. By and large, mood, attitudinal and social support variables stood out as fitting psychosocial predictors of cardiac surgery outcomes. Future investigations ought to expand these findings in terms of potential inter-relationships between psychosocial factors and their combinatorial impact on surgical outcomes.

Studies specific to CAD and CABG too have replicated the impactful role of the aforementioned psychosocial factors in patients' well-being. In the domain of mood, psychological distress which collectively refers to anxiety and depression was found to be prevalent and affecting patients' coping and recovery during the CABG period (Kop & Ader, 2006; Moser & De Jong, 2006; Russ *et al.*, 2012). Health locus of control has been principally investigated under attitudinal measures owing to its close association with health behaviours and re-uptake of normal life activities (Bergvik, Sørlie, & Wynn, 2012; Leong, Molassiotis, & Marsh, 2004). Perceived social support has been recognised as a major contributor to patients' emotional state during invasive cardiac procedures (Chivukula, Swain, Rana, & Hariharan, 2013). In light of the above trends, the following sections evaluate the characteristics and functions of anxiety, depression, health locus of control, and perceived social support in context of CABG.

Anxiety and Depression: Psychological Reactions to CABG

An observation widely attested is that the surgery patient naturally tends to encounter bewilderment, lack of control, loneliness, pressure, and fear (Norlyk, Martinsen, & Dahlberg, 2013; Parvan *et al.*, 2013). In context of CABG, these feelings intensify because the body's lifeline organ—the heart—is in question (Piscatella, 2010). Psychological distress in the form of anxiety and depression becomes the norm in this overwhelming situation.

Anxiety characteristically emerges as a response to oncoming threat so that the individual is made alert to safeguard herself or himself against the unpredictable outcome of the encounter with the threat. Evolutionarily, such autonomic arousal served to maximise survival (Bateson, Brilot, & Nettle, 2011). In contemporary healthcare however, the anxiety-provoking threat (e.g., surgery) is in fact a requisite for survival. Anxiety thus can dampen the patient's constructive perception of surgery. Research investigations have consistently identified the presence of anxiety in patients undergoing CABG. McCormick, Naimark, and Tate (2006), in their study on 42 patients who were awaiting CABG in the near future, found that 72% of patients showed moderate to severe levels of anxiety on a single item visual analogue scale. The use of such a scale however lacks clarification if the respondents had perceived anxiety in the same way as the investigators had operationalised. In another study (Ebadi, Moradian, Feyzi, & Asiabi, 2011), 93 patients had received the advice for CABG after their diagnostic Angiogram. Patients were then asked to fill in the Hospital Anxiety and Depression Scale (HADS), 10 hours after their Angiogram. It was found that 44% of patients had borderline anxiety while 12% had definite anxiety. Whether the patients' anxiety was related to the invasive procedure of Angiogram, the diagnosis of heart disease, or the requirement of CABG is ambiguous. The only known Indian study related to prevalence on psychological distress prior to and following CABG (Chaudhury *et al.*, 2006) involved 30 patients. Findings, based on HADS scores, indicated that 43% of patients demonstrated definite anxiety a day before CABG while 37% had anxiety even a week after surgery. The three studies cited above substantiate the certainty of the anxiety experience, from the time one is given the advice for CABG. The low sample sizes however question the generalisability of the high occurrence of anxiety (up to more than half of the sample).

Larger investigations have observed that pre-CABG anxiety is, at best, modest. For instance, severe anxiety assessed on STAI was found in only 5% of 240 patients (Koivula, Paunonen-Ilmonen, Tarkka, Tarkka, & Laippala, 2001). In a study on 184 patients who were enlisted for CABG, 92% had minor anxiety (on HADS) which normalised six months after surgery (Murphy *et al.*, 2008). The mean anxiety score in another study on a sample of 187 patients (Douki *et al.*, 2011) which had used STAI as an assessment was 38 ± 9.95 for pre-surgery state anxiety and 32 ± 9.40 for post-surgery state anxiety, on a scale of 20–80. Furthermore, 58% of patients showed low anxiety pre-operatively and 62% of patients had low anxiety post-operatively. Interestingly nonetheless, anxiety scores before and after CABG were found to be significantly correlated. The results altogether imply that anxiety is prevalent and bears prognostic relevance although its symptoms may not account for clinical significance and diagnosis.

Anxiety has been recognised as an independent risk factor for CAD. The intensity of symptoms related to anxiety and stress—sweating, palpitations, and rapid breathing—through the activation of the sympathetic nervous system adversely affects cardiac function (Hocaoglu, Yeloglu, & Polat, 2011). The presence of anxiety in healthy individuals has been associated with the risk of CAD and cardiac death (Blumenthal & Smith, 2010). Further, patients whose Angiogram results were abnormal were noted to concurrently have higher anxiety scores in comparison with those whose Angiogram revealed normal cardiac activity, despite both the groups sharing similar socio-demographic features and risk factors (Sunbul *et al.*, 2013). This suggests that being an anxious individual can lead to poor cardiac health. Trait anxiety seems to surface as a cause. It refers to a relatively stable disposition that leads one to perceive most stimuli as threats (Gidron, 2013). A longitudinal follow-up study hinted at the relevance of trait anxiety in cardiac surgery. An above-average score on trait anxiety before surgery had a significant impact on mortality over four years after cardiac surgery. Trait anxiety score even six months after discharge had a significant association with re-hospitalisation (Székely *et al.*, 2007). These findings restate the prognostic importance of anxiety for the cardiac well-being of healthy as well as diagnosed persons. However, it may not be feasible to trace the effects of trait anxiety before the diagnosis or presentation for surgery among patients already identified with CAD. Instead, state anxiety which identifies tension and arousal in a specific situation

(Endler & Kocovski, 2001) can be more informative in prospective research study designs.

State anxiety in patients with cardiac disease or those undergoing CABG could be a purely circumstantial outcome resulting from the perceived imminence of death or high-risk surgery (Hocaoglu *et al.*, 2011). Even so, the impact of state anxiety reaches farther than prolonging the negative mood state. It exerts effects concomitantly and in the long term, as evidenced across empirical investigations. Douki *et al.* (2011) found as expected that anxiety was significantly and negatively associated with the mental health dimension of quality of life, pre-operatively and post-operatively. Additionally, anxiety that was re-assessed 18 months after CABG was significantly and negatively associated with the physical functioning dimension in addition to the mental health dimension of quality of life. In another study (Rosenbloom, Wellenius, Mukamal, & Mittleman, 2009), a significant dose-response relationship was identified between anxiety and adverse cardiac events. According to this finding, a 10-point rise in anxiety score on the STAI assessment predicted an increased risk of mortality or myocardial infarction by 24%. The study however did not find a significant relationship between anxiety and the progress of atherosclerosis in the grafted vessels, which prevented the explanation of the process by which anxiety had predicted cardiac fatalities. It must be noted nonetheless that there was no report on whether atherosclerosis itself was significantly associated with the events of mortality and myocardial infarction. As the authors conceded, anxiety may have acted through alternative underlying pathological processes (e.g., hyper-activation of catecholamine production) or health risk behaviours (e.g., tobacco consumption) that can similarly trigger death and morbidity. Overall, the link between anxiety and adherence is not conclusive, although there seems to be a trend of low exercise adherence, overuse of medications and less stress reduction in the presence of anxiety (Dunbar-Jacob, Gemmell, & Schlenk, 2009; Kuhl *et al.*, 2009). Plausibly, anxiety can prompt individuals to be hyper-vigilant, whereby they would consume excess drugs even when they experience mild symptoms and would avoid physical activities with the apprehension of aggravating the disease condition. In view of the association between anxiety and poor outcomes in recovery and quality of life, the potential for anxiety to inhibit well-being through direct influence or intermittent variables merits exploration in further research.

Depression too assumes a dynamic trajectory in context of CABG. Heart disease and depression are so closely linked that each can be a precursor or successor to the other. For instance, Type D personality, characterised by the propensity for negative affect across situations and the inhibition to express such affect in social contexts, has been linked time and again with the development of heart disease as well as poor health outcomes in diagnosed cases (Denollet & Conraads, 2011; Tulloch & Pelletier, 2008). This sets the need for psychological assessment and intervention in routine medical protocols, so that predisposition in vulnerable patients does not necessarily culminate in cardiac adversities that may be avoidable.

Depression may also emerge as an outcome of the experience of illness and surgery. Prior to CABG, the occurrence of depression is relatively lower than anxiety, and the trend reverses soon after. In Chaudhury *et al.*'s (2006) report on a sample of 30 patients, 30% experienced definite depression as against 43% who were found to have anxiety. Nonetheless a week after CABG, 40% of patients presented depression including those who had showed pre-operative depression, while a reduced 37% of the sample had anxiety. Murphy *et al.* (2008) detailed on three observations with regard to depression and anxiety in patients undergoing CABG. The majority 72% of their patients had minor depression before surgery which reduced by six months after surgery. Another 14% of the sample initially had severe depression that remitted within six months after surgery. The final 14% of patients had minor depression which aggravated by six months post-operatively. A larger majority of patients (92%) had minor pre-operative anxiety which declined by six months after surgery. The remaining 8% of the sample had major pre-surgery anxiety which however remitted in the post-operative assessment. The results cumulatively suggest that the occurrence of depression in patients before CABG is overshadowed by that of anxiety although the impact and longevity of depression is more severe.

The determinants of depression in patients subjected to CABG range from the increased inflammation during surgery to the status of the patient after surgery. Non-medical factors such as problems of finance and loss of labour days may also trigger depression. Emerging evidence has identified inflammatory processes as underlying the depressive symptoms. The use of the HLM during CABG is found to prompt the body's defensive inflammatory response which is conducted by proteins called cytokines. Across infections, elevated inflammation is known to manifest as negative symptoms such as reduced appetite, lethargy and nausea which constitute 'sickness behaviour'. This sickness behaviour seems to aggravate into depression when inflammation is intensive (as may be the case with CABG when the external HLM takes over the body's circulation), or when the individual's stress response mechanism of the corticotrophin-releasing circuit is hyper-sensitive (Dantzer, O'Connor, Freund, Johnson, & Kelley, 2008). Accordingly, Steptoe and colleagues observed that definite depressive symptoms found in 20% of their patients a year after CABG were significantly correlated with the concentration of pro-inflammatory cytokines found 1–3 days after surgery (Steptoe *et al.*, 2015). The bi-directionality of the inflammation–depression relationship has also been evidenced. Higher depressive symptoms before CABG was observed to be statistically associated with lengthier post-surgery hospital stay through the mediation of the higher concentration of inflammation indicators, e.g., C-reactive protein response. In comparison, having no depressive symptoms before surgery was not associated with longer in-patient stay (Poole *et al.*, 2014). While yet to be confirmed, the consensus seems to be that inflammation is a common cause for depressive symptoms and unfavourable cardiac outcomes.

A counter-argument would challenge why merely 20% of patients with a history of CABG in Steptoe *et al.*'s work (2015) showed the inflammation-induced depression. Indeed, these patients may have been vulnerable on account of an overactive stress response mechanism. Yet, there is suggestion from another research group that the impact of stress can be successfully mitigated through psychological therapy. Consider for instance the use of a multi-component psychological intervention (Thornton, Andersen, Schuler, & Carson, 2009) targeting the reduction of stress and emotional distress, along with the improvement of social adjustment, treatment adherence and health behaviours for patients with recent diagnosis of breast cancer. By four months, there were indeed significant positive changes observed with reference to anxiety, dietary habits, smoking, perceived social support, immunity and depression. Furthermore, mediation analyses highlighted that the impact of the intervention on white blood cell count (a marker of inflammation) was conducted through depressive symptoms. This meant that the intervention had a direct influence on psychological symptoms and an indirect effect on inflammation. The conclusion drawn was that the psychological intervention could influence physiological processes by minimising depression. The reverse causal direction was also not denied for lack of evidence. It was therefore possible that inflammation processes had been changed by the intervention whereby the concurrently occurring level of depression had also changed. This explanation can be extrapolated for the CABG situation too. For example, pain and physical discomforts arising after surgery deprive the patient for up to three months of normal life routine. Depressive symptoms can then be a direct outcome of the post-surgery status of the patient, if these perceptions of trauma persist (Pietrzyk, Gorczyca-Michta, Michta, Nowakowska, & Wożakowska-Kaplon, 2014). Be it direct or indirect, the benefit of psychological support in the process of regaining one's physical and mental health can no longer be denied.

The impact of depression on patients' prognosis following CABG is a robust phenomenon. Depression confers immediate disadvantages such as lengthier hospital stay as well as long-term repercussions namely slower and poorer recovery (Poole, 2013). The key tendency towards loss of interest that is engendered by depression prevents the patient from actively adopting positive behaviours such as rigorous adherence to medication and exercise which are indispensible to maintain satisfactory cardiac health (Khawaja, Westermeyer, Gajwani, & Feinstein, 2009). One study used continual in-hospital assessment of depression to explore its evolving association with adverse outcomes after CABG. A group of 72 patients were assessed two days after extubation (removal of tubes) following surgery, during discharge from hospital, and six weeks after discharge. Those who reported higher scores on depression in the two days after extubation had significantly lower scores at the time of discharge on the mental and physical health dimensions of quality of life, lower perceived recovery, lesser perceived control over one's condition, and reduced walking distance than patients with lower depression scores. High scorers on depression at the time of discharge similarly showed the sustenance of lower levels of perceived recovery and perceived control. In addition, these patients had a 4% higher likelihood of developing infections by six weeks after discharge. This trend remained so even after adjusting for known risk factors of wound infection namely, obesity, Diabetes Mellitus and higher age that usually hinder healing (Doering, Moser, Lemankiewicz, Luper, & Khan, 2005). Depression therefore acts upon behavioural and physiological components in recovery. The study rightly provides an insight that if assessment is feasible throughout the period of surgery, so is intervention which can re-model the prognostic course of patients from maladaptive to facilitative. Based on the aforesaid findings across studies, it may be proposed that the psychological intervention before and after CABG should be able to cognitively and affectively immunise patients against the possible development of depression. This positive psychological state in turn can keep a check on inflammatory responses that then feed back into sustaining the lowered depression as well as the recovered cardiac health.

The universal prevalence of anxiety and depression in medical patients has led to the recognition of the unified concept of psychological distress which signifies the combination of both emotional states. It may be recalled that anxiety and depression had generally presented below clinical significance in a majority of patients undergoing CABG (Chaudhury *et al.*, 2006; Douki *et al.*, 2011). Yet, the impact on prognosis and quality of life remained sizeable (Rosenbloom *et al.*, 2009; Doering *et al.*, 2005). Moreover, the wide use of the self-report instrument, HADS, across healthcare settings to simultaneously measure anxiety and depression has tendered the possibility of identifying global psychological distress on the same scale. In fact, there is evidence that the unitary factor structure in HADS is as psychometrically sound as its two-factor structure across chronic health conditions (López *et al.*, 2012; Martin, Tweed, & Metcalfe, 2004; Nowak *et al.*, 2014; Schönberger & Ponsford, 2010). This emerges from the consistent significant correlations being observed between anxiety and depression scores on HADS. Further, the concomitant presence of certain symptoms of both affective conditions without each being independently significant can nevertheless have a cumulative effect on health outcomes, making overall distress scientifically relevant for diagnosis and intervention (Pallant & Tennant, 2007; Roberts, Bonnici, Mackinnon, & Worcester, 2001). Identifying overall psychological distress alongside the categories of anxiety and depression may be valuable to demarcate the unique and amalgamated roles of these mood states, with and without psychological intervention, in the course of adherence and prognosis in patients undergoing CABG.

Health Locus of Control and Perceived Social Support: Scaffolds of Cardiac Health

With the growing pandemic of chronic illnesses, the management of which demands behavioural efforts at the self-care level, research interest in tapping into patients' beliefs has strengthened. This vantage point seeks an understanding of the patient's concept of illness and its characteristics so that the individual's behaviour in illness management can then be predicted (Weinman & Petrie, 1997). One such example is the health locus of control. It is an off-shoot of locus of control, and provides information on the type of attributions one makes for one's health and illness. The construct arose out of the evidence regarding the causal influence of an individual's belief of control (more than having the control itself) on behaviour (Shapiro, Schwartz, & Astin, 1996).

Primarily, two sources of attributions are recognised with respect to locus of control—internal and external. Internal locus of control is relevant when an individual believes that one's own thoughts and actions are responsible and are in control of causing and altering the situation. External locus of control is based on the belief that aspects outside oneself cause and control the situation. In context of health, the general conception proceeds that internal locus of control is beneficial for optimum health management since the person takes charge. External locus of control, on the contrary, may foster an understanding that regardless of one's behaviour or lifestyle, one's health is pre-determined by other persons or forces (Burish *et al.*, 1984). In referring to health locus of control, the external source has been further classified into powerful others (i.e., doctors and significant others) and chance (i.e., supernatural and serendipitous elements), in order to distinguish factors that are closely related to one's health such as medical professionals and family members from putative chance factors that are ambiguous and not measurable yet form a major component in one's belief system (Wallston *et al.*, 1994).

The predictive value of health locus of control with reference to health behaviours has been demonstrated to be significant in the healthy population. One multi-centre study (Steptoe & Wardle, 2001) assessed a range of health behaviours among 7,115 European young adults. Logistic regression analyses showed that when age, sex, country, chance beliefs and powerful others beliefs were controlled, high internal locus of control was associated with 60% of the positive health behaviours measured, viz., regular exercise, regular breakfast, daily brushing of teeth, intentional fibre consumption, no extra salt addition and avoidance of fat intake. On the other hand, high scorers for chance locus of control were prone to smoking, unrestricted alcohol consumption, irregular breakfast habits, reduced consumption of fruits and fibre, and lesser avoidance of fat intake. Those with high powerful others locus of control showed daily fruit consumption and restricted alcohol consumption, yet simultaneously were less likely to regularly exercise, brush their teeth, wear a seatbelt and reduce their salt ingestion. These findings did not change even with the addition of a measure of health value, i.e., the self-rated significance of health for oneself. The study confirms the association between different sources of attribution and positive as well as negative health behaviours. Despite involving a large cross-country sample, it lacked sophistication on account of no insight into the nature of association (e.g., causal or intermediary) between locus of control and health behaviours. Moreover, as the measurement of health locus of control and health behaviours was concurrent, positive reporting bias and redundancy in measurement cannot be refuted. Rather, a follow-up of health behaviours would have been appropriate.

Health locus of control appears to influence motivation which in turn affects the behavioural intention, as revealed by the findings of Hagger and Armitage (2004). They explored this trajectory in the area of physical activity with a sample of 1,198 adolescents. In addition to assessing locus of control (internal, powerful others, and chance), the study used measures of perceived locus of causality and Ajzen's (1991) TPB concepts. Unlike locus of control which measures who or what controls an event, perceived locus of causality (Ryan & Connell, 1989) concerns with how a source causes the event. It includes four dimensions such as intrinsic motivation (that one exercises because it makes one happy), identified regulation (that one exercises because it helps one stay healthy), introjected regulation (that one exercises because one will feel guilty if one does not) and external regulation (that one exercises because others think that one should). The variables of TPB that were examined in the study were intention (that one plans to exercise), attitudes (that exercising will benefit one's health or not), subjective norms (that close relatives want one to exercise), and perceived behaviour control (that one has control over actually doing exercises or not). Based on the results of structural equation modelling, internal locus of control was found to have the strongest positive influence on attitude and intention for physical activity through the mediation of intrinsic motivation. Less strong yet significant was the finding that powerful others locus of control was a significant predictor of external regulation which further was a negative predictor of attitude and intention, suggesting that higher external regulation by powerful others was predictive of lower personal attitude and intention for engaging in physical activity. Additionally, chance locus of control was a negative predictor of intrinsic motivation which sequentially had a positive association with intention, indicating that chance beliefs could reduce the intention to exercise on account of low personal motivation. The results may seem obvious without suggesting any new trend. That these intricate findings were significant nonetheless corroborates that locus of control is a valid construct influencing and capable of predicting intentions for behaviour. Perhaps, including an assessment of actual behaviour either as a self-report or an observational checklist would have been informative about the mechanism associating locus of control and actual behaviour.

Research on locus of control in chronic illness has distinguished some dominant trends in the functionality of its types. For aspects which required patients' participation such as following general preventive health behaviours and adherence behaviours as applicable in Hypertension and Diabetes Mellitus, high internal locus of control was found to be suitable. However, aspects wherein patients had the least involvement in the outcomes such as for terminal illness, external locus of control was considered to be advantageous for reducing distress (Burish *et al.*, 1984; Morowatisharifabad, Mahmoodabad, Baghianimoghadam, & Tonekaboni, 2010; Omeje & Nebo, 2011; Wallston & Wallston, 1978; Wu, Tang, & Kwok, 2004). In case of heart disease too, similar findings have been replicated. For instance, patients hospitalised with Heart Failure had the highest locus of control in powerful others, patients admitted for CABG who had low levels of depression had high chance locus of control, and individuals who had successfully returned to work after coronary revascularisation procedures had high internal locus of control and low powerful others locus of control (Bergvik *et al.*, 2012; Hiatt, 2009; Rydlewska *et al.*, 2013). It may be generally inferred from the above that the types of locus of control serve different functions at different time-points and in different situations. The underlying implication in empirical literature is that a successful association between locus of control and stress reduction is not simply about having internal locus of control. This however may be counterproductive in case of patients undergoing CABG. For instance, high chance locus of control before surgery may in fact be a marker of the lack of awareness and complacency concerning one's role in the success of CABG. Internal locus of control can conversely promote more cooperation, optimism, learning and lower depressive symptoms during the period of surgery and hospitalisation, compared with external locus of control (Cromwell, Butterfield, Brayfield, & Curry, 1977; Hecht, 2013; Lefcourt & Davidson-Katz, 1991). More empirical evidence is needed to confirm the contribution of different loci of control throughout the period of surgery and convalescence.

Psychosocial support provisions must be planned bearing in mind that perceptions of control form an important tenet of coping in a stressful situation. Illness and hospitalisation may symbolically seize the patients' sense of control as she or he is required to submit to the rules, procedures and authorities in the healthcare setting (Norlyk *et al.*, 2013; Shapiro *et al.*, 1996). This can trigger positive or negative effects. As aforesaid evidence indicates, the patient may consider health professionals to be in the best position to help her or him recover from the illness, and hence would attribute control to them. The flipside however is that once the stress of hospitalisation is over, the patient must regain internal locus of control in order to adequately adhere to one’s self-care regimen. Alternatively, individuals with internal locus of control may feel stressed in the situation of hospitalisation. Yet, it has been illustrated that they aim to restore their control through actively seeking information about their condition. In both instances, psycho-education can be beneficial as supported by Sørlie and Sexton’s study (2004) with patients undergoing cardiac, urology and gastrointestinal surgery. The investigators did not in effect test an intervention, but assessed patients’ receipt of adequate illness-specific information, quality of relationship with doctors and quality of health communication with nurses as a proxy for health awareness. Health locus of control was measured before and four months after surgery. Findings based on regression analyses pointed out that post-surgery internal locus of control was predicted by pre-surgery internal locus of control, CAD, years of education and positive relationship with doctors, and was negatively related to stress. Post-surgery powerful others locus of control had significant association with pre-surgery powerful others locus of control, CAD, and perceived feeling of stress. Post-surgery chance locus of control was positively related to pre-surgery chance locus of control, disease severity and stress, and was negatively associated with years of education. It was evident that having internal locus of control was related to positive experiences such as quality doctor–patient relationship and higher educational qualification, while external locus of control (powerful others or chance) was linked to negative factors such as stress and low educational qualification. On one hand, patients become vulnerable and feel the lack of personal control due to their intrapersonal characteristics such as fewer years of education and more stress, and on the other, they can be made resilient through good relationships with their doctors. In-hospital psycho-educational support may thus help patients with disadvantages (e.g., low education) to take charge of their responsibilities in the self-care of illness. For educated patients, it may serve to reinforce their internality and sustain their efforts in the self-management of illness.

A thought-provoking insight from the health locus of control literature is that the success or failure of one's condition is often perceived as being controlled by people around one. This necessitates an exploration of social support. Humans, being the proverbial social animals, develop and experience illness in the community of their family and friends. Scientific literature is awash with evidence that these social ties exert an influence on the course of the disease. Positive marital status (i.e., being married rather than being unmarried/widowed/divorced/separated) for example has emerged as a significant independent predictor of reduced cardiac events and mortality after diagnosis of CAD (Compare *et al.*, 2013; Floud *et al.*, 2014). Given the typical middle-age onset of CAD (Sharma & Ganguly, 2005), one's marital relationship is the primary source of social support for disease management (Whitsitt, 2009). However, it must be borne in mind that support does not inevitably come with having the relationship, because the quality of the relationship may be positive or negative. Perceived social support is more apt a construct as it measures the individual's subjective appraisal of the availability of support from the relationship (Procidano & Smith, 1997). In a study comparing perceived social support with received social support (Helgeson, 1993), the former was found to be a more effective indicator of adjustment (measured in terms of level of anxiety, depression, and hostility) among patients admitted after a cardiac event. Perceived social support is an overall innate cognitive understanding of whether the support matches one's expectations or not. If the perception is positive, it can assuage the emotional stress wherein one feels that one lacks the necessary resources and help in the given situation. On the other hand, received social support is a factual report of the help received. This help may or may not be considered relevant by the individual to cope in the given situation. Hence in Helgeson's (1993) investigation, received social support rather than perceived social support did not definitely relate to the changes in patients' feelings of anxiety, depression and hostility.

Perceived social support is regarded as a resource owing to its function as a protective shield in potentially pathological situations. The buffering effect has been theoretically conceptualised by means of the information-based model, the identity and self-esteem model, the social influence model, and the tangible resource model. According to the information-based model, an individual may be comforted by the perception that social support can provide her or him the relevant information to re-evaluate the situation and reduce its harmful impact. The identity and self-esteem model maintains that an individual's self-esteem and identity may be boosted by the perception that social support can help her or him overcome the situation. In the social influence model, the individual may perceive confidence over a stressful situation because social support would influence or pressurise her or him to cope in a fruitful manner. With regard to the tangible resource model, the individual may feel secure by the perception that social support will provide him the needed resources such as finances to cope with the situation (Cohen, 1988). It may be noted that in each of the models, the individual may not in fact receive the specific support. However, the belief (which plausibly has grown out of experience) that one has help at hand brings down the negative affect and transforms the threatening situation into a manageable one. Therefore, perceived social support can be treated as a moderator between stress and its impact.

The relationship between perceived social support and psychological distress has been evidently established. Chivukula *et al.* (2013) contrasted levels of perceived social support, anxiety, and depression between patients undergoing diagnostic Angiography and those having CABG. The type of procedure itself bore a significant impact on psychological distress such that waiting for Angiography was more anxiety-provoking and depressing than awaiting CABG. Moreover, patients for CABG reported greater perceived social support than patients for Angiography. A supplementary finding was that perceived social support was significantly predictive of the variance in anxiety and depression in the whole cardiac sample and the Angiography sub-sample. For the CABG sample, perceived social support was a significant predictor of anxiety, not depression. Perhaps, a multiple regression analysis inclusive of the type of procedure and perceived social support would clarify the contributions of each factor individually and collectively to psychological distress. Nonetheless, as the authors acknowledged, it is apparent that perceived social support buffers the level of psychological distress in cardiac patients undergoing invasive procedures. In yet another study, low emotional support from one's relationships particularly with the spouse was linked to greater anxiety before CABG (Koivula, Paunonen-Ilmonen, Tarkka, Tarkka, & Laippala, 2002). Perceived support from significant others appears to confer the necessary emotional immunity when undergoing medical procedures.

In context of medical treatment, social support extends beyond one's relationships with family and friends. A research group (Koivula, Tarkka, Tarkka, Laippala, & Paunonen-Ilmonen, 2002) considered the patients' report of the social support they received from nurses a day prior to CABG. This perceived support was measured through a specifically developed scale examining informational, emotional, and tangible aid. Anxiety (assessed by HADS and STAI) and fear of surgery (measured using a specifically designed scale) were the two outcomes. Mirroring Chivukula *et al.*'s (2013) result, these patients too did not demonstrate high anxiety although 25% of patients each had intense or medium fear of surgery. Specifically, high emotional support from nurses was associated with low fear and anxiety, while high informational support was related to low fear. The study provided evidence on the need for social support from health professionals as well, in order to foster positive emotional states and constructive health cognitions in patients for CABG. In fact, positive associations have been found between trust in one's doctor and powerful others health locus of control, while chance locus of control was negatively related to trust in the physician (Brincks, Feaster, Burns, & Mitrani, 2010). It appears that social support and health locus of control act complementarily in the process of treatment and recovery. In concurrence with the earlier discussed information-based model and social influence model (Cohen, 1988), it is inferred that patients rely heavily on social support from familial and professional sources in affectively coming to terms with surgery and in cognitively making sense of CABG. Interventions must aim to foster a positive relationship between providers and patients so that the detrimental effect of low perceived social support on patients' psychological state is counterbalanced.

While perceived social support does affect emotional distress arguably because both are, in theory, psychological aspects—the former being a cognitive evaluation and the latter an affective state, it is useful to peruse the workings of the role of perceived social support in health. The recognition of social support in the health paradigm sprang from the observation that social isolation could predict all-cause mortality while social support, social involvement, or social integration reduced premature morbidity and mortality. In contemporary society where chronic illness dominates the landscape of health, social support has been recognised as a resource for successful management. In areas of adherence to diet, exercise and reduction of health risk behaviours, the role of family has been significant for timely and appropriate execution of the advice prescribed by doctors (Reblin & Uchino, 2008). Further, having adequate social support and social network has been linked to stress reduction through mitigation of the action of inflammatory markers and neuro-endocrinal activation (Eisenberger, Taylor, Gable, Hilmert, & Lieberman, 2007; Loucks *et al.*, 2006). Therefore, social support benefits the behavioural and physiological mechanisms of health.

A shortage of perceived social support, on the other hand, interferes with patients' physical and mental health. In a sample of 4,278 patients undergoing diagnostic Angiography, low score on perceived social support was associated with low scores on all dimensions of health-related quality of life namely, general health, general mental health, physical functioning, role limitations owing to emotional problems, restricted social functioning due to physical health issues, role limitations on account of physical health problems, body pain and vitality. Detailed analyses showed that marital status had interacted with overall social support to influence body pain. This meant that high social support was related to low pain regardless of whether one was married or single. However, being married than not was related to worse body pain, in the event of low overall social support (Bosworth *et al.*, 2000). Ruiz and others explained that marital dissatisfaction could aggravate the adverse impact of the partner's neuroticism on the CABG patient's and partner's depressive symptoms, leading to greater strain in care-giving (Ruiz, Matthews, Scheier, &

Schulz, 2006). Such trends create an environment unfit for optimum adherence and recovery of the patient. These justify the potent role of the perceived quality or support of the relationship over its mere status in the patients' overall quality of life during illness and medical treatment.

Support from health providers too has a pronounced impact on tangible health-related aspects. Empirical studies in cases of HIV/AIDS and CABG have supported that informational support from peer patients and healthcare staff had resulted in adherence to recovery activities while in the hospital (e.g., pulmonary exercises for CABG) and adoption of health promotional behaviours in the long term such as safe sex practices (Bastone & Kerns, 1995; Houston, Osborn, Lyons, Masvawure, & Raja, 2015). It is imperative for doctors to offer adequate informational support to their patients and thereby uphold good quality relationships, the absence of which engenders non-adherence leading to poor health outcomes (Swain *et al.*, 2015).

The literature on perceived social support discussed herein presents a case not merely for the assessment of perceived social support in order to understand its role in the course of patients' coping and recovery. Rather, it emphasises on the provision of psychosocial intervention that extends adequate social support from providers to patients so that positive emotional coping and recovery are achieved.

Altogether, health locus of control and perceived social support constitute two sides of the coin of patients' belief system. These relate to the control and resources one perceives as having and as needed to move one from illness to wellness.

Existing Psychological Support Provisions in Healthcare Protocols

Interventions that are designed by psychologists or that incorporate psychological principles have been gaining ground in healthcare given the large turnout of chronic diseases (American Psychological Association, 2016c). The approaches adopted in these programmes can be broadly classified into two types—educational and therapeutic—as will be deliberated upon in this section.

Diagnosis of a disease often generates learning needs on part of the patient regarding its characteristics. Patients with CAD, for example, expressed perceived learning needs that pertained to symptoms, anatomy and workings of the heart, medication and prevention (Czar, Ed, & Engler, 1997; Timmins & Kaliszer, 2003). Learning needs in case of chronic diseases additionally create a 'teachable moment', which refers to health events that present an opportunity to change the individual's lifestyle and behaviour for positive health outcomes (Lawson & Flocke, 2009). Psycho-education in medical settings is an evidence-based strategy to exploit the teachable moment and provide informational support through the use of psychotherapeutic principles such as those of cognitive-behavioural and learning theories (Lukens & McFarlane, 2004). The awareness generated by the intervention aids patients' adjustment with the condition and reformation of modifiable risk factors (Child, Sanders, Sigel, & Hunter, 2010).

The application of psycho-educational intervention around the time of CABG has yielded mixed results. A randomised controlled trial (Guo, East, & Arthur, 2012) found that psycho-education could endow positive benefits immediately after the intervention. A pre-CABG educational programme was administered to 76 patients who were compared with a control group of 77 patients. The intervention comprised an information leaflet containing details about admission, pre-surgery tests, preparation for surgery, ICU atmosphere and environment, communication with providers, exercises, discharge, lifestyle modification, and contact information. Psychological distress and perceived pain were assessed before CABG and on the seventh post-operative day. The duration of ICU stay as well as overall hospital stay were also recorded. The reduction in anxiety and depression from the baseline to post-surgery assessment was significantly higher in the intervention group relative to the control group. No significant difference was observed in terms of pain, and length of ICU stay and overall hospital stay. Qualitative data revealed positive feedback for the intervention. The participants however expressed discontentment over the hospital staff's minimal communication and information-sharing with them. This hints at the need to additionally engage health providers in the psycho-education programme. The lack of significant difference in perceived pain may not imply that the intervention was not effective. The follow-up period of a week may have been too short for the healing of major surgical wounds.

The impact of patient education has not always been positive. A group of patients were categorised according to their baseline scores for anxiety measured through the use of STAI at the point of admission—mild anxiety, moderate anxiety, and severe anxiety. All the groups received an educational intervention that was facilitated by a psychologist. Anxiety was re-measured a day before CABG. Scores on STAI ranged between 20 and 80. Anxiety was found to have significantly reduced from the baseline to pre-surgery assessments only for the severe anxiety group. A reduction in the mean anxiety score, albeit non-significant, was noted for the group with moderate anxiety. Surprisingly, the mild anxiety group reported a significant rise in the mean anxiety score after intervention. The authors inferred that education may be appropriate for severely anxious patients (Akbarzadeh, Kouchaksaraei, Bagheri, & Ghezel, 2009). This presents a problematic generalisation on many counts. There was no description of the format and method of administration of the pre-surgery education which prevents analysis of its strengths and limitations. No evidence was recorded showing that the increase in anxiety for the mild anxiety group was a negative outcome, as the authors had not investigated the impact of this rise on any other variable related to recovery or well-being. Perhaps, this group may represent patients who may have been complacent or in denial regarding their surgery. These patients plausibly came to comprehend the situation of CABG only after the intervention. Taylor and Asmundson (2004) argued that low health anxiety in the face of high risk (such as surgery) can in fact result in sustenance of maladaptive health behaviours and risks. Alternatively, other unexplored confounding variables may have prompted mild anxiety to rise in Akbarzadeh *et al.*'s (2009) study. Moreover, the trend of decrease in anxiety for the moderate and severe anxiety groups underscores that education was a necessary interventional aid.

Psychological interventions have also been designed to directly alleviate distress. One common and cost-effective method is relaxation. In Twiss, Seaver, and McCaffrey's (2006) randomised controlled trial, a music intervention administered during and after CABG significantly reduced anxiety. Post-operative intubation in the intervention group was lower by three hours relative to the control group, although this difference in time was not significant. Elsewhere, unspecified relaxation presented by Anaesthesiologists before surgery and during post-surgery ICU stay helped lower the values of patients' vital signs (systolic blood pressure, body temperature, pulse rate) within 48 hours after CABG. However, patients did not demonstrate any reduction in their pain perception and use of pain relievers during ICU stay (Firoozabadi & Ebadi, 2014). The use of Guided Imagery across studies with patients undergoing cardiac surgery produced similar effects such that anxiety was lowered, but there was mostly no significant impact on the length of stay, use of pain killers and physical functioning post-operatively (Casida & Lemanski, 2010;

Hermele, 2007). The limited impact may be on account of the short follow-up periods such as a week after CABG. The usefulness of relaxation techniques has therefore not been consistently replicated, largely owing to the unrealistic expectation of results within the duration of post-surgery hospital stay. Another limitation common to the studies presented above is that it is unclear whether the improvement is attributable to the intervention itself or the additional care provided. Hermele's study (2007) indeed had compared a Guided Imagery group with a music intervention group and a control group. This design too was not informative with respect to group differences perhaps because the music intervention group received a tape with music that was also included in the Guided Imagery tape. Further, both interventions may have produced similar effects because the fundamental underlying aim was to achieve relaxation.

Longer duration between the relaxation intervention and subsequent review seems to have revealed better results. A large study (Appels *et al.*, 2006) recruited 710 patients after Angioplasty to assess the efficacy of group therapy in comparison with standard care. The 6-members-per-group intervention which lasted around six months wherein patients discussed and supported each other, were simultaneously trained in relaxation exercises, and were stimulated for physical exercise under professional supervision was found to statistically enhance health-related quality of life, and decrease exhaustion and the probability of depression even 18 months after the intervention. Another set of researchers (Dehdari, Heidarnia, Ramezankhani, Sadeghian, & Ghofranipour, 2009) administered Progressive Muscle Relaxation alongside standard care (involving exercise training and lifestyle modification) to one group of patients who had enrolled for post-CABG cardiac rehabilitation. The control group was subjected to standard care only. The programme lasted six weeks after CABG. Findings a month after the programme indicated that for the intervention group, there were significant reductions in the scores on state and trait anxiety coupled with significant improvements in all the dimensions of quality of life (physical functioning, execution of roles, body pain relief, general health, vitality, social functioning, emotional problems, and mental health). While the two studies above highlighted the realistic need and benefit of multi-component psychological intervention inclusive of relaxation, the theoretical significance of relaxation as a therapy is omitted in their analyses. The findings fell short as it was not possible to tease out whether the significant changes were truly resulting from the use of relaxation or its combination with other elements of cardiac rehabilitation.

In view of the aforesaid studies, it may be inferred that any technique of relaxation merits being contrasted with other types of psychological intervention, so that the process and extent of its impact as a therapeutic interventional approach during surgery are made explicit. A comparison of relaxation and psycho-education, for instance, can be insightful about the inherent differential effectiveness. The suggested mechanisms for the impact of relaxation are through the reciprocal inhibition of negative affect and the induction of positive emotions. Different types of relaxation namely Progressive Muscle Relaxation and Guided Imagery deliberately bring down the sympathetic arousal response of a negative emotional state (e.g., anxiety) by creating the reciprocal states of calmness and tranquillity (Chen *et al.*, 2012; Wolpe, 1958). Positive affective states have been repeatedly associated with the enhancement of health-promoting behaviours and the reduction of stress response which in turn enhance health outcomes (Steptoe, Dockray, & Wardle, 2009). The workings of relaxation thus differ from that of psycho-education which essentially targets health cognition. The paradigm of comparison of interventions can be enlightening while assessing the distinct efficacy of different types of psychological intervention.

Rosendahl and others contended that different psychological interventions in reality produce the same effect. They enrolled 847 patients awaiting CABG in two groups of psychological intervention and spiritual intervention respectively based on patients' preferences for either intervention. A control group of participants was enlisted before and after the participation of the intervention groups. The psychological intervention module comprised unspecified relaxation along with hypnotherapeutic and behavioural components. The spiritual intervention consisted of the discussion about patients' issues, as well as religious interpretations and rituals. For the analysis, psychological and spiritual interventions were collectively examined in comparison with the control group. A significant impact of the interventions was seen only in case of the reduction of negative mood, without any significant change in morbidity, anxiety, depression, positive mood, patient satisfaction and pain. Interestingly, patients' perception of the helping alliance received through the interventions was significantly associated with better outcomes, thus suggesting that supportive interpersonal interactions were a key resource for the well-being of these patients. The authors concluded that this justified their examination of psychological and spiritual interventions together, rather than comparatively (Rosendahl *et al.*, 2009, 2013). Their inference comes across as an oversimplification of the concepts and mechanisms of specific psychological interventions. Moreover, they did not base this argument on evidence refuting differential impact as they had examined psychological and spiritual interventions together against the control group. This may have contributed to their finding that the interventions could impact only one variable. If helping alliance is all that is necessary, professional psychological practice in healthcare would be redundant. There is no dearth of helping alliance, as patients are typically already in receipt of support from healthcare staff and significant others. Yet, the need for a psychologist in medical settings was made evident in the previous sections which indicated that the pre-existing support from other sources in healthcare (non-psychologists) can, on occasions, be maladaptive and sub-optimal for psychological well-being and overall health.

Planning Psychosocial Intervention

While the preceding sections testified to the necessity of applying psychosocial intervention in the milieu of CABG, it is vital to chalk out what might constitute an effective psychosocial intervention.

Theory-driven psychosocial intervention programmes are needed. Health Psychologists have postulated numerous theories, models and constructs of health behaviour, a few of which were discussed earlier. One set of frameworks relates to an individual's socio-cognitive processes concerning health and illness such as Health Locus of Control (Wallston & Wallston, 1981) and Health Belief Model or HBM (Rosenstock, 1974). The second set pertains to an individual's behavioural actions affecting health such as the TPB (Ajzen, 1991) and the IMB (Fisher *et al.*, 2003). Each theory enumerates specific guidelines that may be applied for the goal suggested by the said theory. The application additionally allows for its theoretical evolution. When the aim of an investigation however is to maximise the effectiveness of intervention, an eclectic adaptation of concepts from across theories may be warranted. This strategy, particularly when combining socio-cognitive and behavioural theories, engenders a wider influence on the different variables affecting a multi-factorial outcome of interest (Lippke & Ziegelmann, 2008).

An intervention for behaviour change must explicitly address affective states and social support which are generally not referred to in the aforesaid behaviour change models. In this review, the prevalence of psychological distress in the forms of anxiety and depression was a recurrent finding among patients awaiting medical procedures. This however was not a stand-alone phenomenon but bore a negative impact on patients' adherence and recovery. Further, perceived social support and health locus of control acted as buffers for distress that in turn modulated the nature of adherence and prognosis. Psychological distress among patients undergoing invasive procedures was found to be a result of their lack of awareness of the procedure as well as the trauma and the after-effects of experiencing the procedure. To simultaneously tackle these issues, a psycho-educational intervention facilitated by a team of doctors, psychologists, and patients can give clear information about the technique of the procedure, the experience of the procedure, and the possible strategies for positive coping and recovery during the period of the procedure. This approach incorporates information, motivation and subjective norms from the health provider's and recipient's perspectives, based on the frameworks of the TPB and the IMB. Going by the HBM, the enhanced health beliefs and attitudes of the patient receiving psycho-education will equip her or him for optimum adherence and positive procedural outcomes. It may also be noted that the patient would receive informational social support (Cohen, 1988), a resource that allows her or him to constructively re-interpret the threatening situation so as to experience less distress. Alternatively, relaxation intervention induces positive affective states of pleasure and calmness. The Broaden-and-Build theory (Fredrickson, 2001) from Positive Psychology states that positive emotions foster a tendency for more adaptive and progress-oriented behaviours. Patients practising relaxation may consequently have a higher potential to carry out health-promoting behaviours, as advised by professionals for the recovery period. The overarching influence in the psycho-educational and relaxation intervention is of the biopsychosocial model, which categorises health as a function and experience of biological, psychological and social factors within and around the individual (Engel, 1977). Suls and Rothman (2004) therefore insisted that research on health ought to pursue complex designs that account for the relationships among multiple variables while the interventions attempt to modify the three dimensions of health.

Psychosocial intervention can aim to be patient-centric through the provision of peer support. For example, a case for peer-based psycho-education is arguable based on Edelmann's (1995) classification of two types of information: procedural (steps involved in surgery) and sensory (patient's typical experience during surgery). For a patient, both perspectives are essential to comprehend and feel convinced about the condition and the treatment she or he is about to endure. Lyons, Fanshawe, and Lip (2002) presented a qualitative analysis of interviews with patients undergoing Angioplasty. Apprehension in the pre-Angioplasty phase was alleviated on receiving information about the process from professionals and from those who had previously undergone the procedure. Nonetheless, patients expressed having faced difficulty in understanding the doctors' narrative due to its technical language. The findings altogether indicate that mere factual knowledge (given by a doctor) is insufficient to assuage anxiety; rather, lay experience-based knowledge (provided by previous patients) is more meaningful. Peer-supported education emerges as a key element. This does not undermine the medical expert's role, without which the peer's contribution would be lop-sided as well. However, it is imperative to recognise the peer as an expert in her or his own right for having successfully undergone the procedure and having sustained its benefits in the daily routine of life. The lessons gained in her or his experience can be prophylactic for a new patient who awaits the experience anew. Peer support thus imparts empathy, frame of reference, optimism, and self-confidence (Mead & MacNeil, 2005). Hariharan and Rath (2008) reported the case of a cancer patient who, having successfully recovered, served as a peer counsellor. This benefitted other patients as well as gave the counsellor herself a feeling of satisfaction and meaning. Peer education may successfully induce a vicarious effect in new patients. The information provided by the peer patient and the prevailing healthy state of the peer patient may invoke positive affect in the new patient. The resourcefulness of peer support in the Indian medical context is largely unexplored. Aswathy and colleagues argued that in a heavily burdened healthcare system such as India's, peers can form a grassroots-level support reserve to address the banal yet consequential issues of everyday management of Diabetes Mellitus (Aswathy, Unnikrishnan, Kalra, & Leelamoni, 2013). The sustainability of peer support groups is however a major detriment to be mindful of, since high dropout and low attendance have been observed across empirical reports that were based on such groups. Patients were noted to experience barriers of health, time suitability and transportation facilities to reach the group meeting, once they had returned to their normal routine (Bottonari *et al.*, 2012; Paul, Keogh, D'Eath, & Smith, 2013). Novel methods such as one-on-one support, telephone-based programmes, and video recordings have been used to overcome the challenges of attendance by providing peer support at the patient's bedside or doorstep (Heisler *et al.*, 2013; Simmons *et al.*, 2013; Wu, Chang, Courtney, Shortridge-Baggett, & Kostner, 2011). It is beneficial to ensure the provision of peer support using these feasible techniques, particularly during critical periods such as admission for surgery and discharge after surgery.

Psychosocial intervention must help bridge the patient–doctor relationship. An important parallel to the peer patient in the CABG phenomenon is the Cardiothoracic Surgeon. Considered to be the expert with exhaustive knowledge of the disease as well as the healer who would fix the condition, the Surgeon may be perceived as being the captain of the ship. Brock's (1962) landmark address at an award presentation however illustrated a different picture. Brock, a Cardiothoracic Surgeon himself, explained that the unique health profile of each patient, the shouldering of the responsibility of success and failure for the surgical team, and the strenuous demands of long and multiple duties in the hospital cause the Surgeon to come across vulnerability, uncertainty, emotionality, and loneliness. While Brock's narrative created awareness about an often unidentified side of Surgeons that adds to the dynamics of a surgery setting, it addressed a scientific audience only. The patient who enters into a therapeutic relationship with the Surgeon equally deserves to be aware of this. Doctor–patient communication becomes the means in such a context so that transparent exchange of information for both individuals is made possible. However, research suggests that doctors in Cardiology and Cardiothoracic care tend to use jargon during patient consultations, and these jargon were largely misunderstood or not understood by their patients (Thomas, Hariharan, Rana, Swain, & Andrew, 2014). The Surgeon's involvement in psycho-educational programmes can facilitate a non-technical communication to the patient concerning the procedure. Research evidence further indicates discrepancy in doctors' and patients' respective perceptions of information to be communicated. Ivarsson and others tested an intervention wherein one group received a booklet with complete information pertaining to possible life-threatening situations and complications for all organs around the time of cardiac surgery (CABG and valve replacement). The control group as well as the intervention group received a standard booklet containing the details about transportation, surgical procedure, and preparation. The study measured patients' satisfaction with the pre-operative information they received, anxiety, depression, and distress related to surgery. Both groups were not found to differ in their levels of the need for information about complications, pre- and post-surgery anxiety and depression, and surgery-related distress. Relative to the control group however, the intervention group expressed significantly higher satisfaction with the overall information provided, was more inclined to want to discuss complications with one's family, was more prone to believe that alternative treatments could be discussed with one's doctor, and was more likely to be aware of the legal right to information concerning treatments, outcomes and risks (Ivarsson, Larsson, Lührs, & Sjöberg, 2005). Indeed, the study did not demonstrate the benefit of such information on psychological and surgery-related distress. Probably, the standard booklet was sufficient to psychologically prepare the control group for surgery on par with the intervention group. Yet, the findings of significant difference hint at the empowerment of patients as participants in medical decision-making rather than as mere recipients. A noteworthy observation highlighted by the authors was that the Surgeons who helped develop the intervention booklet had consistently expressed that patients do not understand or need an awareness of all the risks as it would do more harm than good. Such perceptions present the danger of breeding misconceptions that the Surgeon knows and decides what is right. These prevent the possibility for open dialogue of risks and alternative treatments even if a patient wants to. Clear communication can further extract adequate adherence from patients who would be motivated to do so in matching the Surgeon's efforts (Martin *et al.*, 2005). Psycho-education modules must thus involve Surgeons too as facilitators to aid the optimal and ethical exchange of information in large healthcare systems.

Psychological distress can also be arrested through relaxation. It may be brought to mind that relaxation works on the principle of reciprocal inhibition of the stress response. When faced with a threatening event, the individual's sympathetic nervous system is instinctively activated, by which the body is ready for fight or flight against the supposed danger. In the process, a number of biochemical changes occur such that stress hormones are released. A chronic state of stress response increases one's vulnerability to a range of health problems from common cold to heart disease (Seaward, 2000). On the contrary, relaxation involves the deliberate transformation of the stress response into a stress-free state. This is possible when the individual intentionally engages in continuous mental and/or physical actions that deflect the body's attention and resources from the reflexive sympathetic arousal, thus suppressing its activation (Park *et al.*, 2013). Relaxation can work as a timely intervention for surgical patients. An advantage of relaxation is that it is less cognitively demanding than psycho-education which compels rational thinking and thought restructuring. The methods of relaxation circumvent complex cognitive processing, yet hold the potential to bring down psychological distress (Bellardita, Cigada, & Molinari, 2006). Among the different relaxation techniques, Autogenic Training and Guided Imagery seem appropriate for practice during the period of surgery as these involve mental exercises to relax. Autogenic Training consists of mentally perceiving (without inducing) the existing warmth and heaviness that gradually change into dilation and distension in different parts of the body. However, the focus in this technique is confined to the body which may be stressful for a patient awaiting invasive surgery. Guided Imagery, on the other hand, offers a temporary refuge through visualisation of an alternative pleasant situation. Here, the individual is typically given suggestions of calming scenery that provoke her or him to conjure up the situation in the mind through all sensory modes (Lukens, Turkoglu, & Burg, 2012). She or he is thus able to virtually experience a pleasing situation even while being in a seemingly threatening medical atmosphere. Research evidence suggests that the impact of Guided Imagery tended to confine to palliative benefits (e.g., higher patient satisfaction and reduced negative affect) immediately after surgery (Halpin, Speir, CapoBianco, & Barnett, 2002; Hermele, 2007). Whether Guided Imagery holds out advantages in domains beyond purely psychological states such as self-care and overall prognosis is to be further evidenced.

Summary

The available scientific literature has facilitated key insights into the field of interest. Certainly, this review may not be exhaustive yet its discursive exploration of an assortment of methods, concepts and findings has thrown light on the complementary, contradictory and ambiguous trends related to the process and outcomes in the nexus of CAD, CABG and psychological distress.

The patient's psychological state around the time of CABG is not a mere outcome; rather, it serves as a cause, predictor and/or intermediary of further psychological distress, adherence and prognosis in the short and long run of recovery. Psychological distress (anxiety and depression) is clearly rampant and consequential in patients being subjected to CABG. However, the roles of anxiety and depression during CABG are dynamic given that these mood states may be directly related to the apprehension or misconceptions about the procedure, or may be amplified by the deficiency of perceived social support and internal locus of control. Nonetheless, what demand further exploration are the direction and intensity of interactions among psychological distress, perceived social support and types of locus of control which currently are ambiguous, particularly in the Indian context.

Adherence after CABG is the primary route for maintaining health. The multidimensional aetiology of CAD makes adherence a plastic psycho-behavioural process, the success of which may be curtailed by the patient's psychosocial status. Yet, its malleability can be harnessed for positive outcomes through professional psychosocial support. Good prognosis is the ultimate goal, achieving which requires addressing psychological distress, adherence and the psychosocial factors impinging upon them.

Psychosocial intervention that is feasible and impactful in the context of CABG broadly includes psycho-education and relaxation. The limitations of previous studies that had used these approaches provide directions for future. Psycho-education must balance technical facts (from professionals) with experiential information (from peer patients). An audiovisual psycho-educational programme may be investigated as a practical and sustainable intervention. However, when provided to pre-surgery patients who might already be experiencing heightened anxiety levels, comprehensive psycho-education could be counter-productive if it results in information flooding. Hence, the quantity of information must be limited to the immediate condition, say, preparing for surgery in the pre-CABG phase. Similarly, instructions relating to post-surgery care, risks and management of complications may be reserved for the pre-discharge phase. Evidence on the effectiveness of relaxation is mixed although this therapeutic approach may be particularly useful during hospitalisation wherein psychosocial intervention must share the limited time with ongoing medical protocols. A comparative design involving psycho-education and relaxation for patients advised to undergo CABG will be insightful not merely about the mechanism of the interventional impact but also about the nature and determinants of adherence, prognosis, and psychosocial well-being. The findings will additionally highlight the issues on the feasibility and the efficacy of inducting psychosocial intervention concurrent with medical services in mainstream healthcare.

The appalling paucity of work by psychologists with regard to psychological issues and contributions possible in the care of cardiac patients, specifically in India, was consistently observed across sections of this review. While professionals from other healthcare disciplines have commendably attempted to adapt various psychological principles for use with cardiac patients, the results were short-lived or under-explained. This inadequacy forms the stepping stone for the current study. It is indeed time the field of Health Psychology accomplished its role in assessment and intervention programmes positioned within Indian healthcare. The strengths and shortcomings of the research investigations presented above helped delineate the aims and method to be pursued in this study.

For the present study, research questions were initially set down, basing upon which, objectives and hypotheses were outlined.

Research Questions

1. Does exposure to psychosocial intervention lead to a higher level of adherence in patients undergoing CABG?
2. Does exposure to psychosocial intervention generate better prognosis in patients undergoing CABG?
3. Does exposure to psychosocial intervention result in a greater reduction of psychological distress from pre-surgery to post-surgery assessments in patients undergoing CABG?
4. Does the impact of psychosocial intervention on prognosis in patients undergoing CABG follow a pathway?

Objectives

1. To compare the relative impact of the Programme for Affective and Cognitive Education (PACE) and Relaxation interventions vis-à-vis the Control group with no psychosocial intervention on adherence and prognosis in patients undergoing CABG.
2. To compare the relative impact of the PACE and Relaxation interventions vis-à-vis the Control group with no psychosocial intervention on psychological distress reduction in patients undergoing CABG.
3. To identify the factors contributing to adherence and prognosis in patients undergoing CABG.

4. To trace the pathways between psychosocial interventions and prognosis in patients undergoing CABG.

Hypotheses

1. Exposure to the PACE or Relaxation intervention vis-à-vis the Control group with no psychosocial intervention will lead to a higher level of adherence in patients undergoing CABG.
2. Exposure to the PACE or Relaxation intervention vis-à-vis the Control group with no psychosocial intervention will generate better prognosis in patients undergoing CABG.
3. Exposure to the PACE or Relaxation intervention vis-à-vis the Control group with no psychosocial intervention will result in a greater reduction of psychological distress from pre-surgery to post-surgery assessments in patients undergoing CABG.
4. The respective impact of the PACE and Relaxation interventions on prognosis in patients undergoing CABG will follow a pathway.

Chapter III

Method

Chapter III

Method

This chapter details the plan and design, sample, tools, interventions, and procedure followed in conducting the present study. The guiding aim in developing the method of this study was to measure and compare the efficacy of two types of psychosocial intervention that supplemented standard hospital treatment for patients undergoing CABG.

Plan and Design

Three phases of psychological assessment and two stages of psychosocial intervention were considered for the study. The first phase of assessment, known as ‘pre-surgery assessment’, was conducted a day before CABG to determine the level of psychological distress (i.e., anxiety and depression), perceived social support and health locus of control in the participants. The second and third phases of assessment were held in the post-surgery period. The second phase of assessment, called ‘first review assessment’, was scheduled approximately a week or 7–10 days after the participant’s discharge from the hospital following CABG when the participant visited the hospital for the first medical review by her or his consulting doctor. During this visit, the level of psychological distress in the participants was re-evaluated. The third phase of assessment, referred to as ‘second review assessment’, was held about a month after the first review or six weeks after the participant’s discharge from the hospital when she or he visited the hospital for the second review by her or his consulting doctor. This assessment was performed to find out about the level of psychological distress, adherence, and prognosis in the participants. The first stage of intervention, termed ‘pre-surgery intervention’, was administered a day before CABG to the respective intervention groups on completion of the pre-surgery assessment. The second stage of intervention, designated as ‘pre-discharge intervention’, was provided to the respective intervention groups a day before participants’ discharge from the hospital after CABG.

The study primarily adopted a quasi-experimental design using the pretest-posttest non-equivalent control groups design. As presented in Table 3.1, the study compared two experimental groups with a control group on adherence, prognosis, and psychological distress reduction. The study examined the impact of psychosocial intervention on adherence and prognosis six weeks after CABG, and on reduction of psychological distress across time. Further, it identified the significant variables that predicted adherence and prognosis, and additionally traced the pathways followed from psychosocial intervention to prognosis.

The experimental group 1 (n_1 = 100) received a specifically designed intervention called Programme for Affective and Cognitive Education (PACE) along with standard hospital treatment, and was labelled the ‘PACE group’. The experimental group 2 (n_2 = 100) was given a relaxation intervention using Guided Imagery, and was called the ‘Relaxation group’. The ‘Control group’ (n_3 = 100) received only the standard hospital treatment for CABG. Each participant was sequentially assigned to one of the three groups in the order of PACE group, Relaxation group, and Control group, as and when they were recruited.

Qualitative data were generated by means of semi-structured interviews with a sub-sample of 15 participants (five from each of the three groups). Participants who were expressive and willing to attend semi-structured interviews were selected, based on the principle of purposive sampling, in order to understand their individual differences, perspectives and subjective experiences. Finally, telephonic interviews were carried out with a sub-sample of 100 participants to substantiate and supplement the data on prognosis.

The type of group (PACE, Relaxation, Control) was the independent variable, while adherence and prognosis were the dependent variables. Psychological distress (anxiety and depression) had a dual role in the study—as a dependent variable to the type of group, and as a predictor of criterion variables such as adherence and prognosis. Perceived social support and health locus of control were mainly considered as predictors of criterion variables (psychological distress, adherence, prognosis).

The plan and design of the study are comprehensively encapsulated in Table 3.1.

Table 3.1

Plan and design of the study

Group	Pre-surgery assessment (Day before CABG)	Intervention		Post-surgery assessment		Follow-up	
		Pre-surgery (Day before CABG)	Pre-discharge (Day before discharge)	First review (1 week after discharge)	Second review (6 weeks after discharge)	Semi-structured interview for in-depth qualitative data (6 weeks after discharge)	Telephonic interview for "resumption of routine" data (5 months after discharge)
PACE (n_1 = 100)	a) Psy. distress	PACE part 1	PACE part 2	Psy. distress	a) Psy. distress	$n_{q1} = 5$	$n_{t1} = 33$
	b) Perceived social support				b) Adherence		
	c) Health locus of control				c) Prognosis		
Relaxation (n_2 = 100)	a) Psy. distress	Guided Imagery	Guided Imagery	Psy. distress	a) Psy. distress	$n_{q2} = 5$	$n_{t2} = 34$
	b) Perceived social support				b) Adherence		
	c) Health locus of control				c) Prognosis		
Control (n_3 = 100)	a) Psy. distress	No intervention	No intervention	Psy. distress	a) Psy. distress	$n_{q3} = 5$	$n_{t3} = 33$
	b) Perceived social support				b) Adherence		
	c) Health locus of control				c) Prognosis		

Note. $n_{q(1,2,3)}$ and $n_{t(1,2,3)}$ represent sub-sample sizes for in-depth qualitative interview and telephonic interview respectively

Participants

The sample of this study comprised patients who were admitted into the hospital for planned CABG. The sites of data collection were four corporate hospitals in Hyderabad, India. The inclusion and exclusion criteria used for recruitment of participants are described below.

Inclusion criteria. (i) Patients aged between 25 and 70 years, who were undergoing a planned CABG for the first time (ii) Patients who had the provision to use a CD or DVD at home (iii) Patients who were willing to sign the informed consent form

Exclusion criteria. (i) Patients known to have any diagnosed mental illness (ii) Patients having any other co-morbidity besides Hypertension and Type 2 Diabetes Mellitus

The study aimed at recruiting 300 participants. The sample size was deduced through a field survey of the number of CABGs performed at the hospitals where data were to be collected. It was found that approximately 84 CABGs were carried out per week at these hospitals on the patients who could satisfy the inclusion criteria for this study. With a target of recruiting at least 15% of such patients during data collection per week, the sample size for six months was 302 patients. To maintain equal group sizes, the sample size was finalised as 300 patients (100 per group). Keeping in view the prospect of subject attrition across phases of the interventional study, more number of participants was sought. During the study, 322 patients were recruited in total. In the event of subject drop-out that brought down the sample size below 300, a new patient fulfilling the eligibility criteria was recruited. The final sample consisted of 300 participants, equally distributed into three groups—PACE group (n_1 = 100), Relaxation group (n_2 = 100), and Control group (n_3 = 100). Participants were sequentially assigned to one of the three groups in the order of PACE group, Relaxation group and Control group, as and when they were recruited.

Homogeneity of the groups. In the chapter of Review of Literature, it was discussed how many a time, differences in patients' levels of compliance and prognosis are attributable to differences in their levels of anxiety, depression, perceived social support and health locus of control. Since there were three groups in the study, it was necessary to ascertain whether these groups were homogenous on major variables of interest such as in terms of demographic characteristics (gender, educational qualification, mode of payment, and age) and pre-surgery psychosocial variables (psychological distress, perceived social support, and health locus of control). In each group, 81% of participants were men and 19% were women, making the three groups identical in terms of gender. Results of chi-square analyses (Table 3.2) showed that there was no significant association between the groups and the distribution of educational qualification ($p > .05$), as well as between the groups and the distribution of mode of payment ($p > .05$). Further, one-way between groups analyses of variance or ANOVA (Table 3.3) revealed that the three groups did not significantly differ ($p > .05$) in terms of mean age, as well as mean scores of psychological distress, perceived social support and health locus of control before CABG. This test of homogeneity was meant to ensure that differences between the groups after psychosocial intervention and CABG would not be related to any of the above factors.

Table 3.2

Observed count, expected count, and χ^2 values for educational qualification and mode of payment across groups

	Observed (Expected)			χ^2
	PACE	Relaxation	Control	
Educational qualification				
Graduation or above	22 (25.3)	32 (25.3)	22 (25.3)	
High school	28 (32.7)	31 (32.7)	39 (32.7)	7.84 ($p > .05$)
Literate school drop-out	40 (32.3)	29 (32.3)	28 (32.3)	
Non-literacy	10 (9.7)	8 (9.7)	11 (9.7)	
Mode of payment				
Personal fund	18 (19.7)	21 (19.7)	20 (19.7)	
Employer	25 (20.7)	17 (20.7)	20 (20.7)	3.13 ($p > .05$)
Insurance company	7 (9.7)	12 (9.7)	10 (9.7)	
Government	50 (33.3)	50 (33.3)	50 (33.3)	

Table 3.3

Mean, standard deviation, and F-statistic values for age and psychosocial variables before CABG across groups

	***M* (*SD*)**			**F(2, 297)**
	PACE	Relaxation	Control	
Age	56.44 (7.12)	55.40 (8.16)	56.31 (7.86)	0.54 (p > .05)
Psychological distress				
Overall	8.80 (4.62)	9.03 (4.73)	9.84 (5.39)	1.23 (p > .05)
Anxiety	5.11 (2.94)	5.52 (3.12)	5.70 (3.34)	0.93 (p > .05)
Depression	3.69 (2.62)	3.51 (2.50)	4.14 (2.75)	1.53 (p > .05)
Perceived social support				
Overall	68.70 (9.92)	66.39 (10.32)	66.76 (10.36)	1.48 (p > .05)
Family	25.42 (2.50)	24.61 (3.60)	24.94 (2.75)	1.86 (p > .05)
Friends	17.64 (7.72)	16.44 (7.83)	16.68 (7.67)	0.67 (p > .05)
Significant other	25.64 (2.22)	25.34 (2.54)	25.14 (2.89)	0.96 (p > .05)
Health locus of control				
Self	12.22 (3.17)	12.19 (2.97)	12.27 (2.70)	0.02 (p > .05)
Doctors	1.83 (1.63)	1.86 (1.49)	1.60 (1.54)	0.84 (p > .05)
Others	1.89 (2.23)	1.70 (2.00)	1.41 (1.62)	1.51 (p > .05)
Unknown others	2.06 (2.07)	2.25 (2.39)	2.72 (2.27)	2.29 (p > .05)

Considering the overall sample, the age of participants ranged from 33 to 70 years, and the mean age was 56.1 years (*SD* = 7.7). Men constituted 81% of the sample while women made up 19%. In terms of educational qualification, 25% were graduates or above, 33% had completed schooling, 32% were school drop-outs and 10% were non-literate. The participants used different modes of payment for surgery. Within the whole sample, CABG treatment was funded by self (20%), employer (20%), insurance company (10%) and government (50%). There were employees (30%), retired persons (23%), business persons (17%), housewives (14%), farmers (8%), labourers (5%), and unemployed persons (3%).

A sub-sample of participants was considered for qualitative data. During the process of assessment and intervention, 15 articulate and willing participants (five each from the PACE, Relaxation, and Control groups) were identified on the basis of the principle of purposive sampling (Marshall, 1996), in order to qualitatively understand their experiences using semi-structured interviews. The mean age of these 15 participants was 56.5 years (*SD* = 6.3). In this sub-sample, 80% of participants were men and 20% were women. The level of educational qualification included non-literacy (13%), school drop-out (20%), high school education (47%), as well as graduation and higher degrees (20%). The sub-sample comprised employed persons (33%), business persons (20%), retired persons (20%), housewives (13%), labourers (7%), and unemployed persons (7%).

For long-term follow-up regarding the time required by participants to return to their normal routine activities after surgery, a sub-sample of 100 participants was randomly chosen from the original study sample and individually contacted by the investigator over telephone, five months after surgery. Out of these 100 participants, 33 each belonged to the PACE and Control groups while 34 were from the Relaxation group. Men and women respectively constituted 79% and 21% of the sample. The mean age was 55.3 years (*SD* = 7.6). The range of educational qualification included non-literacy (12%), school drop-out (25%), high school education (37%), as well as graduation and higher degrees (26%). There were employed persons (32%), retired persons (22%), business persons (17%), housewives (13%), farmers (8%), labourers (5%), and unemployed persons (3%).

Tools

Assessments during the study were carried out using five patient-reported outcome measures—Hospital Anxiety and Depression Scale (HADS), Multidimensional Scale of Perceived Social Support (MSPSS), Locus of Control checklist for CABG (LOCOCAB), Adherence Scale for Cardiac Patients (ADSCAP), and Biopsychosocial Prognosis Scale for CABG (BIPROSCAB). The content, application, and development (where applicable) of the tools are discussed below.

Hospital Anxiety and Depression Scale (HADS). HADS (Zigmond & Snaith, 1983) consisted 14 items that were measured on a 4-point scale which ranged between 0 and 3 (response descriptions varied for each item). The items of HADS (Appendix A1) were simple statements about self. The participant was required to respond to the statements by rating about the extent to which each statement was true in her or his case. The scale assessed the severity of anxiety and depression experienced during the past week. There were two sub-scales—anxiety (e.g., I feel tense or 'wound up') and depression (e.g., I feel as if I am slowed down). Each sub-scale had 7 items. The two sub-scales together (14 items) constituted measurement of overall distress. As HADS has been recommended to be used with medical in-patient and out-patient population, it was suitable for this study which measured psychological distress during hospitalisation and out-patient review visits. HADS has been reported to be a psychometrically sound tool when used with medical, psychiatric, and normal populations. In a review of 747 papers that had used HADS, reliability given by Cronbach's alpha ranged between .68 and .93 (M = .83) for the anxiety sub-scale, and between .67 and .90 (M = .82) for the depression sub-scale. Scores of the HADS sub-scales were found to demonstrate large correlations (greater than .60) with scores on other tools specific to anxiety and depression such as State-

Trait Anxiety Inventory, and Beck Depression Inventory, which suggested that HADS was a valid scale (Bjelland, Dahl, Haug, & Neckelmann, 2002). The English and Telugu forms of HADS were obtained from GL Assessment and Mapi Research Trust.

Scoring. Each item was scored between 0 and 3 depending on the respondent's rating. To obtain the score of each sub-scale, the sum of the scores of items in the sub-scale was calculated. The anxiety sub-scale included items 1, 3, 5, 7, 9, 11 and 13, while items 2, 4, 6, 8, 10, 12 and 14 were part of the depression sub-scale. The total score on each sub-scale varied between 0 and 21. According to the clinical norms, a total score on a sub-scale between 0 and 7 suggested normal level of anxiety or depression, between 8 and 10 implied a probable case of anxiety or depression, while a score of 11 or above indicated a definite case of anxiety or depression (Snaith, 2003). In the current study, scores were considered in terms of degree such that higher score on a sub-scale indicated higher level of anxiety or depression. A composite score, indicative of overall distress, was calculated by adding the total scores of the two sub-scales. This ranged between 0 and 42. Higher composite score was suggestive of higher overall distress.

Multidimensional Scale of Perceived Social Support (MSPSS). MSPSS (Zimet *et al.*, 1988) was made up of 12 items that were measured on a 7-point scale, ranging in the degree of agreement (1 = Very Strongly Disagree, 7 = Very Strongly Agree). The items were in the form of statements about support received from different social support agents. MSPSS (Appendix A2) had three sub-scales. Each sub-scale comprised 4 items. The sub-scales measured the levels of support that the respondent perceived as receiving from three sources—family (e.g., I can talk about my problems with my family), friends (e.g., My friends really try to help me), and significant other (e.g., There is a special person in my life who cares about my feelings). The developers (Zimet *et al.*, 1988) had reported the psychometric properties of MSPSS. In terms of reliability, Cronbach's alpha indicating internal consistency was found to be .91 for the significant other sub-scale, .87 for the family sub-scale, .85 for the friends sub-scale and .88 for the whole scale. The validity estimation was based on correlating the MSPSS scores with the anxiety and depression scores obtained on the Hopkins Symptoms Checklist (HSCL). Significant negative correlations were found between MSPSS scores and HSCL anxiety and depression scores, whereby the authors deduced MSPSS to be a valid scale. The translation of MSPSS into Telugu was done using the standard procedure that involved translation and back translation.

Scoring. Each item received a score between 1 and 7, depending on the degree of agreement. The sum of the items on each sub-scale provided the score for that sub-scale. Items 3, 4, 8, and 11 came under the family sub-scale. The friends sub-scale included items 6, 7, 9, and 12. Items 1, 2, 5, and 10 were considered for the significant other sub-scale. The sub-scale scores ranged between 4 and 28. A total perceived social support score was obtained by adding the scores of the sub-scales such that it ranged between 12 and 84. The higher the aforesaid scores were, the higher were the respondent's levels of perceived social support on the whole scale and sub-scales.

Locus of Control checklist for CABG (LOCOCAB). LOCOCAB (Appendix A3) was developed for this study. It measured the extent to which the respondent believed that the illness, recovery, and problems related to CABG were controlled by oneself, doctors, others, or unknown others (i.e., fate/God/luck/chance/destiny). LOCOCAB listed 18 items with four response choices—myself (HLOC–Self), doctors (HLOC–Doctors), others (HLOC–Others), and fate/God/luck/chance/destiny (HLOC–Unknown others). The items were statements relating to issues about one’s current health condition. The checklist was used to ascertain the sources to which the respondent attributed the nature of and responsibility for her or his current cardiac condition. Items referred to different aspects relevant to a patient in wait of CABG such as psychological well-being (e.g., If my thoughts and feelings are in a negative direction, it is because of...), physical recovery (e.g., Improvement in my physical health condition is majorly influenced by...), adherence (e.g., The responsibility of following the prescribed exercise/walking schedule rests on...), and prognosis (e.g., Speeding up my recovery is in the hands of...). The respondent had to indicate whether oneself, others, doctors, or fate/God/luck/chance/destiny was/were responsible for the aspect described in a particular item. LOCOCAB was designed basing on the Multidimensional Health Locus of Control–Form C or MHLC–Form C (Wallston *et al.*, 1994). Since MHLC–Form C was found to have low reliability in the current target population during pilot testing (detailed explanation in Appendix B2), LOCOCAB was developed. LOCOCAB had items that dealt with issues similar to those on MHLC–Form C. However, the response format was changed from a frequency-based scale to a checklist wherein the respondent had to identify a single source of control that majorly affected the aspect described in the item. A total of 24 items were written initially. The 24-item form was presented to a panel of four Health Psychologists who were requested to indicate whether each item was ‘Relevant’ or ‘Not relevant’. The criterion for retaining items was that of absolute agreement among the four judges. Eighteen of the 24 items met this criterion and were finalised for LOCOCAB. Using Kuder-Richardson formula 20, internal consistency was found for the four health loci of control—HLOC–Self (.67), HLOC–Doctors (.49), HLOC–Others (.67), and

HLOC–Unknown others (.68). The translation of LOCOCAB into Telugu was done using the standard procedure involving translation and back translation.

Scoring. There were four sub-scale scores, each for one source of control, i.e., HLOC–Self, HLOC–Others, HLOC–Doctors, and HLOC–Unknown others. A score of 1 was assigned for each attribution. The total score for each source of control was the total number of attributions made to that source (e.g., If 12 out of 18 items were attributed to Others, the score for HLOC–Others was 12). The score on each sub-scale ranged between 0 and 18. A higher score was suggestive of higher locus of control in a particular source of control.

Adherence Scale for Cardiac Patients (ADSCAP). ADSCAP (Appendix A4) was developed by Hariharan, Thomas, and Rana (2015a). The published article on the development of ADSCAP is given in Appendix B1. The scale had 17 negative statements regarding adherence, to be rated on a 4-point scale that varied in terms of frequency (1 = Always, 4 = Never). The items were in the form of questions about different aspects of self-care for patients with heart disease. Each item was a statement of non-adherence (e.g., Did you decide not to take your medicine?). The aim of the scale was to assess the extent to which the respondent had adhered to the advice of the doctor in the preceding four weeks. The scale sought information about adherence concerning not just pharmacological therapy but also recommendations related to lifestyle. Based on the results of exploratory factor analyses (EFA), ADSCAP had 5 dimensions, viz., adherence to exercise which had 4 items (e.g., Did you fail to do your prescribed exercise/walking?), avoidance of health risk behaviours which had 4 items (e.g., Did you smoke/chew tobacco?), adherence to medication which had 3 items (e.g., Did you miss taking your medicine because you felt better?), adherence to diet which had 4 items (e.g., Did you eat oily food (such as papad, chips, etc.)?), and planned adherence and emergency care which had 2 items (e.g., Did you avoid consulting your doctor though you noticed some symptom that bothered you (e.g., pain in wound, swelling in ankles, breathlessness, chest pain, headache, etc.)?). ADSCAP had two additional questions which sought information on the dates of the patient's visit for the two scheduled post-CABG medical consultations, as these also constituted adherence to the doctor's advice. These two questions had four response categories (i.e., On the exact date given by the doctor, Delayed by 1–6 days, Delayed by a week, and Delayed by more than a week). The reliability of the scale was tested in terms of internal consistency. Cronbach's alpha of the 17-item scale was found to be .75. For the sub-scales, the internal consistency was seen to be .90 (adherence to exercise), .73 (avoidance of health risk behaviours), .79 (adherence to medication), .44 (adherence to diet) and .57 (planned adherence and emergency care). ADSCAP also demonstrated criterion validity, as its scores had significant negative correlations with the psychological distress scores of HADS. The validity of ADSCAP was further tested by administering a parallel form (ADSCAP-Caregiver) to the primary caregiver of the patient who independently reported the patient's adherence behaviour. No significant difference was found in the adherence levels reported by patients and caregivers (Hariharan *et al.*, 2015a). ADSCAP was translated into Telugu using the standard procedure which involved translation and back translation.

Scoring. Based on the ratings given by the participants, scoring was done. The score for each item ranged between 1 and 4. The overall adherence score was arrived at by summing the scores of the 17 items. This varied between 17 and 68. Higher the score in this range, greater was the overall adherence. Scores for the dimensions of adherence to exercise (items 9, 10, 11, and 12), avoidance of health risk behaviours (items 1, 8, 16, and 17), and adherence to diet (items 3, 4, 14, and 15) ranged between

4 and 16. For the adherence to medication dimension (items 2, 6, and 7), the score ranged between 3 and 12. The score for the dimension of planned adherence and emergency care (items 5 and 13) ranged between 2 and 8. Higher scores in the dimensions indicated higher adherence in the dimensions.

Biopsychosocial Prognosis Scale for CABG (BIPROSCAB). BIPROSCAB (Appendix A5) was developed by Hariharan, Thomas, and Rana (2015b – under peer review). It was constructed to measure, from a biopsychosocial perspective, the prognosis of patients who had undergone CABG. The period of CABG encompasses the medical condition of CAD, the psychological strains experienced in the form of uncertainty, and the social support found in one's attending family and friends. Each of these classes of factors may independently act as strengths or weaknesses, and may exert joint influence during the patient's surgical period and post-surgical recovery. BIPROSCAB attempted to gauge this composite and dynamic situation, with focus being distributed on the three dimensions of the biopsychosocial paradigm. Thus, the aim of BIPROSCAB was to trace the evolution of holistic prognosis from illness and surgery to wellness a month after CABG. A biopsychosocial assessment was planned to quantify the patient's prognosis in terms of the level of wellness after CABG. BIPROSCAB had 25 items, measured on a 5-point scale, ranging in terms of frequency (1 = Very often, 5 = Never). The items were in the form of statements about different problems relating to one's current health condition (e.g., I experienced some uneasiness in my chest). BIPROSCAB evaluated the nature of prognosis of the respondent based on her or his retrospective report of the frequency of symptoms during the month after CABG. The items described bio-physical problems (e.g., I experienced pain in the leg/arm where they had cut for surgery), psychological concerns (e.g., I felt very sad and low), and social consequences (e.g., I missed my social life) due to one's health condition. Through applying EFA, the developers found that BIPROSCAB had 9 dimensions, viz., post-CABG affect state measured by 4 items (e.g., I worried if my heart condition was normal), post-CABG anxiety with 5 items (e.g., I felt my heartbeat going fast), post-CABG physical pain with 3 items (e.g., I had pain in the chest where they had cut for surgery), discomfort in surgical sites with 3 items (e.g., I experienced numbness in the surgical site(s) in the leg/arm), worry about return to normalcy with 2 items (e.g., The pains or discomfort worried me), discomfort in the leg with 2 items (e.g., I noticed swelling in both my feet), CABG bio-social by-products with 2 items (e.g., My family/friends put restrictions on me because of surgery), constraints in socialising with 2 items (e.g., I experienced some pain or problem in breathing while talking), and infection and interference to routine life with 2 items (e.g., It was strenuous to bathe or dress myself). While the items were specific physical, psychological or social problems, they reflected the interdependent mind–body relationship. There were five additional questions in BIPROSCAB. The information sought through these questions contributed to the pace of recovery from surgery. One sought information about the number of days spent by the patient in the ICU, and the ward or room in the hospital after CABG. The response had to be given as an exact whole number of days. Two questions respectively asked whether the respondent felt physically and mentally confident to return to her or his normal routine activities. The respondent had to answer 'Yes' or 'No' here. The last two questions sought information on post-surgery infections and re-hospitalisation respectively. The responses were recorded in 'Yes' or 'No' format. The internal consistency values for BIPROSCAB were .73 (whole scale), .71 (post-CABG affect state), .54 (post-CABG anxiety), .44 (post-CABG physical pain, and CABG bio-social by-products), .41 (discomfort in surgical sites, and worry about return to normalcy), .36 (discomfort in the leg), .33 (constraints in socialising), and .18 (infection and interference to routine life). BIPROSCAB also had criterion validity, based on significant negative correlations (*r* significantly ranged from -.18 to -.71) found between prognosis scores (overall and dimension-wise) and psychological distress scores of HADS (Hariharan *et al.*, 2015b – under peer review). BIPROSCAB was translated into Telugu using standard translation and back translation procedures.

Scoring. The overall prognosis score was arrived at by summing the scores on all items. This overall score varied between 25 and 125. Higher the score, better was the overall prognosis. For the post-CABG affect state dimension (items 9, 16, 20, and 23), the score ranged between 4 and 20. The score for the dimension of post-CABG anxiety (items 1, 3, 6, 10, and 12) varied between 5 and 25. For the post-CABG physical pain (items 11, 19, and 24) and discomfort in surgical sites dimensions (items 7, 13, and 21), scores were in the range of 3–15. The scores for the dimensions of worry about return to normalcy (items 2 and 25), discomfort in the leg (items 5 and 15), CABG bio-social by-products (items 4 and 22), constraints in socialising (items 14 and 18), and infection and interference to routine life (items 8 and 17) ranged between 2 and 10. Higher score in a dimension implied better prognosis in that dimension.

Patient Personal Details Form. This form (Appendix A6) sought demographic, medical, and contact information that were relevant for analyses and follow-up.

Interventions

The framework and contents of the modules for PACE and Relaxation are described below.

Programme for Affective and Cognitive Education (PACE). This audiovisual intervention (CD enclosed) was designed to enhance positive affect and strengthen the cognitive base of patients undergoing CABG. The programme consisted of an interaction involving a Cardiothoracic Surgeon, a successful CABG patient, and a Health Psychologist. The affect part was taken care of by including a patient who had successfully undergone CABG and could give helpful tips in coping with surgery and the aftermath. This was reinforced by the Health Psychologist who touched upon not only the biomedical aspects but also a number of relevant minute psychosocial concomitants such as dealing with anxiety and significance of social support. The cognitive aspect was handled by the Cardiothoracic Surgeon who provided information and explained the logic behind significant biomedical matters related to CABG. Further, the Surgeon also related the common experiences that he had witnessed with patients of CABG. PACE was so-called because in a short duration, it endeavoured to bear a transformative effect on the participant's cognitions and affect, leading to optimal behaviour for the purpose of successful CABG. The rationale was that many apprehensions, once addressed, would bring down the levels of anxiety and strain. Further, a strong knowledge base which created the right understanding of the problem, the disease condition and the post-CABG condition would enhance insight into the process and create motivation, leading to optimal adherence behaviour. Such an integrated programme targeting a particular behaviour of adherence necessitated the presentation about not simply what was being done during CABG, but also what was being experienced in CABG. The cognitive education in PACE was packed with the content on physiological changes and healing, procedures and risks involved, and self-care required for a patient of CABG. Simultaneously, the discussion on the emotional and coping experience during and after CABG formed the affective guidance in PACE. Two audiovisual recordings were made for pre-surgery and pre-discharge phases. The programme was available in Telugu and English. In order to ensure a better identification with the peer by the patient, the gender of the peer was matched with that of the patient.

Role of peer. In narrating her or his personal experience of CABG, the peer shed light on the physical, emotional and practical concerns of a patient during the periods of surgery and recovery. She or he highlighted the vulnerability encountered and the resilience demonstrated. For a new patient, this would constitute not a mere description but a realistic understanding about the situation one was personally experiencing, a suggestion of the expected challenges and potential problem-solving strategies, a reinforcement of the hope of survival and success in surgery, and an espousal of motivation and self-confidence to actively participate in the recovery process. In short, the involvement of the peer was expected to provide empathetic support and facilitate vicarious conditioning wherein the new patient learnt about and internalised from the peer the possible ways to cope with and make sense of CABG. Yet, the peer's narration was non-directive, i.e., she or he did not assert her or his experience as the only possible one, but encouraged the participant to maximise one's psychosocial resources for a positive surgery experience. While the peer had progressed ahead of the new patient in terms of recovery, she or he admitted being still in the process, as self-care in heart disease is a lifelong undertaking that presents challenges and achievements at different times in different contexts. Thus, the new patient could still relate to the peer being one of her or his kind, and aim to match up to the peer's success. The affective frame of reference was thus strengthened with the presence of the peer.

Role of Cardiothoracic Surgeon. The Cardiothoracic Surgeon was introduced in the discussion to elaborate on the facts relating to CABG. Being the technical expert, he intended to dispel misconceptions surrounding the method of CABG, the nature and duration of recovery, and the changing statuses of the patient during and after surgery. As one who had encountered numerous patients, the Surgeon delineated the different experiences and outcomes possible for a patient, based on her or his physiological and psychosocial characteristics as well as the Surgeon's contribution. The Surgeon emphasised on the limitations of his efforts in the absence of participation by the patient and her or his family. This transparent disclosure was meant to induce in the patient a sense of mutual teamwork for achieving successful recovery. The inputs of the Surgeon in PACE were intended to lessen ambiguity and inculcate reassurance through creating optimal health cognitions.

Role of Health Psychologist. The Health Psychologist handled the dual moderator and expert role. She exercised neutrality as a third-party observer trying to understand the milieu of CABG. The moderator thus worked to juxtapose the peer and Surgeon's accounts, and probed aspects where relevant. Simultaneously, she drew attention to psychosocial constraints and strengths that bear significance for a patient during surgery and recovery. Hence, the Health Psychologist steered the discussion to illuminate the holistic biopsychosocial picture of CABG.

Content of PACE modules. Each discussion (one for male patients and another for female patients) was divided into two 20-minute modules—pre-surgery and pre-discharge. The key points focussed on during the pre-surgery module related to major fears and state of mind, coping strategies, hospital procedures, perceived sources of success for CABG, role of social support and immediate experiences following CABG, as explained by the peer. The Surgeon simultaneously threw light on the rate of success of CABG, techniques of surgery, importance of the patient's level of awareness, expected cooperation from the patient and the family during hospital stay, and expected experiences following CABG. In sum, the pre-surgery module outlined the preparation for CABG, the process of surgery, and the post-operative hospital stay in order to endorse the participant's choice for CABG and encourage the participant to fulfil her or his role while in the hospital. In the pre-discharge module, the peer spoke about the areas of adherence, usefulness of review consultations, fears and coping strategies after surgery, return to normal life, role of family support, and overall impact of CABG on her or his life. The Surgeon focussed on the time and process of recovery after surgery, self-care regimen, importance of review consultations, handling of fears on returning home, resumption of normal activities, and expected prognosis after CABG. The pre-discharge module, covering post-surgery adherence, review consultations and normal routine activities, motivated the participant to sustain the success of CABG through exercising active self-care.

Relaxation. This intervention (CD enclosed) consisted of audio instruction by a senior Clinical Psychologist using the technique of Guided Imagery wherein suggestions were provided to relax the participant at the somatic and affective levels. Guided Imagery is a standard method used for relaxing the person by involving all the sense organs. The logic is that the patient in the pre-CABG phase tends to have anxiety, apprehension, and fears which are typically not elaborately addressed in hospitals. Guided Imagery works on the principle of classical conditioning wherein the associative value of the evoked pleasant sensory experience triggers relaxation of the musculoskeletal and psychological states. Suggestions are narrated to prompt images and experiences in the mind of the participant undergoing Guided Imagery from her or his exclusive mental repertoire. In this way, the individual relives positive sensations and imageries from her or his life. This process acts as a personalised coping strategy in a stressful situation such as surgery. The calm achieved through the visualisation of the given suggestions further relaxes one’s breathing pattern, heart rate, and blood pressure. Therefore, although the imminence of CABG and its outcomes might be perceived as uncertain and anxiety-provoking, Guided Imagery aims to espouse an alternative physiological and affective state. In so doing, the principle of reciprocal inhibition comes into play as one intuitively recognises that the relaxation experienced through visualisation contradicts and lessens the concurrent anxiety being experienced. Altogether in this technique, the participant’s visualisation of the given pleasant suggestions was meant to positively manoeuvre bodily and mental processes. The intervention was developed in Telugu and English.

Content of Relaxation modules. A Clinical Psychologist was involved for developing the audio programme. He presented suggestions describing the beauty of nature in a pleasant tone, modulating his voice where appropriate. Specifically, the 18-minute module sought to help the patient in visualising her or his exploration of a hill station. Before suggestions were provided, the nature of visualisation was explained by him so that the participant engaged all the sense organs and holistically experienced the situation. The scenery evoked included different elements of nature to be envisaged in different sensory modalities. The suggestions helped the patient travel from a guesthouse through the landscapes of a fresh lawn, a lush forest, and a clear pond towards the snowy mountains. Throughout this expedition, the participant was suggested to experience the smells, sounds, sights and the feel of the vibrant flora and fauna therein. Intermittently, the participant was directed to focus on her or his body, and sense the changes such visualisation was bringing about so that she or he appreciated the association between the two. A pause of 1.5 minutes was provided after 15 minutes of suggestions during which the participant could silently reflect on the relaxation experience at the mental and bodily levels. The concluding suggestions thereafter reiterated the state of tranquillity created in one’s mind and body through visualisation. The participant was then transported back to the room where she or he was lying down in, with a concluding suggestion which asserted that the relaxed state would sustain as long as the participant willed it to, regardless of changing circumstances. The module was so-designed that by the end of it the participant would have visualised the situation, achieved a state of relaxation, and learnt the association between visualisation and relaxation.

Procedure

The procedure is explained hereunder with reference to ethical clearance and permissions, development of interventions, pilot testing, and main study.

Ethical clearance and permissions. The necessary clearance was obtained from the Institutional Ethics Committee at the University of Hyderabad (Appendix C1) before the commencement of pilot testing. In order to use the scales available in literature, the investigator ensured that required permissions were acquired. MHLC–Form C (used only for pilot testing) and MSPSS were available in the public domain, and hence were used without seeking permission from the respective authors. For HADS, the mandatory licence for the required number of administrations in the pilot as well as the main studies was purchased by the investigator from GL Assessment (Appendices C2.1 and C2.2). The translation of HADS into Telugu was obtained from Mapi Research Trust. To finalise the sites for data collection, the investigator approached the concerned administrative authorities at five corporate hospitals in Hyderabad that had the facility for CABG. All of these hospitals agreed to permit data collection for the study in their premises. They were requested to sign and seal on the request letter addressed to them (Appendix C3). The investigator was then introduced to the Cardiothoracic Surgeons at these hospitals. They were given the Doctor Information Sheet (Appendix C4). Surgeons willing to participate were required to sign the Doctor Informed Consent Form (Appendix C5). Based on pilot study observations of patient volume, four of the five hospitals were finalised for main study data collection.

Development of interventions. The intervention modules for PACE and Relaxation were specifically developed for this study.

PACE. The audiovisual recordings of PACE were undertaken at a professional multimedia studio on two days with the two panels respectively. The programme involving the first panel (with a male peer) targeted male participants while the programme involving the second panel (with a female peer) targeted female participants. Since it was not feasible to recreate this forum and discussion live for each participant in the PACE group during data collection, the discussions within these two panels were separately recorded for standardised audiovisual presentation. Written individual consent was obtained from the Health Psychologist, Cardiothoracic Surgeons and peer patients (Appendices C6.1–C6.3). The duration of the original discussion (pre-surgery and pre-discharge together) was about 70 minutes each for the two panels. The recording of each panel was edited thrice, using inputs from experts in the fields of Health Psychology and multimedia production, to develop two modules (pre-surgery and pre-discharge) separate for male and female participants, each lasting 20 minutes. The language of the discussions was Telugu. English subtitles were integrated into the final version of the modules.

Relaxation. The Guided Imagery modules were recorded at a professional radio station. Since it was not practical to have the same Clinical Psychologist with identical suggestions for all the participants in the Relaxation group, the intervention module was recorded for standardised audio presentation. Written consent was sought from the Clinical Psychologist (Appendix C7). The suggestions were recorded in Telugu and English. Minor editing was done to match the content and maintain a similar duration of 20 minutes for the Telugu and English modules. The investigator who administered the Relaxation intervention using the recorded Guided Imagery module in the field had undergone a month's training in relaxation techniques, under the aegis of the Clinical Psychologist who recorded the module.

Pilot study. The pilot study was conducted with three major objectives: (i) To test the effectiveness and feasibility of psychosocial intervention with patients undergoing CABG (ii) To examine the feasibility of applying the proposed research design (iii) To test the existing and newly developed tools. The salient changes incorporated in the main study based on the pilot study results are presented in brief here. The detailed report of the pilot study in terms of method and results is included in Appendix B2. A publication related to the pilot study is given in Appendix B3.

The results of the pilot study clearly indicated the feasibility of the psychosocial intervention modules of PACE and Relaxation. The PACE and Relaxation groups were willing and able to engage in the 60-minute assessment+intervention session. In addition to the three groups of PACE, Relaxation and Control, the pilot study involved a fourth group receiving both PACE and Relaxation interventions (called the P+R group). The P+R programme typically required 90 minutes for administering the PACE and Relaxation interventions consecutively after assessment. At times, this interfered with the hospital schedule for patients as they had to be moved to labs for pre-CABG medical investigations. While the attending hospital staff allowed up to an hour altogether for psychological assessment+intervention, the P+R programme had to be terminated in between, for medical investigations. In such cases, the investigator had to wait up to three hours for the patient's return to administer the Relaxation intervention. It also resulted in the intervention being extended into the late evening or the night before CABG, which was again interrupted if the patient had visitors. The patient was also observed to have fatigue owing to two consecutive interventions. The investigator noted a number of practical problems in administering the two consecutive interventions for the P+R group that resulted in interruption and fatigue for participants. Statistical analyses of group differences indicated that the P+R group significantly differed from the Control group only in terms of mean depression score at the first review, while the PACE group significantly differed from the Control group on mean anxiety scores at the first and second reviews, the mean depression score at the first review and mean prognosis score. There was also a significant difference between the Relaxation and Control groups on mean adherence scores. However, the P+R group did not significantly differ from the PACE and Relaxation groups on any post-intervention variable.

The pilot study suggested modification in the research design. A pretest-posttest non-equivalent control groups design was used for the pilot study to compare three experimental groups with a control group. In view of the above results and observations revealing the limitations of the combined intervention group (P+R), it was decided that the P+R group would be dropped in the main study. Thus, the design of the study was modified (as given in Table 3.1) so as to enhance its feasibility.

The assessment tools used during the pilot study were HADS, MSPSS, BIPROSCAB, MHLC–Form C (Appendix A7), 20-item Adherence Scale for Cardiac

Patients (ADSCAP–20; Appendix A8), and Doctor's Rating Scale of CABG Prognosis (DORSCAP; Appendix A9). Being the first measurement, reliability analyses of the scales were carried out during the pilot study. The following changes were made in the research tools depending on the results of the pilot study:

Tools dropped. DORSCAP, which obtained doctors' ratings of their patients' post-CABG prognosis, was dropped because it lacked the power to discriminate among patients on the dependent variable of doctor-rated prognosis. The mean scores of the four groups on DORSCAP were not significantly different although the groups significantly differed on BIPROSCAB scores (patient-rated prognosis). MHLC–Form C was modified given that two of its four sub-scales (internal and doctors), which comprised dimensions relevant in the case of surgery patients, had low reliability (Cronbach's alpha = .50 and .05 respectively). As a result, LOCOCAB (elaborately described on pp. 100–102) was developed by modifying MHLC–Form C.

Tools finalised. HADS and MSPSS were found to be reliable for use. HADS, as a whole, had Cronbach's alpha of .80, while the subscales of anxiety and depression had Cronbach's alpha of .75 and .65 respectively. The subscales of MSPSS had Cronbach's alpha ranging between .74 and .89, while that of the whole scale was .84. Participants reported no difficulty in responding to HADS and MSPSS. The reliability of ADSCAP–20 was assessed on a sample of 200 cardiac out-patients. The internal consistency or Cronbach's alpha was found to be .67 for this scale. EFA, using principal component analyses with varimax rotation, were computed. When three items were deleted, the internal consistency of the final 17-item ADSCAP was noted to be .75. Further, the results of EFA revealed a 5-factor structure indicating five dimensions for adherence, viz., adherence to exercise, avoidance of health risk behaviours, adherence to medication, adherence to diet, and planned adherence and emergency care (Hariharan *et al.*, 2015a). Based on the investigator's observation, examples were added to items 3, 4 and 14 in the finalised ADSCAP. The reliability of BIPROSCAB was tested on a sample of 200 out-patients who had been subjected to CABG. The internal consistency or Cronbach's alpha was found to be .73 for this scale. No item was dropped. EFA, using principal component analysis with varimax rotation, was run. Nine dimensions of prognosis evolved, viz., post-CABG affect state, post-CABG anxiety, post-CABG physical pain, discomfort in surgical sites, worry about return to normalcy, discomfort in the leg, CABG bio-social by-products, constraints in socialising, and infection and interference to routine life. Based on the investigator's observation, the language was simplified and elaborated for certain items. In light of the above, the tools finalised for the main study were HADS, MSPSS, LOCOCAB, ADSCAP, and BIPROSCAB.

Main study. Data for the main study were collected from 300 participants at four hospitals where permissions for access were taken.

Process of recruitment. A patient who fulfilled the inclusion criteria for this study was approached for recruitment a day before CABG. The investigator visited each potential participant in her or his respective ward or room. After a brief introduction and rapport building by the investigator, the patient was requested to read the Patient Information Sheet (Appendix C8) and clarify any doubts with the investigator. If she or he was willing, the patient was asked to sign the Patient Informed Consent Form (Appendix C9). In cases of non-literate patients, their literate attendant who was present at the time of recruitment was asked to read the Patient Information Sheet. If the patient and the attendant were willing, the patient affixed a thumb impression or sign (if she or he had learnt to write her or his name) on the Patient Informed Consent Form, following which the attendant was requested to sign as the witness. The participant's details were collected using the Patient Personal Details Form.

Administration of assessments and interventions. The pre-surgery assessment consisting of the individual administration of HADS, MSPSS, and LOCOCAB was conducted after recruitment. This lasted about 30 minutes. The patient was then sequentially assigned to a group. For example, the first participant was included in the PACE group, the second was a part of the Relaxation group, the third fell into the Control group, and so on with the other participants. If the participant was in the PACE group, the pre-surgery module was individually administered in the preferred language (English or Telugu) using a tablet computer. Instructions were given to maintain attention for the 20-minute intervention. After the session, the participant was encouraged to follow the recommendations given by the panel in the video. Suppose the participant was in the Relaxation group, the Guided Imagery module was individually administered in the preferred language (English or Telugu) using a tablet computer. Instructions were given prior to the 18-minute intervention to lie down on the bed in a free and comfortable position, close the eyes, breathe comfortably, and focus on the suggestions to the extent possible. After the session, the participant was asked to gradually open the eyes and allow some time before getting up from her or his position. The participant was encouraged to recall and sustain the relaxed mode until the next session. The Control group did not receive any psychosocial intervention. These participants received the standard medical treatment only. At the end of the session, participants in all the groups were thanked and wished the best for CABG.

A patient typically returned to her or his respective ward or room from the ICU in 2–3 days after CABG, and stayed in the ward or room for another 3–4 days.

On the day preceding discharge, the investigator visited the participant again. Those in the PACE group individually received the pre-discharge module in the preferred language (English or Telugu) on a tablet computer. Instructions were given to maintain attention for the 20-minute intervention. After the session, the participant was encouraged to follow the recommendations given by the panel in the video. A DVD containing the pre-discharge intervention in the preferred language (English or Telugu) was given to the participants in the PACE group before discharge to help reinforce their understanding of post-operative care at home. The Relaxation group participants received the same Guided Imagery module that was administered for pre-surgery intervention. This was done to enable the participant to learn the technique of Relaxation through repeated exposure. Instructions were given prior to the 18-minute intervention to lie down on the bed in a free and comfortable position, close the eyes, breathe comfortably, and focus on the suggestions to the extent possible. After the session, the participant was asked to gradually open the eyes and allow some time before getting up from her or his position. The participant was encouraged to recall and sustain the relaxed mode until the next session. The Relaxation programme was so-designed that the participant would be able to learn and independently engage in the technique after two sessions that were supervised by the investigator at the hospital. A CD containing the Guided Imagery module in the preferred language (English or Telugu) was given to each participant in the Relaxation group before discharge to facilitate continual practice of the technique at home. As regards the Control group, the investigator briefly interacted with the participants, enquiring about their health. This group did not receive any intervention, CD, or DVD. Participants in all groups were wished a speedy recovery. Weekly reminders were given to the Relaxation group up to the second review, so that the participants practised Guided Imagery at least once a week. One reminder was given to the PACE group, so that the participants repeated viewing the pre-discharge intervention at least once in the month following discharge from hospital. This was to reinforce the affective support and health cognitions in this group. During the first review (a week after discharge from hospital) when participants visited their doctors for the first medical review, HADS was individually re-administered to all participants. The assessment took around 10 minutes. At the second review (six weeks after hospital discharge) when participants visited their doctors for the second medical review, all of them individually completed BIPROSCAB, ADSCAP and HADS. This required nearly 30 minutes. Participants were thanked and debriefed following this final assessment. At this point, the Control group participants were each offered a DVD of the pre-discharge PACE intervention, in order to satisfy the ethical obligation.

Qualitative data collection. Semi-structured interviews were individually carried out with 15 participants for a session lasting around 20–30 minutes after assessment during the second review. A semi-structured interview schedule (Appendix A10) was used by the investigator for conducting the interviews. At the end of the interviews, participants were debriefed and thanked.

Telephonic interviews. A sub-sample of 100 participants was individually interviewed via telephone five months after CABG to find out about the duration they each had needed to return to their normal routine activities.

Chapter IV

Results

Chapter IV

Results

The study essentially aimed at finding out the difference in the efficacy of two types of psychosocial intervention in comparison with standard hospital treatment (without psychosocial intervention) in patients undergoing CABG. The primary objective of the study sought to quantify the effect of psychosocial intervention on adherence and prognosis. One-way between groups ANOVA were computed for the differences across the groups in respect of adherence and prognosis. The groups (PACE, Relaxation, and Control) acted as the independent variable, while adherence and prognosis represented the dependent variable in separate analyses. Other parametric and non-parametric tests were applied on supplementary questions related to adherence and prognosis to substantiate the results of ANOVA.

Another objective of the study was to understand the impact of psychosocial intervention on the reduction of psychological distress across time in patients subjected to CABG. The study was so-designed to compare the psychological distress of patients at three points of time within each group. Paired samples *t*-tests were carried out, holding time-points as the independent variable and psychological distress as the dependent variable for each group. Thereafter, the groups were compared by means of one-way between groups ANOVA, in terms of the changes in psychological distress across the three time-points of the study. The groups served as the independent variable while the change values of psychological distress between time-points within the groups were taken as the dependent variable.

The study also planned to identify the factors that contributed to adherence and prognosis. An attempt was made to investigate if the factors directly contributed to adherence and prognosis, or followed a path in doing so. Accordingly, path analyses were conducted through a series of multiple regression analyses to evolve comprehensive models that explained the mechanism and trajectory of impact of the two types of psychosocial intervention on adherence and prognosis. For qualitative data, thematic analysis was done. The statistical results are reported in the order of the research objectives, followed by the qualitative findings.

Impact of Psychosocial Intervention on Adherence

Subsequent to CABG, the biomedical regimen requires patients to practise the prescribed advice concerning medication, diet and exercise. This adherence routine is known to hold a positive impact on prognosis. In the present study which was based on the biopsychosocial perspective, the administration of psychosocial intervention was proposed in order to enhance adherence and thereby prognosis. Therefore, the first objective was to determine whether psychosocial intervention had led to improvements in different dimensions of adherence. Accordingly, one-way between groups ANOVA were calculated to identify the impact of psychosocial intervention on adherence, and further to compare the efficacy of the PACE and Relaxation interventions, relative to Control (no intervention), in terms of overall adherence and its dimensions.

Scores on ADSCAP provided information on patients' levels of overall adherence, adherence to exercise, avoidance of health risk behaviours, adherence to medication, adherence to diet, and planned adherence and emergency care. Higher scores indicated higher adherence. The mean scores of the three groups for overall adherence and its dimensions are presented in Table 4.1. There was a significant effect of the groups on overall adherence, $F(2, 297) = 62.85$, $p < .001$. The effect size was large (η^2 = .30). Table 4.2 comprises the post-hoc comparisons of mean scores using Tukey's HSD test. Based on these analyses, it was found that the mean overall adherence scores of the three groups were significantly different from each other (p < .001). Accordingly, the PACE group had the significantly highest mean overall adherence score (M = 67.39, SD = 1.01), the Relaxation group fared second (M = 65.62, SD = 1.80) and the Control group had the lowest mean overall adherence score (M = 64.04, SD = 3.03).

The ANOVA results revealed that the effect of the groups was also significant for four of the five dimensions of adherence. On the adherence to exercise dimension, the groups exerted a significant effect, $F(2, 297) = 58.22$, $p < .001$. The effect size was large (η^2 = .28). Post-hoc analyses with Tukey's HSD test revealed that the mean scores of the three groups were significantly different from each other (p < .001). The PACE group had the significantly highest mean score (M = 15.63, SD = 0.98), followed by the Relaxation group (M = 14.38, SD = 1.67) and the Control group (M = 13.06, SD = 2.18). With respect to the avoidance of health risk behaviours dimension, the effect of the groups was found to be significant, $F(2, 297) = 4.11$, $p < .05$. The effect size was small (η^2 = .03). By comparing mean scores using Tukey's HSD test, only the PACE group's mean score (M = 16.00, SD = 0.00) was significantly higher than the Control group's mean score (M = 15.91, SD = 0.38), $p < .05$. The mean score of the Relaxation group did not significantly differ from those of the other two groups. With regard to the adherence to diet dimension, a significant effect of the groups was observed, $F(2, 297) = 7.93$, $p < .001$. The effect size was small (η^2 = .05). Post-hoc comparisons of mean scores applying Tukey's HSD test revealed that the PACE group's mean score (M = 15.78, SD = 0.48) was significantly higher than that of the Relaxation group (M = 15.39, SD = 0.91), $p < .05$. The PACE group (M =

15.78, SD = 0.48) also scored significantly higher than the Control group (M = 15.26, SD = 1.31), $p < .001$. On the planned adherence and emergency care dimension, there was a significant effect of the groups, $F(2, 297) = 4.30$, $p < .05$. The effect size was small ($\eta^2 = .03$). Using Tukey's HSD test to compare the groups' mean scores, it was found that only the PACE group (M = 7.98, SD = 0.14) had a significantly higher mean score than the Control group (M = 7.86, SD = 0.40), $p < .05$. The Relaxation group did not show significant differences from the other groups. There was no significant effect of the groups in the dimension of adherence to medication.

The trends in adherence across the groups are plotted in Figure 4.1. In overall and dimension scores, the PACE group stood out as the most adherent group. Differences between the Relaxation and Control groups were not visually evident consistently even though the former group typically had higher scores.

Adherence to scheduled review visits constitutes a part of clinical adherence. ADSCAP gave additional information about patients' adherence to dates prescribed for two medical reviews after CABG. This data is presented as a frequency cross-tabulation for chi-square analyses (Table 4.3). The association between the groups and adherence to first review visit was significant, $\chi^2(2, N = 300) = 10.68$, $p < .01$. Higher percentage of participants in the PACE group (94%), and lower percentage of participants in the Relaxation group (82%) and the Control group (78%) attended the first review on the exact date. The rate of adherence to first review was the highest in the PACE group and lowest in the Control group (Figure 4.2). For the second review however, there was no significant association between the groups and adherence.

Adherence is closely linked to prognosis. Logically, if the groups significantly differed in adherence, they are expected to differ in prognosis too. It will be of interest to observe if the groups significantly differed in prognosis, in the next section.

Table 4.1

Mean, standard deviation, F, and η^2 values for adherence across the three groups

	***M* (*SD*)**			***F*(2, 297)**	η^2
	PACE	Relaxation	Control		
Overall adherence	67.39 (1.01)	65.62 (1.80)	64.04 (3.03)	62.85***	.30
Adherence to exercise	15.63 (0.98)	14.38 (1.67)	13.06 (2.18)	58.22***	.28
Avoidance of health risk behaviours	16.00 (0.00)	15.98 (0.14)	15.91 (0.38)	4.11*	.03
Adherence to medication	12.00 (0.00)	11.99 (0.10)	11.95 (0.26)	2.69	.02
Adherence to diet	15.78 (0.48)	15.39 (0.91)	15.26 (1.31)	7.93***	.05
Planned adherence and emergency care	7.98 (0.14)	7.88 (0.33)	7.86 (0.40)	4.30*	.03

Note. *p < .05, ***p < .001

Table 4.2

Mean comparisons using Tukey's HSD test between the three groups for adherence

	P – R	**P – C**	**R – C**
Overall adherence	1.77***	3.35***	1.58***
Adherence to exercise	1.25***	2.57***	1.32***
Avoidance of health risk behaviours	0.02	0.09*	0.07
Adherence to diet	0.39*	0.52***	0.13
Planned adherence and emergency care	0.10	0.12*	0.02

Note. P = PACE group, R = Relaxation group, C = Control group
*p < .05, ***p < .001

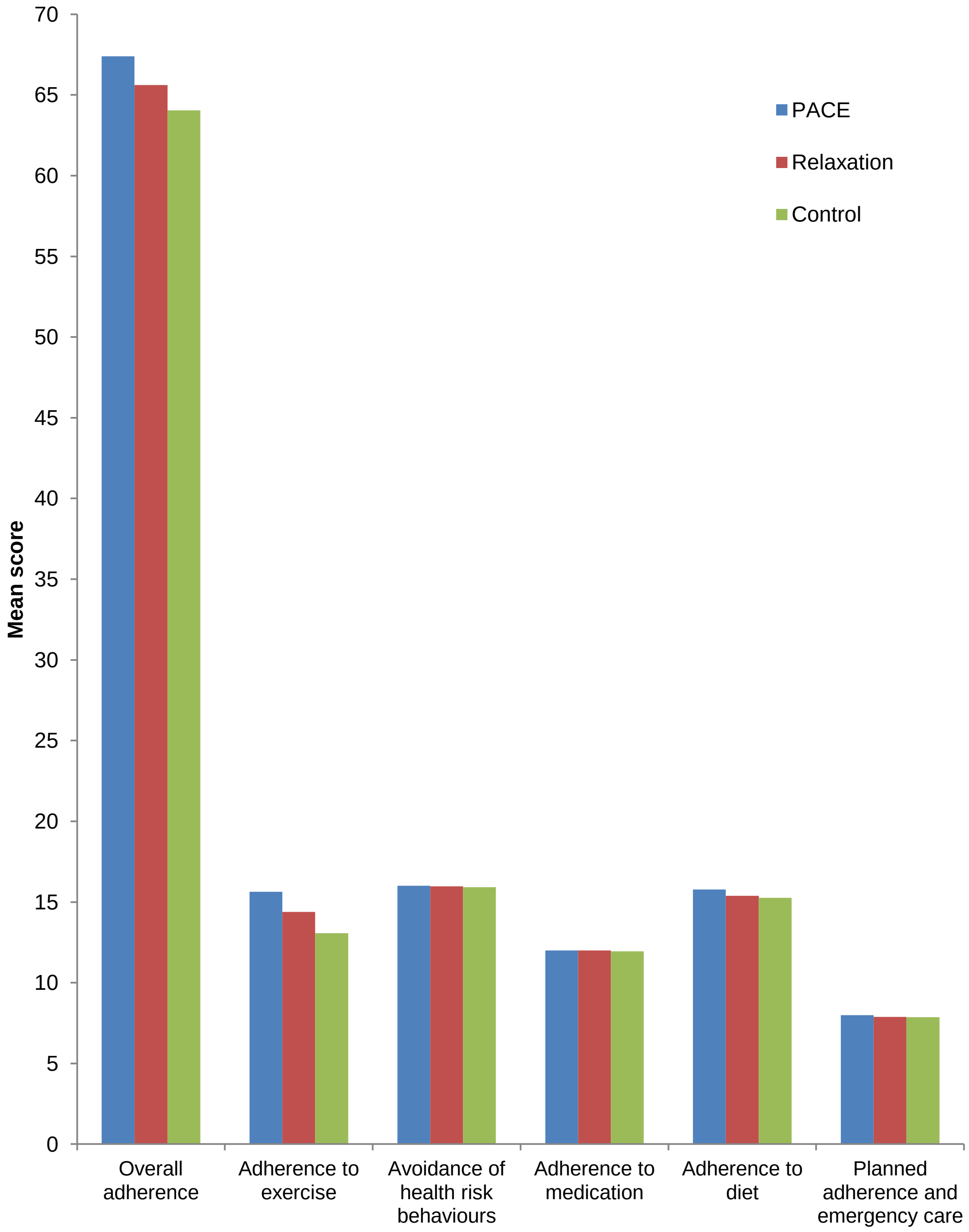


Figure 4.1 Means of the three groups for overall adherence and its dimensions

Table 4.3

Frequency cross-tabulation of patients adhering to review visit dates across the groups

	Exact date visit		Delayed visit#		Total		χ^2
	O (E)	%	O (E)	%	O (E)	%	
First review							
PACE	94 (84.7)	94%	6 (15.3)	6%	100 (100.0)	100%	
Relaxation	82 (84.7)	82%	18 (15.3)	18%	100 (100.0)	100%	10.68**
Control	78 (84.7)	78%	22 (15.3)	22%	100 (100.0)	100%	
Total	254 (254.0)	84.7%	46 (46.0)	15.3%	300 (300.0)	100%	
Second review							
PACE	79 (76.7)	79%	21 (23.3)	21%	100 (100.0)	100%	
Relaxation	82 (76.7)	82%	18 (23.3)	18%	100 (100.0)	100%	5.18
Control	69 (76.7)	69%	31 (23.3)	31%	100 (100.0)	100%	
Total	230 (230.0)	76.7%	70 (70.0)	23.3%	300 (300.0)	100%	

Note. O = Observed frequency, E = Expected frequency
#Delayed by 1–6 days, a week, or more than a week
**p < .01

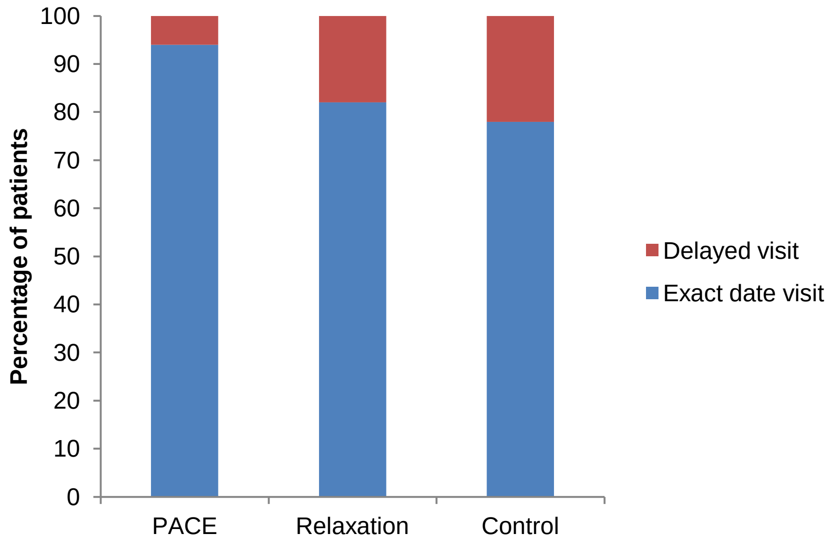


Figure 4.2 Percentage of patients adhering to the first review visit date across the three groups

Impact of Psychosocial Intervention on Prognosis

The first objective of the study also aimed to compare the two psychosocial intervention groups and the Control group on prognosis. In fact, the decisive outcome of the present study was prognosis. For this purpose, one-way between groups ANOVA were carried out. Data regarding patients' prognosis was obtained through BIPROSCAB. Higher scores on the scale suggested higher levels of prognosis. Table 4.4 presents the results of ANOVA on overall prognosis as well as its dimensions. There was a significant effect of the groups on mean overall prognosis scores, $F(2, 297) = 92.67$, $p < .001$, and the effect size was large ($\eta^2 = .38$). Post-hoc analyses based on Tukey's HSD test are presented in Table 4.5. It was found that the means of the three groups significantly differed from each other ($p < .001$). The PACE group achieved the significantly highest mean overall prognosis score ($M = 113.45$, $SD = 5.78$). The mean overall prognosis score of the Relaxation group followed next ($M = 103.05$, $SD = 8.92$). The Control group had the significantly lowest mean overall prognosis score ($M = 96.92$, $SD = 10.64$).

It is apparent from Table 4.4 that the three groups significantly differed not only on overall prognosis but also on all its nine dimensions. As evident from Table 4.5 that depicted the results of Tukey's HSD test, significant differences were observed between the PACE and Relaxation groups on all dimensions except that of infection and interference to routine life. Nonetheless, the PACE group differed from the Control group on all nine dimensions. However, differences between the Relaxation and Control groups were observed to be limited only to five out of nine dimensions.

Table 4.4

Mean, standard deviation, F, and η^2 values for prognosis across the groups

	M (*SD*)			***F*(2, 297)**	η^2
	PACE	Relaxation	Control		
Overall prognosis	113.45	103.05	96.92	92.67***	.38
	(5.78)	(8.92)	(10.64)		
Post-CABG affect state	19.87	19.27	18.44	17.49***	.11
	(0.49)	(1.61)	(2.46)		
Post-CABG anxiety	22.50	19.94	18.44	41.21***	.22
	(2.55)	(3.11)	(3.80)		
Post-CABG physical pain	13.00	11.49	9.74	43.38***	.23
	(2.03)	(2.53)	(2.81)		
Discomfort in surgical sites	11.06	9.01	8.88	11.61***	.07
	(3.52)	(3.89)	(3.33)		
Worry about return to normalcy	9.60	8.61	7.98	21.97***	.13
	(0.88)	(1.79)	(2.27)		
Discomfort in the leg	8.90	7.82	7.60	10.33***	.07
	(1.61)	(2.56)	(2.21)		
CABG bio-social by-products	9.67	9.03	8.96	8.35***	.05
	(0.91)	(1.54)	(1.52)		
Constraints in socialising	9.97	9.57	9.26	10.92***	.07
	(0.30)	(1.09)	(1.48)		
Infection and interference to routine life	8.88	8.31	7.62	10.93***	.07
	(1.71)	(2.03)	(1.97)		

Note. ***$p < .001$

Table 4.5

Mean comparisons using Tukey's HSD test between the three groups for prognosis

	P – R	**P – C**	**R – C**
Overall prognosis	10.40***	16.53***	6.13***
Post-CABG affect state	0.60*	1.43***	0.83**
Post-CABG anxiety	2.56***	4.06***	1.50**
Post-CABG physical pain	1.51***	3.26***	1.75***
Discomfort in surgical sites	2.05***	2.18***	0.13
Worry about return to normalcy	0.99***	1.62***	0.63*
Discomfort in the leg	1.08**	1.30***	0.22
CABG bio-social by-products	0.64**	0.71**	0.07
Constraints in socialising	0.40*	0.71***	0.31
Infection and interference to routine life	0.57	1.26***	0.69*

Note. P = PACE group, R = Relaxation group, C = Control group
*$p < .05$, **$p < .01$, ***$p < .001$

Examining the specific components of BIPROSCAB is important to understand the prognostic areas where group differences existed. In the dimension of post-CABG affect state, the groups had a significant effect, $F(2, 297) = 17.49$, $p < .001$. The effect size was medium ($\eta^2 = .11$). Post-hoc analyses applying Tukey's HSD test revealed that the PACE group's mean score ($M = 19.87$, $SD = 0.49$) was significantly higher than that of the Relaxation group ($M = 19.27$, $SD = 1.61$), $p < .05$. The PACE group ($M = 19.87$, $SD = 0.49$) also scored significantly higher than the Control group ($M = 18.44$, $SD = 2.46$), $p < .001$. The Relaxation group ($M = 19.27$, $SD = 1.61$) had a significantly higher mean score than the Control group ($M = 18.44$, $SD = 2.46$), $p < .01$.

With respect to the dimension of post-CABG anxiety, the effect of the groups was found to be significant, $F(2, 297) = 41.21$, $p < .001$. A large effect size was noted ($\eta^2 = .22$). By using Tukey's HSD test, it was observed that the PACE group had a significantly higher mean ($M = 22.50$, $SD = 2.55$) than the Relaxation group ($M = 19.94$, $SD = 3.11$), $p < .001$. The PACE group ($M = 22.50$, $SD = 2.55$) also scored significantly higher than the Control group ($M = 18.44$, $SD = 3.80$), $p < .001$. The mean score of the Relaxation group ($M = 19.94$, $SD = 3.11$) was also significantly higher than that of the Control group ($M = 18.44$, $SD = 3.80$), $p < .01$.

With regard to the dimension of post-CABG physical pain, a significant effect of the groups was observed, $F(2, 297) = 43.38$, $p < .001$, and the effect size was large ($\eta^2 = .23$). Post-hoc comparisons of mean scores applying Tukey's HSD test revealed that the three groups significantly differed from each other ($p < .001$). The PACE group had the significantly highest mean ($M = 13.00$, $SD = 2.03$), followed by the Relaxation group ($M = 11.49$, $SD = 2.53$) and last the Control group ($M = 9.74$, $SD = 2.81$).

When considering the dimension of discomfort in surgical sites, there was a significant effect of the groups, $F(2, 297) = 11.61$, $p < .001$. The effect size was medium ($\eta^2 = .07$). Using Tukey's HSD test to compare the groups' mean scores, it was found that only the PACE group had a significantly higher mean score ($M = 11.06$, $SD = 3.52$) than the Relaxation group ($M = 9.01$, $SD = 3.89$), $p < .001$. The PACE group ($M = 11.06$, $SD = 3.52$) also scored significantly higher than the Control group ($M = 8.88$, $SD = 3.33$), $p < .001$.

On the dimension of worry about return to normalcy, the effect of the groups was significant, $F(2, 297) = 21.97$, $p < .001$, and the effect size was medium ($\eta^2 = .13$). Post-hoc analyses by means of Tukey's HSD test revealed that the mean score of the PACE group (M = 9.60, SD = 0.88) was significantly higher than that of the Relaxation group (M = 8.61, SD = 1.79), $p < .001$. The PACE group (M = 9.60, SD = 0.88) also scored significantly higher than the Control group (M = 7.98, SD = 2.27), $p < .001$. The Relaxation group (M = 8.61, SD = 1.79) too had a significantly higher mean score than the Control group (M = 7.98, SD = 2.27), $p < .05$.

With respect to the dimension of discomfort in the leg, the groups exerted a significant effect, $F(2, 297) = 10.33$, $p < .001$. The effect size was medium ($\eta^2 = .07$). By using Tukey's HSD test, it was found that only the PACE group's mean score (M = 8.90, SD = 1.61) was significantly higher than that of the Relaxation group (M = 7.82, SD = 2.56), $p < .01$. The PACE group (M = 8.90, SD = 1.61) also scored significantly higher than the Control group (M = 7.60, SD = 2.21), $p < .001$.

With regard to the dimension of CABG bio-social by-products, a significant effect of the groups was observed, $F(2, 297) = 8.35$, $p < .001$, and the effect size was small ($\eta^2 = .05$). Post-hoc comparisons of mean scores applying Tukey's HSD test revealed that only the PACE group had a significantly higher mean score (M = 9.67, SD = 0.91) than the Relaxation group (M = 9.03, SD = 1.54), $p < .01$. The PACE group (M = 9.67, SD = 0.91) also scored significantly higher than the Control group (M = 8.96, SD = 1.52), $p < .01$.

When considering the dimension of constraints in socialising, there was a significant effect of the groups, $F(2, 297) = 10.92$, $p < .001$. The effect size was medium ($\eta^2 = .07$). Using Tukey's HSD test, it was found that only the mean score of the PACE group (M = 9.97, SD = 0.30) was significantly higher than that of the Relaxation group (M = 9.57, SD = 1.09), $p < .05$. The PACE group (M = 9.97, SD = 0.30) also scored significantly higher than the Control group (M = 9.26, SD = 1.48), $p < .001$.

In the last dimension of infection and interference to routine life, the groups showed a significant effect, $F(2, 297) = 10.93$, $p < .001$. The effect size was medium ($\eta^2 = .07$). Based on Tukey's HSD test, the mean score of the PACE group ($M = 8.88$, $SD = 1.71$) was significantly higher than that of the Control group ($M = 7.62$, $SD = 1.97$), $p < .001$. Additionally, the Relaxation group's mean score ($M = 8.31$, $SD = 2.03$) was significantly higher than that of the Control group ($M = 7.62$, $SD = 1.97$), $p < .05$.

From Figure 4.3, it may be inferred that the PACE intervention had generated the highest possible overall prognosis among the three groups. Not receiving psychosocial intervention, as was the case of the Control group, led to the lowest comparable overall prognosis. Across the dimensions likewise, the PACE group scaled the highest mean scores. The Relaxation group achieved higher scores compared with the Control group; however, owing to non-significant differences between the two groups in four dimensions (discomfort in surgical sites, discomfort in the leg, CABG bio-social by-products, and constraints in socialising), the variation was visually less evident.

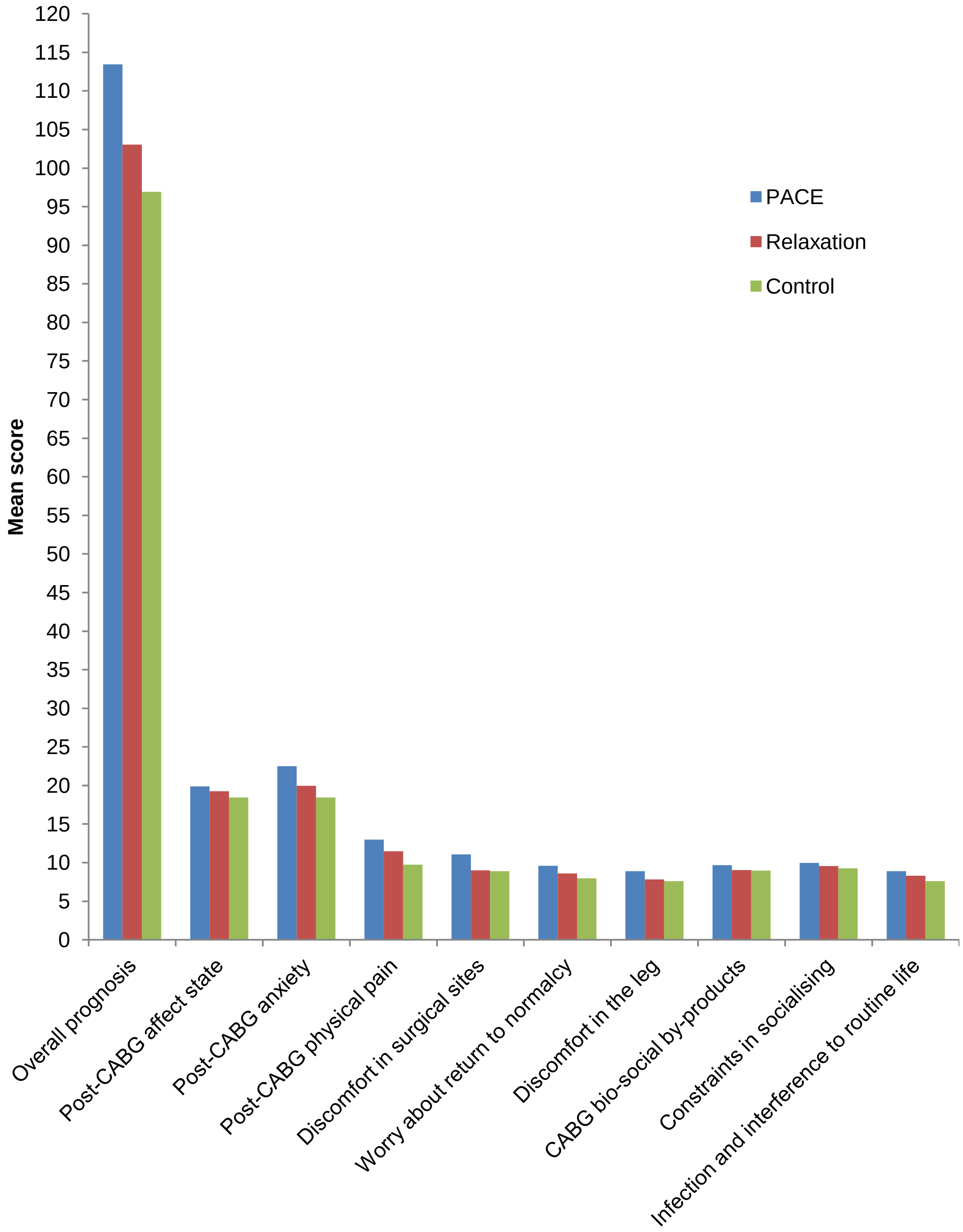


Figure 4.3 Means of the three groups for prognosis

The results of prognosis, based on the scale, were supplemented with other related information on BIPROSCAB that did not form a part of the scale. The patients were asked two questions relating to the length of post-surgery stay (in the ICU, and ward or room). Results of one-way between groups ANOVA indicated no significant differences across the groups in the mean number of days of post-surgery ICU stay (*M*, *SD*: PACE = 3.39, 1.21; Relaxation = 3.49, 1.32; Control = 3.78, 1.66) as well as ward or room stay (*M*, *SD*: PACE = 3.20, 1.15; Relaxation = 3.16, 1.22; Control = 3.14, 1.17).

In addition to the above, participants were asked questions on perceived physical fitness and mental readiness to resume their normal routine activities about six weeks after CABG as well as wound infection and re-hospitalisation details, if any. The data related to perceived physical fitness and mental readiness are shown in a frequency cross-tabulation (Table 4.6). There was a significant association between the groups and perceived physical fitness, $\chi^2(2, N = 300) = 69.92$, $p < .001$. It was noted that higher percentage of participants from the PACE group (87%) reported perceived physical fitness. Further, lower percentage of participants in the Relaxation group (43%) and the Control group (31%) indicated feeling physically fit. In terms of mental readiness, the association between the groups and mental readiness was seen to be significant, $\chi^2(2, N = 300) = 33.06$, $p < .001$. Higher percentage of participants in the PACE group (99%) and the Relaxation group (88%) reported mental readiness. However, lower percentage of participants from the Control group (71%) indicated mental readiness. Overall, a larger proportion of the PACE group reported feeling physically fit and mentally ready to resume normal routine activities about six weeks after CABG while a smaller proportion of the Control group felt so (Figures 4.4 and 4.5).

Infection in surgical sites and rehospitalisation also reflect patients' prognosis. BIPROSCAB sought information about whether the patient had experienced wound infections and re-hospitalisation during six weeks after being discharged from the hospital following CABG. The frequency cross-tabulation of the data is given in Table 4.7. A significant association was found between the groups and post-surgery infections, $\chi^2(2, N = 300) = 10.22, p < .01$. Higher percentage of participants from the Control group (37%) and the Relaxation group (30%), alongside lower percentage of participants from the PACE group (17%) reported wound infections after surgery. The PACE group had the least amount of infections and the Control group had the most (Figure 4.6). Post-surgery re-hospitalisation rates were very low in the sample, whereby the expected count in the frequency cross-tabulation (Table 4.7) was below five in 50% of the cells. Chi-square test was not computed for this aspect.

In order to find out if a relationship existed between overall prognosis and the time needed for return to one's normal routine activities, the number of weeks required after surgery to resume one's activities was documented in a sub-sample of 100 participants five months after hospital discharge. The mean duration reported by the participants was 11.52 weeks ($SD = 6.21$). The mean overall prognosis score of these participants was 103.01 ($SD = 11.76$). Results of Pearson's product-moment correlation revealed a significant negative relationship between overall prognosis score and duration for return to normal routine activities, $r(98) = -.34, p < .01$. This indicated that a higher prognosis score was related to a faster return to one's normal routine activities. However, using one-way between groups ANOVA, no significant difference between the groups was found on the mean number of weeks for return to normal routine activities (M, SD: PACE = 9.58, 5.34; Relaxation = 12.00, 6.48, Control = 12.97, 6.43).

Table 4.6

Frequency cross-tabulation of patients reporting perceived physical fitness and mental readiness to resume normal routine activities

	Yes		No		Total		χ^2
	O (E)	%	O (E)	%	O (E)	%	
Perceived physical fitness							
PACE	87 (53.7)	87%	13 (46.3)	13%	100 (100.0)	100%	
Relaxation	43 (53.7)	43%	57 (46.3)	57%	100 (100.0)	100%	69.92***
Control	31 (53.7)	31%	69 (46.3)	69%	100 (100.0)	100%	
Total	161 (161.0)	53.7%	139 (139.0)	46.3%	300 (300.0)	100%	
Mental readiness							
PACE	99 (86.0)	99%	1 (14.0)	1%	100 (100.0)	100%	
Relaxation	88 (86.0)	88%	12 (14.0)	12%	100 (100.0)	100%	33.06***
Control	71 (86.0)	71%	29 (14.0)	29%	100 (100.0)	100%	
Total	258 (258.0)	86%	42 (42.0)	14%	300 (300.0)	100%	

Note. O = Observed frequency, E = Expected frequency
***p < .001

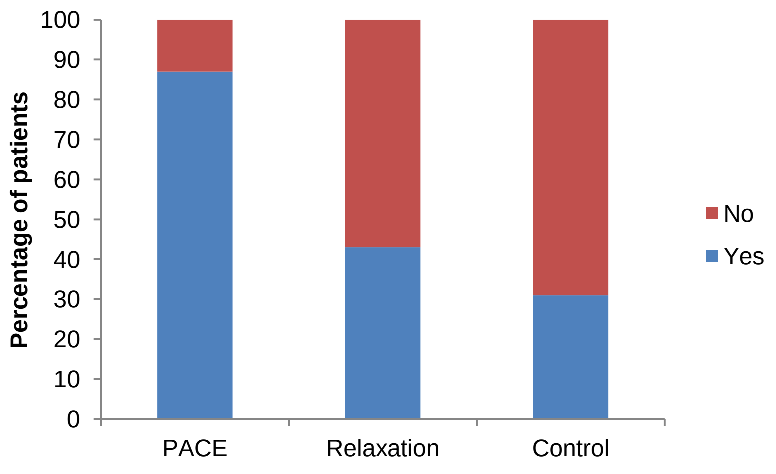


Figure 4.4 Percentage of patients reporting perceived physical fitness for normal routine activities across the three groups

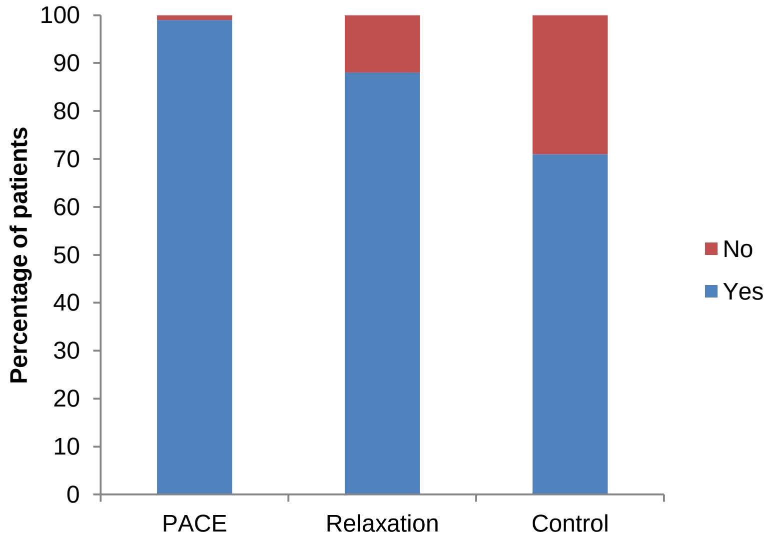


Figure 4.5 Percentage of patients reporting mental readiness for normal routine activities across the three groups

Table 4.7

Frequency cross-tabulation of patients reporting post-CABG wound infections and re-hospitalisation

	Yes		No		Total		χ^2
	O (E)	%	O (E)	%	O (E)	%	
Wound infections							
PACE	17 (28.0)	17%	83 (72.0)	83%	100 (100.0)	100%	
Relaxation	30 (28.0)	30%	70 (72.0)	70%	100 (100.0)	100%	
Control	37 (28.0)	37%	63 (72.0)	63%	100 (100.0)	100%	10.22**
Total	84 (84.0)	28%	216 (216.0)	72%	300 (300.0)	100%	
Re-hospitalisation							
PACE	2 (3.3)	2%	98 (96.7)	98%	100 (100.0)	100%	
Relaxation	4 (3.3)	4%	96 (96.7)	96%	100 (100.0)	100%	
Control	4 (3.3)	4%	96 (96.7)	96%	100 (100.0)	100%	—
Total	10 (10.0)	3.3%	290 (290.0)	96.7%	300 (300.0)	100%	

Note. O = Observed frequency, E = Expected frequency

χ^2 test was not computed for re-hospitalisation as expected count was below 5 in 50% of cells

**p < .01

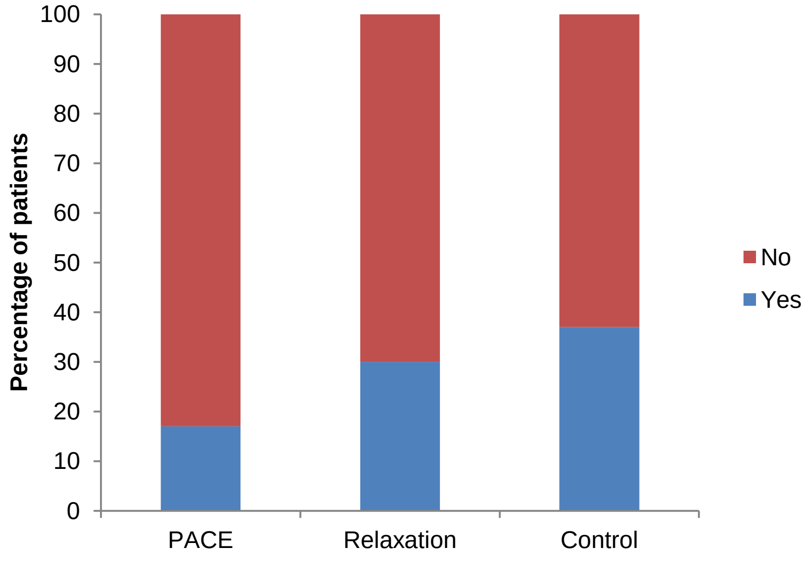


Figure 4.6 Percentage of patients reporting post-CABG wound infections across the three groups

The second objective of the study was to compare the relative impact of the PACE and Relaxation interventions vis-à-vis the Control group which received only the standard hospital treatment on psychological distress reduction. Since the two interventions respectively aimed at empowering the patient with necessary information and reassurance (PACE) and reducing anxiety in order to bring the patient to a psychological equilibrium (Relaxation), it was felt appropriate to examine the relative effect of these two types of intervention on psychological distress (measured by anxiety and depression). This was based on the assumption that the relevance of the cognitive base created through psycho-education and the influence on affective state through peer assurance (PACE) as well as the direct influence of Relaxation on psychological states would be best seen on the distress levels of the patients, as will be explored in the next section.

Effect of Psychosocial Intervention on Psychological Distress across Time

Psychological distress has been said to influence the course of outcomes during the period of CABG. Since the objective was to examine if psychosocial intervention could significantly reduce the levels of overall distress, anxiety and depression, changes in these parameters across time initially had to be tested. Given that the experience of surgery engenders physical and psychological changes, it may be argued that the patient after CABG holds certain significant changes in her or his being. Delineating the impact of psychosocial intervention in this situation requires that psychological distress be compared within each group between two time-points at a time, such as by using paired samples *t*-test. This helps to measure the change in psychological distress with each change in the situation, i.e., 1 (pre-surgery) to 2 (first review), 2 to 3 (second review), and 1 to 3, separately for the PACE, Relaxation and Control groups. Paired samples *t*-tests were used to understand the effectiveness of psychosocial intervention (PACE and Relaxation) and non-intervention (Control) across time, viz., a day before CABG (pre-surgery), a week after hospital discharge (first review), and six weeks after hospital discharge (second review). For convenience, short phrases have been used to represent the time-points: ‘overall distress–1’ refers to pre-surgery overall distress, ‘overall distress–2’ indicates overall distress at the first review, and ‘overall distress–3’ denotes overall distress at the second review. Correspondingly, ‘anxiety–1’ and ‘depression–1’ stand for pre-surgery anxiety and depression, ‘anxiety–2’ and ‘depression–2’ correspond with anxiety and depression at the first review, and ‘anxiety–3’ and ‘depression–3’ represent anxiety and depression at the second review.

The mean scores for overall distress, anxiety, and depression across the three time-points in the PACE group are given in Table 4.8. The PACE group showed a significant drop in its mean scores from overall distress–1 (M = 8.80, SD = 4.62) to overall distress–2 (M = 1.77, SD = 1.72), $t(99)$ = 14.88, p < .001. There was also a significant decrease from overall distress–1 (M = 8.80, SD = 4.62) to overall distress–3 (M = 1.36, SD = 1.57), $t(99)$ = 16.99, p < .001. The effect size in both instances (Cohen's d = 2.02 and 2.16) was large. Similarly, the mean scores significantly decreased between overall distress–2 (M = 1.77, SD = 1.72) and overall distress–3 (M = 1.36, SD = 1.57), $t(99)$ = 2.17, p < .05. The effect size was small (Cohen's d = 0.25). In terms of anxiety, a significant decline in means was noted from anxiety–1 (M = 5.11, SD = 2.94) to anxiety–2 (M = 0.35, SD = 0.74), $t(99)$ = 16.56, p < .001. The reduction was also significant from anxiety–1 (M = 5.11, SD = 2.94) to anxiety–3 (M = 0.62, SD = 0.85), $t(99)$ = 16.11, p < .001. The effect size was large in both cases (Cohen's d = 2.22 and 2.07). A significant increase in means was found between anxiety–2 (M = 0.35, SD = 0.74) and anxiety–3 (M = 0.62, SD = 0.85) for the PACE group, $t(99)$ = -3.09, p < .01. The effect size was small (Cohen's d = -0.34). With regard to depression, a significant decrease was seen from mean depression–1 (M = 3.69, SD = 2.62) to mean depression–2 (M = 1.42, SD = 1.48), $t(99)$ = 7.39, p < .001. There was also a significant reduction from mean depression–1 (M = 3.69, SD = 2.62) to mean depression–3 (M = 0.74, SD = 1.16), $t(99)$ = 10.92, p < .001. A large effect was observed in both situations (Cohen's d = 1.07 and 1.46). There was further a significant mean reduction from depression–2 (M = 1.42, SD = 1.48) to depression–3 (M = 0.74, SD = 1.16), $t(99)$ = 4.28, p < .001. The effect size was medium (Cohen's d = 0.51).

Figure 4.7 illustrates the patterns of overall distress, anxiety, and depression across the three time-points for the PACE group. There was a continual reduction in the mean levels of overall distress and depression across time. As regards anxiety, a drop between the pre-surgery and first review assessments was followed by a rise in the mean score by the time of the second review assessment, which nonetheless was significantly lower than the pre-surgery score.

Table 4.8

Mean, standard deviation, t, and Cohen's d values for overall distress, anxiety, and depression across three time-points in the PACE group

	M	***SD***	***t*(99)**			**Cohen's *d***		
			1 – 2	**2 – 3**	**1 – 3**	**1 – 2**	**2 – 3**	**1 – 3**
Overall distress–1	8.80	4.62						
Overall distress–2	1.77	1.72	14.88***	2.17*	16.99***	2.02	0.25	2.16
Overall distress–3	1.36	1.57						
Anxiety–1	5.11	2.94						
Anxiety–2	0.35	0.74	16.56***	-3.09**	16.11***	2.22	-0.34	2.07
Anxiety–3	0.62	0.85						
Depression–1	3.69	2.62						
Depression–2	1.42	1.48	7.39***	4.28***	10.92***	1.07	0.51	1.46
Depression–3	0.74	1.16						

Note. *$p < .05$, **$p < .01$, ***$p < .001$

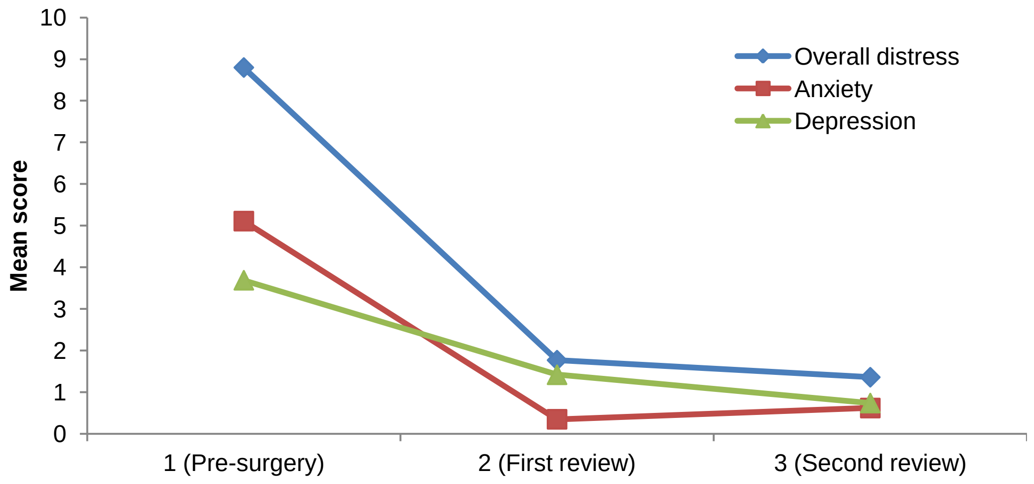


Figure 4.7 Means of the PACE group for overall distress, anxiety, and depression across three time-points

In Table 4.9, the mean scores of the Relaxation group for overall distress, anxiety and depression at different time-points are presented. A significant decrease in mean scores was observed between overall distress–1 (M = 9.03, SD = 4.73) and overall distress–2 (M = 5.13, SD = 2.83), $t(99) = 8.17$, $p < .001$, as well as between overall distress–1 (M = 9.03, SD = 4.73) and overall distress–3 (M = 4.07, SD = 3.02), $t(99) = 10.47$, $p < .001$. The effect size was large in both instances (Cohen's d = 1.00 and 1.25). There was also a significant mean decrease from overall distress–2 (M = 5.13, SD = 2.83) to overall distress–3 (M = 4.07, SD = 3.02), $t(99) = 3.75$, $p < .001$, and the effect size was small (Cohen's d = 0.36). A significant decrease in mean scores was seen between anxiety–1 (M = 5.52, SD = 3.12) and anxiety–2 (M = 1.37, SD = 1.43), $t(99) = 13.73$, $p < .001$, as well as between anxiety–1 (M = 5.52, SD = 3.12) and anxiety–3 (M = 1.62, SD = 1.54), $t(99) = 13.21$, $p < .001$. A large effect size was found for both cases (Cohen's d = 1.71 and 1.59). The decline was not sustained due to the non-significant change between mean anxiety–2 and mean anxiety–3. The Relaxation group witnessed a non-significant change in mean scores from depression–1 to depression–2. There was a significant decrease in means from depression–1 (M = 3.51, SD = 2.50) to depression–3 (M = 2.45, SD = 2.30), $t(99) = 3.69$, $p < .001$, and the effect size was small (Cohen's d = 0.44). The mean score also significantly reduced from depression–2 (M = 3.76, SD = 2.25) to depression–3 score (M = 2.45, SD = 2.30), $t(99) = 5.87$, $p < .001$. The effect size was medium (Cohen's d = 0.58).

The trends of overall distress, anxiety, and depression in the Relaxation group are portrayed in Figure 4.8. The group's mean overall distress progressively reduced across the time-points. Specifically for anxiety and depression however, fluctuating patterns were noted. The mean level of anxiety decreased from the pre-surgery to first review assessments, yet increased by the second review assessment. The second review anxiety mean nonetheless was significantly lower than the pre-surgery mean. In case of depression, the means increased between the pre-surgery and first review assessments; however, the mean reduced at the second review assessment.

Table 4.9

Mean, standard deviation, t, and Cohen's d values for overall distress, anxiety, and depression across three time-points in the Relaxation group

	M	***SD***	***t*(99)**			**Cohen's *d***		
			1 – 2	**2 – 3**	**1 – 3**	**1 – 2**	**2 – 3**	**1 – 3**
Overall distress–1	9.03	4.73						
Overall distress–2	5.13	2.83	8.17***	3.75***	10.47***	1.00	0.36	1.25
Overall distress–3	4.07	3.02						
Anxiety–1	5.52	3.12						
Anxiety–2	1.37	1.43	13.73***	-1.51	13.21***	1.71	-0.17	1.59
Anxiety–3	1.62	1.54						
Depression–1	3.51	2.50						
Depression–2	3.76	2.25	-0.85	5.87***	3.69***	-0.11	0.58	0.44
Depression–3	2.45	2.30						

Note. ***p < .001

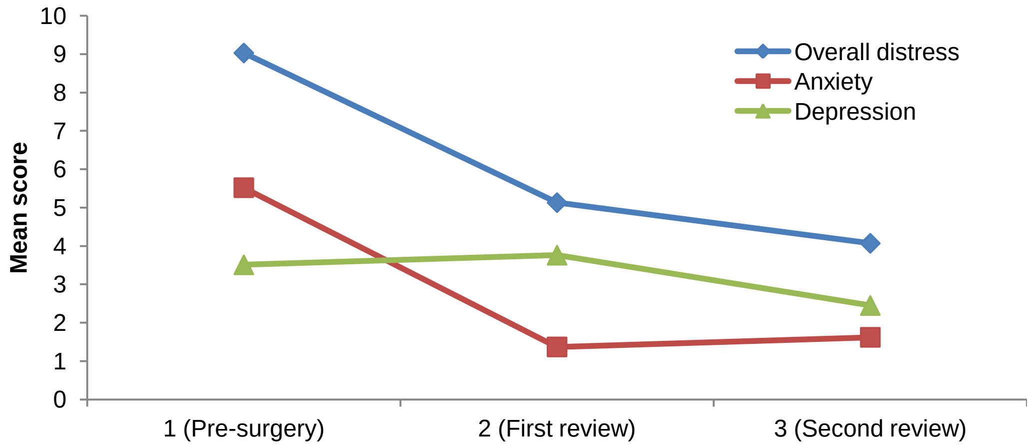


Figure 4.8 Means of the Relaxation group for overall distress, anxiety, and depression across three time-points

Consider the mean overall distress, anxiety, and depression scores for the Control group (Table 4.10). There was a significant drop in the mean scores between overall distress–1 (M = 9.84, SD = 5.39) and overall distress–2 (M = 7.38, SD = 3.77), $t(99)$ = 4.60, p < .001, as well as between overall distress–1 (M = 9.84, SD = 5.39) and overall distress–3 (M = 6.72, SD = 3.60), $t(99)$ = 5.42, p < .001. A medium effect size (Cohen's d = 0.53 and 0.68) was noted in both cases. The change in mean scores between overall distress–2 and overall distress–3 was not significant. The mean score significantly reduced from anxiety–1 (M = 5.70, SD = 3.34) to anxiety–2 (M = 2.64, SD = 2.17), $t(99)$ = 8.76, p < .001, and also from anxiety–1(M = 5.70, SD = 3.34) to anxiety–3, (M = 3.08, SD = 2.21), $t(99)$ = 7.13, p < .001. The effect size was large in these two situations (Cohen's d = 1.09 and 0.93). However, a significant increase was noted in the mean score between anxiety–2 (M = 2.64, SD = 2.17) and anxiety–3 (M = 3.08, SD = 2.21), $t(99)$ = -2.00, p < .05, and the effect size was found to be small (Cohen's d = -0.20). These trends reversed for depression. There was a non-significant change in mean scores between depression–1 and depression–2, and between depression–1 and depression–3. A significant decrease was seen in the mean score between depression–2 (M = 4.74, SD = 2.80) and depression–3 (M = 3.64, SD = 2.55), $t(99)$ = 4.39, p < .001. The effect size was small (Cohen's d = 0.41). This meant that the depression means did not significantly decrease between the pre-surgery and second review assessments in the Control group.

Figure 4.9 plots the course of mean overall distress, anxiety, and depression in the Control group. There was a downward trend for mean overall distress across the time-points. However, inconsistent changes were noted for anxiety and depression. Mean anxiety reduced between the pre-surgery and first review assessments, yet increased by the second review assessment. Furthermore, mean depression increased from the pre-surgery to first review assessments; however, it decreased by the time of the second review assessment. Yet, mean depression at the second review was not significantly lower than the pre-surgery mean depression for the Control group.

Table 4.10

Mean, standard deviation, t, and Cohen's d values for overall distress, anxiety, and depression across three time-points in the Control group

	M	***SD***	***t*(99)**			**Cohen's *d***		
			1 – 2	**2 – 3**	**1 – 3**	**1 – 2**	**2 – 3**	**1 – 3**
Overall distress–1	9.84	5.39						
Overall distress–2	7.38	3.77	4.60***	1.86	5.42***	0.53	0.18	0.68
Overall distress–3	6.72	3.60						
Anxiety–1	5.70	3.34						
Anxiety–2	2.64	2.17	8.76***	-2.00*	7.13***	1.09	-0.20	0.93
Anxiety–3	3.08	2.21						
Depression–1	4.14	2.75						
Depression–2	4.74	2.80	-1.81	4.39***	1.45	-0.22	0.41	0.19
Depression–3	3.64	2.55						

Note. **p* < .05, ****p* < .001

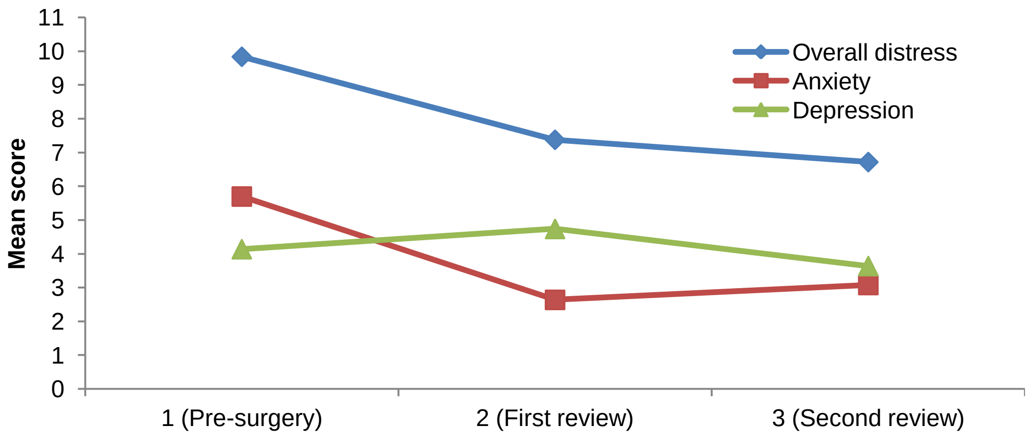


Figure 4.9 Means of the Control group for overall distress, anxiety, and depression across three time-points

Effect of Psychosocial Intervention on Psychological Distress Reduction across Groups

Having learnt about the differences in psychological distress across three time-points within each of the three groups, the next step was to verify whether the extent of changes in anxiety, depression and overall distress between time-points varied across groups. Specifically, the study sought to find out whether the changes in psychological distress were different for groups receiving psychosocial intervention when compared with the Control group that did not receive such intervention. At the outset, it is necessary to emphasise that overall distress, anxiety and depression scores showed a progressive decline across the three time-points as seen in the previous section. Reduction in psychological distress after CABG is natural and expected, as one overcomes the stressors of surgery and hospitalisation. Yet, it is important to examine and compare the proportion of reduction in psychological distress across groups. If the groups are found to significantly differ in the proportion of reduction in psychological distress, the result may be attributed to the different interventions, as the groups were homogenous otherwise.

In order to examine the above, change scores were computed. The change in overall distress score from time-point 1 to time-point 2 was arrived at by deducting the overall distress score of time-point 2 from that of time-point 1 for every participant. Similarly, the overall distress score at time-point 3 was deducted from that of time-point 2. Further, the overall distress score of time-point 3 was subtracted from that of time-point 1. The same was followed for anxiety and depression scores. The values derived were called overall distress change, anxiety change, and depression change. Thus, 'overall distress change–1' was the difference between overall distress–1 score and overall distress–2 score, 'overall distress change–2' was the difference between overall distress–2 score and overall distress–3 score, while ‘overall distress change–3’ was the difference between overall distress–1 score and overall distress–3 score. The difference between anxiety–1 score and anxiety–2 score gave ‘anxiety change–1’, and the difference between anxiety–2 score and anxiety–3 score yielded ‘anxiety change–2’, while the difference between anxiety–1 score and anxiety–3 score generated ‘anxiety change–3’. Likewise, ‘depression change–1’ was obtained by subtracting depression–2 score from depression–1 score, ‘depression change–2’ was arrived at by subtracting depression–3 score from depression–2 score, and ‘depression change–3’ was found by subtracting depression–3 score from depression–1 score. In order to verify if there was any significant difference across the PACE, Relaxation and Control groups in the amount of change in overall distress, anxiety and depression, one-way between groups ANOVA were computed using these change scores.

The mean change scores of overall distress, anxiety, and depression for the three groups are shown in Table 4.11. There was a significant effect of the groups on overall distress change–1, $F(2, 297) = 22.20$, $p < .001$, and overall distress change–3, $F(2, 297) = 18.87$, $p < .001$. The effect size was medium for overall distress change–1 ($\eta^2 = .13$) and overall distress change–3 ($\eta^2 = .11$). Values of post-hoc analyses applying Tukey’s HSD test are given in Table 4.12. As depicted by the results, mean overall distress change–1 of the PACE group ($M = 7.03$, $SD = 4.72$) was significantly higher than that of the Relaxation group ($M = 3.90$, $SD = 4.78$), $p < .001$. The PACE group’s mean ($M = 7.03$, $SD = 4.72$) was also significantly higher than the Control group’s mean ($M = 2.46$, $SD = 5.35$), $p < .001$. The mean overall distress change–3 score of the PACE group ($M = 7.44$, $SD = 4.38$) was significantly higher than that of the Relaxation group ($M = 4.96$, $SD = 4.74$), $p < .01$. The PACE group’s mean ($M =$

7.44, *SD* = 4.38) was also significantly higher than the Control group's mean (*M* = 3.12, *SD* = 5.76), $p < .001$. Further, mean overall distress change–3 was significantly higher in the Relaxation group (*M* = 4.96, *SD* = 4.74) than the Control group (*M* = 3.12, *SD* = 5.76), $p < .05$.

The effect of the groups was significant on mean anxiety change–1 scores, $F(2, 297) = 7.52$, $p < .01$, and mean anxiety change–3 scores, $F(2, 297) = 9.15$, $p < .001$. A small effect was found for anxiety change–1 ($\eta^2 = .05$), and a medium effect was noted for anxiety change–3 ($\eta^2 = .06$). Post-hoc analyses based on Tukey's HSD test revealed that the PACE group had a significantly higher mean anxiety change–1 score (*M* = 4.76, *SD* = 2.88) than the Control group (*M* = 3.06, *SD* = 3.49), $p < .001$. The Relaxation group too had a significantly higher mean anxiety change–1 score (*M* = 4.15, *SD* = 3.02) than the Control group (*M* = 3.06, *SD* = 3.49), $p < .05$. Similarly, the PACE group had a significantly higher mean anxiety change–3 score (*M* = 4.49, *SD* = 2.79) than the Control group (*M* = 2.62, *SD* = 3.67), $p < .001$. The Relaxation group too had a significantly higher mean anxiety change–3 score (*M* = 3.90, *SD* = 2.95) than the Control group (*M* = 2.62, *SD* = 3.67), $p < .05$. Mean scores of the PACE and Relaxation groups did not significantly differ for anxiety changes.

There was a significant effect of the groups on mean depression change–1, $F(2, 297) = 25.26$, $p < .001$, and mean depression change–3, $F(2, 297) = 17.96$, $p < .001$. The effect size was large in case of depression change–1 ($\eta^2 = .15$), and medium for depression change–3 ($\eta^2 = .11$). Pair-wise comparisons using Tukey's HSD test showed that the PACE group had significantly higher mean depression change–1 score (*M* = 2.27, *SD* = 3.07) than the Relaxation group (*M* = -0.25, *SD* = 2.94), $p < .001$. The PACE group's mean (*M* = 2.27, *SD* = 3.07) was also significantly higher than the Control group's mean (*M* = -0.60, *SD* = 3.32), $p < .001$. Likewise for depression change–3, the mean score of the PACE group (*M* = 2.95, *SD* = 2.70) was significantly higher than that of the Relaxation group (*M* = 1.06, *SD* = 2.87), $p < .001$. The PACE group's mean (*M* = 2.95, *SD* = 2.70) was also significantly higher than the Control group's mean (*M* = 0.50, *SD* = 3.46), $p < .001$. Mean scores of the Relaxation and Control groups did not significantly differ for depression changes.

No significant differences between the groups were observed on the mean scores of overall distress change–2, anxiety change–2, and depression change–2.

Table 4.11

Mean, standard deviation, F, and η^2 *values for changes in overall distress, anxiety, and depression between the time-points*

	***M* (*SD*)**			***F*(2, 297)**	$\boldsymbol{\eta^2}$
	PACE	Relaxation	Control		
Overall distress change–1	7.03 (4.72)	3.90 (4.78)	2.46 (5.35)	22.20***	.13
Overall distress change–2	0.41 (1.89)	1.06 (2.83)	0.66 (3.55)	1.34	.01
Overall distress change–3	7.44 (4.38)	4.96 (4.74)	3.12 (5.76)	18.87***	.11
Anxiety change–1	4.76 (2.88)	4.15 (3.02)	3.06 (3.49)	7.52**	.05
Anxiety change–2	-0.27 (0.87)	-0.25 (1.66)	-0.44 (2.20)	0.39	.003
Anxiety change–3	4.49 (2.79)	3.90 (2.95)	2.62 (3.67)	9.15***	.06
Depression change–1	2.27 (3.07)	-0.25 (2.94)	-0.60 (3.32)	25.26***	.15
Depression change–2	0.68 (1.59)	1.31 (2.23)	1.10 (2.51)	2.24	.02
Depression change–3	2.95 (2.70)	1.06 (2.87)	0.50 (3.46)	17.96***	.11

Note. $^{**}p < .01$, $^{***}p < .001$

Table 4.12

Mean comparisons using Tukey's HSD test between the three groups for changes in overall distress, anxiety, and depression between the time-points

	PACE – Relaxation	PACE – Control	Relaxation – Control
Overall distress change–1	3.13***	4.57***	1.44
Overall distress change–3	2.48**	4.32***	1.84*
Anxiety change–1	0.61	1.70***	1.09*
Anxiety change–3	0.59	1.87***	1.28*
Depression change–1	2.52***	2.87***	0.35
Depression change–3	1.89***	2.45***	0.56

Note. *p < .05, *p < .001, ***p < .001

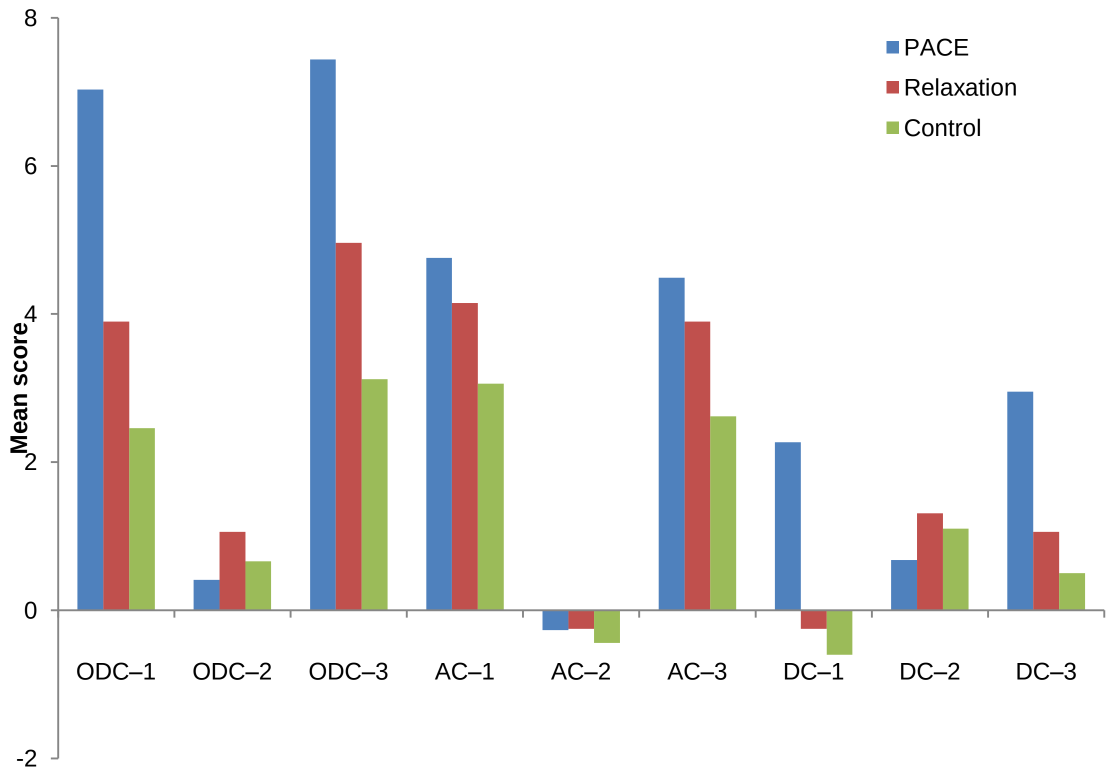


Figure 4.10 Means of the three groups for changes in overall distress, anxiety, and depression between the time-points (ODC = Overall Distress Change, AC = Anxiety Change, DC = Depression Change)

The patterns of the groups for changes in overall distress, anxiety, and depression are depicted in Figure 4.10. This graph shows values plotted in the positive quadrant (0 to +8) and negative quadrant (0 to -2). For overall distress change–1, anxiety change–1, depression change–1, overall distress change–3, anxiety change–3 and depression change–3, the PACE group consistently demonstrated the highest mean change scores, suggesting that the changes in overall distress, anxiety and depression were greatest for the PACE group between the pre-surgery and first review assessments as well as between the pre-surgery and second review assessments. Further, these set of changes for the PACE group were positive values (i.e., bars were positioned only in the positive quadrant of the graph), signifying the decrease in overall distress, anxiety and depression for the PACE group between the pre-surgery and first review assessments as well as between the pre-surgery and second review assessments. This indicates the effectiveness of the PACE intervention in bringing down psychological distress between the pre-surgery and post-surgery time-points. Although the Relaxation group also showed positive changes in overall distress change–1, overall distress change–3, anxiety change–1, anxiety change–3 and depression change–3 which indicate decrease in overall distress, anxiety and depression, the proportion of reduction was lower than was seen in the PACE group. The lowest change scores consistently belonged to the Control group. The Relaxation and Control groups witnessed an increase in depression change–1, as denoted by their respective bars being situated in the negative quadrant. In contexts of overall distress change–2 and depression change–2, the Relaxation group generally showed the most amount of decrease and was followed by the Control and PACE groups, yet the group differences were statistically non-significant. With respect to anxiety change–2, the bars of all the three groups were situated in the negative quadrant of the graph. This suggests that the three groups experienced an increase in anxiety between the first review and second review assessments, yet the group differences in this regard were not statistically significant. Moreover, anxiety change–3 was positive for the three groups, showing that post-surgery anxiety six weeks after hospital discharge was lower than pre-surgery anxiety. Altogether, the impact of the groups was significantly evident for the first and third sets of changes (overall distress change–1, anxiety change–1, depression change–1, overall distress change–3, anxiety change–3, and depression change–3).

The third objective of the study was to identify the factors that contribute to adherence and prognosis of patients subjected to CABG. The next section presents the attempts made to meet this objective.

Psychosocial Correlates of Adherence and Prognosis

The preceding sections have confirmed that psychosocial intervention had shown a significant impact on adherence, prognosis, and psychological distress reduction in patients undergoing CABG. The subsequent goal was to understand the relationships between various psychosocial factors and overall adherence as well as overall prognosis. Pearson's product-moment correlations were computed between psychosocial factors on one hand, and overall distress, overall adherence and overall prognosis on the other. The categorical variables namely gender, PACE, Relaxation, and Control involved coding for analyses. Under gender, men were coded as 0 while women were coded as 1. PACE, Relaxation, and Control were dummy coded into three variables such that participants who belonged to the PACE group got 1 under PACE, and 0 under Relaxation and Control. Those in the Relaxation group got 1 under Relaxation, and 0 under PACE and Control. Participants in the Control group got 1 under Control, and 0 under PACE and Relaxation. Age, education (years), total perceived social support, dimensions of health locus of control (HLOC–Self, HLOC–Doctors, HLOC–Others, and HLOC–Unknown others), overall distress, overall adherence, and overall prognosis were in the form of continuous variables. The results of correlational analyses, presented in Table 4.13, provide information on the relationships between the variables of the study.

Overall distress–1 had significant positive correlations with gender (r = .14, p < .05), indicating that women scored higher on overall distress–1. Overall distress–1 showed negative correlations with age (r = -.12, p < .05) and total perceived social support (r = -.18, p < .01). This suggested that when age or total perceived social support was high, overall distress–1 was low.

Overall distress–2 was found to have significant negative correlations with total perceived social support (*r* = -.13, *p* < .05), HLOC–Doctors (*r* = -.12, *p* < .05), and PACE (*r* = -.57, *p* < .001). This implied that when patients perceived social support or they perceived the control of health events in doctors, overall distress–2 was low. Further, the finding indicated that when one received the PACE intervention during the CABG period, overall distress–2 was low. On the other hand, Control group (*r* = .50, *p* < .001) and overall distress–1 (*r* = .27, *p* < .001) each showed a significant positive relation with overall distress–2, suggesting that when one was in the Control group or had high overall distress–1, overall distress–2 was high.

Overall distress–3 had a significant negative relationship with PACE (*r* = -.53, *p* < .001). This implied that when one received the PACE intervention during the period of CABG, overall distress–3 was low. However, HLOC–Unknown others (*r* = .14, *p* < .05), Control group (*r* = .53, *p* < .001), overall distress–1 (*r* = .26, *p* < .001) and overall distress–2 (*r* = .70, *p* < .001) each demonstrated a significant positive relationship with overall distress–3, suggesting that when health locus of control in unknown other factors was high, when overall distress–1 was high, when overall distress–2 was high, or when one was in the Control group, overall distress–3 was high.

Overall adherence showed significant negative correlations with Control group (*r* = -.46, *p* < .001), overall distress–1 (*r* = -.12, *p* < .05), overall distress–2 (*r* = -.51, *p* < .001), and overall distress–3 (*r* = -.55, *p* < .001). This indicated that when one was in the Control group, when overall distress–1 was high, when overall distress–2 was high, or when overall distress–3 was high, overall adherence was low. Overall adherence had significant positive relationships with total perceived social support (*r* = .17, *p* < .01), HLOC–Doctors (*r* = .14, *p* < .05), and PACE (*r* = .48, *p* < .001).

According to this finding, when total perceived social support was high, when health locus of control in doctors was high, or when one received the PACE intervention during the period of CABG, overall adherence after surgery was high.

Overall prognosis showed significant negative relationships with gender (r = -.16, p < .01), Control group (r = -.49, p < .001), overall distress–1 (r = -.29, p < .001), overall distress–2 (r = -.57, p < .001), and overall distress–3 (r = -.72, p < .001). This implied that overall prognosis for women was lower. Alternatively, when one was in the Control group, when overall distress–1 was high, when overall distress–2 was high, or when overall distress–3 was high, overall prognosis was low. Conversely, overall prognosis had significant positive correlations with education (r = .13, p < .05), total perceived social support (r = .13, p < .05), PACE (r = .58, p < .001), and overall adherence (r = .43, p < .001). The finding suggested that when one's years of education were more, when total perceived social support was high, when overall adherence was high, or when one received the PACE intervention during the CABG period, overall prognosis was high.

Table 4.13

Pearson's product-moment correlation coefficients between predictor and criterion variables

	M (*SD*)	OD 1	OD 2	OD 3	OA	OP
Age	56.05 (7.72)	-.12*	.04	.05	-.06	.03
Gender	-	.14*	.09	.09	-.06	-.16**
Education	9.41 (5.13)	-.07	-.02	-.06	.07	.13*
TPSS	67.28 (10.22)	-.18**	-.13*	-.10	.17**	.13*
HLOC–Self	12.23 (2.94)	.05	.01	-.08	.01	.08
HLOC–Doctors	1.76 (1.55)	-.04	-.12*	-.10	.14*	.02
HLOC–Others	1.67 (1.97)	.02	-.03	.04	-.05	-.01
HLOC–UO	2.34 (2.26)	-.05	.10	.14*	-.07	-.11
PACE	-		-.57***	-.53***	.48***	.58***
Relaxation	-		.07	.004	-.02	-.09
Control	-		.50***	.53***	-.46***	-.49***
OD 1	9.22 (4.93)	1.00	.27***	.26***	-.12*	-.29***
OD 2	4.76 (3.70)		1.00	.70***	-.51***	-.57***
OD 3	4.05 (3.60)			1.00	-.55***	-.72***
OA	65.68 (2.51)				1.00	.43***
OP	104.47 (11.03)					1.00

Note. Gender was coded as a binary categorical variable (0 = Male patient, 1 = Female patient); PACE, Relaxation, and Control were coded as dummy variables (0 = not in group, 1 = present in group)
OD 1 = Overall Distress–1, OD 2 = Overall Distress–2, OD 3 = Overall Distress–3, OA = Overall Adherence, OP = Overall Prognosis, TPSS = Total Perceived Social Support, HLOC–UO = HLOC–Unknown Others
*$p < .05$, **$p < .01$, ***$p < .001$

It may be of great relevance to identify the contributions of the individual psychosocial variables and the combination of psychosocial variables towards overall distress, as well as those that predict overall adherence and prognosis. An attempt was made to identify the predictors of overall distress, overall adherence, and overall prognosis. Multiple regression analyses, using simultaneous entry method, were computed for this purpose. The analyses followed the chronological order of the variables in the study, such that the contributions of demographic factors (age, gender, and education) and pre-surgery variables (perceived social support and health locus of control) towards overall distress–1 were first determined. In the second analysis, the predictors of overall distress–2 were identified by including demographic factors, pre-surgery variables, the group assignment (PACE, Relaxation, and Control) and overall distress–1. The factors affecting overall distress–3 were then established by considering demographic factors, pre-surgery variables, the group assignment, overall distress–1, and overall distress–2. For determining the predictors of overall adherence, the contributions of demographic factors, pre-surgery variables, the group assignment, overall distress–1, overall distress–2 and overall distress–3 were assessed. Finally, the role of demographic factors, pre-surgery variables, the group assignment, overall distress–1, overall distress–2, overall distress–3 and overall adherence were examined to isolate the predictors of prognosis.

In the first set of analyses pertaining to overall distress–1, the variables age, gender, education, total perceived social support score, and scores of the four dimensions of health locus of control (HLOC–Self, HLOC–Doctors, HLOC–Others, and HLOC–Unknown others) were entered as predictors. The resulting significant model is presented in Table 4.14. Age, gender, education, total perceived social support, HLOC–Doctors, HLOC–Others, and HLOC–Unknown others emerged as contributors. This model explained 7% of variance in overall distress–1, $R^2 = .07$, $F(7, 292) = 3.13$, $p < .01$. The significant independent predictors of overall distress–1 were total perceived social support and gender. Total perceived social support was a significant negative and independent predictor of overall distress–1 (β = -.18, p < .01). Therefore, having higher perceived social support predicted lesser psychological distress before surgery. The significant positive and independent role of gender in overall distress–1 (β = .17, p < .01) showed that being a woman about to undergo CABG predicted higher level of psychological distress. Perceived social support had higher independent influence than gender on overall distress–1.

Table 4.14

Multiple regression analysis for variables predicting overall distress–1

	B	***SEB***	***β***	***t***
Age	-0.07	.04	-.11	1.88
Gender	2.16	.77	.17	2.79**
Education	0.04	.06	.04	0.61
Total perceived social support	-0.09	.03	-.18	3.03**
HLOC–Doctors	-0.08	.18	-.03	0.44
HLOC–Others	-0.01	.14	-.004	0.08
HLOC–Unknown others	-0.10	.13	-.05	0.78
SE			4.81	
R^2			.07	
C			18.52	
F			3.13**	

Note. *B* = Unstandardised beta coefficient, *SEB* = Standard Error of Beta, β = Standardised beta coefficient, *t* = *t*-test, *SE* = Standard Error of the estimate, R^2 = Variance, *C* = Constant, *F* = *F*-statistic
**p < .01

While overall distress prior to CABG related to factors such as perceived social support and gender, it is of interest to identify the significant predictors for the level of overall distress following surgery. Overall distress–2 referred to the level of overall distress a week after hospital discharge following CABG. For overall distress–2, the variables of age, gender, education, total perceived social support and the four dimensions of health locus of control, along with the three groups (PACE, Relaxation, and Control) and overall distress–1 were taken as predictors. A model (Table 4.15) comprising age, gender, education, total perceived social support, HLOC–Doctors, HLOC–Others, HLOC–Unknown others, PACE, Relaxation, and overall distress before CABG (overall distress–1) was found to be significant. It explained 46% of variance in overall distress–2, $R^2 = .46$, $F(10, 289) = 24.26$, $p < .001$. Exposure to the psycho-educational intervention (PACE), exposure to the Guided Imagery intervention (Relaxation), and the level of overall distress before CABG (overall distress–1) were the significant independent predictors of overall distress a week after hospital discharge (overall distress–2). PACE ($\beta = -.69$, $p < .001$) and Relaxation ($\beta = -.26$, $p < .001$) were the significant negative and independent predictors of overall distress–2. This suggested that receiving either of the two psychosocial interventions predicted lesser psychological distress at the first review assessment. The values reveal that the PACE intervention had a stronger negative correlation with psychological distress than the Relaxation intervention. However, overall distress–1 positively and independently predicted overall distress–2 ($\beta = .21$, $p < .001$) whereby, a higher level of psychological distress before CABG predicted a higher level of psychological distress at the first review after CABG. The strength of this positive influence was nonetheless lesser than the negative correlation between the two psychosocial interventions and overall distress–2.

Table 4.15

Multiple regression analysis for variables predicting overall distress–2

	B	***SEB***	***β***	***t***
Age	0.04	.02	.07	1.67
Gender	0.48	.45	.05	1.06
Education	0.003	.04	.004	0.09
Total perceived social support	-0.02	.02	-.06	1.19
HLOC–Doctors	-0.16	.11	-.07	1.54
HLOC–Others	0.04	.08	.02	0.53
HLOC–Unknown others	0.04	.07	.03	0.55
PACE	-5.37	.40	-.69	13.39***
Relaxation	-2.05	.40	-.26	5.15***
Overall distress–1	0.16	.03	.21	4.70***
SE			2.77	
R^2			.46	
C			5.14	
F			24.26***	

Note. *B* = Unstandardised beta coefficient, *SEB* = Standard Error of Beta, *β* = Standardised beta coefficient, *t* = *t*-test, *SE* = Standard Error of the estimate, R^2 = Variance, *C* = Constant, *F* = *F*-statistic
***$p < .001$

An attempt was also made to identify the factors that contributed to the level of overall distress at the time of the second review, which took place six weeks after hospital discharge (overall distress–3). The variables age, gender, education, total perceived social support, the four dimensions of health locus of control, the three groups (PACE, Relaxation, and Control) and overall distress–1, along with overall distress–2 were entered as predictors. A significant model (Table 4.16) evolved that consisted the factors of age, gender, education, total perceived social support, HLOC–Self, HLOC–Doctors, HLOC–Others, PACE, Relaxation, overall distress–1, and overall distress–2. This model explained 56% of variance in overall distress–3, R^2 = .56, $F(11, 288) = 33.87$, $p < .001$. The significant independent predictors were overall distress–2, PACE, Relaxation, and overall distress–1. Among these, overall distress–2 (β = .47, $p < .001$) and overall distress–1 (β = .11, $p < .01$) were significant positive and independent predictors of overall distress–3. Therefore, having lower psychological distress about a week after hospital discharge or before surgery suggested lower level of psychological distress at the second review too. The level of psychological distress at the first post-surgery review had greater contribution than the level of pre-surgery psychological distress to the level of psychological distress six weeks after hospital discharge. Nevertheless, PACE (β = -.36, $p < .001$) and Relaxation (β = -.20, $p < .001$) were significant negative and independent predictors of overall distress–3, thus indicating that belonging to the PACE or Relaxation groups predicted lesser psychological distress at the second review assessment. The PACE intervention showed more influence in reducing psychological distress six weeks after hospital discharge than the Relaxation intervention. Yet, overall distress–2 had the highest contribution among the independent predictors of overall distress–3.

The next and an important objective was to examine the factors that predicted overall adherence. Multiple regression analysis was computed by taking the variables of age, gender, education, total perceived social support, the four dimensions of health locus of control, the groups (PACE, Relaxation, and Control), overall distress–1 and overall distress–2, along with overall distress–3. A model (Table 4.17) including age, gender, education, total perceived social support, HLOC–Doctors, HLOC–Others, HLOC–Unknown others, PACE, Relaxation, overall distress–1, overall distress–2, and overall distress–3 was seen to be significant, and explained 41% of variance in overall adherence, $R^2 = .41$, $F(12, 287) = 16.43$, $p < .001$. PACE, overall distress–3, Relaxation, and total perceived social support were the significant independent predictors. Of these, PACE ($\beta = .36$, $p < .001$), Relaxation ($\beta = .17$, $p < .01$) and total perceived social support ($\beta = .10$, $p < .05$) were the significant positive and independent predictors, such that receiving any of the two psychosocial interventions or perceiving higher social support predicted a higher level of adherence after CABG. The contribution of the PACE intervention was the highest towards overall adherence, followed by the Relaxation intervention, and finally total perceived social support. Conversely, the significant negative and independent predictor of overall adherence was overall distress–3 ($\beta = -.25$, $p < .001$). This meant that lower psychological distress six weeks after hospital discharge predicted a higher level of adherence. Nevertheless, the largest contribution among the independent predictors was of the PACE intervention which exerted a positive influence on adherence.

Table 4.16

Multiple regression analysis for variables predicting overall distress–3

	B	***SEB***	***β***	***t***
Age	0.02	.02	.05	1.12
Gender	0.06	.40	.01	0.15
Education	-0.03	.03	-.05	1.09
Total perceived social support	0.01	.02	.02	0.36
HLOC–Self	-0.11	.07	-.09	1.68
HLOC–Doctors	-0.10	.10	-.04	0.94
HLOC–Others	0.06	.09	.03	0.66
PACE	-2.75	.45	-.36	6.18***
Relaxation	-1.51	.36	-.20	4.17***
Overall distress–1	0.08	.03	.11	2.71**
Overall distress–2	0.46	.05	.47	8.88***
SE		2.42		
R^2		.56		
C		2.72		
F		33.87***		

Note. *B* = Unstandardised beta coefficient, *SEB* = Standard Error of Beta, *β* = Standardised beta coefficient, *t* = *t*-test, *SE* = Standard Error of the estimate, R^2 = Variance, *C* = Constant, *F* = *F*-statistic
***p* < .01, ****p* < .001

Table 4.17

Multiple regression analysis for variables predicting overall adherence

	B	***SEB***	***β***	***t***
Age	-0.02	.02	-.06	1.30
Gender	-0.09	.32	-.02	0.29
Education	0.02	.03	.04	0.78
Total perceived social support	0.03	.01	.10	2.07*
HLOC–Doctors	0.13	.08	.08	1.67
HLOC–Others	-0.08	.06	-.06	1.26
HLOC–Unknown others	0.02	.05	.02	0.33
PACE	1.92	.39	.36	4.95***
Relaxation	0.90	.31	.17	2.96**
Overall distress–1	0.01	.03	.02	0.47
Overall distress–2	-0.09	.05	-.13	1.83
Overall distress–3	-0.18	.05	-.25	3.64***
SE			1.98	
R^2			.41	
C			64.88	
F			16.43***	

Note. *B* = Unstandardised beta coefficient, *SEB* = Standard Error of Beta, *β* = Standardised beta coefficient, *t* = *t*-test, *SE* = Standard Error of the estimate, R^2 = Variance, *C* = Constant, *F* = *F*-statistic
**p* < .05, ***p* < .01, ****p* < .001

While overall adherence was found to be predicted by the variables mentioned above, it is of relevance to identify the factors contributing to overall prognosis. For the analyses relating to overall prognosis, the variables age, gender, education, total perceived social support, the four dimensions of health locus of control, the groups (PACE, Relaxation, and Control), overall distress–1, overall distress–2 and overall distress–3, along with overall adherence were entered as predictors. A significant model (Table 4.18) comprising age, gender, education, total perceived social support, HLOC–Self, HLOC–Doctors, HLOC–Others, PACE, Relaxation, overall distress–1, overall distress–2, overall distress–3, and overall adherence was found. The model explained 61% of variance in prognosis, $R^2 = .61$, $F(13, 286) = 34.77$, $p < .001$. It is of significance to note here that psychosocial variables contributed up to 61% to prognosis after CABG. The significant independent predictors were overall distress–3, PACE, overall distress–1, and gender. Among these, the significant negative and independent predictors were overall distress–3 ($\beta = -.50$, $p < .001$), overall distress–1 ($\beta = -.12$, $p < .01$) and gender ($\beta = -.09$, $p < .05$) whereby having lower psychological distress six weeks after hospital discharge or before surgery, or being a man undergoing CABG projected higher overall prognosis. The influence of overall distress–3 was higher than those of overall distress–1 and gender on overall prognosis. Yet, PACE ($\beta = .37$, $p < .001$) stood out as the sole significant positive and independent predictor of overall prognosis. Hence, receiving the PACE intervention predicted higher overall prognosis after CABG. The highest independent contribution to overall prognosis was of overall distress–3, and the lowest independent contributor was overall distress–1.

Table 4.18

Multiple regression analysis for variables predicting overall prognosis

	B	***SEB***	***β***	***t***
Age	0.03	0.05	.02	0.61
Gender	-2.38	1.15	-.09	2.07*
Education	0.16	0.09	.07	1.80
Total perceived social support	0.03	0.04	.02	0.60
HLOC–Self	0.09	0.19	.02	0.45
HLOC–Doctors	-0.33	0.30	-.05	1.09
HLOC–Others	-0.02	0.27	-.003	0.06
PACE	8.68	1.43	.37	6.07***
Relaxation	2.13	1.10	.09	1.94
Overall distress–1	-0.27	0.09	-.12	2.99**
Overall distress–2	0.002	0.17	.001	0.01
Overall distress–3	-1.54	0.18	-.50	8.81***
Overall adherence	-0.18	0.21	-.04	0.85
SE		7.02		
R^2		.61		
C		116.22		
F		34.77***		

Note. *B* = Unstandardised beta coefficient, *SEB* = Standard Error of Beta, *β* = Standardised beta coefficient, *t* = *t*-test, *SE* = Standard Error of the estimate, R^2 = Variance, *C* = Constant, *F* = *F*-statistic
**p* < .05, ***p* < .01, ****p* < .001

The findings of the five multiple regression analyses highlighted the following points:

1. Psychosocial variables together predicted prognosis to the extent of 61%.
2. Affiliation to psychosocial intervention groups (PACE and Relaxation) stood out as an independent negative predictor of overall distress at the first and second reviews, indicating that receiving psychosocial intervention predicted lower psychological distress.
3. Receiving psychosocial intervention, namely the PACE intervention, was found to emerge as a significant positive predictor of overall adherence and overall prognosis.
4. Overall distress was found to make negative contributions towards overall adherence and overall prognosis.
5. Overall distress at any time-point was predicted by the level of overall distress in the preceding time-point(s).

The findings are graphically represented so as to detect if a path existed between the variables, adherence, and prognosis. The findings of the five multiple regression analyses described above paved way to conceptualise a model of the psychosocial correlates that contributed to adherence and prognosis in patients subjected to CABG (Figure 4.11). The bold coloured paths represent the significant independent predictors of the outcomes. The black dotted paths depict contributors to the significant model for a particular outcome that were not independently significant to predict that outcome. Among the demographic variables, the major independent role was played by gender for overall distress–1 and overall prognosis. Education and the four dimensions of health locus of control contributed to the models for overall distress, overall adherence, and overall prognosis only in the presence of the other variables considered. Total perceived social support played an independent role in predicting overall distress–1 and overall adherence. Psychological distress consistently influenced its ensuing counterpart. For instance, overall distress–1 predicted overall distress–2, while overall distress–1 and overall distress–2 predicted overall distress–3. However, psychological distress was not always the highest predictor of psychological distress in the succeeding time-point. PACE was the largest contributor to overall distress–2, followed by Relaxation and by overall distress–1. In case of overall distress–3 however, overall distress–2 surfaced as the principal predictor, after which came PACE, Relaxation and overall distress–1. Overall adherence was an outcome independently predicted by total perceived social support, overall distress–3, and the two psychosocial interventions. Gender, overall distress–1, overall distress–3, and PACE being the significant individual predictors of overall prognosis suggested that the nature of prognosis after CABG was being predicted from the pre-surgery time-point and was influenced the most by post-surgery psychological distress (overall distress–3) as well as by having the PACE intervention. Affiliation to the Control group was the only variable that did not fit into the regression models for any of the outcomes. This indicates that in the presence of the PACE and Relaxation interventions, the contribution of Control towards psychological distress, adherence and prognosis in patients undergoing CABG was non-significant.

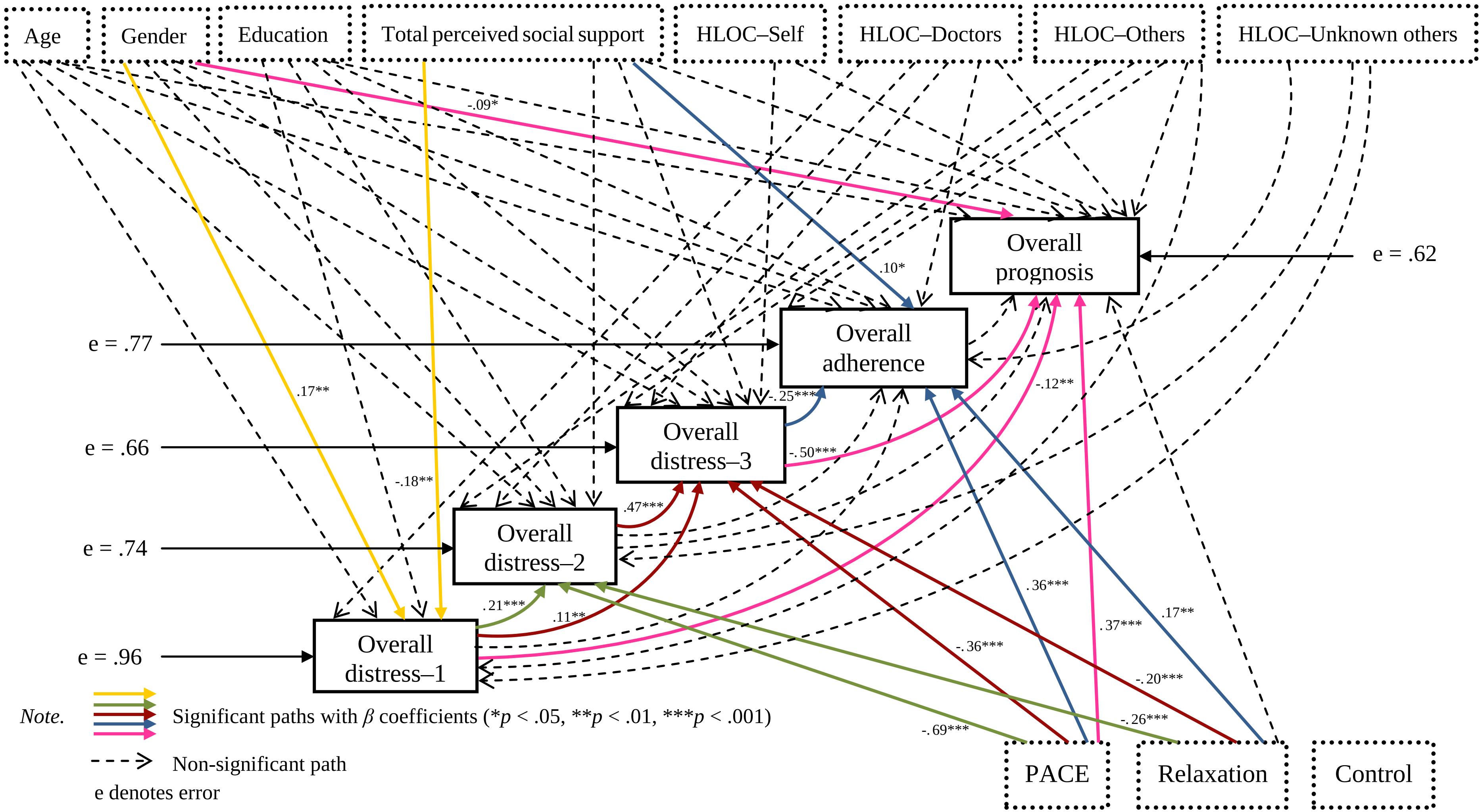


Figure 4.11 Psychosocial correlates of adherence and prognosis in patients undergoing CABG

Table 4.19

Multiple regression analysis for significant variables predicting overall distress–1

	B	***SEB***	***β***	***t***
Gender	1.92	.71	.15	2.70**
Total perceived social support	-0.09	.03	-.19	3.27**
SE			4.81	
R^2			.06	
C			14.85	
F			8.60***	

Note. *B* = Unstandardised beta coefficient, *SEB* = Standard Error of Beta, *β* = Standardised beta coefficient, *t* = *t*-test, *SE* = Standard Error of the estimate, R^2 = Variance, *C* = Constant, *F* = *F*-statistic
**$p < .01$, ***$p < .001$

In order to have a clearer picture, the analysis was carried forward taking into consideration only the variables identified as distinct individual predictors. A second stage of multiple regression analyses was undertaken using only the significant independent predictors of overall distress, overall adherence, and overall prognosis which were found in the previous stage of multiple regression analyses. Overall distress–1 was regressed on gender and total perceived social support (Table 4.19). The resulting model was found to be significant. It accounted for 6% of variance in overall distress–1, $R^2 = .06$, $F(2, 297) = 8.60$, $p < .001$. In addition, total perceived social support was the significant independent and negative predictor ($\beta = -.19$, $p < .01$), while gender was the significant independent and positive predictor ($\beta = .15$, $p < .01$) of overall distress–1. This indicated that higher perceived social support and male gender independently predicted lesser psychological distress in patients for CABG. Perceived social support had a higher contribution than gender to overall distress–1.

Table 4.20

Multiple regression analysis for significant variables predicting overall distress–2

	B	***SEB***	***β***	***t***
PACE	-5.44	.40	-.69	13.76***
Relaxation	-2.12	.40	-.27	5.36***
Overall distress–1	0.17	.03	.22	5.06***
SE		2.78		
R^2		.44		
C		5.75		
F		77.11***		

Note. *B* = Unstandardised beta coefficient, *SEB* = Standard Error of Beta, *β* = Standardised beta coefficient, *t* = *t*-test, *SE* = Standard Error of the estimate, R^2 = Variance, *C* = Constant, *F* = *F*-statistic
***$p < .001$

Overall distress–2 was regressed on PACE, Relaxation, and overall distress–1 (Table 4.20). Consequently, a significant model emerged which explained 44% of variance in overall distress–2, $R^2 = .44$, $F(3, 296) = 77.11$, $p < .001$. The three predictors were significantly independent, with PACE ($\beta = -.69$, $p < .001$) and Relaxation ($\beta = -.27$, $p < .001$) figuring as the negative contributors, and overall distress–1 ($\beta = .22$, $p < .001$) being the positive contributor. According to this finding, receiving either of the two psychosocial interventions or having lower psychological distress before surgery projected lower psychological distress at the first review. The largest contribution towards overall distress–2 was of the PACE intervention, while overall distress–1 had the smallest predictive influence.

Table 4.21

Multiple regression analysis for significant variables predicting overall distress–3

	B	***SEB***	***β***	***t***
PACE	-2.64	.44	-.35	5.97***
Relaxation	-1.53	.36	-.20	4.23***
Overall distress–1	0.08	.03	.11	2.57*
Overall distress–2	0.47	.05	.48	9.27***
SE		2.43		
R^2		.55		
C		2.49		
F		89.41***		

Note. *B* = Unstandardised beta coefficient, *SEB* = Standard Error of Beta, *β* = Standardised beta coefficient, *t* = *t*-test, *SE* = Standard Error of the estimate, R^2 = Variance, *C* = Constant, *F* = *F*-statistic
*p < .05, ***p < .001

Overall distress–3 was regressed on PACE, Relaxation, overall distress–1, and overall distress–2 (Table 4.21). The resulting model was seen to be significant. It contributed 55% of variance in overall distress–3, R^2 = .55, $F(4, 295) = 89.41$, p < .001. Further, the significant independent and positive predictors were overall distress–2 (β = .48, p < .001) and overall distress–1 (β = .11, p < .05), while PACE (β = -.35, p < .001) and Relaxation (β = -.20, p < .001) emerged as the significant independent and negative predictors of overall distress–3. Hence, having lower psychological distress about a week after hospital discharge, being in either of the psychosocial intervention groups, or having lower psychological distress before CABG predicted lower psychological distress six weeks after hospital discharge. Overall distress–2 exerted the highest independent contribution to overall distress–3, and overall distress–1 had the lowest contribution.

Table 4.22

Multiple regression analysis for significant variables predicting overall adherence

	B	***SEB***	***β***	***t***
Total perceived social support	0.03	.01	.11	2.46*
PACE	2.05	.36	.39	5.78***
Relaxation	0.97	.30	.18	3.24**
Overall distress–3	-0.23	.04	-.33	5.76***
SE			1.99	
R^2			.38	
C			63.75	
F			45.86***	

Note. *B* = Unstandardised beta coefficient, *SEB* = Standard Error of Beta, *β* = Standardised beta coefficient, *t* = *t*-test, *SE* = Standard Error of the estimate, R^2 = Variance, *C* = Constant, *F* = *F*-statistic
*$p < .05$, **$p < .01$, ***$p < .001$

Overall adherence was regressed on total perceived social support, PACE, Relaxation, and overall distress–3 (Table 4.22). Subsequently, a significant model surfaced which accounted for 38% of variance in overall adherence, $R^2 = .38$, $F(4, 295) = 45.86$, $p < .001$. All the variables entered remained as significant independent predictors. PACE ($\beta = .39$, $p < .001$), Relaxation ($\beta = .18$, $p < .01$), and total perceived social support ($\beta = .11$, $p < .05$) were found to be the significant positive and independent contributors. Overall distress–3 ($\beta = -.33$, $p < .001$) was the significant independent and negative predictor of overall adherence. As per this finding, receiving either of the two psychosocial interventions, having lower psychological distress six weeks after hospital discharge, or having higher perceived social support indicated a higher level of adherence. The PACE intervention made the largest independent contribution towards overall adherence, and total perceived social support had the lowest yet positive predictive influence.

Table 4.23

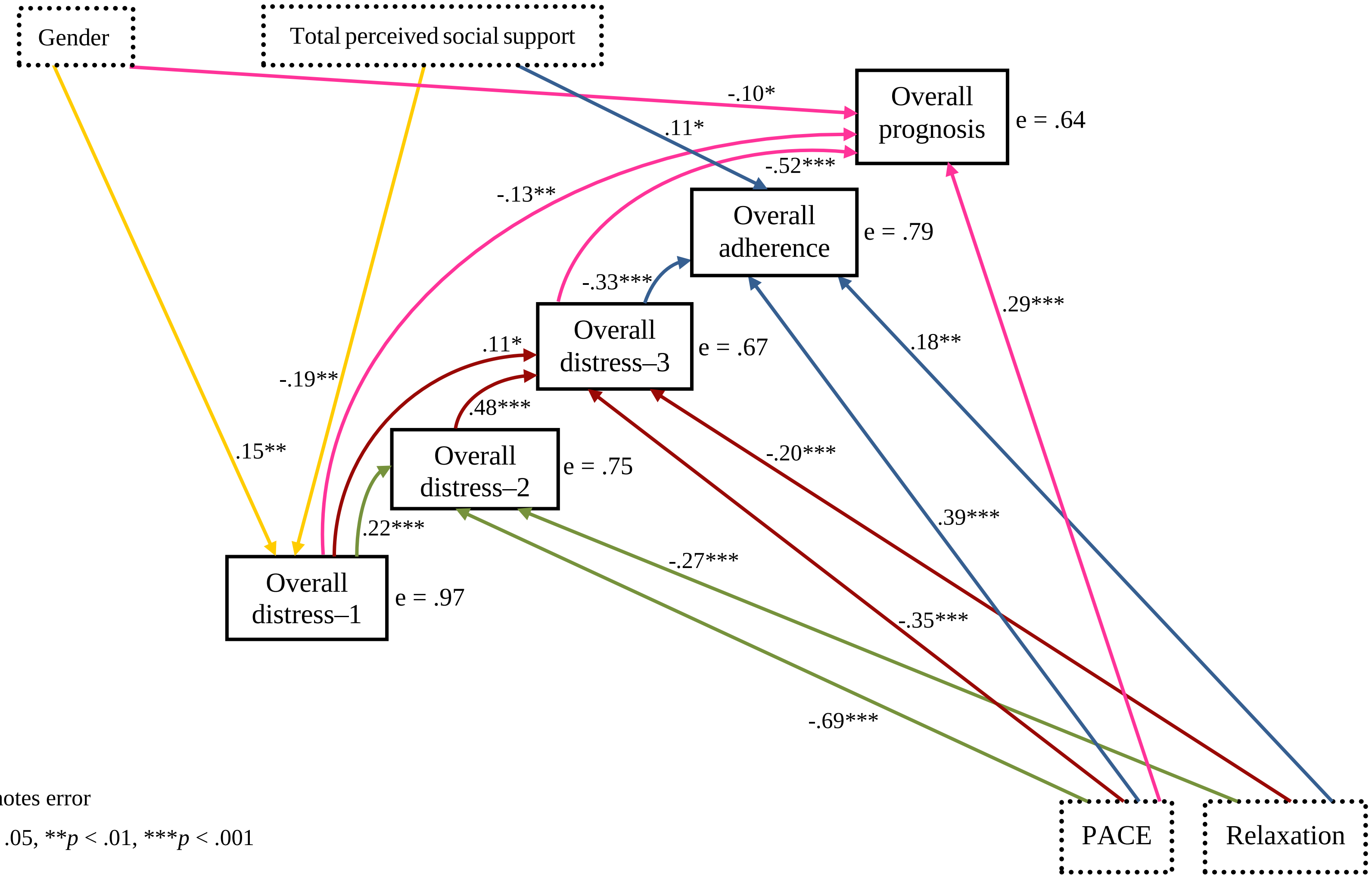
Multiple regression analysis for significant variables predicting overall prognosis

	B	***SEB***	***β***	***t***
Gender	-2.74	1.05	-.10	2.61*
PACE	6.83	1.03	.29	6.67***
Overall distress–1	-0.28	.09	-.13	3.22**
Overall distress–3	-1.60	.14	-.52	11.47***
SE			7.06	
R^2			.60	
C			111.77	
F			108.82***	

Note. *B* = Unstandardised beta coefficient, *SEB* = Standard Error of Beta, *β* = Standardised beta coefficient, *t* = *t*-test, *SE* = Standard Error of the estimate, R^2 = Variance, *C* = Constant, *F* = *F*-statistic
*p < .05, **p < .01, ***p < .001

Overall prognosis was regressed on gender, PACE, overall distress–1, and overall distress–3 (Table 4.23). The resulting model was noted to be significant. It contributed 60% of variance in prognosis, $R^2 = .60$, $F(4, 295) = 108.82$, $p < .001$. PACE was the only significant independent and positive contributor, $\beta = .29$, $p < .001$. Conversely, overall distress–3 ($\beta = -.52$, $p < .001$), overall distress–1 ($\beta = -.13$, $p < .01$) and gender ($\beta = -.10$, $p < .05$) were the significant independent and negative contributors to overall prognosis. Therefore, having lower psychological distress six weeks after hospital discharge, receiving the PACE intervention, having lower psychological distress before surgery, or being a man predicted higher prognosis after CABG. Overall distress–3, which was a negative predictor, showed the largest independent contribution to overall prognosis, while the negative predictor gender made the lowest contribution.

A reduced model of the significant psychosocial correlates of adherence and prognosis for patients of CABG (Figure 4.12) was sourced from the second stage of multiple regression analyses explained above. Gender was the sole demographic variable which bore significance (although of lesser strength compared to the other variables in the model) at the opening and closing time-points of the study, through its independent contributions to overall distress–1 and overall prognosis. Overall distress–1 affected overall distress at the two post-surgical time-points as well as overall prognosis. Overall distress–2 influenced overall distress–3. Overall distress–3 in turn played a major role in overall adherence and overall prognosis. Overall distress–2 made the highest independent contribution to overall distress–3 which then was the highest independent predictor of overall prognosis. Overall distress–1 which refers to the baseline psychological distress, measured before the administration of psychosocial intervention, made the lowest independent contribution to post-intervention psychological distress (i.e., overall distress–2 and overall distress–3). The independent influences of the PACE and Relaxation interventions on post-intervention psychological distress were greater than that of overall distress–1. The Relaxation intervention independently contributed to overall distress–2, overall distress–3 and overall adherence, yet was not a significant independent predictor of overall prognosis. The PACE intervention nonetheless contributed to all the variables it was regressed on (post-surgical overall distress, overall adherence and overall prognosis). Moreover, the PACE intervention was the only variable that emerged as the largest independent predictor twice, for overall distress–2 and overall adherence. The PACE intervention was also the only positive independent predictor of overall prognosis after CABG.



Note. e denotes error

*$p < .05$, **$p < .01$, ***$p < .001$

Figure 4.12 Significant psychosocial correlates (with β coefficients) of adherence and prognosis in patients undergoing CABG

The reduced model obtained through the second stage of multiple regression analyses which included significant predictors only was tested to ensure that its fit to the data was as good as that of the full model obtained from the first stage of multiple regression analyses. The test comparing the fit of the two models was not significant ($p > .05$), indicating that the fit of the two models did not significantly differ (elaborately explained in Appendix B4). The reduced model (Figure 4.12) has better readability compared with the full model (Figure 4.11). Thus, the causal relationship has more compact representation in the reduced model than the full model. It is recommended to adopt the reduced model as it has better clarity and moreover, it did not significantly differ from the full model.

The reduced model suggested a path between the two psychosocial interventions, adherence, and prognosis. A further attempt was made to have a closer examination of the model and evolve a framework that traces the pathway, as will be seen in the next section.

Pathway between Psychosocial Intervention and Prognosis

For a clearer understanding of the role of psychosocial intervention in overall prognosis after CABG, two path models (for PACE and Relaxation respectively) were derived from the findings relating to the psychosocial correlates of overall adherence and overall prognosis presented in the previous section. The numerical values used in these models are based on the second stage of multiple regression analyses. It may also be noted that no pathway was traced between Control (i.e., no psychosocial intervention) and overall prognosis as the said group was neither a significant independent predictor nor a constituent of the significant models for any of the outcomes, as seen in the first stage of multiple regression analyses.

Figure 4.13 depicts the pathway of impact between the PACE intervention and overall prognosis. The effectiveness of the PACE intervention in increasing overall prognosis was seen directly and indirectly. For one, the PACE intervention had a straightforward independent influence on overall prognosis (β = .29, p < .001). Simultaneously, overall distress–3 was a significant as well as the largest independent predictor of overall prognosis (β = -.52, p < .001). The contribution of overall distress–3 to overall prognosis was stronger than that of the PACE intervention to overall prognosis. However, the PACE intervention also played a significant independent role in predicting overall distress–3 (β = -.35, p < .001). It becomes apparent therefore that overall distress–3, although the highest contributor to overall prognosis, was itself significantly influenced by the PACE intervention. Being a significant negative and independent predictor of overall distress–3, the PACE intervention was able to reduce the level of psychological distress experienced six weeks after CABG. Overall distress–3 in turn exerted a significant negative and independent influence on overall prognosis. This meant that higher psychological distress six weeks after CABG implied poorer prognosis. Yet, if the patient had undertaken the PACE intervention, the level of psychological distress reduced and consequently the level of prognosis improved. In sum, the PACE intervention directly predicted the level of overall prognosis to a small extent, and concurrently predicted overall distress–3 which in turn was the leading contributor to overall prognosis.

The pathway of influence from the Relaxation intervention to overall prognosis is illustrated in Figure 4.14. There was only one route of indirect influence in this context. The Relaxation intervention, by itself, was no significant predictor of overall prognosis. However, overall distress–3 emerged as the largest negative contributor to overall prognosis (β = -.52, $p < .001$). Therefore, high psychological distress six weeks after CABG exerted a negative influence on prognosis such that overall prognosis was low. Yet, the Relaxation intervention was a significant negative predictor of overall distress–3 (β = -.20, $p < .001$). This indicated that receiving the Relaxation intervention helped decrease the level of psychological distress six weeks following CABG. The reduced psychological distress then predicted better prognosis. The impact of the Relaxation intervention on overall prognosis was hence mapped through predicting overall distress–3.

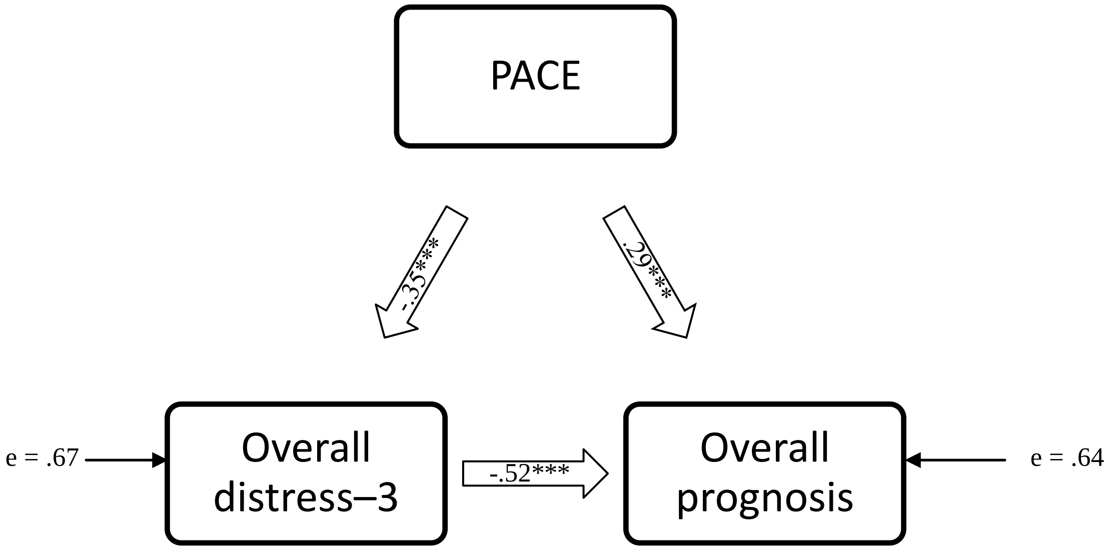


Figure 4.13 Pathway between the PACE intervention and prognosis of patients subjected to CABG

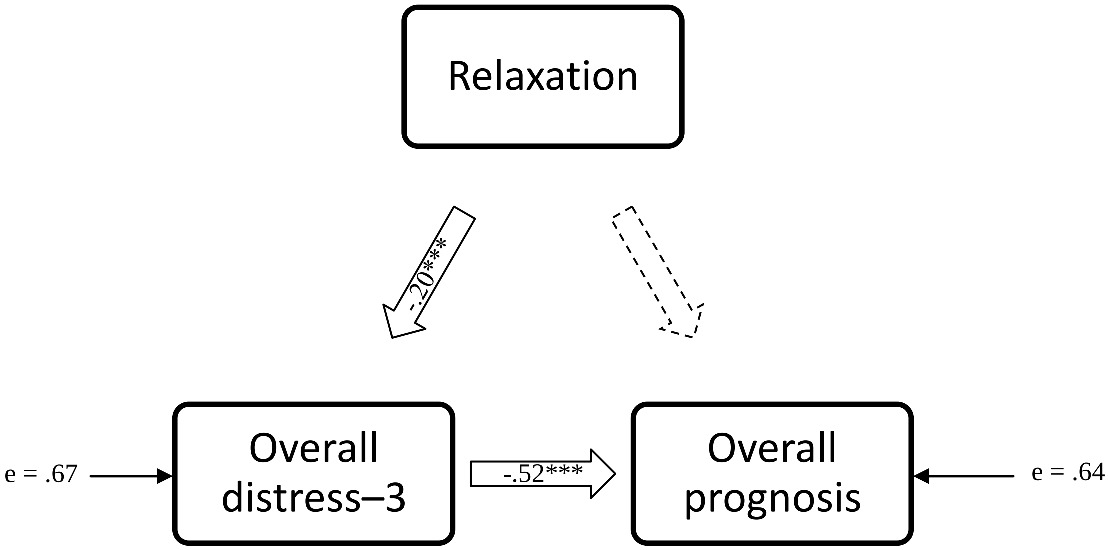
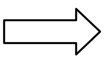
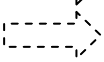


Figure 4.14 Pathway between the Relaxation intervention and prognosis of patients subjected to CABG

Note.  Significant independent path with β coefficient (***p < .001)

 Non-significant path

e denotes error

In view of the above findings, it is inferred that among the three conditions of testing in this study (PACE, Relaxation, and Control), PACE and Relaxation were the significant contributors in the process of influencing overall prognosis of CABG. In particular, the PACE intervention was the more effective one, given its ability to directly and indirectly predict overall prognosis.

To increase the efficacy of the findings in the current research study, two sources of qualitative data were also considered. The first set of qualitative data came from semi-structured interviews with 15 participants (five from each group), and the second set of data related to the observations of the investigator. These data paved way to understand the process and individual differences that may have played a role in the outcome of the medical treatment (CABG) along with psychosocial support (through assessment and intervention).

Qualitative Data from Participants

Data from semi-structured interviews with 15 participants (Table 4.24) were analysed, using the principles of thematic analysis given by Willig (2013). The aim was to interpret and seek patterns in the subjective experiences of participants during their hospital stay and on their return home. Following the transcription of interviews, the transcribed data were read and re-read. During this process, codes (meaningful and informative units of data in the transcript) were identified. Three themes were identified from the list of codes. The themes characterise the investigator's interpretation of the qualitative data. The themes are described and supported by representative excerpts from participants' interviews. Pseudonyms have been used in order to protect participants' anonymity.

Relief through psychosocial intervention. Participants from the two psychosocial intervention groups described their movement from the state of fear to courage on receipt of intervention –

> Before surgery, I was very afraid. Even though I am a hefty man and quite old (in age), I could not gather courage... The videos were very nice... The support and words came right in time. If I am here successfully recovering, it is because of the courage I got through you. (*Abdul, 63 years, Male, PACE group*)

> Thanks for reaching out to me during surgery. With your sessions and support, my recovery has speeded up in a positive way. The Relaxation session would bring the freshness of nature before my eyes… The support was 50% responsible for my recovery. (*Mohan, 66 years, Male, Relaxation group*)

The responses above indicate that the wait for CABG could overwhelm patients, such that these participants succumbed to pessimistic thoughts and feelings.

These also highlight the value patients attribute to mental strength and positive emotions in the process of coping and recovering.

Table 4.24

Demographic characteristics of participants attending the semi-structured interviews

	Pseudonym	Group	Age	Gender	Theme
1.	Abdul	PACE	63 years	Male	Relief through psychosocial intervention
2.	Mahesh	PACE	66 years	Male	Relief through psychosocial intervention
3.	Shiva	PACE	55 years	Male	Relief through psychosocial intervention
4.	Radha	PACE	55 years	Female	Differential influences of psychosocial interventions
5.	Rajesh	PACE	53 years	Male	Differential influences of psychosocial interventions
6.	Mohan	Relaxation	66 years	Male	Relief through psychosocial intervention
7.	Fatima	Relaxation	59 years	Female	Relief through psychosocial intervention
8.	Krishna	Relaxation	62 years	Male	Differential influences of psychosocial interventions
9.	Srinivas	Relaxation	48 years	Male	Differential influences of psychosocial interventions
10.	Vijay	Relaxation	53 years	Male	Differential influences of psychosocial interventions
11.	Arun	Control	54 years	Male	Finding solace in interaction and assessment
12.	Gayathri	Control	48 years	Female	Finding solace in interaction and assessment
13.	Narayana	Control	51 years	Male	Finding solace in interaction and assessment
14.	Pavan	Control	64 years	Male	Finding solace in interaction and assessment
15.	Vinod	Control	51 years	Male	Finding solace in interaction and assessment

The relevance of continued intervention through the use of the take-home DVDs and CDs that were given to the PACE and Relaxation group members at the time of discharge was also expressed by the participants –

> Yesterday I was feeling quite uneasy and that worried me. My son sat me down and showed me your video again. I felt better listening to the encouragement from the people in there. (*Mahesh, 66 years, Male, PACE group*)

> Whenever I am disturbed, your CD comes very handy. I feel instantly better at home. (*Fatima, 59 years, Female, Relaxation group*)

> I watched the videos every day (during the month after discharge). I insist that I do all that is advised and have also been requesting others who attend to me to follow and do the same. I have ensured that I ask my Surgeon all the doubts I have. That is what the video tells me to do. (*Shiva, 55 years, Male, PACE group*)

Mahesh's and Fatima's response corroborate the positive and comforting nature of psychosocial intervention, such that patients regained their confidence when they were not feeling in the best of their spirits after returning home following surgery. This highlights that the course of recovery involved ups and downs, thus lending significance to the provision of repetitive intervention for patients even after hospital discharge. Shiva's response points out that the PACE intervention had specifically induced him to actively participate in understanding his health (clarifying doubts with the surgeon) and taking care of his health (following advice).

Differential influences of psychosocial interventions. The theme of the impact of the PACE intervention on health-enhancing behaviour was consistently observed across participants' responses –

> I am following your advice to the letter. You have been a great support. I am doing very well… Jamuna madam's part was very motivating. (*Radha, 55 years, Female, PACE group*)

> I am doing very well after surgery. I am following all recommendations. People try to tell me, "Oh poor man! He can't do anything now, after heart surgery." But then I remember all the encouragement I received, and get myself to do my walking and daily activities. It surprises people around me. (*Rajesh, 53 years, Male, PACE group*)

Besides emphasising that the PACE intervention was useful in promoting lifestyle changes after surgery, the responses above highlight the benefit of peer-facilitated education as was the case in the PACE videos. Particularly, Rajesh's response suggests that the motivating information he obtained had prevented him from harbouring misconceptions such as of being physically inactive after CABG although people around him expressed so. Further, his reference to surprising people around him by resuming the advised walking and daily activities underlines the power of psycho-education to dispel myths and promoting health-sustaining behaviours. With regard to the Relaxation intervention, the effect was largely seen in its ability to create positive affective states for participants –

> Your session was very nice. It transported me to the hill stations I had been to on holiday before. I felt that tranquillity. (*Krishna, 62 years, Male, Relaxation group*)

> Relaxation has calmed me down. It has also helped with my quality of sleep (after surgery). (*Srinivas, 48 years, Male, Relaxation group*)

Srinivas' response indicates the cascading influence of the Relaxation intervention. It had improved the participant's mood state, and had consequently led to better quality of sleep following surgery.

Participants however provided a few recommendations to further enhance the two psychosocial interventions. Two participants from the PACE group independently suggested that specific advice regarding diet such as the type and quantity of food to be consumed and avoided could have been incorporated into the PACE programme. One male participant from the Relaxation group preferred to have a female voice narrating the suggestions of Guided Imagery –

> The relaxation programme could have been better if a lady was giving the suggestions. Her voice would have been more soothing. (*Vijay, 53 years, Male, Relaxation group*)

The participants' suggestions may be useful for future research to customise intervention.

Finding solace in interaction and assessment. The responses from the Control group, which did not receive psychosocial intervention, were surprisingly positive –

> I received the best response of care from you when I think of the entire hospital team. For you constantly kept checking on me and how I was doing. That is why I was insisting that just as it is important that I meet the doctor today I must also meet you. (*Arun, 54 years, Male, Control group*)

> Whenever you gave me questions, it made me think about what I was feeling and how. I began to reflect. Thanks for that. (*Vinod, 51 years, Male, Control group*)

> I must thank you for being there during hospitalisation. Your interaction was encouraging. I always hope to see you in the hospital so I can talk. (*Gayathri, 48 years, Female, Control group*)

The above three responses from the Control group participants offer a testimony of their yearning for psychosocial support during and after hospitalisation.

The need for periodic assessment is the key inference here. Furthermore, these patients had likened the investigator's role in their mental well-being to that of the doctor's role in their physical health. It is apparent that patients derive more satisfaction from biopsychosocial care than biomedical treatment. Two members of the Control group expressed the disadvantage they experienced when provided with standard hospital treatment only –

> I was not specifically instructed on exercise and diet. I was not sure of how long one must walk. Now that you are asking about these things, I am wondering why I was not told. (*Narayana, 51 years, Male, Control group*)

> When I was admitted for surgery, I was looking for information about surgery. I wasn't told much. But, I asked around from patients who had already undergone surgery. I learnt so much then... I felt that was the best source. (*Pavan, 64 years, Male, Control group*)

The two responses illustrate the current ineffective quality of communication that healthcare professionals hold with their patients. It must be noted that the hospitals where the two participants had undergone CABG provided pre-surgery education as well as post-surgery dietary and physiotherapeutic counselling to all patients of CABG. Yet, that these patients lacked information and understanding of their health condition and the adherence regimen suggests that the quality of communication in pre-surgery and post-surgery phases had perhaps not served the intended purpose. Interestingly, Pavan felt that he overcame this barrier by speaking with other patients who had already undergone CABG. His reliance on peer support is an indirect endorsement of the relevance of the PACE intervention which involved a peer patient alongside health experts in educating patients who awaited CABG.

The qualitative data from the current participants matched the quantitative results which showed a graded level of improvement in adherence and prognosis as well as decrease in psychological distress across the PACE, Relaxation, and Control groups. The patients' responses suggested that the PACE intervention was effective in motivating and directing them to maintain their health, and the Relaxation intervention was useful to enhance their positive emotions. The Control group participants, despite receiving no psychosocial intervention during surgery, felt that the interaction was a form of support in itself. The psychosocial package of periodic assessment and/or intervention was thus positively accepted by all the groups in the study.

Investigator's Observations

The conduct of the main study was smooth and uneventful. The role of pilot testing is important to acknowledge in this regard. Based on the results of the pilot study, the design for the main study was restructured, making it realistic to carry out on a larger scale and in a time-friendly manner. It was possible to complete the pre-surgery assessment+intervention session within an hour, and without tiring patients or disturbing the routine of the hospital staff. Administration of the post-surgery intervention session consumed 30–40 minutes. Participants were able to easily respond to the assessment tools in the main study. On completion of an intervention session, patients and caregivers generally expressed that the time was well-spent.

Participants, who formed a part of the sample, had readily agreed to be a part of the study after reading the Patient Information Sheet. Patients who refused to participate when approached (approximately 30 patients) had cited reasons such as lack of time, no interest in the study, no assurance of meeting the investigator after hospital discharge, and no perceived need for psychosocial assessment and support.

At review visits, administering assessments seemed challenging as it was not always possible to ensure a private space or room in the hospital for the purpose. Yet, the enthusiasm of participants to interact with the investigator even in relatively crowded waiting halls helped ensure that the assessments were completed. During semi-structured interviews, participants often gave brief responses expressing pleasure and gratitude for being approached and being consistently monitored. The investigator used non-directive probes to help them express themselves in detail.

To summarise from the investigator's point of view, the experience and interaction with hospital authorities, staff, doctors, caregivers and patients, for the most part, was pleasant, encouraging and educative.

Summary

The statistical analyses shed light on the positive impact of the two psychosocial interventions as well as on the relevance of different psychosocial factors when considering the levels of patients' adherence and prognosis after CABG. Results based on the four objectives of the study revealed that when compared with the Control group, the PACE group consistently achieved significantly higher levels of adherence, prognosis as well as reduction in psychological distress across time, while the Relaxation group did not always have significantly higher scores. Nonetheless, the impact of the two psychosocial interventions on prognosis followed a pathway. The three groups of PACE, Relaxation, and Control were noted to be homogenous on all pre-intervention parameters—demographic factors, perceived social support, health locus of control, and psychological distress. Analyses of post-intervention data revealed significant group differences in terms of overall adherence, overall prognosis and psychological distress reduction, indicating the impact of psychosocial intervention.

For the dimensions of adherence, group differences specifically between the PACE and Control groups were apparent in four dimensions (adherence to exercise, avoidance of health risk behaviours, adherence to diet, and planned adherence and emergency care). The PACE and Relaxation groups significantly differed from each other in two dimensions (adherence to exercise and adherence to diet). There was a significant difference between the Relaxation and Control groups only in the dimension of adherence to exercise.

Across the nine dimensions of prognosis, the significant effect of the groups was found. The PACE group significantly differed from the Control group in all the nine dimensions (post-CABG affect state, post-CABG anxiety, post-CABG physical pain, discomfort in surgical sites, worry about return to normalcy, discomfort in the leg, CABG bio-social by-products, constraints in socialising, and infection and interference to routine life). The PACE group also significantly differed from the Relaxation group in the prognosis dimensions, except infection and interference to routine life. The Relaxation group had significantly higher scores than the Control group in five out of nine dimensions of prognosis (post-CABG affect state, post-CABG anxiety, post-CABG physical pain, worry about return to normalcy, and infection and interference to routine life).

With regard to psychological distress, group differences were apparent for changes in psychological distress between the pre-surgery and first review assessments, as well as between the pre-surgery and second review assessments. Within-group reductions in overall distress, anxiety, and depression across time were seen for the PACE and Relaxation groups, while the Control group did not show a consistent significant decrease in depression.

Efforts to evolve a statistical model related to the psychosocial influences on overall adherence and overall prognosis showed that overall distress, the two psychosocial interventions and total perceived social support were the major independent predictors of overall adherence, while overall distress, the PACE intervention and gender individually predicted overall prognosis. Psychological distress played a central role, as it not only was affected by psychosocial factors but also exerted the largest independent influence on overall prognosis. In respect of psychosocial intervention, the PACE intervention had a relatively greater impact on overall prognosis by itself and through its influence on overall distress which in turn predicted overall prognosis. For the Relaxation intervention, the impact was less pronounced and indirect, i.e., through its influence on overall distress. The Control group, which stood for the absence of psychosocial intervention, was the sole variable that failed to reach significance in all regression models.

Thematic analysis of qualitative responses shed light on the distinct utility of the PACE and Relaxation interventions, as well as on how these could be improved in future. The Control group participants specifically highlighted the necessity of professional psychosocial support in healthcare settings, by confiding that their participation in the present study afforded them the opportunity for empathetic interaction.

The results, on the whole, substantiated the benefits of supplementing medical care with psychosocial intervention for the success of CABG in terms of boosting patients' adherence and prognosis. They simultaneously projected the pivotal influence that psychological distress exhibited in this milieu, thus justifying the rationale of the research study to remedy psychological distress during CABG.

Chapter V

Discussion

Chapter V

Discussion

Situated in the field of Health Psychology, the present investigation with patients undergoing CABG tested four hypotheses using two psychosocial intervention groups (PACE and Relaxation) alongside a Control group (that received standard hospital treatment only). The groups were subjected to self-report assessments before CABG and during two review visits following hospital discharge after surgery. Intervention modules were administered prior to and after CABG during the patient's hospital stay. Three hypotheses which conjectured that psychosocial intervention during CABG would help enhance patients' adherence and prognosis as well as reduce psychological distress were partially accepted. Results were in favour of the PACE intervention that consistently led to significantly higher adherence, prognosis and psychological distress reduction compared with the Control group. The differences between the Relaxation and Control groups however were not always significant. Nevertheless, the fourth hypothesis relating to the pathway between psychosocial intervention and prognosis through psychological distress was supported since both PACE and Relaxation interventions contributed to reduced psychological distress which in turn predicted higher prognosis. The lack of contribution of the Control group to the path model of overall prognosis additionally corroborated the impact of psychosocial intervention.

In terms of overall adherence and overall prognosis, there was a significant effect of the groups and further, the three groups statistically differed from each other. This meant that within the same duration of six weeks after the similar experience of CABG across the three groups, there were varying levels of self-care and recovery which altogether represent the outcome of surgery. The period of six weeks signifies the critical phase of healing of the chest and leg wounds, as well as of the chest sternum after CABG (Bupa Asia, 2016). In addition, the susceptibility to infections, respiratory problems and re-hospitalisation is high during this time (Fasken, Wipke-Tevis, & Sagehorn, 2001). The typical progress of the groups in adherence and prognosis trended in a stepped manner. The PACE group scored the highest, and was followed by the Relaxation and Control groups. Receiving psychosocial intervention rather than not had substantially enhanced patients' potential to meticulously undertake post-surgical health management and positively recover during six weeks after hospital discharge. The results not only confirmed the achievement of better outcomes in the psychosocial intervention groups for adherence and prognosis, in comparison with the Control group, but also indicated the differential impact of the two psychosocial interventions, viz., Programme for Affective and Cognitive Education and Relaxation.

The first hypothesis posited that adherence would be higher in the psychosocial intervention groups than the Control group. The immediate post-surgical scenario at home calls for strict adherence to medication intake, diet control, walking and/or exercises, and symptom monitoring. Non-observance or under-observance of these instructions can trigger adversities such as uncontrolled blood glucose level, clotting in the legs, and wound infections (California Pacific Medical Center, 2011; Healthwise, 2015). Overall adherence was significantly the highest in the PACE group and lowest in the Control group. Findings pertaining to the dimensions of adherence were further enlightening. In the dimensions of adherence to exercise, avoidance of health risk behaviours, adherence to diet, and planned adherence and emergency care, the PACE group scored significantly higher than the Control group.

The PACE group also had significantly higher adherence to exercise and diet than the Relaxation group. The Relaxation group, on the other hand, differed from the Control group only in the dimension of adherence to exercise. It was clear that the Control group had the lowest adherence in all dimensions, the Relaxation group had relatively moderate adherence in the dimension of exercise, while the PACE group had the comparably highest adherence to exercise, avoidance of health risk behaviours, adherence to diet, and planned adherence and emergency care. The findings suggest that the group which received the PACE intervention had grasped the nuances of the adherence required after CABG, and hence was capable of achieving superior levels of adherence across the aforesaid dimensions. Other studies noted that patients' specific knowledge of risk factors and treatment strategies was associated with enhanced lifestyle changes (Alm-Roijer, Stagmo, Udén, & Erhardt, 2004; Pearson & Kopin, 2003). The Control group which did not receive psychosocial intervention may be said to have lacked the necessary know-how and support to practise the multidimensional adherence after surgery.

Consider also that the Relaxation group had not significantly differed from the Control group in the dimensions of avoidance of health risk behaviours, adherence to diet, and planned adherence and emergency care. The PACE group had shown significant difference from the Control group in these areas too. Relaxation through Guided Imagery was aimed at the affect factor to bring down distress levels in patients, whereas the PACE intervention sought to enrich patients' cognition by laying a foundation of knowledge regarding the do's and don'ts in the aftermath of CABG. Cognitive enrichment may also be related to affect (by dissipating unfounded and irrational fears) and behaviour (by practising with conviction what is prescribed). Hence, it was along expected lines for adherence to be high in the PACE group as compared with the Relaxation group. The finding that the PACE group had maintained higher adherence standards than the Relaxation group in the aforementioned four dimensions highlights that the motivational education format of the PACE intervention had helped patients gather the knowledge and drive for adherence, as the World Health Organization (2003) had recommended. It is necessary for healthcare providers to educate and motivate patients to practise the prescribed self-care regimen from the time they are discharged.

Of particular interest is the finding that adherence to medication did not significantly differ across the groups. This indicated that the Control group was on par with the two psychosocial intervention groups for medication intake. In light of significant differences that were observed in the non-medication domains (diet, exercise, health risk behaviours, planned adherence and emergency care), the finding of no significant group difference in adherence to medication highlights, as Mehta (2011) noted, the dominance of the biomedical attitude to health among patients who do not receive psychosocial intervention (represented by the Control group). Additionally, studies observed that patients' adherence takes a toll when it involves changes in lifestyle (Martin *et al.*, 2005). Ingesting pills arguably demands less time, thought, and effort than exercising, diet control, and symptom monitoring. In another study that recruited patients with CAD, adherence to lifestyle modification was 16% lower than that of adherence to pharmacological therapy (Lunelli, Portal, Esmério, Moraes, & de Souza, 2009). The need for convincing patients about the equal importance of lifestyle measures and recommending strategies to practise adherence in everyday life comes through. During the PACE intervention, patients were explained about the principal areas of adherence and the consequences of failing to adhere by the Cardiothoracic Surgeon, while the peer patient recounted the methods to ensure adherence in daily routine (e.g., using mobile phone alarms for timely intake of medicines, having one's spouse accompany one on daily walks). With the PACE intervention elucidating to patients the what, why and how of adherence, the plan of adherence was driven home for them. Moreover, the peer patient's assertion that adherence was effortful but rewarding in sustaining health after surgery would have induced motivation and confidence among participants of the PACE group. The aspects of motivation and planning are important to focus on when preparing cardiac patients for adherence (Kähkönen *et al.*, 2015). At all the hospitals where data were collected for this study, patients were offered information in oral and written forms about the instructions for adherence by nursing, physiotherapy, and dietetics professionals. Yet, the Control group achieved lesser adherence than the PACE group in all domains related to lifestyle. This reiterates the inferences of earlier research studies that mere provision of information without motivating patients or recommending the means to practise adherence was less effective (Pakpour *et al.*, 2014; Zarani *et al.*, 2010, 2012, 2014).

Adherence to review visits showed mixed results. A significant association between the groups and adherence to first review was found such that the highest percentage of participants who had visited their doctor for the review a week after hospital discharge was from the PACE group, while the lowest percentage was from the Control group. This is a noteworthy achievement given that follow-up visits in India tend to become sidelined on account of problems like patients' lack of awareness about the significance of follow-ups, high expenses, and long-distance travel to hospitals (Banerjee & Varma, 2013; Yadava, 2013). Yet again, the fact that the PACE group participants were found to be more adherent to the first review consultation indicates the benefit of the cognitive foundation they had through the

PACE intervention which emphasised the significance of review consultations. However, there was no significant association between the groups and adherence to second review. It is possible that as the participants recovered with time, their need for medical services may have waned. It is also possible that during the first review, the feedback from the doctor was encouraging enough that it may have communicated a positive outcome which in turn may have undermined the patients' timing of second review. The finding that the PACE group did not differ from the other two groups in the timing of the second review also raises the issue of sustenance of the PACE intervention. It is essential for cardiac patients to ensure that they regularly meet their doctor in order to facilitate consistent health monitoring (Aroesty, 2015). For instance, Vanchenauer *et al.* (2008) found that as time progressed after CABG, patients' adherence to diet and their desire for dietary counselling increasingly diminished. Elsewhere, the course of natural recovery within six months after CABG was observed to breed misconceptions among patients such as that they no longer need to practise lifestyle management strategies (Taebi *et al.*, 2014). The similar trend of decrease in the number of patients adhering to the second review visit date in this study implicates the need to offer psychosocial intervention even after hospital discharge so as to reinforce patients' beliefs about timely review consultations and to inculcate habitual adherence to review visits.

The anchor of health in CAD is adherence (Esselstyn *et al.*, 2014; Leon *et al.*, 2005). CABG is one such contemporary treatment procedure for chronic diseases that is accompanied by a disclaimer that its success is subject to the patient's discretion and action in her or his subsequent lifestyle choices. The patient's lifestyle after surgery determines the eventual success of CABG (Kulik *et al.*, 2015). It must however be conceded that a healthcare system with a biomedical approach cannot expect its patients to adhere to advice in domains beyond medication. According to Mehta (2011), these patients are less likely to believe that their health is a function of non-biological processes (e.g., lifestyle). Alternatively, when patients encounter integrated care through a biopsychosocial approach, they may be led to regard lifestyle as a key ingredient of health, and thereby may be stimulated to adopt and adhere to the prescribed multi-factorial secondary prevention regimen. In support of this position, the PACE and Relaxation groups showed significantly higher adherence than the Control group. The better adherence of the PACE group compared with that of the Relaxation group indicates that the PACE intervention had facilitated the cognition and affect essential to abide by the advice related to lifestyle changes. Based altogether on the above discussion, the first hypothesis which stated that exposure to the PACE or Relaxation intervention vis-à-vis the Control group with no psychosocial intervention would lead to a higher level of adherence in patients undergoing CABG is partially accepted.

The second hypothesis conjectured that exposure to the PACE or Relaxation intervention vis-à-vis the Control group with no psychosocial intervention would generate better prognosis in patients undergoing CABG. It is important to recognise prognosis as a projected outcome of post-treatment well-being, and not as the final product. In the instance of chronic diseases, prognosis rather than absolute recovery is a useful substitute to describe the patient's status. Prognosis is particularly of consequence for patients of CABG, as their primary diagnosis is the chronic condition of CAD. The trajectory that the participant's health would most likely follow in future is indicated by prognosis (Hilden & Habbema, 1987). It was thus a suitable outcome variable to consider at the second review assessment for patients after CABG in the study. Based on the statistical results, the PACE group had the highest prognosis, overall and across dimensions, among the three study groups. The PACE group scored significantly higher in all nine dimensions of prognosis when compared with the Control group. The nine dimensions included biomedical, psychosocial, and bio-social aspects of prognosis. This conveys that patients who received the PACE intervention had experienced relatively lesser bio-medical symptoms, psychological concerns, and social consequences after CABG than those without psychosocial intervention. Existing literature (Guo *et al.*, 2012; Watt-Watson *et al.*, 2004) has principally explored the impact of patient education on anxiety, depression, and immediate post-operative outcomes such as hospital stay and pain. This study further demonstrates the prolonged impact of the PACE programme on aspects of recovery across biopsychosocial domains during the month after CABG. Moreover, the two-group design (Intervention *vs.* Control) of the previous studies mentioned could not definitively explain whether the intervention itself or the additional care through intervention had been responsible for the observed changes. The presence of two types of psychosocial intervention (PACE and Relaxation) in the current design helped suppress this quandary.

When compared with the Relaxation group, the PACE group had significantly higher scores across the dimensions of prognosis except in the infection and interference to routine life dimension. The Relaxation group demonstrated significantly higher scores than the Control group in five out of nine dimensions of prognosis, viz., post-CABG affect state, post-CABG anxiety, worry about return to normalcy, post-CABG physical pain, and infection and interference to routine life. The first three dimensions relate to negative thoughts, fears, and apprehensions after hospital discharge. Improvement in these areas indicates that the Relaxation intervention which employed the Guided Imagery technique had not only induced a positive state of affect but had also been successful in effectively assuaging the psychological concerns of the patients. The Relaxation group's higher prognosis scores, relative to the Control group, in post-CABG physical pain as well as infection and interference to routine life dimensions may have been possible through the impact of positive emotions (induced by Relaxation when regularly practised) and of reduced psychological distress on physiological inflammation (Koh, Lee, Beyn, Chu, & Kim, 2008; Thornton *et al.*, 2009). As argued in the Review of Literature chapter, reports of previous studies suggesting a limited impact of relaxation namely decline in patients' emotional distress with no other significant changes such as in pain perception and physical abilities (Casida & Lemanski, 2010; Firoozabadi & Ebadi, 2014; Twiss *et al.*, 2006) may be attributed to the absence of follow-up. The relatively longer follow-up duration in the present study may have brought out the gradual impact of Relaxation on multiple prognostic dimensions. As the PACE group additionally had the significantly highest prognosis in the dimensions of discomfort in surgical sites, discomfort in the leg, CABG bio-social by-products and constraints in socialising, the overall impact of this psycho-educational programme in the biopsychosocial prognosis of patients after CABG was clearly evident.

Prognosis was found to have a significant negative relationship with the duration for return to normal routine activities whereby, a higher prognosis score was related to a faster return (less time) to normal routine activities. This justifies that recovery is not merely physiological but requires progress in psychosocial domains as well for a patient to regain her or his routine life and abilities after CABG (Cserép, Székely, & Merkely, 2013). In fact, the significantly highest percentage of participants to report perceived physical fitness and mental readiness six weeks after hospital discharge were from the PACE group. Furthermore, the significantly lowest percentage of participants to encounter post-CABG wound infections also belonged to the PACE group while the Control group had the highest percentage of participants with wound infections. Psychosocial care, particularly PACE, was thus instrumental in rebuilding patients' confidence about their capacities and in preventing post-surgical complications. A complication-free six weeks after CABG is known to project timely return to routine activities and work (Aroesty, 2015). Accordingly in this study too, the order in which the groups scored for overall prognosis (PACE followed by Relaxation followed by Control) matched the groups' percentages to report perceived physical fitness and mental readiness to return to one's activities (highest in PACE, lowest in Control). Taken together, these results evidence that the prognosis variable measured in this study was a valid representative of patients' real-life outcomes such as post-surgical infections and return to normal routine activities.

The findings of non-significant difference related to prognosis merit deliberation. There were no group differences for the duration of post-surgery ICU stay and post-surgery ward or room stay. However in this study, one may also take into cognizance the trend of hospital stay packages that exists in contemporary corporate Indian healthcare. These packages specify a particular duration for in-patient stay based on the amount paid (Rao, 2014). Any additional stay for personal or medical reasons would typically be at extra expense. The non-significant difference in the length of stay in the ICU and ward or room may be attributed to the homogeneity with respect to mode of payment for CABG across the PACE, Relaxation, and Control groups. The findings are also reminiscent of earlier studies (e.g., Guo *et al.*, 2012) which did not find a significant impact of psychological support on hospital stay, primarily owing to short follow-up durations. When one research group chose a longer follow-up period of six months, a mere 18% of patients were found to return for hospitalisation related to severe conditions such as Heart Failure, Renal Failure and Respiratory Failure (Abdelnabey, Elfeky, Mohamed, & Badr, 2014). Another study with a 30-day follow-up period after CABG pointed out that the most common cause of re-hospitalisation was infection (Hannan *et al.*, 2011), the rates of which in this study were found to vary across the groups. However, these infections may have required mere ambulatory treatment without re-hospitalisation in the current study. It may nevertheless be worthwhile to adopt a longitudinal design that peruses the impact of the PACE and Relaxation interventions on these outcomes in the long run. The above discussion, as a whole, leads one to state that the second hypothesis which posited that exposure to the PACE or Relaxation intervention vis-à-vis the Control group with no psychosocial intervention would generate better prognosis in patients undergoing CABG is partially supported.

The third hypothesis pertained to the effect of the PACE and Relaxation interventions on psychological distress. It indicated that psychological distress of patients in psychosocial intervention groups would significantly reduce compared to the Control group that did not receive any psychosocial intervention. At the outset, it is important to underline that psychological distress was the central variable in the study that exerted influence on the outcomes (adherence and prognosis), and even channelled the impact of the psychosocial interventions onto these outcomes. An analogy from environmental science is useful to comprehend the role that psychological distress exhibits in the CABG context. When faced with the problem of mass extinction of species needed to sustain the ecosystem, ecologists proposed the technique of ‘umbrella species’ conservation. They identified one species within a particular ecosystem whose list of survival needs were wide-ranging such that the survival needs of all the other species within that ecosystem were nearly covered within its list. The experts then attempted to protect and provide this inventory of survival needs in the said ecosystem such that many species were prevented from extinction by merely targeting one umbrella species (Roberge & Angelstam, 2004). In a similar manner, psychological distress acted as the umbrella variable which when targeted for psychosocial intervention not only brought down psychological distress after intervention but further led to spill-over improvements in the areas of adherence and prognosis. For example, the PACE intervention which aimed to address the affective and cognitive bases of psychological distress also concurrently addressed the affective and cognitive factors of adherence and prognosis. This was evident in the pathway models which traced the line of impact from each of the psychosocial interventions to prognosis through psychological distress which was the largest independent predictor of prognosis.

The present analyses also explored how psychological distress changed across time within the three groups, and compared the proportion of reduction in psychological distress across the groups. In the PACE and Relaxation groups, overall distress significantly decreased in a steady manner from the pre-surgery to the first review to the second review assessments. The Control group however showed a significant decrease in overall distress only between the pre-surgery and first review assessments, without any further decrease from the first review to second review assessments. Decrease in overall distress from the day before surgery (pre-surgery assessment) to a week after hospital discharge (first review assessment) is natural, as the success of surgery and return to home will bring down the patient’s apprehensions. Yet, that only the psychosocial intervention groups continued to demonstrate the decrease in overall distress up to six weeks after hospital discharge (second review) corroborates the potency of the PACE and Relaxation interventions to sustain the decline in overall distress, even after patients had returned home.

It must be recalled here that psychological distress in the present sample was not considered in terms of clinical cut-offs. The principal trigger for their anxiety and depressive symptoms was the situation of CABG (Parvan *et al.*, 2013; Piscatella, 2010). Thus, when the PACE intervention extended the required knowledge and emotional support, patients' fear, uncertainty and lethargy were allayed. The Relaxation programme helped reduce the stress arousal response. However, as it did not target patients' cognitions (knowledge and understanding about CABG and self-care), their apprehensions may not have been as fully addressed as with the PACE intervention. The Control group participants, who were left to themselves without psychosocial support, were not able to experience a sustainable decrease in their overall psychological distress, six weeks after hospital discharge. Furthermore, depression did not significantly differ between the pre-surgery and second review assessments for the Control group. In fact, the PACE group witnessed a trend of progressive decrease even in case of its depression scores which consistently declined from pre-surgery to second review assessments. Interestingly however, the PACE and Control groups showed a significant increase in their respective anxiety scores between the first review and second review assessments. It is possible that the lack of direct personal administration of intervention for the PACE group had led to an increase in anxiety scores. Alternatively, it may be argued that the PACE group which had shown a steep decrease in anxiety among the three groups between the pre-surgery and first review assessments had already attained the possible lowest score. Hence, anxiety may have increased around the second review assessment in view of patients' preparation for normal routine activities as well as the long gap between the second and third review consultations (usually 3–4 months after second review). The Control group which had the lowest level of reduction in anxiety from the pre-surgery to first review assessments experienced a further significant increase in anxiety at the second review assessment whereby its anxiety level was still the highest among the three groups at the second review.

The differences across the groups in regard of the proportion of distress reduction between time-points were significant for overall distress change–1, anxiety change–1, depression change–1, overall distress change–3, anxiety change–3 and depression change–3, which suggested that the amount of decrease in psychological distress varied across groups between the pre-surgery and first review assessments as well as between the pre-surgery and second review assessments. For anxiety change–1 and anxiety change–3, the PACE and Relaxation groups each showed greater reductions than the Control group. This implies that the presence of either psychosocial intervention during the period of CABG increased the possibility for experiencing considerable reduction in anxiety. That the PACE group showed significantly more overall distress change–1, overall distress change–3, depression change–1 and depression change–3 than the Relaxation and Control groups emphasises the greater impact of psycho-education in alleviating overall distress and depression. The lack of significant group differences in overall distress change–2, anxiety change–2, and depression change–2 is noteworthy to explore in prospective research. Nonetheless, this study evidently found that reduction in psychological distress from pre-surgery to six weeks after CABG was significantly higher with psychosocial intervention (namely PACE). The above arguments put together lend partial support to the third hypothesis which stated that exposure to the PACE or Relaxation intervention vis-à-vis the Control group with no psychosocial intervention would result in a greater reduction of psychological distress from pre-surgery to post-surgery assessments in patients undergoing CABG.

The subsequent analyses examined the psychosocial correlates of patients' outcomes. Psychological distress is an affect state and has the potential to influence a gamut of behaviour that originate from motivation. Adherence is a behaviour that is triggered and sustained by motivation which in turn is built on the foundation of one's cognitive and emotional base. The results relating to multiple linear regression analyses indicated an interesting trajectory ultimately leading to prognosis. The factors that independently predicted higher psychological distress at the point of pre-CABG assessment (prior to psychosocial intervention) were low perceived social support and female gender. To elaborate, women undergoing CABG and patients who perceived lower social support were found to experience higher psychological distress. In the absence of psychosocial intervention, the only positive resource for patients to cope with psychological distress seems to be perceived social support. This corresponds to the buffering impact of perceived social support in challenging situations (Cohen, 1988). The multiple linear regression model for pre-surgery psychological distress also highlighted the need for added attention to be paid to women awaiting CABG. Empirical research and healthcare practice ought to evolve from a gender-neutral to a gender-sensitive approach (O'Donnell, Condell, & Begley, 2004). Psychosocial intervention in the current study appears to have addressed women's concerns. For the post-surgery review assessments which were carried out after the phase of psychosocial intervention, the impact of gender and perceived social support on post-CABG psychological distress was replaced by the independent contributions of the PACE intervention, Relaxation intervention and psychological distress from the preceding time-points. Therefore, it may not be far-fetched to infer that the two psychosocial interventions seem to have had qualities similar to the positive role of perceived social support, and had even lessened the burden of female gender in influencing psychological distress after surgery. The model also concurs with research studies carried out earlier (Douki *et al.*, 2011; McKenzie, Simpson, & Stewart, 2010) which consistently found that pre-operative distress predicted post-surgery distress. Psychological distress from the week after hospital discharge which was the largest independent predictor of psychological distress six weeks after hospital discharge was nonetheless the post-intervention distress level, and had itself shown significant reduction from pre-surgery distress through the impact of psychosocial intervention. Hence, lower psychological distress a week after hospital discharge predicted lower psychological distress a month later.

Adherence was independently predicted by the two psychosocial interventions, overall distress six weeks after hospital discharge, and perceived social support. Echoing the results of group differences (ANOVA), the regression model revealed that the PACE programme had a greater independent contribution to adherence than the Relaxation intervention. The positive contribution of perceived social support towards adherence indicates its resourcefulness for patients' well-being after surgery. In Indian households where family is the crux of daily life and an asset during crises (Chivukula *et al.*, 2013), the challenge of the multidimensional self-care regimen may have been eased through patients' perception that they would receive help from their relatives in making the prescribed lifestyle changes during the critical six weeks after surgery.

Being the only significant negative predictor of pre-surgery psychological distress, high perceived social support independently predicted low level of anxiety and depression when awaiting CABG. This reiterates that perceived social support is invaluable and often the only resource that patients bank on for handling negative affect during invasive medical procedures. Given that the psychosocial interventions had emerged as the only significant negative predictors of subsequent post-surgery psychological distress, it may be inferred that these programmes (particularly PACE which involved peer support) had been able to extend psychosocial comfort to patients and thereby brought down their anxiety and depressive symptoms.

Female gender was a negative predictor of prognosis and pre-surgery psychological distress. Related literature that focussed on gender differences has affirmed that recovery after CABG is far more taxing for women than it is for men (Blankstein *et al.*, 2005; Guru, Fremes, Austin, Blackstone, & Tu, 2006). Women, in these reports, tended to have poorer health presentation before CABG, and further encountered more unfavourable outcomes such as mortality and re-hospitalisation post-operatively. However, it may be the case that these studies wherein data were collected between late-1990 and early 21st century may not represent the contemporary scenario where overall death and readmission rates after CABG have declined with increasing technology (Cleveland Clinic, 2010). Yet, the continuing negative significance of female gender in the present findings suggests that morbidity may still be worse for women. The responsibility of attending to family needs on a day-to-day basis that is largely shouldered by women has been argued to burden them in terms of having to resume their duties quicker, and having to multi-task just as they did before surgery (Vaccarino *et al.*, 2003). Psychosocial support becomes more relevant in this context so that female patients and their families are sensitised to handle these issues constructively. The findings of the study provide evidence in this regard. Female gender, which predicted higher psychological distress before surgery, was not an independent predictor of post-surgery psychological distress. The psychosocial interventions (PACE and Relaxation) were in effect the negative predictors of post-CABG psychological distress. Indeed, for the final outcome of prognosis, female gender resurfaced as a negative independent predictor yet the strength of its contribution was merely one-third of the strength of the PACE intervention's contribution. It may be inferred from the above that psychosocial intervention (such as PACE) was capable of mitigating the vulnerability of women to experience higher psychological distress as well as to perceive lower social support. Researchers are increasingly reporting that women with heart disease tend to improve more on their physical and psychological health as well as quality of life outcomes only when a gender-specific intervention is offered to them rather than a generalised intervention for men and women (Beckie & Beckstead, 2010; Claesson *et al.*, 2005; Schneiderman, Orth-Gomér, & Burell, 2015). The greater impact of the PACE intervention on prognosis can thus be attributed to the gender-specific modules developed for male and female patients. Even so, in future, investigations with mixed research designs can help determine the quantitative and subjective attributes and attributions for gendered prognosis in case of CABG.

Besides gender, the independent predictors of prognosis were level of overall distress at the second review, the PACE intervention, and level of overall distress before surgery. The significant negative contributions of overall distress at two-points (before CABG and at the second review) underscore the crucial and dynamic roles played by patients' affective states in their process of recovery. An optimistic finding here is that the level of post-surgery overall distress (i.e., after psychosocial intervention) was the larger contributor than the baseline pre-surgery psychological distress. In addition, the PACE intervention had a stronger positive impact on prognosis than pre-surgery psychological distress. The two observations posit an inference that although overall distress consistently was a negative predictor of prognosis, the impact of psychosocial intervention and time had altered its influence. For one, post-surgery overall distress was lower than pre-surgery overall distress in all the three groups and yet was the higher contributor to prognosis than pre-surgery distress. In this manner, the vigour of psychological distress was lowered over time, and this reduced psychological distress explained more variance in prognosis. In addition, the presence of the PACE intervention had independently enhanced prognosis. As the Relaxation and Control groups did not independently contribute to prognosis, the effectiveness of the PACE intervention is further substantiated.

The finding that merits special emphasis is that a combination of psychosocial variables namely age, gender, education, perceived social support, health locus of control, and psychosocial interventions majorly predicted prognosis (first stage of multiple regression analyses). Among these predictors, the PACE intervention stood out, having positively and significantly contributed to prognosis. This finding is loud and clear in demanding a biopsychosocial approach to health in general, and in underlining the role of Behavioural Cardiology in caring and healing patients with CAD. Despite the documented impact of adherence to secondary prevention on recovery after CABG in literature (Esselstyn *et al.*, 2014; Kulik *et al.*, 2015; Piscatella, 2010), adherence did not independently predict prognosis in the present sample. Indeed, adherence contributed to the significant model of prognosis but only in collaboration with the demographic and psychosocial variables. The independent predictive factors of prognosis were overall distress at the end-point of the study (six weeks after CABG), the PACE intervention, overall distress at the initial pre-surgery stage, and gender. Adherence is a long-term process; its benefits or the repercussions of non-adherence emerge gradually. For instance, atherosclerosis (blocking of coronary arteries) which can result from maladaptive behavioural choices (e.g., sedentary lifestyle and smoking) usually takes years to turn pathological and merit the diagnosis of CAD (Roberts, 2000; WebMD, 2014). In this light, the duration of six weeks after discharge for the final review assessment in the study may not have been sufficient to account for the independent influence of adherence on prognosis. Given the time-frame of the study, adherence can be viewed as an outcome variable after psychosocial intervention during the period of CABG rather than an intermediary variable that could single-handedly influence prognosis within six weeks.

The contribution of the PACE intervention to reduced psychological distress six weeks after discharge and the significantly highest contribution of psychological distress to prognosis visibly traced the pathway from the PACE intervention to prognosis. Similarly, the finding that the Relaxation intervention significantly predicted the reduced distress six weeks after discharge which in turn predicted prognosis also indicated a distinct pathway. Thus, in the presence of the impact of both psychosocial interventions on prognosis, the role of adherence in prognosis was camouflaged. The clear trajectory from the PACE and Relaxation interventions through reduced psychological distress is evidence that the fourth hypothesis which stated that the respective impact of the PACE and Relaxation interventions on prognosis in patients undergoing CABG would follow a pathway is accepted.

How could a 2-part 40-minute audiovisual programme of the PACE intervention wield the observed impact on adherence and prognosis? The answer may be found in inspecting the elements behind the seemingly simple, quick and economical PACE modules. The confluence of affective and cognitive components in the PACE programme may have been responsible. Appreciating the patient as a person with needs for emotional comfort and interpersonal affiliation during the time of crisis positively changes the course of her or his health outcomes and satisfaction with the experience of care (Bhattacharyya, 2003; Entwistle & Watt, 2013; Williams, 1956). Theoretically, the PACE intervention had incorporated technical, experiential and psychosocial information through the inclusion of a Cardiothoracic Surgeon, a peer patient with history of successful CABG, and a Health Psychologist. The peer patient’s narrative sought to provide first-hand knowledge of being subject to surgery, empathetic endorsement of the patient’s experience, practical strategies to overcome challenges during and after hospitalisation, hope concerning the success of surgery, and confidence about the patient’s ability to encounter, deal with and survive the procedure. The Cardiothoracic Surgeon aimed to provide adequate and patient-centred details about the surgical procedure of CABG while also encouraging the patient to cooperate with healthcare professionals in the process. The Health Psychologist endeavoured to emphasise upon the influence of mental health and social support in coping and recovery. The convergence of the three perspectives rendered a biopsychosocial intervention that has largely been favoured in principle by literature in the past (e.g., Lippke & Ziegelmann, 2008).

From the theoretical standpoint, the PACE intervention was a close adaptation of the IMB framework (Fisher *et al.*, 2003). At its core, there was *information* meant to increase patients’ health literacy about CABG, self-care, and psychosocial resources for adaptive coping. The very presence of a patient who successfully coped with CABG may in itself have been a motivating factor for the one about to undergo the process. Further, two experts consistently *motivated* the patient by providing scientific basis for the experiences and coping one encounters during the process. The component of *behavioural skills* was managed by describing specific strategies before surgery and prior to discharge to guide patients’ cognitions, affect, and behaviour in the process of adjustment to surgery, adherence, and recovery. In a healthcare system such as India's which witnesses a large patient volume and a disproportionate doctor–patient ratio (Coarasa *et al.*, 2014), the PACE intervention may be a versatile education, communication and psychosocial support tool to bridge the gap between doctors and patients. The PACE intervention was capable of inducing a larger impact on all outcomes measured within the duration of six weeks in this study, while the Relaxation intervention plausibly needed longer time and continued practice for it to hold out its overall impact.

The Relaxation intervention, using Guided Imagery, was primarily based on modifying affect and arousal aspects. It aimed to create a calm somatic and affective state in the patient which is prophylactic for psychological distress (Wolpe, 1958). Yet, its impact can be likened to the ripple effect whereby having induced positive emotions, the Relaxation intervention was indirectly able to improve the adherence and prognosis levels of patients when compared with patients not receiving any psychosocial intervention (Control group). The Broaden-and-Build theory (Fredrickson, 2001) may technically explain this finding. Relaxation through Guided Imagery involved visualising a pleasant experience of nature as an alternative to the tense surgery circumstance of the patient. In this process, the positive emotions evoked such as tranquillity, peace, joy and appreciation reduce stress and counter the physiological arousal of negative affect. According to Fredrickson (2000), the relaxed state creates openness and energy for carrying out health-enhancing behaviours. Therefore, adherence and prognosis were higher in the Relaxation group relative to the Control group.

The lesser strength in effectiveness of Guided Imagery when compared with Programme for Affective and Cognitive Education may be due to the need for repeated sessions over a period of time so that the patient learnt the technique. On the other hand, the PACE intervention was direct and time-bound such that it was possible to administer different psycho-educational modules just once before and after CABG targeting different goals before and after surgery. The advantage of the PACE programme over the Relaxation intervention was in its potential to simultaneously address cognitions and affect, leading to health-enhancing behaviour (adherence). This, in effect, led to the direct and indirect contribution (through reducing psychological distress) of the PACE intervention to prognosis. The Relaxation intervention could afford only an indirect contribution (through lowering psychological distress) towards prognosis. That being said, Relaxation as an intervention should not be simplistically dismissed. Perhaps, the PACE and Relaxation interventions would be applicable in different situations. The former is useful to concisely educate the patient at critical points (e.g., before surgery and before discharge). However, there may be patients who already have adequate information (at times, an overload) provided by health professionals and significant others, or who do not wish to know much about the procedure. Such patients may regardless seek to stay calm and positive before surgery. Relaxation may be a preferred intervention strategy in such cases. Future research can adopt a choice-based approach to understand the profile and outcomes of patients who prefer psycho-education to relaxation, or vice-versa.

The outcomes of the Control group represent the typical state of affairs in the current healthcare system. It is one of mediocre quality and under-achieved potential for well-being, despite state-of-the-art infrastructure and medical services (Dalal, 2005). Given the homogeneity of the three groups in this study, the achievements of the PACE and Relaxation groups evidence that patients similar to those in the Control group could move up from average to favourable event-free health outcomes when psychosocial intervention was offered during hospitalisation for CABG. The hospitals where data were collected had made attempts at educating patients such as through having television sets which played health videos and hand-outs that described different cardiac conditions. Yet, the Control group which relied on these resources alone had outcomes indicating that individual intervention and personal interaction by the investigator yielded better outcomes for the PACE and Relaxation groups. Leaving the onus of finding information and motivation to patients may not be fruitful. Studies report low information-seeking behaviour among patients in India, which may be attributed to low health literacy or low educational and socio-economic backgrounds (Kumar, Hoovayya, & Ahmed, 2014; Perumal, Prasad, Surapaneni, & Joshi, 2015). Furthermore, unmonitored information-seeking can be counter-productive, if patients resort to sources (particularly, on the internet) that are not credible to provide appropriate information or that lead to misinterpretations of information (Diaz *et al.*, 2002). Though patients in the Control group were provided the PACE intervention DVD at the terminal point of data collection to honour ethical practice, it remains a fact that they did not receive the intervention prior to surgery.

The timing of interventions was crucial for their impact. The interventions were presented at critical periods of vulnerability to the two psychosocial intervention groups, so as to prevent the aggravation of psychological distress. A second paradigm of timing was to exploit ‘teachable moments’ which signify decisive points in patients’ lives when they are open to change their behaviour for better health outcomes (Lawson & Flocke, 2009). With reference to the situation of CABG, patients may recognise the personal and interpersonal cost of illness and invasive procedures whereby the CABG period amounted to a teachable moment.

Administering psychosocial intervention in this milieu and time yielded desired outcomes in adherence and prognosis for the PACE and Relaxation groups. Longitudinal studies can help answer the issues of timing of intervention by examining the outcomes of the Control group after the provision of psychosocial intervention at later points.

Qualitative data from participants in the present study clearly articulated that psychosocial monitoring, with or without intervention, was positive on its own. The 'Relief through psychosocial intervention' theme indicated the therapeutic benefits of psychosocial intervention, especially in its potential to comfort and encourage patients at different points during surgery and recovery at home. The indication, particularly by the Control group in the 'Finding solace in interaction and assessment' theme, that contact with the investigator was supportive reflects the lacuna in the domain of communication within current healthcare provisions. The interaction with the investigator in the current study may have been perceived as a form of empathetic social support by participants, especially in the Control group. The assessments that were carried out during the course of this study alone were reportedly able to induce introspection in the patients about their lifestyle, emotions, and thoughts. Assessments have been argued to function as tools for education. They help in communicating to the patient that the aspect being measured bears importance for their cardiac well-being (Hariharan *et al.*, 2015a). Koivula, Tarkka, *et al.* (2002) found that perceived social support from nurses helped reduce fear and anxiety in patients awaiting CABG. In the present study, whether the placebo interaction with the investigator had affected the Control group's outcomes compared to patients who were not included in the study and who had not experienced such communication cannot be ascertained in the current analyses. Nonetheless, since the Control group had significantly lower scores than the PACE and Relaxation groups, it may be inferred that a planned and structured intervention was more useful than the casual interaction witnessed by the Control group. Moreover, the Control group expressed that they had not received specific guidelines concerning their adherence routine. The healthcare system must value a consistent interaction and feedback system to manage patients’ concerns. All healthcare professionals in contact with patients awaiting CABG should be sensitised regarding patient communication. These personnel may also be trained to identify psychological distress so that they can alert psychologists to attend and intervene. The role of the Surgeon in the CABG scenario becomes especially evident. Studies have categorically evidenced that the quality of communication between doctors and patients with chronic diseases influences their trust in the doctor, medical decisions, as well as adherence and prognosis (Saha & Beach, 2011; Swain *et al.*, 2015). It is clear that the PACE intervention which involved Cardiothoracic Surgeons to educate patients had minimised the gap. Furthermore, in the ‘Differential influences of psychosocial interventions’ theme, the PACE group participants’ reference to adopting behavioural practices according to prescribed recommendations points out that the PACE programme had provided information and motivation to pursue one’s self-care regimen. In contrast, the Relaxation group participants primarily focussed on positive affective states without explicit alluding to post-surgical health management. These qualitative results elucidated and authenticated the repeated statistical findings of better outcomes demonstrated by the PACE group than the Relaxation group, as well as of the higher gains shown by the two psychosocial intervention groups when compared with the Control group. The psychosocial interventions not only exhibited significant quantifiable impact on psychological distress reduction, adherence and prognosis, but also promoted the quality of patient satisfaction.

Implications

An important contribution of the study is the novel and compact PACE intervention which realistically brought together cognitive and affective support through presenting technical and experiential information at the patient's bedside. The consistently higher outcomes of the PACE group evidences that a timely, cost-effective, multidimensional, and impactful intervention is feasible for application in contemporary Indian healthcare. Peer support is argued to be an under-utilised capital of healthcare systems (Perez & Kidd, 2015). This resource functions as the most relatable testimony for new patients to comprehend their condition and plan for their health management (Aswathy *et al.*, 2013). Moreover, the Indian affinity for social ties arguably makes this form of support an easily accepted technique of intervention. The current study adopted a virtual peer support format in order to avoid logistic problems which would prevent administering the intervention within available time and space in hospitals that did not have specific provisions for psychosocial support. The results nonetheless indicate that the PACE intervention had served its purpose.

The findings of the study justify the rationale for patient-centred, mind–body healthcare (Moss, 2003; Vallish *et al.*, 2015). In fact, the development of the unique elements of the present investigation namely the PACE intervention as well as the tools for adherence and prognosis had involved an exploration of patients' experiences. It is indeed time that the healthcare system moved towards patient involvement in its policy making, assessments and delivery of services, such as above, so that its objectives are met and maximised in a manner that reaches out to and empowers patients. When patients receive psychosocial support, they tend to want to support prospective patients in a similar manner. This way, the healthcare system can create a resource bank of peer support workers, the efficacy of which can be tested in further research such as in day-to-day adherence and cardiac rehabilitation. Nevertheless, peer support must be offered under the auspices of health professionals so that the information and support being provided are regulated. As was the case of the PACE programme, the joint intervention by a Cardiothoracic Surgeon, a peer patient and a Health Psychologist is an evidence-based biopsychosocial intervention option.

The portability of intervention is a key aspect to be borne in mind during its design and delivery. The PACE and Relaxation interventions were individually presented in standard audiovisual and audio formats in the patient's ward or room. This prevented confounding related to differences in content, and allowed for timely intervention. Further, as patients had stated in their qualitative feedback, the take-home DVDs and CDs of the PACE and Relaxation interventions respectively were resources which they relied on for motivation and comfort at home. In the age of tele-medicine, a variety of electronic transmission methods can be adopted for wider and remote dissemination even after hospital discharge. Universal access to psychological services must thus follow. As witnessed in this study, psychosocial intervention, when introduced in the healthcare system, should cut across and reach out to groups generally distinguished on grounds of education, occupation and/or hospital package. At the same time, intervention must be tailored, such as for men and women to address specific vulnerabilities.

The need for consistent psychosocial monitoring and intervention for patients during the period of CABG is another prominent message of the study. The current design afforded a timely and cost-effective map to quantify and influence the outcomes of patients subjected to CABG. The scales for adherence and prognosis developed for the current research work were psychometrically sound instruments that holistically explored patients' self-reported experiences and outcomes of surgery. These multidimensional assessment tools may be further adapted for use with patients experiencing other chronic diseases and invasive medical procedures. The administration of patient self-report tools not only helped measure the different variables of the study but was also perceived as being therapeutic and educational. It allowed patients to introspect about the aspects being measured. These findings and observations support the use of patient-based self-report tools during investigation, and uphold the virtue of patient-centred research (Nelson *et al.* 2015).

Psychological support provisions are increasingly recognised in India, yet the scope is largely limited to psychiatric settings and patients with critical mental illness (Sinha & Kaur, 2011). Behavioural Cardiology is surfacing as an important field in the branch of Health Psychology. Given that cardiac health is closely related to the lifestyle and affective state of the individual, it is imperative to envisage and implement multidisciplinary teamwork in the treatment and management of cardiac problems. Such a proactive and progressive step in cardiac healthcare may be cost-effective as it would prevent several complications due to cardiovascular diseases.

The role of Health Psychologists is central to the provision of psychosocial support in healthcare settings. For instance, the present findings should not be interpreted to imply that psychosocial intervention was a stand-alone entity capable of achieving the objectives set out for the study. The involvement of a Health Psychologist in the PACE intervention expert panel, the contributions of Health Psychologists and a Clinical Psychologist in the development of tools and Relaxation modules respectively, as well as the role of the investigator during interaction with patients, conduct of assessments and administration of interventions assert that the persons involved in creating and executing these aspects must be trained for facilitating psychosocial care. Outsourcing the development of tools and interventions to psychologists, and later allowing other healthcare professionals (without training in Psychology) to administer these to patients would replicate the shortcomings of studies reviewed earlier (e.g., Rajendran *et al.*, 2004; Sharif *et al.*, 2012). For ethical reasons and optimal results, psychosocial intervention+assessment must be catered by Health Psychologists who offer evidence-based psychosocial support in healthcare.

Strengths and Limitations

The study involved participants from across age, educational and mode of payment strata, yet the study groups were homogeneous in comparison at the point of recruitment. The sample was representative of different socio-demographic characteristics despite being sourced from corporate hospitals. The pretest-posttest design which allowed the repeated assessment of psychological distress was useful to trace its timeline and evolution. Pertinently, this led to establishing the dynamic contributions of changing overall distress towards adherence and prognosis. Considering perceived social support and health locus of control aided a multidimensional understanding of the psychosocial factors at play directly and indirectly for adherence and prognosis. The multiple regression-based path models were effective to corroborate the findings from analyses of group differences. Particularly, the large predictive role of the PACE intervention found for all the dependent variables justified its approach and strengths, relative to the Relaxation intervention and mere standard hospital treatment (Control). The findings thus call to look beyond conventional lifestyle modification programmes (as was observed regarding the cardiac rehabilitation programmes reviewed), in order to actively optimise patients' psychosocial resources and minimise their psychological vulnerability. Ideally, the integrated lifestyle and psychosocial intervention programme should be economical and accessible. In the study, the use of audiovisual aids as media for psychosocial intervention helped reach out to patients regardless of their literacy levels. The psychosocial profiling and intervention of 300 patients began before surgery at their bedside, and culminated after the crucial 6-week period for post-CABG healing at the second review consultation. This approach therefore demonstrated that integrated biopsychosocial care can be exercised within available resources, spaces, and time. Gathering long-term data about the duration for return to normal routine activities allowed reiteration of the significance of psychosocial well-being for resuming regular activities after CABG. The consideration of qualitative data from participants helped substantiate their satisfaction regarding the psychosocial package offered to them in the form of assessment and/or intervention. The data altogether were extensive in ranging between pre-surgery status and return to normal routine activities, and were intensive in the combination of quantitative and qualitative findings.

Certain limitations of the study must be acknowledged to aid further research and practice. Patient follow-up exceeding the six weeks' time-frame of the present design will be insightful into the sustainability of psychosocial intervention when patients have returned to their normal routine, particularly their workplace. While the use of take-home intervention DVDs and CDs was assumed to address the absence of intervention once patients had been discharged, the lack of continued significant reduction in psychological distress between the two review assessments for the PACE and Relaxation groups vis-à-vis the Control group hints at the need for face-to-face reinforcement of post-discharge psychosocial intervention. Since medical follow-ups are periodically scheduled (although with increasingly longer intervals) even after six weeks following hospital discharge, continued psychosocial assessment and intervention during these visits may be adopted. For instance, a third module of PACE may be delivered during follow-up to address the do's and don'ts after full recovery from surgery. The aim may be to prevent complacency and non-adherence in the long run. Based on qualitative suggestions from the current participants (e.g., a female voice for Guided Imagery, and detailed advice regarding adherence in PACE), the interventions may also be tailored pragmatically. An alternative possibility is to supplement the intervention with hand-outs and booklets. This would be especially applicable in case of the PACE intervention. The video may provide general guidelines, while booklets can be used to customise information for specific health profiles (e.g., patients with Hypertension, patients with Diabetes Mellitus, and patients with multiple co-morbidities). Another aspect that requires further study is health locus of control during the period of CABG. It was surprising to note that health locus of control did not independently contribute to psychological distress, adherence, or prognosis. The present investigation had explored health locus of control in conjunction with other psychosocial factors namely, perceived social support and psychological distress which were found to be independent predictors at different points. Perhaps, social support and psychological distress had greater roles during the period of CABG. Moreover, social desirability seems to interfere with the measurement instrument used for health locus of control. It was found during pilot testing that a standardised tool (MHLC–Form C) had not yielded reliable findings in the target population. Locus of control, in general, is measured under stable life conditions, with or without illness. During the intense period of CABG (an invasive surgery) however, anxiety, feelings of dependency, physical condition and hospital environment may affect the individual’s response and may not truly reflect who or what is perceived to control the circumstances. The construct and its measurement thus may be revisited in future. All the recommendations concerning assessment and intervention would however be practical only when Health Psychology is formally instituted, recognised, and supported as a department in healthcare settings in India.

Conclusion

The provision of psychosocial intervention in the forms of Programme for Affective and Cognitive Education and Relaxation during the pre-operative and post-operative hospital stay of patients admitted for CABG led to superior outcomes in adherence and prognosis, primarily by way of reduction in psychological distress. Specifically, the unique Programme for Affective and Cognitive Education that was conceptualised, developed and tested by the current study had literally set *pace* for the comparably highest levels of adherence and prognosis after CABG, relative to those in the Relaxation and Control groups. The study evidenced that psychosocial intervention is a way forward to advance, enhance, and humanise care during CABG.

The healthcare system awaits fundamental health policy change in an immediate efficient manner, given that psychological distress emerged as the chief intermediary variable determining the outcomes of patients who underwent CABG. The prominence of psychological distress before and after surgery highlighted the psychosocial nature of the patient's experiences throughout the CABG period. The Control group participants, whose care protocol was characteristic of contemporary standard hospital treatment, demonstrated the lowest levels of adherence and prognosis in the study. While this espouses a gloomy picture for patients being subjected to CABG, it is also noteworthy that psychological distress was malleable to significantly decrease across time when addressed through psychosocial intervention. This affirms the recurrent inference across analyses in the study that psychosocial intervention is a necessary and valid means to ensure that the apparently medical procedure of CABG meets its goals across the biological and psychosocial domains of patients' lives.

Mental healthcare is a need not only of those with psychiatric diagnoses. Patients across the current three groups regarded their participation in the study as a means to solicit an empathetic interaction, which was seemingly deficient in the routine hospital care protocol for CABG. Psychosocial assessment and intervention, as the study found, constituted an accessible support system for these patients. Therefore, the healthcare system must move beyond its preoccupation with curing to holistically caring for the patient undergoing CABG.

This thesis urges for the official creation, delivery, and evolution of psychological services namely psychosocial assessment and intervention in the CABG surgical treatment of patients with CAD in India. The findings herein evidence the feasibility, empirical success, and subjective patient satisfaction achieved by integrating psychosocial intervention into the biomedical regimen of CABG. Years ago, a pioneering research investigation indicated that merely 40 seconds of doctors' empathetic communication could alleviate patients' anxiety (Fogarty, Curbow, Wingard, McDonnell, & Somerfield, 1999). The present study evidentially adds that 40 minutes of psychosocial intervention during the week-long hospital stay for CABG effectively improves patients' adherence and prognosis.

References

References

Abdelnabey, S. R., Elfeky, H. A., Mohamed, W. Y., & Badr, S. A. (2014). Readmission after open heart surgery: Study of predictors and frequency. *Journal of Biology, Agriculture and Healthcare*, *4*, 93–103.

Abegunde, D., & Stanciole, A. (2006). An estimation of the economic impact of chronic noncommunicable diseases in selected countries (Working paper). Geneva: World Health Organization. Retrieved from http://tinyurl.com/97fwagc. Accessed 25 September 2015.

Abu-Hanna, A., & Lucas, P. J. F. (2001). Prognostic models in medicine: AI and statistical approaches. *Methods of Information in Medicine*, *40*, 1–5.

Agarwal, A., Agarwal, A., Nag, K., Chakraborty, S., & Ali, K. (2011). Doctor patient communication—A vital yet neglected entity in Indian medical education system. *Indian Journal of Surgery*, *73*, 184–186. doi: 10.1007/s12262-010-0208-z

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179–211. doi: 10.1016/0749-5978(91)90020-T

Akbarzadeh, F., Kouchaksaraei, F. R., Bagheri, Z., & Ghezel, M. (2009). Effect of preoperative information and reassurance in decreasing anxiety of patients who are candidate for Coronary Artery Bypass Graft surgery. *Journal of Cardiovascular & Thoracic Research*, *1*, 25–28.

Albus, C. (2010). Psychological and social factors in Coronary Heart Disease. *Annals of Medicine*, *42*, 487–494. doi: 10.3109/07853890.2010.515605

Allen, L. A., Stevenson, L. W., Grady, K. L., Goldstein, N. E., Matlock, D. D., Arnold, R. M.,... Council on Cardiovascular Surgery and Anesthesia. (2012).

Decision making in Advanced Heart Failure: A scientific statement from the American Heart Association. *Circulation, 125,* 1928–1952. doi: 10.1161/CIR.0b013e31824f2173

Alm-Roijer, C., Stagmo, M., Udén, G., & Erhardt, L. (2004). Better knowledge improves adherence to lifestyle changes and medication in patients with Coronary Heart Disease. *European Journal of Cardiovascular Nursing*, *3*, 321–330. doi: 10.1016/j.ejcnurse.2004.05.002

Ambresin, G., Chondros, P., Dowrick, C., Herrman, H., & Gunn, J. M. (2014). Self-rated health and long-term prognosis of depression. *Annals of Family Medicine*, *12*, 57–65. doi: 10.1370/afm.1562

American Heart Association. (2015). *About heart attacks*. Retrieved from http://tinyurl.com/7cxx2t8. Accessed 11 June 2015.

American Psychological Association. (2016a). *Anxiety*. Retrieved from http://tinyurl.com/omq5ybg. Accessed 23 January 2016.

American Psychological Association. (2016b). *Depression*. Retrieved from http://tinyurl.com/nt7ufzf. Accessed 23 January 2016.

American Psychological Association. (2016c). *Psychologists' role in treating persons with a chronic illness*. Retrieved from http://tinyurl.com/7og3nyg. Accessed 23 January 2016.

Appels, A., van Elderen, T., Bär, F., van der Pol, G., Erdman, R. A. M., Assman, M.,... Pedersen, S. S. (2006). Effects of a behavioural intervention on quality of life and related variables in Angioplasty patients: Results of the EXhaustion Intervention Trial. *Journal of Psychosomatic Research*, *61*, 1–7. doi: 10.1016/j.jpsychores.2005.12.008

Aroesty, J. M. (2015). *Patient information: Coronary Artery Bypass Graft surgery (Beyond the basics)*. Retrieved from http://tinyurl.com/of9225o. Accessed 23 January 2016.

Aronowitz, R. A. (1998). *Making Sense of Illness: Science, Society and Disease*. Cambridge: Cambridge University Press.

Asokan, T. V. (2009). Towards an ideal paradigm. *Indian Journal of Psychological Medicine*, *31*, 58–61. doi: 10.4103/0253-7176.63574

Astin, J. A., Shapiro, S. L., Eisenberg, D. M., & Forys, K. L. (2003). Mind-body medicine: State of the science, implications for practice. *Journal of the American Board of Family Medicine*, *16*, 131–147. doi: 10.3122/jabfm.16.2.131

Aswathy, S., Unnikrishnan, A. G., Kalra, S., & Leelamoni, K. (2013). Peer support as a strategy for effective management of Diabetes in India. *Indian Journal of Endocrinology and Metabolism*, *17*, 5–7. doi: 10.4103/2230-8210.107790

Babu, A. S., Noone, M. S., Haneef, M., & Narayanan, S. M. (2010). Protocol-guided phase-1 cardiac rehabilitation in patients with ST-elevation myocardial infarction in a rural hospital. *Heart Views*, *11*, 52–56. doi: 10.4103/1995-705X.73209

Balady, G. J., Ades, P. A., Bittner, V. A., Franklin, B. A., Gordon, N. F., Thomas, R. J.,... Yancy, C. W. (2011). Referral, enrollment, and delivery of cardiac rehabilitation/secondary prevention programs at clinical centers and beyond: A presidential advisory from the American Heart Association. *Circulation*, *124*, 2951–2960. doi: 10.1161/CIR.0b013e31823b21e2

Balady, G. J., Fletcher, B. J., Froelicher, E. S., Hartley, L. H., Krauss, R. M., Oberman, A.,... Members. (1994). Cardiac rehabilitation programs: A statement for healthcare professionals from the American Heart Association. *Circulation*, *90*, 1602–1610. doi: 10.1161/01.CIR.90.3.1602

Baldwin, W. (2000). Information no one else knows: The value of self-report. In A. A. Stone, J. S. Turkkan, C. A. Bachrach, J. B. Jobe, H. S. Kurtzman, & V. S. Cain (Eds.), *The Science of Self-report: Implications for Research and Practice* (pp. 3–7). Mahwah: Lawrence Erlbaum Associates.

Ballenger, J. C. (2000). Anxiety and depression: Optimizing treatments. *Primary Care Companion to the Journal of Clinical Psychiatry*, *2*, 71–79.

Bandura, A. (2001). Social Cognitive Theory: An agentic perspective. *Annual Review of Psychology*, *52*, 1–26. doi: 10.1146/annurev.psych.52.1.1

Banerjee, S., & Varma, R. P. (2013). Factors affecting non-adherence among patients diagnosed with unipolar depression in a psychiatric department of a tertiary hospital in Kolkata, India. *Depression Research and Treatment, 2013*. doi: 10.1155/2013/809542. Retrieved from http://tinyurl.com/pyndxul. Accessed 19 November 2015.

Barrera, M. Jr. (1986). Distinctions between social support concepts, measures, and models. *American Journal of Community Psychology*, *14*, 413–445. doi: 10.1007/BF00922627

Bastone, E. C., & Kerns, R. D. (1995). Effects of self-efficacy and perceived social support on recovery-related behaviors after Coronary Artery Bypass Graft surgery. *Annals of Behavioral Medicine*, *17*, 324–330. doi: 10.1007/BF02888597

Bateson, M., Brilot, B., & Nettle, D. (2011). Anxiety: An evolutionary approach. *Canadian Journal of Psychiatry*, *56*, 707–715.

Bath, J., Bohin, G., Jones, C., & Scarle, E. (2009). *Cardiac rehabilitation: A workbook for use with group programmes*. Chichester: John Wiley & Sons.

Baucom, D. H., Shoham, V., Mueser, K. T., Daiuto, A. D., & Stickle, T. R. (1998) Empirically supported couple and family interventions for marital distress and adult mental health problems. *Journal of Consulting and Clinical Psychology*, *66*, 53–88. doi: 10.1037/0022-006X.66.1.53

Beaumont Health. (2016). *Advanced Coronary Artery Disease*. Retrieved from http://tinyurl.com/nv9vf89. Accessed 17 February 2016.

Beckie, T. M., & Beckstead, J. W. (2010). The effects of a cardiac rehabilitation program tailored for women on global quality of life: A randomized clinical trial. *Journal of Women's Health*, *19*, 1977–1985. doi: 10.1089/jwh.2010.1937

Bellardita, L., Cigada, M., & Molinari, E. (2006). Relaxation techniques and hypnosis in the treatment of CHD patients. In E. Molinari, A. Compare, & G. Parati (Eds.), *Clinical Psychology and Heart Disease* (pp. 435–450). Milan: Springer-Verlag.

Benning, T. B. (2015). Limitations of the biopsychosocial model in Psychiatry. *Advances in Medical Education and Practice*, *6*, 347–352. doi: 10.2147/AMEP.S82937

Bergvik, S., Sørlie, T., & Wynn, R. (2012). Coronary patients who returned to work had stronger internal locus of control beliefs than those who did not return to work. *British Journal of Health Psychology*, *17*, 596–608. doi: 10.1111/j.2044-8287.2011.02058.x

Berkman, L. F., Sekher, T. V., Capistrant, B., & Zheng, Y. (2012). Social networks, family, and care giving among older adults in India. In National Research Council (US) Panel on Policy Research and Data Needs to Meet the Challenge of Aging in Asia, J. P. Smith, & M. Majmundar (Eds.), *Aging in Asia: Findings From New and Emerging Data Initiatives* (pp. 261–278). Washington, DC: National Academies Press.

Bhattacharyya, S. (2003). Passion and philosophy of cardiac surgery. *Indian Journal of Thoracic and Cardiovascular Surgery*, *19*, 87–91. doi: 10.1007/s12055-003-0021-4

Bienvenu, O. J., & Neufeld, K. J. (2011). Post-traumatic stress disorder in medical settings: Focus on the critically ill. *Current Psychiatry Reports*, *13*, 3–9. doi: 10.1007/s11920-010-0166-y

Bjelland, I., Dahl, A. A., Haug, T. T., & Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale: An updated literature review. *Journal of Psychosomatic Research*, *52*, 69–77. doi: 10.1016/S0022-3999(01)00296-3

Blankstein, R., Ward, R. P., Arnsdorf, M., Jones, B., Lou, Y., & Pine, M. (2005). Female gender is an independent predictor of operative mortality after Coronary Artery Bypass Graft surgery: Contemporary analysis of 31 Midwestern hospitals. *Circulation*, *112*, I-323–I-327. doi: 10.1161/CIRCULATIONAHA.104.525139

Blumenthal, J. A., & Smith, P. J. (2010). Risk factors: Anxiety and risk of cardiac events. *Nature Reviews Cardiology*, *7*, 606–608. doi: 10.1038/nrcardio.2010.139

Boden, W. E. (2004). Surgery, Angioplasty, or medical therapy for symptomatic multivessel Coronary Artery Disease: Is there an indisputable “winning strategy” from evidence-based clinical trials? *Journal of the American College of Cardiology*, *43*, 1752–1754. doi: 10.1016/j.jacc.2004.02.025

Borrell-Carrió, F., Suchman, A. L., & Epstein, R. M. (2004). The biopsychosocial model 25 years later: Principles, practice, and scientific inquiry. *Annals of Family Medicine*, *2*, 576–582. doi: 10.1370/afm.245

Bosworth, H. B., Siegler, I. C., Olsen, M. K., Brummett, B. H., Barefoot, J. C., Williams, R. B.,... Mark, D. B. (2000). Social support and quality of life in patients with Coronary Artery Disease. *Quality of Life Research*, *9*, 829–839. doi: 10.1023/A:1008960308011

Bottonari, K. A., Schultz, M. R., Resnick, S. G., Mueller, L., Clark, J., Sadow, D. C., & Eisen, S. V. (2012). Peer-led vs. clinician-led recovery-oriented groups: What predicts attendance by veterans? *International Journal of Psychosocial Rehabilitation*, *16*, 88–105.

Boudrez, H., & De Backer, G. (2000). Recent findings on return to work after an acute myocardial infarction or Coronary Artery Bypass Grafting. *Acta Cardiologica*, *55*, 341–349.

Brincks, A. M., Feaster, D. J., Burns, M. J., & Mitrani, V. B. (2010). The influence of health locus of control on the patient-provider relationship. *Psychology, Health & Medicine*, *15*, 720–728. doi: 10.1080/13548506.2010.498921

Broadbent, E., Ellis, C. J., Gamble, G., & Petrie, K. J. (2006). Changes in patient drawings of the heart identify slow recovery after myocardial infarction. *Psychosomatic Medicine*, *68*, 910–913. doi: 10.1097/01.psy.0000242121.02571.10

Broadbent, E., Kahokehr, A., Booth, R. J., Thomas, J., Windsor, J. A., Buchanan, C. M.,... Hill, A. G. (2012). A brief relaxation intervention reduces stress and improves surgical wound healing response: A randomised trial. *Brain, Behavior, and Immunity*, *26*, 212–217. doi: 10.1016/j.bbi.2011.06.014

Broadbent, E., Petrie, K. J., Ellis, C. J., Ying, J., & Gamble, G. (2004). A picture of health—myocardial infarction patients' drawings of their hearts and subsequent disability: A longitudinal study. *Journal of Psychosomatic Research*, *57*, 583–587. doi: 10.1016/j.jpsychores.2004.03.014

Brock, R. (1962). A philosophy of surgery: An address delivered at the Toronto General Hospital, November 11, 1961, in association with the presentation of the 1960 Gairdner Foundation International Awards. *Canadian Medical Association Journal*, *86*, 370–372.

Brodziak, A., & Brewczyński, P. Z. (2013). Environmental factors influencing the development of atherosclerosis. *Environmental Medicine*, *16*, 7–15.

Brown University. (2000). *Off Pump Coronary Artery Bypass*, *OPCAB*. Retrieved from http://tinyurl.com/nqdedfm. Accessed 12 June 2015.

Bupa Asia. (2016). *Recovering from your CABG*. Retrieved from http://tinyurl.com/nap8ep8. Accessed 23 January 2016.

Burg, M. M., Barefoot, J., Berkman, L., Catellier, D. J., Czajkowski, S., Saab, P.,... ENRICHD Investigators. (2005). Low perceived social support and post-myocardial infarction prognosis in the Enhancing Recovery in Coronary Heart Disease clinical trial: The effects of treatment. *Psychosomatic Medicine*, *67*, 879–888. doi: 10.1097/01.psy.0000188480.61949.8c

Burish, T. G., Carey, M. P., Wallston, K. A., Stein, M. J., Jamison, R. N., & Lyles, J. N. (1984). Health locus of control and chronic disease: An external orientation may be advantageous. *Journal of Social and Clinical Psychology*, *2*, 326–332. doi: 10.1521/jscp.1984.2.4.326

CADI Research Foundation. (2012). *Angioplasty and CABG in India*. Retrieved from http://tinyurl.com/o3sxx6y. Accessed 12 June 2015.

California Pacific Medical Center. (2011). *Coronary Artery Bypass Graft (CABG) & Heart Valve surgery: Caring for yourself at home*. Retrieved from http://tinyurl.com/no5fdxy. Accessed 17 September 2015.

Casida, J., & Lemanski, S. A. (2010). An evidence-based review on Guided Imagery utilization in adult cardiac surgery. *Clinical Scholars Review*, *3*, 22–30. doi: 10.1891/1939-2095.3.1.22

Chambers, J. A., O'Carroll, R. E., Hamilton, B., Whittaker, J., Johnston, M., Sudlow, C., & Dennis, M. (2011). Adherence to medication in Stroke survivors: A qualitative comparison of low and high adherers. *British Journal of Health Psychology*, *16*, 592–609. doi: 10.1348/2044-8287.002000

Chatterjee, S., & Laxminarayan, R. (2013). Costs of surgical procedures in Indian hospitals. *BMJ Open*, *3*, e002844. doi: 10.1136/bmjopen-2013-002844

Chaudhuri, P., & Jayan, T. V. (2014, February 02). Chill, take a pill. *The Telegraph*. Retrieved from http://tinyurl.com/p6m2al8. Accessed 12 June 2015.

Chaudhury, S., Sharma, S., Pawar, A. A., Kumar, B. K., Srivastava, K., Sudarsanan, S., & Singh, D. (2006). Psychological correlates of outcome after Coronary Artery Bypass Graft. *Medical Journal Armed Forces India*, *62*, 220–223. doi: 10.1016/S0377-1237(06)80004-3

Chauhan, S., & Aeri, B. T. (2013). Prevalence of cardiovascular disease in India and its economic impact – A review. *International Journal of Scientific and Research Publications*, *3*, 1–5.

Chen, K. W., Berger, C. C., Manheimer, E., Forde, D., Magidson, J., Dachman, L., & Lejuez, C. W. (2012). Meditative therapies for reducing anxiety: A systematic review and meta-analysis of randomized controlled trials. *Depression and Anxiety, 29*, 545–562. doi: 10.1002/da.21964

Child, A., Sanders, J., Sigel, P., & Hunter, M. S. (2010). Meeting the psychological needs of cardiac patients: An integrated stepped-care approach within a cardiac rehabilitation setting. *British Journal of Cardiology*, *17*, 175–179.

Chivukula, U., Swain, S., Rana, S., & Hariharan, M. (2013). Perceived social support and type of cardiac procedures as modifiers of hospital anxiety and depression. *Psychological Studies*, *58*, 242–247. doi: 10.1007/s12646-013-0199-5

Claesson, M., Birgander, L. S., Lindahl, B., Nasic, S., Aström, M., Asplund, K., & Burell, G. (2005). Women's Hearts--Stress management for women with Ischemic Heart Disease: Exploratory analyses of a randomized controlled trial. *Journal of Cardiopulmonary Rehabilitation and Prevention*, *25*, 93–102.

Clancy, C. M., & Eisenberg, J. M. (1998). Outcomes research: Measuring the end results of health care. *Science*, *282*, 245–246. doi: 10.1126/science.282.5387.245

Clark, L. A., & Watson, D. (1991). Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology*, *100*, 316–336. doi: 10.1037/0021-843X.100.3.316

Clerkin, E. M., Beard, C., Fisher, C. R., & Schofield, C. A. (2015). An attempt to target anxiety sensitivity via cognitive bias modification. *PLoS One*, *10*, e0114578. doi: 10.1371/journal.pone.0114578

Cleveland Clinic. (2010). *Bypass surgery in women*. Retrieved from http://tinyurl.com/qelzf7c. Accessed 13 August 2015.

Coarasa, J., Das, J., & Hammer, J. (2014). Private vs. Public. *Finance & Development*, *51*, 34–36.

Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine*, *38*, 300–314.

Cohen, S. (1988). Psychosocial models of the role of social support in the etiology of physical disease. *Health Psychology*, *7*, 269–297. doi: 10.1037/0278-6133.7.3.269

Cohn, J. K., & Cohn, P. F. (1983). Patient reactions to the diagnosis of asymptomatic Coronary Artery Disease: Implications for the primary physician and consultant cardiologist. *Journal of the American College of Cardiology*, *1*, 956–958. doi: 10.1016/S0735-1097(83)80216-2

Colbert, J. D., Martin, B., Haykowsky, M. J., Hauer, T. L., Austford, L. D., Arena, R. A.,... Stone, J. A. (2015). Cardiac rehabilitation referral, attendance and mortality in women. *European Journal of Preventive Cardiology*, *22*, 979–986. doi: 10.1177/2047487314545279

Compare, A., Zarbo, C., Manzoni, G. M., Castelnuovo, G., Baldassari, E., Bonardi, A.,... Romagnoni, C. (2013). Social support, depression, and heart disease: A ten year literature review. *Frontiers in Psychology*, *4*, 384. doi: 10.3389/fpsyg.2013.00384

Connell, J. (2006). Medical tourism: Sea, sun, sand and... surgery. *Tourism Management*, *27*, 1093–1100. doi: 10.1016/j.tourman.2005.11.005

Cromwell, R. L., Butterfield, E. C., Brayfield, F. M., & Curry, J. J. (1977). *Acute Myocardial Infarction: Reaction and Recovery*. St. Louis: C. V. Mosby Company.

Cserép, Z., Székely, A., & Merkely, B. (2013). Short and long term effects of psychosocial factors on the outcome of Coronary Artery Bypass surgery. In W. S. Aronow (Ed.), *Artery Bypass* (pp. 463–492). doi: 10.5772/54622. Retrieved from http://tinyurl.com/nknzz47. Accessed 19 November 2015.

Czar, M. L., Ed, M., & Engler, M. M. (1997). Perceived learning needs of patients with Coronary Artery Disease using a questionnaire assessment tool. *Heart & Lung*, *26*, 109–117. doi: 10.1016/S0147-9563(97)90070-4

Dabhadkar, K. C., Kulshreshtha, A., Ali, M. K., & Narayan, K. M. (2011). Prospects for a cardiovascular disease prevention polypill. *Annual Review of Public Health, 32*, 23–38. doi: 10.1146/annurev-publhealth-031210-101214

Dalal, A. K. (2005). Integrating traditional services within primary health care. *Journal of Health Management*, *7,* 249–262. doi: 10.1177/097206340500700206

Dang, A., & Vallish, B. N. (2015). The emerging role of patient-centered outcomes research in shaping the future of healthcare delivery in India: A brief review. *International Journal of Medicine and Public Health*, *5*, 125–127. doi: 10.4103/2230-8598.153807

Dantzer, R., O’Connor, J. C., Freund, G. G., Johnson, R. W., & Kelley, K. W. (2008). From inflammation to sickness and depression: When the immune system subjugates the brain. *Nature Reviews Neuroscience*, *9*, 46–56. doi: 10.1038/nrn2297

Dawber, T. R. (1980). *The Framingham Study: The Epidemiology of Atherosclerotic Disease.* Cambridge: Harvard University Press.

De Vogli, R., Chandola, T., & Marmot, M. G. (2007). Negative aspects of close relationships and heart disease. *Archives of Internal Medicine*, *167*, 1951–1957. doi: 10.1001/archinte.167.18.1951

Dehdari, T., Heidarnia, A., Ramezankhani, A., Sadeghian, S., & Ghofranipour, F. (2009). Effects of progressive muscular relaxation training on quality of life in anxious patients after Coronary Artery Bypass Graft surgery. *Indian Journal of Medical Research*, *129*, 603–608.

Denollet, J., & Conraads, V. M. (2011). Type D personality and vulnerability to adverse outcomes in heart disease. *Cleveland Clinic Journal of Medicine*, *78*, S13–S19. doi: 10.3949/ccjm.78.s1.02

Detweiler-Bedell, J. B., Friedman, M. A., Leventhal, H., Miller, I. W., & Leventhal, E. A. (2008). Integrating co-morbid depression and chronic physical disease management: Identifying and resolving failures in self-regulation. *Clinical Psychology Review*, *28*, 1426–1446. doi: 10.1016/j.cpr.2008.09.002

Dhiren, S. (2010). Coronary Artery Bypass Grafting (CABG): Past present and future. *Gujarat Medical Journal*, *65*, 82–87.

Diaz, J. A., Griffith, R. A., Ng, J. J., Reinert, S. E., Friedmann, P. D., & Moulton, A. W. (2002). Patients' use of the internet for medical information. *Journal of General Internal Medicine*, *17*, 180–185. doi: 10.1046/j.1525-1497.2002.10603.x

Doering, L. V., Moser, D. K., Lemankiewicz, W., Luper, C., & Khan, S. (2005). Depression, healing, and recovery from Coronary Artery Bypass surgery. *American Journal of Critical Care*, *14*, 316–324.

Douki, Z. E., Vaezzadeh, N., Shahmohammadi, S., Shahhosseini, Z., Tabary, S. Z., Mohammadpour, R. A., & Esmaeeli, M. (2011). Anxiety before and after Coronary Artery Bypass Grafting surgery: Relationship to QOL. *Middle-East Journal of Scientific Research*, *7*, 103–108.

Drapeau, A., Marchand, A., & Beaulieu-Prévost, D. (2012). Epidemiology of psychological distress. In L. L'Abate (Ed.), *Mental Illnesses: Understanding,* *Prediction and Control* (pp. 105–134). doi: 10.5772/30872. Retrieved from http://tinyurl.com/n28t6e8. Accessed 17 June 2015.

Dunbar-Jacob, J., Gemmell, L. A., & Schlenk, E. A. (2009). Predictors of patient adherence: Patient characteristics. In S. A. Shumaker, J. K. Ockene, & K. A. Riekert (Eds.), *The Handbook of Health Behavior Change* (3rd ed.) (pp. 397–410). New York: Springer Publishing.

Dusseldorp, E., van Elderen, T., Maes, S., Meulman, J., & Kraaji, V. (1999). A meta-analysis of psychoeducational programs for Coronary Heart Disease patients. *Health Psychology*, *18,* 506–519. doi: 10.1037/0278-6133.18.5.506

Dutta, M. J. (2008). *Communicating Health: A Culture-centered Approach*. Cambridge: Polity Press.

Ebadi, A., Moradian, S. T., Feyzi, F., & Asiabi, M. (2011). Comparison of the hospital anxiety and depression among patients with Coronary Artery Disease based on proposed treatment. *Iranian Journal of Critical Care Nursing*, *4,* 97–102.

Edelmann, R. J. (1995). *Anxiety: Theory, Research, and Intervention in Clinical and Health Psychology*. Chichester: John Wiley & Sons.

Eisenberger, N. I., Taylor, S. E., Gable, S. L., Hilmert, C. J., & Lieberman, M. D. (2007). Neural pathways link social support to attenuated neuroendocrine stress responses. *Neuroimage*, *35*, 1601–1612. doi: 10.1016/j.neuroimage.2007.01.038

Ellis, A. (1962). *Reason and Emotion in Psychotherapy*. Secaucus: Prentice-Hall.

Emani, S., & Binkley, P. F. (2010). Mind-body medicine in Chronic Heart Failure: A translational science challenge. *Circulation: Heart Failure, 3*, 715–725. doi: 10.1161/CIRCHEARTFAILURE.110.951509

Endler, N. S., & Kocovski, N. L. (2001). State and trait anxiety revisited. *Journal of Anxiety Disorders*, *15*, 231–245. doi: 10.1016/S0887-6185(01)00060-3

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science*, *196*, 129–136. doi: 10.1126/science.847460

Entwistle, V. A., & Watt, I. S. (2013). Treating patients as persons: A capabilities approach to support delivery of person-centered care. *American Journal of Bioethics*, *13*, 29–39. doi: 10.1080/15265161.2013.802060

Esselstyn, C. B. Jr., Gendy, G., Doyle, J., Golubic, M., & Roizen, M. F. (2014). A way to reverse CAD? *Journal of Family Practice*, *63*, 356–364b.

Evangelista, L. S., & Shinnick, M. A. (2008). What do we know about adherence and self-care? *Journal of Cardiovascular Nursing*, *23*, 250–257. doi: 10.1097/01.JCN.0000317428.98844.4d

Falvo, D. R. (2011). *Effective Patient Education: A Guide to Increased Adherence* (4th ed.). Sudbury: Jones and Bartlett Publishers.

Fasken, L. L., Wipke-Tevis, D. D., & Sagehorn, K. K. (2001). Factors associated with unplanned readmissions following cardiac surgery. *Progress in Cardiovascular Nursing*, *16*, 107–115. doi: 10.1111/j.0889-7204.2001.00590.x

Fathi, M., Alavi, S. M., Joudi, M., Mahdikhani, H., Ferasatkish, R., Bakhshandeh, H., & Nooghabi, M. J. (2014). Preoperative anxiety in candidates for heart surgery. *Iranian Journal of Psychiatry and Behavioral Sciences*, *8*, 90–96.

Firoozabadi, M. D., & Ebadi, A. (2014). Effect of relaxation on postoperative pain in patients after Coronary Artery Bypass Grafting (CABG) surgery. *NationalPark-Forschung in Der Schweiz* (*Switzerland Research Park Journal*), *103*, 185–191.

Fisher, W. A., Fisher, J. D., & Harman, J. (2003). The Information–Motivation–Behavioral skills model: A general Social Psychological approach to understanding and promoting health behavior. In J. Suls, & K. A. Wallston (Eds.), *Social Psychological Foundations of Health and Illness* (pp. 82–106). Malden: Blackwell Publishing.

Fitzgerald, T. E., Tennen, H., Affleck, G., & Pransky, G. S. (1993). The relative importance of dispositional optimism and control appraisals in quality of life after Coronary Artery Bypass surgery. *Journal of Behavioral Medicine, 16,* 25–43. doi: 10.1007/BF00844753

Floud, S., Balkwill, A., Canoy, D., Wright, F. L., Reeves, G. K., Green, J.,... Million Women Study Collaborators. (2014). Marital status and Ischemic Heart Disease incidence and mortality in women: A large prospective study. *BMC Medicine*, *12*, 42. doi: 10.1186/1741-7015-12-42

Fogarty, L. A., Curbow, B. A., Wingard, J. R., McDonnell, K., & Somerfield, M. R. (1999). Can 40 seconds of compassion reduce patient anxiety? *Journal of Clinical Oncology*, *17*, 371–379.

Forsman, A. K., Nordmyr, J., & Wahlbeck, K. (2011). Psychosocial interventions for the promotion of mental health and the prevention of depression among older adults. *Health Promotion International*, *26*, i85–i107. doi: 10.1093/heapro/dar074

Fox, R. (1998). Compliance, adherence, concordance. *Circulation*, *97*, 127. doi: 10.1161/01.CIR.97.2.127

Framingham Heart Study. (2016). *About the Framingham Heart Study*. Retrieved from http://tinyurl.com/ph9jmxd. Accessed 22 January 2016.

Fredrickson, B. L. (2000). Cultivating positive emotions to optimize health and well-being. *Prevention & Treatment*, *3*. Retrieved from http://tinyurl.com/o28me3w. Accessed 19 November 2015.

Fredrickson, B. L. (2001). The role of positive emotions in Positive Psychology: The Broaden-and-Build theory of positive emotions. *American Psychologist*, *56*, 218–226. doi: 10.1037/0003-066X.56.3.218

Friedman, M., & Rosenman, R. H. (1960). Overt behavior pattern in Coronary Disease: Detection of overt behavior pattern A in patients with Coronary Disease by a new psychophysiological procedure. *Journal of the American Medical Association*, *173*, 1320–1325. doi: 10.1001/jama.1960.03020300032011

Gidron, Y. (2013). Trait anxiety. In M. D. Gellman, & J. R. Turner (Eds.), *Encyclopedia of Behavioral Medicine* (p. 1989). New York: Springer.

Goetz, R. H., Rohman, M., Haller, J. D., Dee, R., & Rosenak, S. S. (1961). Internal mammary-coronary artery anastomosis: A nonsuture method employing tantalum rings. *Journal of Thoracic and Cardiovascular Surgery*, *41*, 378–386.

Gould, E., & Mitty, E. (2010). Medication adherence is a partnership, medication compliance is not. *Geriatric Nursing*, *31*, 290–298. doi: 10.1016/j.gerinurse.2010.05.004

Goyal, A., & Yusuf, S. (2006). The burden of cardiovascular disease in the Indian subcontinent. *Indian Journal of Medical Research*, *124*, 235–244.

Goyal, T. M., Idler, E. L., Krause, T. J., & Contrada, R. J. (2005). Quality of life following cardiac surgery: Impact of the severity and course of depressive symptoms. *Psychosomatic Medicine*, *67*, 759–765. doi: 10.1097/01.psy.0000174046.40566.80

Griffo, R., Ambrosetti, M., Tramarin, R., Fattirolli, F., Temporelli, P. L., Vestri, A. R.,... ICAROS Investigators. (2013). Effective secondary prevention through cardiac rehabilitation after coronary revascularization and predictors of poor adherence to lifestyle modification and medication: Results of the ICAROS Survey. *International Journal of Cardiology*, *167*, 1390–1395. doi: 10.1016/j.ijcard.2012.04.069

Guillemin, M. (2004). Embodying heart disease through drawings. *Health*, *8*, 223–239. doi: 10.1177/1363459304041071

Guo, P., East, L., & Arthur, A. (2012). A preoperative education intervention to reduce anxiety and improve recovery among Chinese cardiac patients: A randomized controlled trial. *International Journal of Nursing Studies*, *49*, 129–137. doi: 10.1016/j.ijnurstu.2011.08.008

Gupta, R., Prakash, H., & Gupta, R. R. (2005). Economic issues in Coronary Heart Disease prevention in India. *Journal of Human Hypertension*, *19*, 655–657. doi: 10.1038/sj.jhh.1001871

Guru, V., Fremes, S. E., Austin, P. C., Blackstone, E. H., & Tu, J. V. (2006). Gender differences in outcomes after hospital discharge from Coronary Artery Bypass Grafting. *Circulation*, *113*, 507–516. doi: 10.1161/CIRCULATIONAHA.105.576652

Hagger, M. S., & Armitage, C. J. (2004). The influence of perceived loci of control and causality in the Theory of Planned Behavior in a leisure-time exercise context. *Journal of Applied Biobehavioral Research*, *9*, 45–64. doi: 10.1111/j.1751-9861.2004.tb00091.x

Hallion, L. S., & Ruscio, A. M. (2011). A meta-analysis of the effect of cognitive bias modification on anxiety and depression. *Psychological Bulletin*, *137*, 940–958. doi: 10.1037/a0024355

Halpin, L. S., Speir, A. M., CapoBianco, P., & Barnett, S. D. (2002). Guided Imagery in cardiac surgery. *Outcomes Management*, *6*, 132–137.

Hamer, M., Molloy, G. J., & Stamatakis, E. (2008). Psychological distress as a risk factor for cardiovascular events: Pathophysiological and behavioral mechanisms. *Journal of the American College of Cardiology*, *52*, 2156–2162. doi: 10.1016/j.jacc.2008.08.057

Hannan, E. L., Zhong, Y., Lahey, S. J., Culliford, A. T., Gold, J. P., Smith, C. R.,... Wechsler, A. (2011). 30-day readmissions after Coronary Artery Bypass Graft surgery in New York state. *JACC: Cardiovascular Interventions*, *4*, 569–576. doi: 10.1016/j.jcin.2011.01.010

Hariharan, M., & Rath, R. (2008). *Coping with Life Stress: The Indian Experience*. New Delhi: Sage.

Hariharan, M., Thomas, M., & Rana, S. (2015a). The Adherence Scale for Cardiac Patients: Development and initial testing. *Indian Journal of Health & Wellbeing*, *6*, 936–942.

Hariharan, M., Thomas, M., & Rana, S. (2015b). Development and preliminary testing of the Biopsychosocial Prognosis Scale for CABG. Manuscript submitted for publication.

Hawkes, A. L., Nowak, M., Bidstrup, B., & Speare, R. (2006). Outcomes of Coronary Artery Bypass Graft surgery. *Vascular Health and Risk Management*, *2*, 477–484.

Healthwise. (2015). *Coronary Artery Bypass Graft surgery: Self-care for recovery*. Retrieved from http://tinyurl.com/pr9epuf. Accessed 17 September 2015.

Heart and Stroke Foundation. (2015). *Cardiac rehabilitation (cardiac rehab)*. Retrieved from http://tinyurl.com/pljtfjp. Accessed 25 November 2015.

Hecht, D. (2013). The neural basis of optimism and pessimism. *Experimental Neurobiology*, *22*, 173–199. doi: 10.5607/en.2013.22.3.173

Heisler, M., Halasyamani, L., Cowen, M. E., Davis, M. D., Resnicow, K., Strawderman, R. L.,... Piette, J. D. (2013). Randomized controlled effectiveness trial of reciprocal peer support in Heart Failure. *Circulation: Heart Failure*, *6*, 246–253. doi: 10.1161/CIRCHEARTFAILURE.112.000147

Helgeson, V. S. (1993). Two important distinctions in social support: Kind of support and perceived versus received. *Journal of Applied Social Psychology*, *23*, 825–845. doi: 10.1111/j.1559-1816.1993.tb01008.x

Hemingway, H. & Marmot, M. (1999). Psychosocial factors in the aetiology and prognosis of Coronary Heart Disease: Systematic review of prospective cohort studies. *British Medical Journal*, *318*, 1460–1467. doi: 10.1136/bmj.318.7196.1460

Herbegue, B., Lahidheb, D., Labbené, N., & Haouala, H. (2014). Depression and anxiety in Coronary Artery Bypass Grafting patients: Comparisons with Percutaneous Intervention. *Archives of Cardiovascular Diseases Supplements*, *6*, 18–19. doi: 10.1016/S1878-6480(14)71313-8

Hermele, S. L. (2007). *The Effectiveness of a Guided Imagery Intervention for Patients undergoing Coronary Artery Bypass Graft Surgery* (Unpublished doctoral dissertation). Fordham University, New York.

Hiatt, E. L. (2009). *Health Locus of Control and Relations to Depression and Perceived Recovery from Coronary Artery Bypass Surgery* (Unpublished doctoral dissertation). University of Houston, Houston.

Hilden, J., & Habbema, J. D. F. (1987). Prognosis in medicine: An analysis of its meaning and rôles. *Theoretical Medicine*, *8*, 349–365. doi: 10.1007/BF00489469

Hocaoglu, C., Yeloglu, C. H., & Polat, S. (2011). Cardiac diseases and anxiety disorders. In Á. Szirami (Ed.), *Anxiety and Related Disorders* (pp. 139–150). Retrieved from http://tinyurl.com/ntm2clh. Accessed 17 June 2015.

Hodges, L. J., Walker, J., Kleiboer, A. M., Ramirez, A. J., Richardson, A., Velikova, G., & Sharpe, M. (2011). What is a psychological intervention? A metareview and practical proposal. *Psycho-Oncology*, *20*, 470–478. doi: 10.1002/pon.1780

Houston, E., Osborn, A., Lyons, T., Masvawure, T., & Raja, S. (2015). Exploring perceived social support from peer facilitators in an HIV treatment adherence intervention for African American patients: A content analysis of participant perspectives. *Journal of Community & Applied Social Psychology*, *25*, 487–501. doi: 10.1002/casp.2228

Hunsley, J., Elliott, K., & Therrien, Z. (2013). *The Efficacy and Effectiveness of Psychological Treatments*. Ottawa: Canadian Psychological Association.

Hunter, D. J. (2008). Health needs more than health care: The need for a new paradigm. *European Journal of Public Health*, *18*, 217–220. doi: 10.1093/eurpub/ckn039

Ivarsson, B., Larsson, S., Lührs, C., & Sjöberg, T. (2005). Extended written pre-operative information about possible complications at cardiac surgery—Do the patients want to know? *European Journal of Cardio-thoracic Surgery, 28,* 407–414. doi: 10.1016/j.ejcts.2005.05.006

Iyer, M. (2015, January 04). 44% advised unnecessary surgery: 2nd opinion-givers. *The Times of India*. Retrieved from http://tinyurl.com/pvhqs6y. Accessed 22 June 2015.

John Hopkins Medicine. (n.d.). *Coronary Artery Bypass Graft surgery (CABG)*. Retrieved from http://tinyurl.com/ns7583k. Accessed 12 June 2015.

Kähkönen, O., Kankkunen, P., Saaranen, T., Miettinen, H., Kyngäs, H., & Lamidi, M. (2015). Motivation is a crucial factor for adherence to a healthy lifestyle among people with Coronary Heart Disease after Percutaneous Coronary Intervention. *Journal of Advanced Nursing*, *71*, 2364–2373. doi: 10.1111/jan.12708

Kaul, U., & Bhatia, V. (2010). Perspective on coronary interventions & cardiac surgeries in India. *Indian Journal of Medical Research*, *132,* 543–548.

Kerper, L. F., Spies, C. D., Löβner, M., Salz, A., Tafelski, S., Balzer, F.,… Krampe, H. (2012). Persistence of psychological distress in surgical patients with interest in psychotherapy: Results of a 6-month follow-up. *PLoS ONE*, *7*, e51167. doi: 10.1371/journal.pone.0051167

Khawaja, I. S., Westermeyer, J. J., Gajwani, P., & Feinstein, R. E. (2009). Depression and Coronary Artery Disease: The Association, Mechanisms, and Therapeutic Implications. *Psychiatry (Edgmont)*, *6*, 38–51.

Koh, K. B., Lee, Y., Beyn, K. M., Chu, S. H., & Kim, D. M. (2008). Counter-stress effects of relaxation on proinflammatory and anti-inflammatory cytokines. *Brain, Behavior, and Immunity, 22*, 1130–1137. doi: 10.1016/j.bbi.2008.06.009

Koivula, M., Paunonen-Ilmonen, M., Tarkka, M. T., Tarkka, M., & Laippala, P. (2001). Fear and anxiety in patients awaiting Coronary Artery Bypass Grafting. *Heart & Lung*, *30*, 302–311. doi: 10.1067/mhl.2001.116134

Koivula, M., Paunonen-Ilmonen, M., Tarkka, M. T., Tarkka, M., & Laippala, P. (2002). Social support and its relation to fear and anxiety in patients awaiting Coronary Artery Bypass Grafting. *Journal of Clinical Nursing*, *11*, 622–633. doi: 10.1046/j.1365-2702.2002.00653.x

Koivula, M., Tarkka, M., Tarkka, M., Laippala, P., & Paunonen-Ilmonen, M. (2002). Fear and in-hospital social support for Coronary Artery Bypass Grafting patients on the day before surgery. *International Journal of Nursing Studies*, *39*, 415–427. doi: 10.1016/S0020-7489(01)00044-X

Kop, W. J., & Ader, D. N. (2006). Depression in Coronary Artery Disease: Assessment and treatment. In E. Molinari, A. Compare, & G. Parati (Eds.), *Clinical Psychology and Heart Disease* (pp. 109–119). Milan: Springer-Verlag.

Krannich, J. A., Weyers, P., Lueger, S., Herzog, M., Bohrer, T., & Elert, O. (2007). Presence of depression and anxiety before and after Coronary Artery Bypass Graft surgery and their relationship to age. *BMC Psychiatry*, *7*, 47. doi: 10.1186/1471-244X-7-47

Krysta, K., Krzystanek, M., Janas-Kozik, M., Klasik, A., & Krupka-Matuszczyk, I. (2015). Impact of pharmacological and psychological treatment methods of depressive and anxiety disorders on cognitive functioning. *Journal of Neural Transmission*, *122,* S101–S110. doi: 10.1007/s00702-014-1282-3

Kuhl, E. A., Fauerbach, J. A., Bush, D. E., & Ziegelstein, R. C. (2009). Relation of anxiety and adherence to risk-reducing recommendations following myocardial infarction. *American Journal of Cardiology*, *103*, 1629–1634. doi: 10.1016/j.amjcard.2009.02.014

Kulik, A., Ruel, M., Jneid, H., Ferguson, T. B., Hiratzka, L. F., Ikonomidis, J. S.,... American Heart Association Council on Cardiovascular Surgery and Anesthesia. (2015). Secondary prevention after Coronary Artery Bypass Graft surgery: A scientific statement from the American Heart Association. *Circulation*, *131*, 927–964. doi: 10.1161/CIR.0000000000000182

Kumar, A. (2011). The changing face of family & its implications on the mental health profession in Delhi. *Delhi Psychiatry Journal*, *14*, 5–8.

Kumar, P. N., Hoovayya, K. P., & Ahmed, S. A. (2014). Study on health information seeking behaviour among inpatients in a tertiary care hospital. *International Journal of Health Sciences and Research*, *4*, 198–209.

Lawson, P. J., & Flocke, S. A. (2009). Teachable moments for health behavior change: A concept analysis. *Patient Education and Counseling*, *76*, 25–30. doi: 10.1016/j.pec.2008.11.002

Lee, Y. S. C., Suchday, S., & Wylie-Rosett, J. (2012). Perceived social support, coping styles, and Chinese immigrants’ cardiovascular responses to stress. *International Journal of Behavioral Medicine*, *19*, 174–185. doi: 10.1007/s12529-011-9156-7

Lefcourt, H. M. (1982). *Locus of Control: Current Trends in Theory and Research* (2nd ed.). New York: Psychology Press.

Lefcourt, H. M., & Davidson-Katz, K. (1991). Locus of control and health. In C. R. Snyder, & D. R. Forsyth (Eds.), *Handbook of Social and Clinical Psychology: The Health Perspective* (vol. 162) (pp. 246–266). Elmsford: Pergamom Press.

Leon, A. S., Franklin, B. A., Costa, F., Balady, G. J., Berra, K. A., Stewart, K. J.,... Lauer, M. S. (2005). Cardiac rehabilitation and secondary prevention of Coronary Heart Disease: An American Heart Association scientific statement from the Council on Clinical Cardiology (Subcommittee on Exercise, Cardiac Rehabilitation, and Prevention) and the Council on Nutrition, Physical Activity, and Metabolism (Subcommittee on Physical Activity), in collaboration with the American Association of Cardiovascular and Pulmonary Rehabilitation. *Circulation*, *111*, 369–376. doi: 10.1161/01.CIR.0000151788.08740.5C

Leong, J., Molassiotis, A., & Marsh, H. (2004). Adherence to health recommendations after a cardiac rehabilitation programme in post-myocardial infarction patients: The role of health beliefs, locus of control and psychological status. *Clinical Effectiveness in Nursing*, *8*, 26–38. doi: 10.1016/j.cein.2004.02.001

Lindsay, G. M., Smith, L. N., Hanlon, P., & Wheatley, D. J. (2001). The influence of general health status and social support on symptomatic outcome following Coronary Artery Bypass Grafting. *Heart*, *85*, 80–86. doi: 10.1136/heart.85.1.80

Lippke, S., & Ziegelmann, J. P. (2008). Theory-based health behavior change: Developing, testing, and applying theories for evidence-based interventions. *Applied Psychology*, *57*, 698–716. doi: 10.1111/j.1464-0597.2008.00339.x

López, P. M., Ferrandis, E. D., Vaillo, Y. A., Garrido, M. J. G., Pérez, S. M., & Guerra, E. I. (2012). Structural validity and distress screening potential of the Hospital Anxiety and Depression Scale in Cancer. *International Journal of Clinical and Health Psychology*, *12*, 435–447.

Loucks, E. B., Sullivan, L. M., D'Agostino, R. B., Larson, M. G., Berkman, L. F., & Benjamin, E. J. (2006). Social networks and inflammatory markers in the Framingham Heart Study. *Journal of Biosocial Science*, *38*, 835–842. doi: 10.1017/S0021932005001203

Lucas, V. S. (2011). Psychological stress and wound healing in humans: What we know. *Wounds*, *23*, 76–83.

Luedemann, J., Schminke, U., Berger, K., Piek, M., Willich, S. N., Döring, A.,... Kessler, C. (2002). Association between behavior-dependent cardiovascular risk factors and asymptomatic carotid atherosclerosis in a general population. *Stroke*, *33*, 2929–2935. doi: 10.1161/01.STR.0000038422.57919.7F

Lukens, C., Turkoglu, D., & Burg, M. M. (2012). Stress management with cardiac patients. In E. A. Dornelas (Ed.), *Stress Proof the Heart: Behavioral Interventions for Cardiac Patients* (pp. 199–221). New York: Springer.

Lukens, E. P., & McFarlane, W. R. (2004). Psychoeducation as evidence-based practice: Considerations for practice, research, and policy. *Brief Treatment and Crisis Intervention*, *4*, 205–225. doi: 10.1093/brief-treatment/mhh019

Lunelli, R. P., Portal, V. L., Esmério, F. G., Moraes, M. A., & de Souza, E. N. (2009). Patients' with Coronary Arterial Disease' adherence to pharmacological and non-pharmacological therapy. *Acta Paulista de Enfermagem*, *22*, 367–373.

Lyons, A. C., Fanshawe, C., & Lip, G. Y. H. (2002). Knowledge, communication and expectancies of cardiac catheterization: The patient's perspective. *Psychology, Health & Medicine*, *7*, 461–467. doi: 10.1080/1354850021000015276

Mackay, J., & Mensah, G. A. (2004). *The Atlas of Heart Disease and Stroke*. Geneva: World Health Organization.

Madan, K., Babu, A. S., Contractor, A., Sawhney, J. P., Prabhakaran, D., & Gupta, R. (2014). Cardiac rehabilitation in India. *Progress in Cardiovascular Diseases*, *56*, 543–550. doi: 10.1016/j.pcad.2013.11.001

Mallik, S., Krumholz, H. M., Lin, Z. Q., Kasl, S. V., Mattera, J. A., Roumains, S. A., & Vaccarino, V. (2005). Patients with depressive symptoms have lower health status benefits after Coronary Artery Bypass surgery. *Circulation*, *111*, 271–277. doi: 10.1161/01.CIR.0000152102.29293.D7

Mampuya, W. M. (2012). Cardiac rehabilitation past, present and future: An overview. *Cardiovascular Diagnosis & Therapy*, *2*, 38–49. doi: 10.3978/j.issn.2223-3652.2012.01.02

Marshall, M. N. (1996). Sampling for qualitative research. *Family Practice*, *13*, 522–525. doi: 10.1093/fampra/13.6.522

Martin, C. R., Tweed, A. E., & Metcalfe, M. S. (2004). A psychometric evaluation of the Hospital Anxiety and Depression Scale in patients diagnosed with end-stage renal disease. *British Journal of Clinical Psychology*, *43*, 51–64. doi: 10.1348/014466504772812968

Martin, L. R., Williams, S. L., Haskard, K. B., & DiMatteo, M. R. (2005). The challenge of patient adherence. *Therapeutics and Clinical Risk Management*, *1*, 189–199.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, *50*, 370–396. doi: 10.1037/h0054346

Mayo Clinic. (2015). *Coronary Artery Disease: Treatment*. Retrieved from http://tinyurl.com/h7qfbn2. Accessed 21 December 2015.

McClelland, D. C. (1961). *The Achieving Society*. Princeton: Van Nostrand Co.

McCormick, K. M., Naimark, B. J., & Tate, R. B. (2006). Uncertainty, symptom distress, anxiety, and functional status in patients awaiting Coronary Artery Bypass surgery. *Heart & Lung*, *35*, 34–45. doi: 10.1016/j.hrtlng.2005.08.002

McHugh, R. K., Whitton, S. W., Peckham, A. D., Welge, J. A., & Otto, M. W. (2013). Patient preference for psychological vs. pharmacologic treatment of psychiatric disorders: A meta-analytic review. *Journal of Clinical Psychiatry*, *74*, 595–602. doi: 10.4088/JCP.12r07757

McKenzie, L. H., Simpson, J., & Stewart, M. (2010). A systematic review of pre-operative predictors of post-operative depression and anxiety in individuals who have undergone Coronary Artery Bypass Graft surgery. *Psychology, Health & Medicine*, *15*, 74–93. doi: 10.1080/13548500903483486

Mead, S., & MacNeil, C. (2005). Peer support: A systematic approach. *Family Therapy Magazine*, *4*, 28–31.

MedlinePlus. (2015). *Coronary Angiography*. Retrieved from http://tinyurl.com/ousxlad. Accessed 22 June 2015.

Mehta, N. (2011). Mind-body dualism: A critique from a health perspective. *Mens Sana Monographs*, *9*, 202–209. doi: 10.4103/0973-1229.77436

Milton, G. M., Maiya, A. G., & Kumar, T. S. (2008). Effect of home based cardiac rehabilitation on quality of life in rural Indian populations – A controlled trial. *Indian Journal of Physiotherapy and Occupational Therapy*, *2*, 1–5.

Mitchell, M. (2005). *Anxiety Management in Adult Day Surgery: A Nursing Perspective.* London: Whurr Publishers.

Molinari, E., Bellardita, L., & Compare, A. (2006). Clinical Psychology for cardiac disease. In E. Molinari, A. Compare, & G. Parati (Eds.), *Clinical Psychology and Heart Disease* (pp. 5–18). Milan: Springer.

Morowatisharifabad, M. A., Mahmoodabad, S. S., Baghianimoghadam, M. H., & Tonekaboni, N. R. (2010). Relationships between locus of control and adherence to Diabetes regimen in a sample of Iranians. *International Journal of Diabetes in Developing Countries*, *30*, 27–32. doi: 10.4103/0973-3930.60009

Moser, D. K., & De Jong, M. J. (2006). Anxiety and heart disease. In E. Molinari, A. Compare, & G. Parati (Eds.), *Clinical Psychology and Heart Disease* (pp. 121–147). Milan: Springer.

Mosleh, S. M., Bond, C. M., Lee, A. J., Kiger, A., & Campbell, N. C. (2014). Effectiveness of theory-based invitations to improve attendance at cardiac rehabilitation: A randomized controlled trial. *European Journal of Cardiovascular Nursing*, *13*, 201–210. doi: 10.1177/1474515113491348

Moss, D. (2003). Mind-body medicine, evidence-based medicine, clinical psychophysiology, and integrative medicine. In D. Moss, A. McGrady, T. C. Davies, & I. Wickramasekera (Eds.), *Handbook of Mind-Body Medicine for Primary Care* (pp. 3–18). Thousand Oaks: Sage Publications.

Murphy, B. M., Elliott, P. C., Higgins, R. O., Le Grande, M. R., Worcester, M. U. C., Goble, A. J., & Tatoulis, J. (2008). Anxiety and depression after Coronary Artery Bypass Graft surgery: Most get better, some get worse. *European Journal of Preventive Cardiology*, *15*, 434–440. doi: 10.1097/HJR.0b013e3282fbc945

Nagarajan, R. (2014, June 29). AIIMS doctors lead the way, wage war on unnecessary medical tests. *The Times of India*. Retrieved from http://tinyurl.com/pukm5z6. Accessed 22 June 2015.

Narayanan, G., & Prabhakaran, D. (2012). Integrating mental health into cardiovascular disease research in India. *National Medical Journal of India*, *25*, 274–280.

National Heart, Lung, and Blood Institute. (2012a). *What is Coronary Artery Bypass Grafting?* Retrieved from http://tinyurl.com/px6jvev. Accessed 12 June 2015.

National Heart, Lung, and Blood Institute. (2012b). *What to expect during Coronary Artery Bypass Grafting.* Retrieved from http://tinyurl.com/j9f2tsf. Accessed 01 February 2016.

National Heart, Lung, and Blood Institute. (2012c). *What to expect after Coronary Artery Bypass Grafting.* Retrieved from http://tinyurl.com/px3f6lb. Accessed 01 February 2016.

Nelson, E. C., Eftimovska, E., Lind, C., Hager, A., Wasson, J. H., & Lindblad, S. (2015). Patient reported outcome measures in practice. *British Medical Journal*, *350*, g7818. doi: 10.1136/bmj.g7818

NHS Choices. (2014). *Coronary Heart Disease: Introduction*. Retrieved from http://tinyurl.com/yhfdpu8. Accessed 11 June 2015.

NHS Choices. (2015a). *Coronary Artery Bypass Graft – How it is performed*. Retrieved from http://tinyurl.com/jp6z2mp. Accessed 01 February 2016.

NHS Choices. (2015b). *Coronary Artery Bypass Graft – Recovery*. Retrieved from http://tinyurl.com/jb6x88y. Accessed 01 February 2016.

Norlyk, A., Martinsen, B., & Dahlberg, K. (2013). Getting to know patients' lived space. *Indo-Pacific Journal of Phenomenology*, *13*, 1–12. doi: 10.2989/IPJP.2013.13.2.5.1179

Nowak, C., Sievi, N. A., Clarenbach, C. F., Schwarz, E. I., Schlatzer, C., Brack, T.,... Kohler, M. (2014). Accuracy of the Hospital Anxiety and Depression Scale for identifying depression in Chronic Obstructive Pulmonary Disease patients. *Pulmonary Medicine*, *2014*. doi: 10.1155/2014/973858. Retrieved from http://tinyurl.com/j7h55gg. Accessed 17 June 2015.

O'Donnell, S., Condell, S., & Begley, C. M. (2004). 'Add women & stir'—The Biomedical Approach to Cardiac Research! *European Journal of Cardiovascular Nursing*, *3*, 119–127. doi: 10.1016/j.ejcnurse.2004.01.003

Omeje, O., & Nebo, C. (2011). The influence of locus control on adherence to treatment regimen among Hypertensive patients. *Patient Preference and Adherence*, *5*, 141–148. doi: 10.2147/PPA.S15098

Padmavati, S. (2004). Development of Cardiothoracic Surgery in India. *Indian Journal of Thoracic and Cardiovascular Surgery*, *20*, 50–52. doi: 10.1007/s12055-004-0018-7

Pakpour, A. H., Gellert, P., Asefzadeh, S., Updegraff, J. A., Molloy, G. J., & Sniehotta, F. F. (2014). Intention and planning predicting medication adherence following Coronary Artery Bypass Graft surgery. *Journal of Psychosomatic Research*, *77*, 287–295. doi: 10.1016/j.jpsychores.2014.07.001

Pallant, J. F., & Tennant, A. (2007). An introduction to the Rasch measurement model: An example using the Hospital Anxiety and Depression Scale (HADS). *British Journal of Clinical Psychology*, *46*, 1–18. doi: 10.1348/014466506X96931

Paoletti, R., Gotto, A. M. Jr., & Hajjar, D. P. (2004). Inflammation in atherosclerosis and implications for therapy. *Circulation*, *109*, III-20–III-26. doi: 10.1161/01.CIR.0000131514.71167.2e

Park, E. R., Traeger, L., Vranceanu, A., Scult, M., Lerner, J. A., Benson, H.,... Fricchione, G. L. (2013). The development of a patient-centered program based on the relaxation response: The Relaxation Response Resiliency Program (3RP). *Psychosomatics, 54*, 165–174. doi: 10.1016/j.psym.2012.09.001

Parvan, K., Zamanzadeh, V., Dizaji, S. L., Shabestari, M. M., & Safaie, N. (2013). Patient's perception of stressors associated with Coronary Artery Bypass surgery. *Journal of Cardiovascular and Thoracic Research*, *5*, 113–117. doi: 10.5681/jcvtr.2013.024

Patel, V., Chatterji, S., Chisholm, D., Ebrahim, S., Gopalakrishna, G., Mathers, C.,... Reddy, K. S. (2011). Chronic diseases and injuries in India. *Lancet*, *377*, 413–428. doi: 10.1016/S0140-6736(10)61188-9

Paul, G., Keogh, K., D'Eath, M., & Smith, S. M. (2013). Implementing a peer-support intervention for people with Type 2 Diabetes: A qualitative study. *Family Practice*, *30*, 593–603. doi: 10.1093/fampra/cmt027

Pearson, T., & Kopin, L. (2003). Bridging the treatment gap: Improving compliance with lipid-modifying agents and therapeutic lifestyle changes. *Preventive Cardiology*, *6*, 204–213. doi: 10.1111/j.1520-037X.2003.02633.x

Pedersen, S. S., Versteeg, H., Denollet, J., Cheng, J. M., Serruys, P. W., & van Domburg, R. T. (2011). Patient-rated health status predicts prognosis following Percutaneous Coronary Intervention with drug-eluting stenting. *Quality of Life Research*, *20*, 559–567. doi: 10.1007/s11136-010-9775-5

Perez, J., & Kidd, J. (2015). Peer support workers: An untapped resource in primary mental health care. *Journal of Primary Health Care*, *7*, 84–87.

Perumal, S. S., Prasad, S., Surapaneni, K. M., & Joshi, A. (2015). Health information-seeking behavior among Hypothyroid patients at Saveetha Medical College and Hospital. *Ethiopian Journal of Health Sciences*, *25*, 147–154.

Pieper, B., Sieggreen, M., Freeland, B., Kulwicki, P., Frattaroli, M., Sidor, D.,… Garretson, B. (2006). Discharge information needs of patients after surgery. *Journal of Wound, Ostomy & Continence Nursing*, *33*, 281–290.

Pietrzyk, E., Gorczyca-Michta, I., Michta, K., Nowakowska, M., & Wożakowska-Kaplon, B. (2014). Depression in patients after Coronary Artery Bypass Grafting. *Psychiatria Polska*, *48*, 987–996.

Pincus, T., & Castrejón, I. (2015). Are patient self-report questionnaires as “scientific” as biomarkers in “treat-to-target” and prognosis in Rheumatoid Arthritis? *Current Pharmaceutical Design*, *21*, 241–256.

Piscatella, J. C. (2010). Thirty-three years after bypass surgery: A heart patient’s perspective. *Proceedings (Baylor University. Medical Center)*, *23*, 266–269.

Pogosova, N., Saner, H., Pedersen, S. S., Cupples, M. E., McGee, H., Höfer, S.,... Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation of the European Society of Cardiology. (2015). Psychosocial aspects in cardiac rehabilitation: From theory to practice. A position paper from the Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation of the European Society of Cardiology. *European Journal of Preventive Cardiology*, *22*, 1290–1306. doi: 10.1177/2047487314543075

Poole, L. (2013). *Psychological and Biological Determinants of Emotional Adaptation and Recovery after Cardiac Surgery* (Unpublished doctoral thesis). University College London, London.

Poole, L., Kidd, T., Leigh, E., Ronaldson, A., Jahangiri, M., & Steptoe, A. (2014). Depression, C-reactive protein and length of post-operative hospital stay in

Coronary Artery Bypass Graft surgery patients. *Brain, Behavior, and Immunity*, *37*, 115–121. doi: 10.1016/j.bbi.2013.11.008

Prabhakaran, D., & Yusuf, S. (2010). Cardiovascular disease in India: Lessons learnt & challenges ahead. *Indian Journal of Medical Research*, *132*, 529–530.

Prochaska, J. O., & Velicer, W. F. (1997). The Transtheoretical Model of health behavior change. *American Journal of Health Promotion*, *12*, 38–48. doi: 10.4278/0890-1171-12.1.38

Procidano, M. E., & Smith, W. W. (1997). Assessing perceived social support: The importance of context. In G. R. Pierce, B. Lakey, I. G. Sarason, & B. R. Sarason (Eds.), *Sourcebook of Social Support and Personality* (pp. 93–106). New York: Plenum Press.

Rajati, F., Mostafavi, F., Sharifirad, G., Sadeghi, M., Tavakol, K., Feizi, A., & Pashaei, T. (2013). A theory-based exercise intervention in patients with Heart Failure: A protocol for randomized, controlled trial. *Journal of Research in Medical Sciences*, *18*, 659–667.

Rajendran, A. J., Manoj, S., Karthikeyan, D., & Davis, S. (2004). Cardiac rehabilitation for CABG patients in South Indian setup: A prospective study. *Indian Journal of Physical Medicine and Rehabilitation*, *15*, 23–33.

Ranjan, P., Kumari, A., & Chakrawarty, A. (2015). How can doctors improve their communication skills? *Journal of Clinical & Diagnostic Research*, *9*, JE01–JE04. doi: 10.7860/JCDR/2015/12072.5712

Rao, S. R. (2014). A tale of 2 countries: The cost of my mother's cardiac care in the United States and India. *Annals of Family Medicine*, *12*, 470–472. doi: 10.1370/afm.1676

Reblin, M., & Uchino, B. N. (2008). Social and emotional support and its implication for health. *Current Opinion in Psychiatry*, *21*, 201–205. doi: 10.1097/YCO.0b013e3282f3ad89

Redelmeier, D. A., Rozin, P., & Kahneman, D. (1993). Understanding patients' decisions: Cognitive and emotional perspectives. *Journal of the American Medical Association, 270*, 72–76. doi: 10.1001/jama.1993.03510010078034

Rehin, K. R., & Raveendran, P. T. (2014). Role of empathy in ensuring patient satisfaction at government hospitals in Kerala: An investigation. *Asian Journal of Management*, *5*, 45–48.

Rissam, H. S., Kishore, S., & Trehan, N. (2001). Coronary Artery Disease in young Indians – The missing link. *Journal, Indian Academy of Clinical Medicine*, *2*, 128–132.

Roberge, J., & Angelstam, P. (2004). Usefulness of the umbrella species concept as a conservation tool. *Conservation Biology*, *18*, 76–85. doi: 10.1111/j.1523-1739.2004.00450.x

Roberts, S. B., Bonnici, D. M., Mackinnon, A. J., & Worcester, M. C. (2001). Psychometric evaluation of the Hospital Anxiety and Depression Scale (HADS) among female cardiac patients. *British Journal of Health Psychology*, *6*, 373–383. doi: 10.1348/135910701169278

Roberts, W. C. (2000). Twenty questions on atherosclerosis. *Proceedings (Baylor University. Medical Center)*, *13*, 139–143.

Roediger, H. L. III (2004). What happened to Behaviorism. *Observer*, *17*, 40–42.

Rosenberger, P. H., Jokl, P., & Ickovics, J. (2006). Psychosocial factors and surgical outcomes: An evidence-based literature review. *Journal of the American Academy of Orthopaedic Surgeons*, *14*, 397–405.

Rosenbloom, J. I., Wellenius, G. A., Mukamal, K. J., & Mittleman, M. A. (2009). Self-reported anxiety and the risk of clinical events and atherosclerotic progression among patients with Coronary Artery Bypass Grafts (CABG). *American Heart Journal*, *158*, 867–873. doi: 10.1016/j.ahj.2009.08.019

Rosendahl, J., Tigges-Limmer, K., Gummert, J., Dziewas, R., Albes, J. M., & Strauss, B. (2013). Bypass Surgery with Psychological and Spiritual Support (the BY.PASS Study): Results of a pragmatic trial based on patients' preference. *Psychotherapy and Psychosomatics*, *82*, 35–44. doi: 10.1159/000339170

Rosendahl, J., Tigges-Limmer, K., Gummert, J., Dziewas, R., Albes, J. M., Strauss, B., & By.pass Investigators (2009). Bypass Surgery with Psychological and Spiritual Support (the By.pass Study): Study design and research methods. *American Heart Journal*, *158*, 8–14. doi: 10.1016/j.ahj.2009.04.017

Rosengart, T. K., de Bois, W., Chedrawy, E., & Vukovic, M. (2008). Adult heart disease. In J. A. Norton, P. S. Barie, R. R. Bollinger, A. E. Chang, S. F. Lowry, S. J. Mulvihill,... R. W. Thompson (Eds.), *Surgery: Basic Science and Clinical Evidence* (2nd ed.) (pp.1621–1668). New York: Springer.

Rosenstock, I. M. (1974). Historical origins of the Health Belief Model. *Health Education & Behavior*, *2*, 328–335. doi: 10.1177/109019817400200403

Rothbaum, F., Weisz, J. R., & Snyder, S. S. (1982). Changing the world and changing the self: A two-process model of perceived control. *Journal of Personality and Social Psychology*, *42*, 5–37. doi: 10.1037/0022-3514.42.1.5

Rotter, J. B. (1954). *Social Learning and Clinical Psychology.* Englewood Cliffs: Prentice-Hall.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied, 80,* 1–28. doi: 10.1037/h0092976

Rozanski, A. (2014). Behavioral Cardiology: Current advances and future directions. *Journal of the American College of Cardiology*, *64,* 100–110. doi: 10.1016/j.jacc.2014.03.047

Rozanski, A., Blumenthal, J. A., Davidson, K. W., Saab, P. G., & Kubzansky, L. (2005). The epidemiology, pathophysiology, and management of psychosocial risk factors in cardiac practice: The emerging field of Behavioral Cardiology. *Journal of the American College of Cardiology*, *45,* 637–651. doi: 10.1016/j.jacc.2004.12.005

Rozanski, A., Blumenthal, J. A., & Kaplan, J. (1999). Impact of psychological factors on the pathogenesis of cardiovascular disease and implications for therapy. *Circulation*, *99,* 2192–2217. doi: 10.1161/01.CIR.99.16.2192

Ruiz, J. M., Matthews, K. A., Scheier, M. F., & Schulz, R. (2006). Does who you marry matter for your health? Influence of patients' and spouses' personality on their partners' psychological well-being following Coronary Artery Bypass surgery. *Journal of Personality and Social Psychology, 91,* 255–267. doi: 10.1037/0022-3514.91.2.255

Russ, T. C., Stamatakis, E., Hamer, M., Starr, J. M., Kivimäki, M., & Batty, G. D. (2012). Association between psychological distress and mortality: Individual participant pooled analysis of 10 prospective cohort studies. *British Medical Journal*, *345*, E4933. doi: 10.1136/bmj.e4933

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, *57*, 749–761. doi: 10.1037/0022-3514.57.5.749

Ryan, R. M., & Deci, E. L. (2000). Self-determination Theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68–78. doi: 10.1037/0003-066X.55.1.68

Rydlewska, A., Krzysztofik, J., Libergal, J., Rybak, A., Banasiak, W., Ponikowski, P., & Jankowska, E. A. (2013). Health locus of control and the sense of self-efficacy in patients with Systolic Heart Failure: A pilot study. *Patient Preference and Adherence*, *7*, 337–343. doi: 10.2147/PPA.S41863

Saha, S., & Beach, M. C. (2011). The impact of patient-centered communication on patients' decision making and evaluations of physicians: A randomized study using video vignettes. *Patient Education and Counseling*, *84*, 386–392. doi: 10.1016/j.pec.2011.04.023

Salmon, P., & Hall, G. M. (2004). Patient empowerment or the emperor's new clothes. *Journal of the Royal Society of Medicine*, *97*, 53–56.

Samina, M., Qadri, G. J., Tabish, S. A., Samiya, M., & Riyaz, R. (2008). Patient's perception of nursing care at a large teaching hospital in India. *International Journal of Health Sciences*, *2*, 92–100.

Saxena, R. (2010). *The Middle Class in India: Issues and Opportunities*. Frankfurt am Main: Deutsche Bank Research.

Schneiderman, N., Orth-Gomér, K., & Burell, G. (2015). Gender considerations in psychosocial-behavioral interventions for Coronary Heart Disease. In K. Orth-Gomér, N. Schneiderman, V. Vaccarino, & H. Deter (Eds.), *Psychosocial*

Stress and Cardiovascular Disease in Women: Concepts, Findings, Future Perspectives (pp. 233–250). Cham: Springer.

Schönberger, M., & Ponsford, J. (2010). The factor structure of the Hospital Anxiety and Depression Scale in individuals with Traumatic Brain Injury. *Psychiatry Research*, *179*, 342–349. doi: 10.1016/j.psychres.2009.07.003

Seaward, B. L. (2000). *Managing Stress in Emergency Medical Services*. Sudbury: Jones and Bartlett Publishers.

Sekhri, T., Kanwar, R. S., Wilfred, R., Chugh, P., Chhillar, M., Aggarwal, R.,... Singh, S. K. (2014). Prevalence of risk factors for Coronary Artery Disease in an urban Indian population. *BMJ Open*, *4*, e005346. doi: 10.1136/bmjopen-2014-005346

Sengstock, D., Vaitkevicius, P., Salama, A., & Mentzer, R. M. (2012). Under-prescribing and non-adherence to medications after Coronary Bypass surgery in older adults: Strategies to improve adherence. *Drugs & Aging*, *29*, 93–103. doi: 10.2165/11598500-000000000-00000

Shah, I., Faheem, M., Shahzeb, Rafiullah, & Hafizullah, M. (2013). Clinical profile, Angiographic characteristics and treatment recommendations in patients with Coronary Artery Disease. *Journal of Pakistan Medical Students*, *3*, 94–100.

Shapiro, D. H. Jr., Schwartz, C. E., & Astin, J. A. (1996). Controlling ourselves, controlling our world: Psychology's role in understanding positive and negative consequences of seeking and gaining control. *American Psychologist*, *51*, 1213–1230. doi: 10.1037/0003-066X.51.12.1213

Sharif, F., Shoul, A., Janati, M., Kojuri, J., & Zare, N. (2012). The effect of cardiac rehabilitation on anxiety and depression in patients undergoing Cardiac

Bypass Graft surgery in Iran. *BMC Cardiovascular Disorders*, *12*, 40. doi: 10.1186/1471-2261-12-40

Sharma, M., & Ganguly, N. K. (2005). Premature Coronary Artery Disease in Indians and its associated risk factors. *Vascular Health and Risk Management*, *1*, 217–225.

Shekar, P. S. (2006). On-pump and off-pump Coronary Artery Bypass Grafting. *Circulation*, *113*, e51–e52. doi: 10.1161/CIRCULATIONAHA.105.566737

Sher, T. G., Bellg, A. J., Braun, L., Domas, A., Rosenson, R., & Canar, W. J. (2002). Partners for Life: A theoretical approach to developing an intervention for cardiac risk reduction. *Health Education Research*, *17*, 597–605. doi: 10.1093/her/17.5.597

Simmons, D., Cohn, S., Bunn, C., Birch, K., Donald, S., Paddison, C.,... Graffy, J. (2013). Testing a peer support intervention for people with Type 2 Diabetes: A pilot for a randomised controlled trial. *BMC Family Practice*, *14*, 5. doi: 10.1186/1471-2296-14-5

Singh, R. B., Mengi, S. A., Xu, Y., Arneja, A. S., & Dhalla, N. S. (2002). Pathogenesis of atherosclerosis: A multifactorial process. *Experimental & Clinical Cardiology*, *7*, 40–53.

Sinha, K. (2011, September 01). MCI wants doctors to spend at least 10 mins with each patient. *The Times of India*. Retrieved from http://tinyurl.com/jje8duu. Accessed 05 January 2016.

Sinha, S. K., & Kaur, J. (2011). National Mental Health Programme: Manpower Development Scheme of Eleventh Five-year Plan. *Indian Journal of Psychiatry*, *53*, 261–265. doi: 10.4103/0019-5545.86821

Smith, G. (2012). An introduction to psychological interventions. In G. Smith (Ed.), *Psychological Interventions in Mental Health Nursing* (pp. 1–23). Maidenhead: Open University Press.

Snaith, R. P. (2003). The Hospital Anxiety and Depression Scale. *Health and Quality of Life Outcomes*, *1*, 29. doi: 10.1186/1477-7525-1-29

Sobel, D. S. (1995). Rethinking medicine: Improving health outcomes with cost-effective psychosocial interventions. *Psychosomatic Medicine*, *57*, 234–244.

Sorg, S., Vögele, C., Furka, N., & Meyer, A. H. (2012). Perseverative thinking in depression and anxiety. *Frontiers in Psychology*, *3*, 1–6. doi: 10.3389/fpsyg.2012.00020

Sørlie, T., & Sexton, H. C. (2004). Predictors of change in health locus of control following surgical treatment. *Personality and Individual Differences*, *36*, 991–1004. doi: 10.1016/S0191-8869(03)00167-3

Stafford, L., Jackson, H. J., & Berk, M. (2008). Illness beliefs about heart disease and adherence to secondary prevention regimens. *Psychosomatic Medicine*, *70*, 942–948. doi: 10.1097/PSY.0b013e318187e22e

Stanford Health Care. (2015). *What is Coronary Artery Bypass Graft surgery?* Retrieved from http://tinyurl.com/otum42q. Accessed 15 October 2015.

Steptoe, A., Dockray, S., & Wardle, J. (2009). Positive affect and psychobiological processes relevant to health. *Journal of Personality*, *77*, 1747–1776. doi: 10.1111/j.1467-6494.2009.00599.x

Steptoe, A., Poole, L., Ronaldson, A., Kidd, T., Leigh, E., & Jahangiri, M. (2015). Depression 1 year after CABG is predicted by acute inflammatory responses. *Journal of the American College of Cardiology*, *65*, 1710–1711. doi: 10.1016/j.jacc.2014.12.068

Steptoe, A., & Wardle, J. (2001). Locus of control and health behaviour revisited: A multivariate analysis of young adults from 18 countries. *British Journal of Psychology*, *92*, 659–672. doi: 10.1348/000712601162400

Stroobant, N., & Vingerhoets, G. (2008). Depression, anxiety, and neuropsychological performance in Coronary Artery Bypass Graft patients: A follow-up study. *Psychosomatics, 49*, 326–331. doi: 10.1176/appi.psy.49.4.326

Suls, J., & Rothman, A. (2004). Evolution of the biopsychosocial model: Prospects and challenges for Health Psychology. *Health Psychology*, *23*, 119–125. doi: 10.1037/0278-6133.23.2.119

Sunbul, M., Zincir, S. B., Durmus, E., Sunbul, E. A., Cengiz, F. F., Kivrak, T.,… Sari, I. (2013). Anxiety and depression in patients with Coronary Artery Disease. *Bulletin of Clinical Psychopharmacology, 23,* 345–352. doi: 10.5455/bcp.20130421014758

Swain, S., Hariharan, M., Rana, S., Chivukula, U., & Thomas, M. (2015). Doctor-Patient communication: Impact on adherence and prognosis among patients with Primary Hypertension. *Psychological Studies*, *60*, 25–32. doi: 10.1007/s12646-014-0291-5

Székely, A., Balog, P., Benkö, E., Breuer, T., Székely, J., Kertai M. D.,... Thayer, J. F. (2007). Anxiety predicts mortality and morbidity after coronary artery and valve surgery—A 4-year follow-up study. *Psychosomatic Medicine*, *69*, 625–631. doi: 10.1097/PSY.0b013e31814b8c0f

Taebi, M., Abedi, H. A., Abbasszadeh, A., & Kazemi, M. (2014). Incentives for self-management after Coronary Artery Bypass Graft surgery. *Iranian Journal of Nursing and Midwifery Research*, *19*, S64–S70.

Takizawa, T., Kondo, T., Sakihara, S., Ariizumi, M., Watanabe, N., & Oyama, H. (2006). Stress buffering effects of social support on depressive symptoms in middle age: Reciprocity and community mental health. *Psychiatry and Clinical Neurosciences*, *60*, 652–661. doi: 10.1111/j.1440-1819.2006.01579.x

Tandon, S. (2013). Of poor patients and callous doctors. *Indian Journal of Medical Ethics*, *10*, 68.

Taylor, S., & Asmundson, G. J. G. (2004). *Treating health anxiety: A Cognitive-behavioral Approach*. New York: Guilford Press.

Theobald, K., & McMurray, A. (2004). Coronary Artery Bypass Graft surgery: Discharge planning for successful recovery. *Journal of Advanced Nursing*, *47*, 483–491. doi: 10.1111/j.1365-2648.2004.03127.x

Thomas, M., Hariharan, M., & Rana, S. (2016). Psychological distress as predictor of adherence and prognosis among patients undergoing Coronary Artery Bypass Grafting. *Journal of the Indian Academy of Applied Psychology*, *42*, 161–171.

Thomas, M., Hariharan, M., Rana, S., Swain, S., & Andrew, A. (2014). Medical jargons as hindrance in doctor–patient communication. *Psychological Studies*, *59*, 394–400. doi: 10.1007/s12646-014-0262-x

Thomas, R. J. (2006). Behavioral Cardiology—Where the heart and head meet. *US Cardiology*, *2*, 1–5.

Thornton, L. M., Andersen, B. L., Schuler, T. A., & Carson, W. E. 3rd. (2009). A psychological intervention reduces inflammatory markers by alleviating depressive symptoms: Secondary analysis of a randomized controlled trial. *Psychosomatic Medicine*, *71*, 715–724. doi: 10.1097/PSY.0b013e3181b0545c

Timmins, F., & Kaliszer, M. (2003). Information needs of myocardial infarction patients. *European Journal of Cardiovascular Nursing*, *2*, 57–65. doi: 10.1016/S1474-5151(02)00089-0

Toombs, S. K. (1993). *The Meaning of Illness: A Phenomenological Account of the Different Perspectives of Physician and Patient*. Dordrecht: Kluwer Academic Publishers.

Tulloch, H., & Pelletier, R. (2008). Does personality matter after all? Type D personality and its implications for cardiovascular prevention and rehabilitation. *Current Issues in Cardiac Rehabilitation and Prevention*, *16*, 2–4.

Twiss, E., Seaver, J., & McCaffrey, R. (2006). The effect of music listening on older adults undergoing cardiovascular surgery. *Nursing in Critical Care*, *11*, 224–231. doi: 10.1111/j.1478-5153.2006.00174.x

Tyrer, P. (2001). The case for cothymia: Mixed anxiety and depression as a single diagnosis. *British Journal of Psychiatry*, *179*, 191–193. doi: 10.1192/bjp.179.3.191

Umberson, D., & Montez, J. K. (2010). Social relationships and health: A flashpoint for health policy. *Journal of Health and Social Behavior*, *51*, S54–S66. doi: 10.1177/0022146510383501

University of Minnesota. (2013). *Atlas of human cardiac anatomy: Coronary arteries*. Retrieved from http://tinyurl.com/pyfgj85. Accessed 25 November 2015.

Upton, D., & Solowiej, K. (2010). Pain and stress as contributors to delayed wound healing. *Wound Practice and Research*, *18*, 114–122.

Vaccarino, V., Lin, Z. Q., Kasl, S. V., Mattera, J. A., Roumanis, S. A., Abramson, J. L., & Krumholz, H. M. (2003). Gender differences in recovery after Coronary

Artery Bypass surgery. *Journal of the American College of Cardiology*, *41*, 307–314. doi: 10.1016/S0735-1097(02)02698-0

Vallish, B. N., Naidu, M., Esam, H., Badgujar, L., Kinra, G., & Dang, A. (2015). The emerging role of Patient-reported outcomes (Pros) in clinical trials in India. *Value in Health*, *18*, A102. doi: 10.1016/j.jval.2015.03.597

van Dixhoorn, J., & White, A. (2005). Relaxation therapy for rehabilitation and prevention in Ischemic Heart Disease: A systemic review and meta-analysis. *European Journal of Preventive Cardiology*, *12*, 193–202. doi: 10.1097/01.hjr.0000166451.38593.de

Vanchenauer, R., Grünenfelder, J., Plass, A., Slankamenak, K., Pantic, L., Kisner, D., & Genoni, M. (2008). Changing lifestyle habits as secondary prophylaxis after Coronary Artery Bypass Grafting. *Heart Surgery Forum*, *4*, E243–E247. doi: 10.1532/HSF98.20081004

Versari, D., Daghini, E., Virdis, A., Ghiadoni, L., & Taddei, S. (2009). Endothelial dysfunction as a target for prevention of cardiovascular disease. *Diabetes Care*, *32*, S314–S321. doi: 10.2337/dc09-S330

Waight, C. A., Strodi, E., Sheridan, J., & Tesar, P. (2015). Posttraumatic growth in post-surgical Coronary Artery Bypass Graft patients. *Health Psychology Open*, *2*, 1–9. doi: 10.1177/2055102915571370

Wallston, B. S., & Wallston, K. A. (1978). Locus of control and health: A review of the literature. *Health Education & Behavior*, *6*, 107–117. doi: 10.1177/109019817800600102

Wallston, K. A. (1989). Assessment of control in healthcare settings. In A. Steptoe, & A. Appels (Eds.), *Stress, Personal Control and Health* (pp. 85–105). New York: John Wiley & Sons.

Wallston, K. A., Stein, M. J., & Smith, C. A. (1994). Form C of the MHLC scales: A condition-specific measure of locus of control. *Journal of Personality Assessment*, *63*, 534–553. doi: 10.1207/s15327752jpa6303_10

Wallston, K. A., & Wallston, B. S. (1981). Health locus of control scales. In H. Lefcourt (Ed.), *Research with the Locus of Control Construct* (Vol. 1) (pp. 189–243). New York: Academic Press.

Watt-Watson, J., Stevens, B., Katz, J., Costello, J., Reid, G. J., & David, T. (2004). Impact of preoperative education on pain outcomes after Coronary Artery Bypass Graft surgery. *Pain*, *109*, 73–85. doi: 10.1016/j.pain.2004.01.012

WebMD. (2014). *Diagnosing atherosclerosis*. Retrieved from http://tinyurl.com/7vnpymd. Accessed 01 October 2015.

Weiner, A. S. B., & Hannum, J. W. (2012). Differences in the quantity of social support between geographically close and long-distance friendships. *Journal of Social and Personal Relationships*, *30*, 662–672. doi: 10.1177/0265407512465997

Weinman, J., Ebrecht, M., Scott, S., Walburn, J., & Dyson, M. (2008). Enhanced wound healing after emotional disclosure intervention. *British Journal of Health Psychology*, *13*, 95–102. doi: 10.1348/135910707X251207

Weinman, J. A., & Petrie, K. J. (1997). Perceptions of health and illness. In K. J. Petrie, & J. A. Weinman (Eds.), *Perceptions of Health and Illness* (pp. 1–17). Amsterdam: Harwood Academic Publishers.

Whitsitt, D. R. (2009). A phenomenological exploration of Coronary Artery Bypass surgery as experienced by three couples. *Journal of Phenomenological Psychology*, *40*, 140–177. doi: 10.1163/004726609X12482630041843

Wiesemann, C. (1998). The significance of prognosis for a theory of medical practice. *Theoretical Medicine and Bioethics, 19,* 253–261. doi: 10.1023/A:1009913915839

Williams, C. (1956). The art of surgery. *Annals of Surgery*, *143*, 561–565.

Willig, C. (2013). *Introducing Qualitative Research in Psychology* (3rd ed.). Maidenhead: Open University Press.

Wockhardt Hospitals. (n.d.). *Wockhardt guide on Coronary Artery Bypass Graft surgery*. Retrieved from http://tinyurl.com/pqct5eq. Accessed 27 October 2015.

Wolpe, J. (1958). *Psychotherapy by Reciprocal Inhibition*. Stanford: Stanford University Press.

World Health Organization. (1993). *Rehabilitation after Cardiovascular Diseases, with Special Emphasis on Developing Countries*. Geneva: World Health Organization.

World Health Organization. (2003). *Adherence to Long-term Therapies: Evidence for Action*. Geneva: World Health Organization.

World Health Organization. (2007). *People at the Centre of Health Care: Harmonizing Mind and Body, People and Systems*. Geneva: World Health Organization.

Wu, A. M. S., Tang, C. S. K., & Kwok, T. C. Y. (2004). Self-efficacy, health locus of control, and psychological distress in elderly Chinese women with chronic illnesses. *Aging & Mental Health*, *8,* 21–28. doi: 10.1080/13607860310001613293

Wu, C. J., Chang, A. M., Courtney, M., Shortridge-Baggett, L. M., & Kostner, K. (2011). Development and pilot test of a peer-support based Cardiac-Diabetes

Self-Management Program: A study protocol. *BMC Health Services Research*, *11*, 74. doi: 10.1186/1472-6963-11-74

Wu, J., Lennie, T. A., Dekker, R. L., Biddle, M. J., & Moser, D. K. (2013). Medication adherence, depressive symptoms, and cardiac event-free survival in patients with Heart Failure. *Journal of Cardiac Failure*, *19*, 317–324. doi: 10.1016/j.cardfail.2013.03.010

Wulsin, L. (2012). Psychological challenges of coping with Coronary Artery Disease. In E. A. Dornelas (Ed.), *Stress Proof the Heart: Behavioral Interventions for Cardiac Patients* (pp. 9–24). New York: Springer.

Wyer, S. J., Earll, L., Joseph, S., Harrison, J., Giles, M., & Johnston, M. (2001). Increasing attendance at a cardiac rehabilitation programme: An intervention study using the Theory of Planned Behaviour. *Coronary Health Care*, *5*, 154–159. doi: 10.1054/chec.2001.0131

Yadava, O. P. (2013). Follow-up after Coronary Artery Bypass Surgery. In O. P. Yadava (Ed.), *Follow-up after Cardiovascular Surgery – ECAB*. New Delhi: Elsevier.

Yehle, K. S., Chen, A. M. H., Plake, K. S., Yi, J. S., & Mobley, A. R. (2012). A qualitative analysis of Coronary Heart Disease patient views of dietary adherence and web-based and mobile-based nutrition tools. *Journal of Cardiopulmonary Rehabilitation and Prevention*, *32*, 203–209. doi: 10.1097/HCR.0b013e31825b4e6a

Yellaiah, J. (2013). Health insurance in India: Rajiv Aarogyasri Health Insurance scheme in Andhra Pradesh. *IOSR Journal of Humanities and Social Sciences*, *8*, 7–14.

Zarani, F., Besharat, M. A., Sadeghian, S., & Sarami, G. (2010). The effectiveness of the Information-Motivation-Behavioral Skills model in promoting adherence in CABG patients. *Journal of Health Psychology, 15,* 828–837. doi: 10.1177/1359105309357092

Zarani, F., Besharat, M. A., Sarami, G., & Sadeghian, S. (2012). An Information–Motivation–Behavioral Skills (IMB) model-based intervention for CABG patients. *International Journal of Behavioral Medicine, 19,* 543–549. doi: 10.1007/s12529-011-9193-2

Zarani, F., Sarami, G., & Sadeghian, S. (2014). Adherence in CABG patients: An empirical test of a health behavior model. *International Journal of Clinical Medicine*, *5*, 225–233. doi: 10.4236/ijcm.2014.55036

Ziegelstein, R. C., Fauerbach, J. A., Stevens, S. S., Romanelli, J., Richter, D. P., & Bush, D. E. (2000). Patients with depression are less likely to follow recommendations to reduce cardiac risk during recovery from a myocardial infarction. *JAMA Internal Medicine, 160*, 1818–1823. doi: 10.1001/archinte.160.12.1818

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, *67*, 361–370. doi: 10.1111/j.1600-0447.1983.tb09716.x

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, *52*, 30–41. doi: 10.1207/s15327752jpa5201_2

Appendices

Hospital Anxiety and Depression Scale (HADS)

GL assessment
the measure of potential

Name: ______________________ ______________________ Date: ____________

FOLD HERE

Clinicians are aware that emotions play an important part in most illnesses. If your clinician knows about these feelings he or she will be able to help you more.

This questionnaire is designed to help your clinician to know how you feel. Read each item below and **underline the reply** which comes closest to how you have been feeling in the past week. Ignore the numbers printed at the edge of the questionnaire.

Don't take too long over your replies, your immediate reaction to each item will probably be more accurate than a long, thought-out response.

FOLD HERE

A	D			A	D
		I feel tense or 'wound up'	**I feel as if I am slowed down**		
3		Most of the time	Nearly all the time		3
2		A lot of the time	Very often		2
1		From time to time, occasionally	Sometimes		1
0		Not at all	Not at all		0
		I still enjoy the things I used to enjoy	**I get a sort of frightened feeling like 'butterflies' in the stomach**		
	0	Definitely as much	Not at all	0	
	1	Not quite so much	Occasionally	1	
	2	Only a little	Quite often	2	
	3	Hardly at all	Very often	3	
		I get a sort of frightened feeling as if something awful is about to happen	**I have lost interest in my appearance**		
3		Very definitely and quite badly	Definitely		3
2		Yes, but not too badly	I don't take as much care as I should		2
1		A little, but it doesn't worry me	I may not take quite as much care		1
0		Not at all	I take just as much care as ever		0
		I can laugh and see the funny side of things	**I feel restless as if I have to be on the move**		
	0	As much as I always could	Very much indeed	3	
	1	Not quite so much now	Quite a lot	2	
	2	Definitely not so much now	Not very much	1	
	3	Not at all	Not at all	0	
		Worrying thoughts go through my mind	**I look forward with enjoyment to things**		
3		A great deal of the time	As much as I ever did		0
2		A lot of the time	Rather less than I used to		1
1		Not too often	Definitely less than I used to		2
0		Very little	Hardly at all		3
		I feel cheerful	**I get sudden feelings of panic**		
	3	Never	Very often indeed	3	
	2	Not often	Quite often	2	
	1	Sometimes	Not very often	1	
	0	Most of the time	Not at all	0	
		I can sit at ease and feel relaxed	**I can enjoy a good book or radio or television programme**		
0		Definitely	Often		0
1		Usually	Sometimes		1
2		Not often	Not often		2
3		Not at all	Very seldom		3

Now check that you have answered all the questions

	A	D
TOTAL		

ఆసుపత్రి వేదన మరియు నిరుత్సాహం ప్రశ్నావళి (HADS)

GL assessment
the measure of potential

పేరు: ______________________ ______________________ తేదీ: ______________

చాలా రకాల జబ్బుల్లో మానసిక భావనలు ముఖ్యపాత్ర వహిస్తాయని వైద్యులకు తెలుసు.మీ వైద్యునికి ఈ మానసిక భావనలు తెలిస్తే అతడు లేదా ఆమె మీకు మరింత బాగా సహాయ పడగలరు.

మీరు ఎలాంటి మానసిక భావనలు కలిగి ఉన్నారో వాటిని మీ వైద్యుడు తెలుసుకునేందుకు సహాయపడే విధంగా ఈ ప్రశ్నావళి రూపొందించబడినది. క్రింది ప్రతి అంశాన్నీ చదివి, గడిచిన 7 రోజుల్లో మీరు లోనైన భావనలకు అతి దగ్గరగా అనిపించే **జవాబు క్రింద గీత గీయండి.** ప్రశ్నావళి అంచున ముద్రించి ఉన్న అంకెలను విడిచిపెట్టండి.

జవాబులిచ్చేందుకు మరీ ఎక్కువ సమయం తీసుకోవద్దు, బాగా ఆలోచించి, ఎక్కువ సమయం తీసుకునే జవాబు కంటే, వెను వెంటనే ఇచ్చే జవాబు మరింత ఖచ్చితంగా ఉండవచ్చు.

వేదన	నిరుత్సాహం	**నాకు ఆందోళనగా లేదా 'ఒత్తిడిగా అనిపిస్తుంది'**
3		ఇంచుమించు ఎల్లప్పుడూ
2		తరచుగా
1		ఒక్కోసారి
0		ఎప్పుడూ లేదు

వేదన	నిరుత్సాహం	**నేను పూర్వం ఆనందించినవన్నీ ఇప్పటికీ నేను ఆనందిస్తున్నాను**
	0	ఖచ్చితంగా ఇప్పటికీ పూర్వంలో లాగే
	1	అంత ఎక్కువగా కాదు
	2	కాస్తంత మాత్రమే
	3	ఎంత మాత్రం లేదు

వేదన	నిరుత్సాహం	**ఏదో ఘోరం జరగబోతున్నట్లు భయపడిన భావనలు నాకు కలుగుతున్నాయి**
3		ఎల్లప్పుడూ మరియు చాలా విపరీతంగా
2		అవును, కానీ అంత విపరీతంగా కాదు
1		కొంత, కానీ అవి నన్ను దిగులు పెట్టలేదు
0		ఎప్పుడూ లేదు

వేదన	నిరుత్సాహం	**నేను నవ్వగలను మరియు అన్నింటిని తమాషా కోణంలో చూడగలను**
	0	పూర్వంలాగే నాకు వీలైనంతగా
	1	ఇప్పుడు అంత ఎక్కువ కాదు
	2	ఖచ్చితంగా ఇప్పుడు అంత ఎక్కువ కాదు
	3	ఎప్పుడూ లేదు

వేదన	నిరుత్సాహం	**దిగులు కలిగించే ఆలోచనలు నా మనసుని తొలుస్తుంటాయి**
3		ఇంచుమించు ఎల్లప్పుడూ లేదు
2		తరచుగా
1		ఒక్కోసారి
0		ఇంచుమించు ఎప్పుడూ లేదు

వేదన	నిరుత్సాహం	**నాకు ఉల్లాసంగా అనిపిస్తున్నది**
	3	ఎప్పుడూ లేదు
	2	తరచుగా కాదు
	1	ఒక్కోసారి
	0	ఇంచుమించు ఎల్లప్పుడూ

వేదన	నిరుత్సాహం	**నేను సౌకర్యంగా మరియు విశ్రాంతిగా ఉండగలను**
0		తప్పకుండా
1		మామూలుగా
2		తరచుగా కాదు
3		ఎప్పుడూ లేదు

పనులు చేయడంలో నేను మందగించినట్లు అనిపిస్తుంది	వేదన	నిరుత్సాహం
ఇంచుమించు ఎల్లప్పుడూ		3
చాలా తరచుగా		2
ఒక్కోసారి		1
ఎప్పుడూ లేదు		0

కడుపులో మెలి పెడుతున్నట్లు ఒక రకమైన భయం కలుగుతున్నది	వేదన	నిరుత్సాహం
ఎప్పుడూ లేదు	0	
ఒక్కోసారి	1	
తరచుగా	2	
చాలా తరచుగా	3	

నా వేష భాషలపట్ల నేను ఆసక్తి కోల్పోయాను	వేదన	నిరుత్సాహం
తప్పకుండా		3
నేను తగినంత శ్రద్ధ తీసుకోవడం లేదు		2
నేను కొన్నిసార్లు తగినంత శ్రద్ధ తీసుకోక పోతుండవచ్చు		1
నేను పూర్వం లాగే శ్రద్ధ తీసుకుంటాను		0

నెమ్మది లేకుండా నేను ఒకచోట ఉండలేని భావన నాకు కలుగుతుంది	వేదన	నిరుత్సాహం
ఇంచుమించు ఎల్లప్పుడూ	3	
చాలా తరచుగా	2	
అంత ఎక్కువ కాదు	1	
ఎప్పుడూ లేదు	0	

నేను దేనికోసమైనా ఆనందంతో ఎదురుచూస్తుంటాను	వేదన	నిరుత్సాహం
ఎప్పటిలాగనే		0
ఎప్పటి కంటే కాస్త తక్కువగా		1
ఎప్పటికంటే చాలా తక్కువగా		2
ఇంచుమించు ఎప్పుడూ లేదు		3

నాకు అకస్మాత్తుగా భయం కలిగినట్లు అనిపిస్తుంది	వేదన	నిరుత్సాహం
చాలా తరచుగా	3	
తరచుగా	2	
అప్పుడప్పుడూ	1	
ఎప్పుడూ లేదు	0	

నేను మంచి పుస్తకం చదవడం లేదా రేడియో వినడం లేదా టెలివిజన్ కార్యక్రమాన్ని చూడటాన్ని ఆనందించగలను	వేదన	నిరుత్సాహం
తరచుగా		0
కొన్నిసార్లు		1
అప్పుడప్పుడూ		2
ఇంచుమించు ఎప్పుడూ లేదు		3

ఇప్పుడు మీరు అన్ని ప్రశ్నలకూ జవాబు ఇచ్చారో లేదో చూసుకోండి

	వేదన	నిరుత్సాహం
మొత్తం		

Multidimensional Scale of Perceived Social Support (MSPSS)

Zimet, Dahlem, Zimet, & Farley (1988)

Date:	**Patient's name:**	**Patient ID:**
Hospital:	**Doctor:**	**Surgery date:**

Instructions: We are interested to know how you feel about the following statements. Read each statement carefully. Indicate with a **tick (✓)** how you feel about each statement.

	Very Strongly Disagree (1)	Strongly Disagree (2)	Mildly Disagree (3)	Neutral (4)	Mildly Agree (5)	Strongly Agree (6)	Very Strongly Agree (7)
1. There is a special person who is around when I am in need.							
2. There is a special person with whom I can share my joys and sorrows.							
3. My family really tries to help me.							
4. I get the emotional help and support I need from my family.							
5. I have a special person who is a real source of comfort to me.							
6. My friends really try to help me.							
7. I can count on my friends when things go wrong.							
8. I can talk about my problems with my family.							
9. I have friends with whom I can share my joys and sorrows.							

Please turn over

	Very Strongly Disagree (1)	Strongly Disagree (2)	Mildly Disagree (3)	Neutral (4)	Mildly Agree (5)	Strongly Agree (6)	Very Strongly Agree (7)
10. There is a special person in my life who cares about my feelings.							
11. My family is willing to help me make decisions.							
12. I can talk about my problems with my friends.							

Thank you

ఎమ్.ఎస్.పి.ఎస్.ఎస్.

తేదీ:	**రోగి పేరు:**	**రోగి ఐ.డి.:**
ఆసుపత్రి:	**డాక్టరు:**	**సర్జరీ తేదీ:**

సూచనలు: ఈ క్రింద ఇచ్చిన వాక్యాల గురించి మీరు ఏమనుకుంటున్నారో మేము తెలుసుకోవాలనుకుంటున్నాము. ప్రతి వాక్యాన్ని జాగ్రత్తగా చదవండి, **(✓) గుర్తుతో** ప్రతి వాక్యాన్ని గురించి మీరు ఏమనుకుంటున్నారో తెలియజేయండి.

	చాలా దృఢంగా వ్యతిరేకిస్తాను (1)	దృఢంగా వ్యతిరేకిస్తాను (2)	స్వల్పంగా వ్యతిరేకిస్తాను (3)	తటస్థం (4)	స్వల్పంగా అంగీకరిస్తాను (5)	దృఢంగా అంగీకరిస్తాను (6)	చాలా దృఢంగా అంగీకరిస్తాను (7)
1. నాకు ఏదైనా అవసరమైతే నాకంటూ ఒక ప్రత్యేక వ్యక్తి నాకు అందుబాటులో ఉన్నారు.							
2. నా సంతోషాలను, బాధలను పంచుకోవడానికీ నాకొక ప్రత్యేకమైన వ్యక్తి ఉన్నారు.							
3. నా కుటుంబం నాకు నిజంగా సహాయం చేయడానికే ప్రయత్నిస్తుంది.							

దయచేసి పేజీ తిప్పండి

	చాలా దృఢంగా వ్యతిరేకిస్తాను (1)	దృఢంగా వ్యతిరేకిస్తాను (2)	స్వల్పంగా వ్యతిరేకిస్తాను (3)	తటస్థం (4)	స్వల్పంగా అంగీకరిస్తాను (5)	దృఢంగా అంగీకరిస్తాను (6)	చాలా దృఢంగా అంగీకరిస్తాను (7)
4. నా భావోద్వేగ-పరమైన అవసరాలకు నా కుటుంబము నుంచి సహాయం దొరుకుతుంది.							
5. నన్ను నిజంగా ఆదరించే ఒక ప్రత్యేకమైన వ్యక్తి నాకు ఉన్నారు.							
6. నా స్నేహితులు నాకు నిజంగా సహాయపడే ప్రయత్నం చేస్తారు.							
7. పనులు సక్రమంగా జరగనప్పుడు నేను నా స్నేహితుల మీద ఆధారపడగలను.							
8. నా సమస్యల గురించి నా కుటుంబంతో మాట్లాడగలను.							
9. నా సంతోషాలను బాధలను పంచుకోవడానికి నాకు స్నేహితులు ఉన్నారు.							

దయచేసి పేజీ తిప్పండి

	చాలా దృఢంగా వ్యతిరేకిస్తాను (1)	దృఢంగా వ్యతిరేకిస్తాను (2)	స్వల్పంగా వ్యతిరేకిస్తాను (3)	తటస్థం (4)	స్వల్పంగా అంగీకరిస్తాను (5)	దృఢంగా అంగీకరిస్తాను (6)	చాలా దృఢంగా అంగీకరిస్తాను (7)
10. నా భావాలను పట్టించుకోడానికి నా జీవితంలో నాకొక ప్రత్యేక-మైన వ్యక్తి ఉన్నారు.							
11. నిర్ణయాలు తీసుకోవడంలో నా కుటుంబం నాకు సహాయం చేయడానికి సిద్ధంగా ఉంది.							
12. నా సమస్యల గురించి నా మిత్రులతో నేను మాట్లాడగలను.							

ధన్యవాదాలు

University of Hyderabad
Centre for Health Psychology

Locus of Control checklist for CABG (LOCOCAB)

Date:	**Patient's name:**	**Patient ID:**
Hospital:	**Doctor:**	**Surgery date:**

Instructions: You are going to undergo heart bypass surgery. We would like to know certain aspects related to your health beliefs. We wish to know what according to you determines your health condition and recovery after surgery. Sometimes, one may think that one's own emotional state, motivation and behaviour contribute to one's health condition and speed of recovery. Some others may think that other people such as family members/friends/relatives play a major role. Few others may think that the concerned doctor holds the key to one's health condition and speed of recovery. Yet others may think that their health condition and speed of recovery is dependent upon aspects such as fate/God/luck/chance/destiny. None of these beliefs are judged as good/bad. Through this checklist, we wish to know the way you think about your health condition and speed of recovery after surgery. The items in this checklist relate to your way of thinking about who controls your health condition and speed of recovery.

There are 18 items related to your health condition in this checklist. Each item has 4 response options, indicating the person/source responsible for the health aspect described in that item. Please read each item carefully, and think and decide who/what determines the final outcome of your health condition described therein. Then, **tick (✓) in the appropriate column** against that item.

For example: My taking medicines regularly is in the hands of…

If the above item is the statement, and you feel that your spouse/parents/children is/are responsible for your taking medicines on time daily, you will tick in column two (Others) against that item. On the other hand, if you think that you are responsible for taking medicines on time, you will tick in column one (Myself) against that item.

There is no right or wrong answer in this. Whatever is true in your case is the right answer for you. **Please answer all items.**

Please turn over

	Myself	Others	Doctors	Fate/God/ Luck/Chance/ Destiny
1. Improvement in my health condition is because of…				
2. Getting back to my normal routine activities majorly depends upon…				
3. Majority of factors that have an adverse effect on my health condition are controlled by…				
4. If I am unable to stick to the prescribed diet, the responsibility lies with…				
5. Speeding up my recovery is in the hands of…				
6. If I am unable to get back to my normal routine activities, the responsibility lies with…				
7. If anything suddenly goes wrong with my health condition, it is because of…				
8. My positive feelings related to my health condition are mainly controlled by…				
9. If my health condition worsens, it is because of…				
10. Improvement in my physical health condition is majorly influenced by…				
11. Any minor setback in my health condition is because of…				
12. The major role played in my recovery relates to…				
13. The responsibility of following the prescribed exercise/walking schedule rests on…				
14. In case my recovery is slow, it is because of…				
15. The responsibility of any deterioration in my physical health condition rests on…				
16. If my thoughts and feelings are in a negative direction, it is because of…				
17. Preventing deterioration of my health condition is in the hands of…				
18. Alerting the doctor on noticing any symptoms is the responsibility of…				

Thank you

హైదరాబాద్ విశ్వవిద్యాలయం

సెంటర్ ఫర్ హెల్త్ సైకాలజీ

లోకొక్యాట్

తేదీ:	**రోగి పేరు:**	**రోగి ఐ.డి.:**
ఆసుపత్రి:	**డాక్టరు:**	**సర్జరీ తేదీ:**

సూచనలు: మీకు బైపాస్ సర్జరీ జరగబోతున్నది. మీ ఆరోగ్యపరమైన నమ్మకాలకు సంబంధించిన కొన్ని విషయాలు మేము తెలుసుకోవాలనుకుంటున్నాము. మీ ఆరోగ్య పరిస్థితిని, ఆపరేషన్ తర్వాత మెరుగుదలని ఏది నిర్ణయిస్తుందని మీరనుకుంటున్నారో తెలుసుకోవాలని అనుకుంటున్నాము. మనిషి ఆరోగ్య పరిస్థితికి మానసిక భావోద్వేగాలు, ప్రేరణ వంటివి చాలావరకు దోహదపడతాయని కొందరనుకుంటారు. మరికొందరు స్వంత ఆరోగ్య పరిస్థితికి కుటుంబం/స్నేహితులు/బంధువులు వంటి ఇతరులు ముఖ్య పాత్ర వహిస్తారని అనుకుంటారు. మరికొందరు తమ ఆరోగ్య పరిస్థితి కోలుకోవడం లేక విషమించడానికి తనకు వైద్యం చేస్తున్న వైద్యుడే కారణమని అనుకుంటారు. ఇంకొందరు తమ ఆరోగ్యం మెరుగుదల లేక విషమించడం కర్మ/దేవుడు/అదృష్టం/యాదృచ్ఛికం/విధి వంటి వాటి మీద ఆధారపడి ఉంటాయని అనుకుంటారు. ఇందులో ఏ నమ్మకాన్నీ మంచి/చెడుగా నిర్ణయించలేము. మా పరిశోధనలో భాగంగా ఆపరేషన్ తర్వాత మీ ఆరోగ్య స్థితి, మెరుగుదల వేగం గురించిన మీ ఆలోచనా విధానం తెలుసుకోవాలనుకుంటున్నాము. మేము మీకిచ్చిన ఈ పట్టిలో మీ ఆరోగ్య పరిస్థితికి సంబంధించిన విషయాలపై మీ ఆలోచన తెలుసుకొనే అంశాలున్నాయి.

ఈ పట్టికలో మీ ఆరోగ్య స్థితికి సంబంధించిన 18 అంశాలున్నాయి. ప్రతి అంశానికీ 4 సమాధానాలుంటాయి. ప్రతి సమాధానమూ ఆ అంశానికి వివరించే ఆరోగ్య స్థితికి కారణం సూచిస్తుంది. ప్రతి అంశాన్ని జాగ్రత్తగా చదివి, ఆలోచించి, ఆ అంశంలో వివరింపబడిన ఆరోగ్య స్థితి తాలూకు ఫలితాన్ని ఎవరు/ఏది నిర్ధారిస్తారో/నిర్ధారిస్తుందో నిర్ణయించుకోండి. ఆతర్వాత **సరైన గడిలో (✓) గుర్తు పెట్టండి.**

ఉదా: నేను మందులు క్రమం తప్పకుండా తీసుకోవడం ఎవరి చేతుల్లో ఉందంటే...

పై ఉదాహరణలో వివరణకి మీ ఆలోచన ప్రకారం సరైన సమయంలో మీరు మందులు వేసుకోడానికి మీ భార్య/భర్త/తల్లి/తండ్రి/పిల్లలు బాధ్యులని అనుకుంటే, మీరు రెండవ గడిలో (ఇతరులు) వివరణ పక్కన (✓) గుర్తు పెట్టాలి. అలాగే, మీరు సరైన సమయానికి మందులు వేసుకోవడానికి మీరే బాధ్యులనుకుంటే ఒకటవ గడిలో (నేను) వివరణ పక్కన (✓) గుర్తు పెట్టాలి.

మీ సమాధానంలో తప్పొప్పులు లేవు. మీ విషయంలో ఏది నిజమైతే మీ వరకు అదే సరైన సమాధానం. **దయచేసి అన్ని అంశాలకూ సమాధానం ఇవ్వండి.**

దయచేసి పేజీ తిప్పండి

	నా/ నేను	ఇతరులు	వైద్యులు	కర్మ/దేవుడు/ అదృష్టం/యా-దృచ్ఛికం/విధి
1. నా ఆరోగ్యం మెరుగుపడటానికి కారకులు...				
2. నేను తిరిగి నా దైనందిన కార్యక్రమాలు మామూలుగా చేసుకోగలగాలంటే దానికి బాధ్యులు...				
3. నా ఆరోగ్య పరిస్థితి విషమించడంపై కొన్ని ముఖ్య ప్రభావాలు ఎవరి చేతిలో ఉంటాయంటే...				
4. వైద్యుల నిర్ణయం ప్రకారం నేను ఆహారం తీసుకోకపోవడానికి కారణం...				
5. నేను తొందరగా కోలుకోవాలంటే దానికి బాధ్యులు...				
6. నేను నా దైనందిన కార్యక్రమాలు తిరిగి మొదలుపెట్టలేకపోవడానికి బాధ్యులు...				
7. హఠాత్తుగా నా ఆరోగ్యం వషమించితే దానికి కారకులు...				
8. నా ఆరోగ్య పరిస్థితి గురించి నేను మంచిగా ఆలోచించడం అనేది ఎవరి మీద ఆధారపడి ఉంటుందంటే...				
9. నా ఆరోగ్యం వషమించడానికి కారకులు...				
10. నా ఆరోగ్య పరిస్థితిలో మెరుగుదలకి ముఖ్యంగా ప్రభావితం చేసేది...				
11. నా ఆరోగ్య పరిస్థితిపై చిన్న ఒడిదుడుకులకు కారణం...				
12. నేను కోలుకోవడంలో ముఖ్య పాత్ర వహించినది...				
13. వైద్యుల నిర్దేశం ప్రకారం నేను వ్యాయామం/వాకింగ్ చెయ్యాలంటే దానికి బాధ్యులు...				
14. నేను కోలుకోవడంలో ఆలస్యం జరిగితే దానికి కారకులు...				
15. నా ఆరోగ్య పరిస్థితిలో ఎలాంటి లోటుపాట్లు వచ్చిన దానికి బాధ్యులు...				
16. నా ఆలోచనలు, భావోద్వేగాలు నెగటివ్ దిశలో పోవడానికి కారకులు...				
17. నా ఆరోగ్యం విషమించకుండా ముందు జాగ్రతలు తీసుకొనే బాధ్యత...				
18. నా ఆరోగ్య పరిస్థితిలో ఎలాంటి అపాయ సంకేతాలు కనబడినా వెంటనే వైద్యునికి సంకేతం పంపించే బాధ్యత...				

ధన్యవాదాలు

Appendix A4

University of Hyderabad
Centre for Health Psychology

Adherence Scale for Cardiac Patients (ADSCAP)

Date:	**Patient's name:**	**Patient ID:**
Hospital:	**Doctor:**	**Surgery date:**

Instructions: We are interested to know the extent to which you follow your doctor's advice in managing your heart condition. Please read each question carefully and **tick (✓) the option** best describing your behaviour during the last four weeks.

In the **last four weeks**, how **often** did the following happen?

	Always (1)	**Most of the time** (2)	**Sometimes** (3)	**Never** (4)
1. Did you forget to take your medicine?	☐	☐	☐	☐
2. Did you decide not to take your medicine?	☐	☐	☐	☐
3. Did you eat salty food (such as pickles, chutneys, etc.)?	☐	☐	☐	☐
4. Did you eat oily food (such as papad, chips, etc.)?	☐	☐	☐	☐
5. Did you run out of medicine?	☐	☐	☐	☐
6. Did you miss taking your medicine because you felt better?	☐	☐	☐	☐
7. Did you miss taking your medicine because you felt sick?	☐	☐	☐	☐
8. You just did not bother to take your medicine.	☐	☐	☐	☐
9. Did you fail to do your prescribed exercise/walking?	☐	☐	☐	☐
10. Did you miss your exercise/walking because you felt tired?	☐	☐	☐	☐
11. You just did not bother to do your exercise/walking.	☐	☐	☐	☐

Please turn over

	Always (1)	Most of the time (2)	Sometimes (3)	Never (4)
12. Did you cut short your exercise/walking for different reasons (e.g., you woke up late, you felt tired or someone who takes care of you could not give time, etc.)?	☐	☐	☐	☐
13. Did you avoid consulting your doctor though you noticed some symptom that bothered you (e.g., pain in wound, swelling in ankles, breathlessness, chest pain, headache, etc.)?	☐	☐	☐	☐
14. Did you eat any one of the following high-calorie foods (e.g., bakery products, sweets, butter, potatoes, cheese, etc.)?	☐	☐	☐	☐
15. Did you eat red meat/egg yolk?	☐	☐	☐	☐
16. Did you consume alcohol?	☐	☐	☐	☐
17. Did you smoke/chew tobacco?	☐	☐	☐	☐

When did you visit your doctor for your first review?

a) On the exact date given by the doctor ☐
b) Delayed by 1–6 days ☐
c) Delayed by a week ☐
d) Delayed by more than a week ☐

When did you visit your doctor for your second review?

a) On the exact date given by the doctor ☐
b) Delayed by 1–6 days ☐
c) Delayed by a week ☐
d) Delayed by more than a week ☐

Thank you

హైదరాబాద్ విశ్వవిద్యాలయం

సెంటర్ ఫర్ హెల్త్ సైకాలజీ

ఆడ్సక్యాప్

తేదీ:	**రోగి పేరు:**	**రోగి ఐ.డి.:**
ఆసుపత్రి:	**డాక్టరు:**	**సర్జరీ తేదీ:**

సూచనలు: మీరు మీ గుండె పరిస్థితిని క్రమబద్ధంగా ఉంచుకునేందుకు మీ డాక్టరు సలహాలు ఎంతవరకు పాటిస్తున్నారో తెలుసుకునేందుకు మేము ఆసక్తితో ఉన్నాము. క్రింద ఇవ్వబడిన ప్రతి ప్రశ్ననూ జాగ్రత్తగా చదివి గడిచిన నాలుగు వారాలలో మీ ప్రవర్తనను బాగా వర్ణించే సరైన **సమాధానాన్ని (✓) గుర్తుతో** తెలియజేయండి.

గత నాలుగు వారాలలో ఎంత **తరచుగా** మీ విషయంలో ఈ క్రిందివి జరిగాయి?

	ఎల్లప్పుడు (1)	చాలా ఎక్కువగా (2)	కొన్నిసార్లు (3)	ఎప్పుడు కాదు (4)
1. మీరు మందులు వేసుకోవడం మరిచిపోయారా?	☐	☐	☐	☐
2. మీరు మందులు వేసుకోవద్దు అనే నిర్ణయం తీసుకున్నారా?	☐	☐	☐	☐
3. మీరు ఉప్పు ఎక్కువగా ఉన్న ఆహారం తిన్నారా (ఉదాహరణకి, నిలవ పచ్చళ్ళు, రోటి పచ్చళ్ళు మొదలైనవి)?	☐	☐	☐	☐
4. మీరు నూనె ఎక్కువగా ఉన్న ఆహారం తిన్నారా (ఉదాహరణకి, అప్పడాలు, చిప్స్ మొదలైనవి)?	☐	☐	☐	☐
5. మందులు అయిపోయిన పరిస్థితి ఎదురయిందా?	☐	☐	☐	☐
6. ఆరోగ్యం మెరుగుగా అనిపించడం వలన మందులు తీసుకోకపోవడం జరిగిందా?	☐	☐	☐	☐
7. అనారోగ్యంగా అనిపించడం వలన మందులు తీసుకోకపోవడం జరిగిందా?	☐	☐	☐	☐
8. మందులు తీసుకోవడం నిర్లక్ష్యం చేసారా?	☐	☐	☐	☐
9. మీకు చేయాల్సిన వ్యాయామం /వాకింగ్ చేయడంలో విఫలమయ్యారా?	☐	☐	☐	☐
10. మీరు అలసటగా అనిపించడం వలన మీ వ్యాయామాన్ని/వాకింగ్ ని మానేశారా?	☐	☐	☐	☐

దయచేసి పేజీ తిప్పండి

	ఎల్లప్పుడు (1)	చాలా ఎక్కువగా (2)	కొన్నిసార్లు (3)	ఎప్పుడు కాదు (4)
11. మీరు మీ వ్యాయామాన్ని/వాకింగ్ ని నిర్లక్ష్యం చేసారా?	☐	☐	☐	☐
12. వివిధ కారణాల వలన (ఉదా: మీరు ఆలస్యంగా నిద్రలేవడం, అలసటగా భావించడం, లేదా మీ పట్ల శ్రద్ధ చూపేవారు సమయాన్ని కేటాయించలేక పోవడం మొదలైనవి) వ్యాయామాన్ని/వాకింగ్ ని తగ్గించారా?	☐	☐	☐	☐
13. మిమ్మల్ని ఆందోళనకి గురిచేసే లక్షణం ఏదైనా (ఉదా: గాయంలో నొప్పి, మడిమల వాపు, శ్వాస ఆడకపోవడం, ఛాతిలో నొప్పి, తలనొప్పి మొదలగునవి) గమనించినప్పటికీ మీ డాక్టరును సంప్రదించకుండా ఉన్నారా?	☐	☐	☐	☐
14. ఎక్కువ పిండిపదార్థం కలిగిన ఆహారం (ఉదాహరణకి, బేకరీ పదార్థాలు, తీపి పదార్థాలు, వెన్న, ఆలుగడ్డ, జున్ను మొదలైనవి) తిన్నారా?	☐	☐	☐	☐
15. మీరు మాంసం/గుడ్డులో పచ్చసోన తిన్నారా?	☐	☐	☐	☐
16. మీరు మద్యం తాగారా?	☐	☐	☐	☐
17. మీరు పొగ తాగడంగాని పొగాకు తినడంగాని చేసారా?	☐	☐	☐	☐

మొదటి సమీక్ష కోసం మీ డాక్టరుని మీరు ఎప్పుడు కలిశారు?

a) డాక్టరుచే ఇవ్వబడిన ఖచ్చితమైన రోజున ☐
b) 1–6 రోజులు ఆలస్యంగా ☐
c) ఒక వారం ఆలస్యంగా ☐
d) ఒక వారం కంటే ఎక్కువ ఆలస్యంగా ☐

రెండో సమీక్ష కోసం మీ డాక్టరుని మీరు ఎప్పుడు కలిశారు?

a) డాక్టరుచే ఇవ్వబడిన ఖచ్చితమైన రోజున ☐
b) 1–6 రోజులు ఆలస్యంగా ☐
c) ఒక వారం ఆలస్యంగా ☐
d) ఒక వారం కంటే ఎక్కువ ఆలస్యంగా ☐

ధన్యవాదాలు

University of Hyderabad
Centre for Health Psychology

Biopsychosocial Prognosis Scale for CABG (BIPROSCAB)

Date:	**Patient's name:**	**Patient ID:**
Hospital:	**Doctor:**	**Surgery date:**

Instructions: We are interested to know how you have been doing since bypass surgery. Please read each item carefully and **tick (✓) the option** best describing your experience during the last four weeks.

In the **last four weeks**, how **often** did you experience the following?

	Very often (1)	**4–5 times (2)**	**2–3 times (3)**	**Only once (4)**	**Never (5)**
1. I felt pain in the chest	☐	☐	☐	☐	☐
2. I found some difficulty in walking normally	☐	☐	☐	☐	☐
3. I experienced difficulty in breathing normally	☐	☐	☐	☐	☐
4. My family/friends put restrictions on me because of surgery	☐	☐	☐	☐	☐
5. I noticed swelling in both my feet	☐	☐	☐	☐	☐
6. I found my patience level going down	☐	☐	☐	☐	☐
7. I experienced some uneasiness in my chest	☐	☐	☐	☐	☐
8. It was strenuous to bathe or dress myself	☐	☐	☐	☐	☐
9. I felt that I am a burden on others	☐	☐	☐	☐	☐
10. I felt my heartbeat going fast	☐	☐	☐	☐	☐
11. I had pain in the chest where they had cut for surgery	☐	☐	☐	☐	☐
12. I experienced difficulty in falling asleep	☐	☐	☐	☐	☐
13. I felt numb in the chest where they had cut for surgery	☐	☐	☐	☐	☐

Please turn over

	Very often (1)	4–5 times (2)	2–3 times (3)	Only once (4)	Never (5)
14. I missed my social life	☐	☐	☐	☐	☐
15. I experienced pain in the leg/arm where they had cut for surgery	☐	☐	☐	☐	☐
16. I worried if my heart condition was normal	☐	☐	☐	☐	☐
17. I developed infection in the chest where they had cut for the purpose of surgery	☐	☐	☐	☐	☐
18. I experienced some pain or problem in breathing while talking	☐	☐	☐	☐	☐
19. I had pain in other areas of the body (e.g., hands, back, shoulders, etc.)	☐	☐	☐	☐	☐
20. I felt very sad and low	☐	☐	☐	☐	☐
21. I experienced numbness in the surgical site(s) in the leg/arm	☐	☐	☐	☐	☐
22. I developed infection in the leg/arm where they had cut for surgery	☐	☐	☐	☐	☐
23. I worried about the future	☐	☐	☐	☐	☐
24. I experienced other pains in the leg/arm related to surgery	☐	☐	☐	☐	☐
25. The pains or discomfort worried me	☐	☐	☐	☐	☐

For how many days were you hospitalised during bypass surgery?

In ICU __________

In ward/room __________

Are you physically ready to get back to your normal routine activities?	Yes	No
Are you mentally ready to get back to your normal routine activities?	Yes	No
Did you experience any wound infection during the last four weeks?	Yes	No
Were you hospitalised after surgery during the last four weeks?	Yes	No

Thank you

హైదరాబాద్ విశ్వవిద్యాలయం

సెంటర్ ఫర్ హెల్త్ సైకాలజీ

బైప్రొసక్యాట్

తేదీ:	**రోగి పేరు:**	**రోగి ఐ.డి.:**
ఆసుపత్రి:	**డాక్టరు:**	**సర్జరీ తేదీ:**

సూచనలు: మీకు బైపాస్ సర్జరీ జరిగినప్పటి నుండి మీరు ఏ విధంగా వున్నారో మేము తెలుసుకోవాలనుకుంటున్నాము. దయచేసి ప్రతి వాక్యాన్ని జాగ్రత్తగా చదివి, గత నాలుగు వారాలలో మీ అనుభవాన్ని బాగా వివరించే **సమాధానాన్ని(✓) గుర్తుతో** మార్కు చేయండి.

గడిచిన నాలుగు వారాలలో, ఈ క్రిందివి మీకు ఎంత **తరచుగా** అనుభవమయ్యాయి:

	చాలా తరచుగా (1)	4-5 సార్లు (2)	2-3 సార్లు (3)	ఒకసారి (4)	ఎప్పుడు కాదు (5)
1. ఛాతిలో నొప్పిగా అనిపించింది	☐	☐	☐	☐	☐
2. మామూలుగా నడవడంలో ఇబ్బంది అనిపించింది	☐	☐	☐	☐	☐
3. మామూలుగా ఊపిరి తీసు-కోవడానికి ఇబ్బంది అను-భవించాను	☐	☐	☐	☐	☐
4. ఈ ఆపరేషను వలన నా కుటుంబం/స్నేహితులు నా పై ఆంక్షలు పెట్టారు	☐	☐	☐	☐	☐
5. నా రెండు పాదాల్లో వాపు గమనించాను	☐	☐	☐	☐	☐
6. నాలో ఓర్పు తగ్గినట్టు అని-పించింది	☐	☐	☐	☐	☐
7. నా ఛాతిలో ఏదో ఇబ్బంది అనిపించింది	☐	☐	☐	☐	☐
8. స్నానం చేయడం, బట్టలు వేసుకోవడం శ్రమగా అని-పించాయి	☐	☐	☐	☐	☐

దయచేసి పేజీ తిప్పండి

	చాలా తరచుగా (1)	4-5 సార్లు (2)	2-3 సార్లు (3)	ఒకసారి (4)	ఎప్పుడు కాదు (5)
9. ఇతరులపై నేను భారంగా ఉన్నట్టు అనిపించింది	☐	☐	☐	☐	☐
10. నా గుండె వేగంగా కొట్టు-కున్నట్లు అనిపించింది	☐	☐	☐	☐	☐
11. ఆపరేషను చేసిన చోట ఛాతిపై నొప్పి కలిగింది	☐	☐	☐	☐	☐
12. నిద్ర పోవడానికి ఇబ్బంది కలిగింది	☐	☐	☐	☐	☐
13. ఛాతిపై ఆపరేషను చేసిన చోట మొద్దుబారినట్లు అనిపించింది	☐	☐	☐	☐	☐
14. సామాన్యంగా బంధుమిత్రులతో గడిపే సమయం, విధానం లేకపోవడం వెలితిగా ఉంది	☐	☐	☐	☐	☐
15. ఆపరేషను చేసిన చోట కాలు/చెయ్యి భాగంలో నొప్పి అనిపించింది	☐	☐	☐	☐	☐
16. నా గుండె పరిస్థితి సరిగ్గా ఉందా లేదా అని ఆందోళన చెందాను	☐	☐	☐	☐	☐
17. ఆపరేషను చేసిన ఛాతి భాగంలో చీము వచ్చింది	☐	☐	☐	☐	☐
18. మాట్లాడేటప్పుడు, ఊపిరి తీసు-కోనేటప్పుడు నొప్పి/ఇబ్బంది అనిపించింది	☐	☐	☐	☐	☐
19. శరీరంలో మిగతా భాగాల్లో (ఉదా: చేతులు, వీపు, భుజాలు మొదలైనవి) నొప్పి కలిగింది	☐	☐	☐	☐	☐
20. నాకు చాలా బాధగా, నిరాశగా అనిపించింది	☐	☐	☐	☐	☐
21. కాలు/చెయ్యి భాగాల్లో ఆపరే-షను చేసిన చోట్లలో మొద్దు-బారినట్లు అనిపించింది	☐	☐	☐	☐	☐

దయచేసి పేజీ తిప్పండి

	చాలా తరచుగా (1)	4-5 సార్లు (2)	2-3 సార్లు (3)	ఒకసారి (4)	ఎప్పుడు కాదు (5)
22. కాలు/చెయ్యి భాగాల్లో ఆపరేషను చేసిన చోట చీము వచ్చింది	☐	☐	☐	☐	☐
23. భవిష్యత్తుని గురించి దిగులుపడ్డాను	☐	☐	☐	☐	☐
24. ఆపరేషనుకి సంబంధించిన కాలు/చెయ్యి భాగాల్లో ఆపరేషనుతో సంబంధంలేని నొప్పి కలిగింది	☐	☐	☐	☐	☐
25. నా నొప్పులు, ఇబ్బంది నన్ను కలవరపెట్టాయి	☐	☐	☐	☐	☐

మీ బైపాస్ సర్జరీ సమయంలో మీరు ఎన్ని రోజులు ఆసుపత్రిలో ఉన్నారు?

ఐ.సి.యు. లో ____________________ వార్డు/గది లో ____________________

మీరు సాధారణంగా చేసే రోజువారీ పనులు చేసుకోడానికి మీ శారీరక పరిస్థితి అనుకూలంగా ఉందా?

అవును **కాదు**

మీరు సాధారణంగా చేసే రోజువారీ పనులు చేసుకోడానికి మీ మానసిక పరిస్థితి అనుకూలంగా ఉందా?

అవును **కాదు**

మీకు గత నాలుగు వారాల్లో గాయం చీము పట్టిందా?

అవును **కాదు**

ఆపరేషను తరువాత మీరు గత నాలుగు వారాల్లో ఆసుపత్రిలో మళ్ళీ చేరారా?

అవును **కాదు**

ధన్యవాదాలు

Appendix A6

University of Hyderabad
Centre for Health Psychology

Patient Personal Details Form

Name:

Age: **Gender:**

Educational qualification: **Occupation:**

Telephone number: **City/District:**

Hospital: **Doctor:**

Patient ID: **Date of admission:**

Diagnosis: **Time since diagnosis:**

Hospital package: **Mode of payment:**

When was the date of your bypass surgery decided?

Within a week before surgery ☐
1–2 weeks before surgery ☐
3–4 weeks before surgery ☐
More than a month before surgery ☐

Do you have a provision to play a CD or a DVD at home? Yes No

If yes, please specify:

CD player ☐
DVD player ☐
Laptop ☐
Desktop computer ☐

Thank you

హైదరాబాద్ విశ్వవిద్యాలయం

సెంటర్ ఫర్ హెల్త్ సైకాలజీ

రోగి వ్యక్తిగత వివరాల పట్టిక

పేరు:

వయస్సు: **లింగము:**

విద్యార్హత: **ఉద్యోగము:**

టెలిఫోన్ నెంబర్: **నగరం/జిల్లా:**

ఆసుపత్రి: **డాక్టరు:**

రోగి ఐ.డి.: **ఆసుపత్రిలో చేరిన తేది:**

రోగ నిర్ధారణ: **రోగ నిర్ధారణ నుండి వ్యవధి:**

ఆసుపత్రి ప్యాకేజ్: **చెల్లింపు విధానం:**

మీ బైపాస్ సర్జరీ తేదీ ఎప్పుడు నిర్ణయించారు?

సర్జరీకి ముందు ఒక వారం ముందుగా ☐

సర్జరీకి 1–2 వారాలకు ముందుగా ☐

సర్జరీకి 3–4 వారాలకు ముందుగా ☐

సర్జరీకి ఒక నెల కంటే ముందుగా ☐

మీ ఇంటిలో సి.డి. (CD) లేదా డి.వి.డి. (DVD) ఉపయోగించే వసతి ఉందా? ఉంది లేదు

ఉంటే, దయచేసి ఈ క్రింది వాటిలో ఏది ఉందో పేర్కొనండి:

సి.డి. ప్లేయర్ ☐

డి.వి.డి. ప్లేయర్ ☐

ల్యాప్టాప్ ☐

డెస్కటాప్ కంప్యూటర్ ☐

ధన్యవాదాలు

Multidimensional Health Locus of Control–Form C (MHLC–FORM C)

Wallston, Stein, & Smith (1994)

Date:	**Patient's name:**	**Patient ID:**
Hospital:	**Doctor:**	**Surgery date:**

Instructions: Each item below is a belief statement about your medical condition with which you may agree or disagree. Beside each statement is a rating which ranges from strongly disagree (1) to strongly agree (6). For each given item we would like you to **tick (✓) the option** that represents the extent to which you agree or disagree with that statement. Please make sure that you answer **EVERY ITEM** and that you tick **ONLY ONE** option per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

	Strongly Disagree (1)	**Moderately Disagree (2)**	**Slightly Disagree (3)**	**Slightly Agree (4)**	**Moderately Agree (5)**	**Strongly Agree (6)**
1. If my condition worsens, it is my own behavior which determines how soon I will feel better again.						
2. As to my condition, what will be will be.						
3. If I see my doctor regularly, I am less likely to have problems with my condition.						
4. Most things that affect my condition happen to me by chance.						
5. Whenever my condition worsens, I should consult a medically trained professional.						
6. I am directly responsible for my condition getting better or worse.						
7. Other people play a big role in whether my condition improves, stays the same, or gets worse.						
8. Whatever goes wrong with my condition is my own fault.						

Please turn over

	Strongly Disagree (1)	Moderately Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Moderately Agree (5)	Strongly Agree (6)
9. Luck plays a big part in determining how my condition improves.						
10. In order for my condition to improve, it is up to other people to see that the right things happen.						
11. Whatever improvement occurs with my condition is largely a matter of good fortune.						
12. The main thing which affects my condition is what I myself do.						
13. I deserve the credit when my condition improves and the blame when it gets worse.						
14. Following doctor's orders to the letter is the best way to keep my condition from getting any worse.						
15. If my condition worsens, it's a matter of fate.						
16. If I am lucky, my condition will get better.						
17. If my condition takes a turn for the worse, it is because I have not been taking proper care of myself.						
18. The type of help I receive from other people determines how soon my condition improves.						

Thank you

ఎమ్.ఎచ్.ఎల్.సి.–ఫార్మ్ సి

తేదీ:	**రోగి పేరు:**	**రోగి ఐ.డి.:**
ఆసుపత్రి:	**డాక్టరు:**	**సర్జరీ తేదీ:**

సూచనలు: క్రింద ఇవ్వబడిన ప్రతి వాక్యమూ మీ ఆరోగ్య పరిస్థితిని గురించి మీకున్న నమ్మకాలకి సంబంధించినది. వాటితో మీరు అంగీకరించవచ్చు లేదా వ్యతిరేకించవచ్చు. ప్రతి వాక్యం పక్కన ఖచ్చితంగా అంగీకరించను (1) నుండి ఖచ్చితంగా అంగీకరిస్తాను (6) వరకూ సూచించే కొలమానం ఇవ్వబడింది. ప్రతి వాక్యం పక్కన దాని పట్ల మీ అంగీకారాన్ని లేదా అనంగీకారాన్ని సరిగ్గా సూచించే **సమాధానాన్ని (✓) గుర్తు** ద్వారా తెలుపమని కోరుతున్నాము. దయచేసి **ప్రతి వాక్యానికీ** సమాధానం ఇవ్వండి. అలాగే ఒక్కొక్క వాక్యానికి **ఒక్క సమాధానాని మాత్రమే** గుర్తించండి. ఈ ప్రశ్నావళి కేవలం మీ వ్యక్తిగత నమ్మకాలకు మాత్రమే కొలత; మీ సమాధానాలలో తప్పొప్పులుండవు.

	ఖచ్చితంగా అంగీకరించను (1)	మధ్యమంగా అంగీకరించను (2)	కొద్దిగా అంగీకరించను (3)	కొద్దిగా అంగీకరిస్తాను (4)	మధ్యమంగా అంగీకరిస్తాను (5)	ఖచ్చితంగా అంగీకరిస్తాను (6)
1. నా పరిస్థితి దిగజారితే మళ్ళీ ఎంత తొందరగా కోలుకుంటానన్నది నా సొంత ప్రవర్తనే నిర్ణయిస్తుంది.						
2. నా పరిస్థితి విషయంలో ఏమి జరగాలో అదే జరుగుతుంది.						
3. నేను నా డాక్టరును క్రమం తప్పకుండా సంప్రదిస్తే నా పరిస్థితిలో సమస్యలు తక్కువగా ఉంటాయి.						

దయచేసి పేజీ తిప్పండి

	ఖచ్చితంగా అంగీకరించను (1)	మధ్యమంగా అంగీకరించను (2)	కొద్దిగా అంగీకరించను (3)	కొద్దిగా అంగీకరిస్తాను (4)	మధ్యమంగా అంగీకరిస్తాను (5)	ఖచ్చితంగా అంగీకరిస్తాను (6)
4. నా పరిస్థితిని ప్రభావితం చేసే విషయాలు చాలా వరకు విధివిధానం వల్ల జరుగుతాయి.						
5. నా పరిస్థితి ఎప్పు-డైనా దిగజారితే, నేను వైద్యనిపు-ణుడిని సంప్రదిం-చాలి.						
6. నా పరిస్థితి మెరుగు చెంద-డానికి/దిగజారడా-నికి ప్రత్యక్షంగా నేనే బాధ్యుడను/బా-ధ్యురాలిని.						
7. నా పరిస్థితి మెరుగు చెందడం, స్థిమితంగా ఉం-డటం లేదా దిగ-జారడంలో ఇత-రులు పెద్ద పాత్ర వహిస్తారు.						
8. నా పరిస్థితిలో ఏమైనా దిగజార-డం ఉంటే అది నా తప్పు వల్లనే.						
9. నా పరిస్థితి ఎలా మెరుగుపడుతుందో నిర్ణయించడంలో అదృష్టానిది పెద్ద పాత్ర.						

దయచేసి పేజీ తిప్పండి

	ఖచ్చితంగా అంగీకరించను (1)	మధ్యమంగా అంగీకరించను (2)	కొద్దిగా అంగీకరించను (3)	కొద్దిగా అంగీకరిస్తాను (4)	మధ్యమంగా అంగీకరిస్తాను (5)	ఖచ్చితంగా అంగీకరిస్తాను (6)
10. నా పరిస్థితి మెరుగుపడాలంటే అన్ని సరిగ్గా జరిగేట్లు చూసుకోవలసింది ఇతరులే.						
11. నా పరిస్థితిలో ఏమాత్రం మెరుగు కనబడినా అది ప్రధానంగా అదృష్టం వల్లనే.						
12. నేను చేసే పనులు నా పరిస్థితిపై ముఖ్యమైన ప్రభావం చుపుతాయి.						
13. నా పరిస్థితిలో మెరుగుకి ప్రశంసాపాత్రుడు/ప్రశంసాపాత్రురాలిని, దిగజారుడుకి నిందనీయుడు/నిందనీయురాలిని నేనే.						
14. డాక్టరు ఆదేశాలను తూచ తప్పకుండా పాటించడం నా పరిస్థితి దిగజారకుండా ఉండేందుకు ఉత్తమ మార్గం.						
15. నా పరిస్థితి దిగజారితే అది నా విధిరాత.						

దయచేసి పేజీ తిప్పండి

	ఖచ్చితంగా అంగీకరించను (1)	మధ్యమంగా అంగీకరించను (2)	కొద్దిగా అంగీకరించను (3)	కొద్దిగా అంగీకరిస్తాను (4)	మధ్యమంగా అంగీకరిస్తాను (5)	ఖచ్చితంగా అంగీకరిస్తాను (6)
16. నేను అదృష్టవంతుడిని/అదృష్టవంతురాలిని అయితే నా పరిస్థితి బాగవుతుంది.						
17. నా పరిస్థితి దిగజారినట్లైతే, దానికి కారణం నేను సరియైన జాగ్రత్త తీసుకోకపోవడమే.						
18. ఇతరుల వద్ద నుండి నేను పొందే సహాయన్నా బట్టి ఎంత తొందరగా నా పరిస్థితి బాగుపడుతుందో నిర్ణయింపబడుతుంది.						

ధన్యవాదాలు

University of Hyderabad
Centre for Health Psychology

20-item Adherence Scale for Cardiac Patients (ADSCAP–20)

Date:	**Patient's name:**	**Patient ID:**
Hospital:	**Doctor:**	**Surgery date:**

Instructions: We are interested to know the extent to which you follow your doctor's advice in managing your heart condition. Please read each question carefully and **tick (✓) the option** best describing your behaviour during the last four weeks.

In the **last four weeks**, how **often** did the following happen?

	Always (1)	**Most of the time (2)**	**Sometimes (3)**	**Never (4)**
1. Did you forget to take your medicine?	☐	☐	☐	☐
2. Did you decide not to take your medicine?	☐	☐	☐	☐
3. Did you eat salty food (such as pickles, chutneys, etc.)?	☐	☐	☐	☐
4. Did you eat oily food (such as papad, chips, etc.)?	☐	☐	☐	☐
5. Did you avoid your meal because you did not feel like eating?	☐	☐	☐	☐
6. Did you eat more than what was prescribed?	☐	☐	☐	☐
7. Did you eat less than what was prescribed?	☐	☐	☐	☐
8. Did you run out of medicine?	☐	☐	☐	☐
9. Did you miss taking your medicine because you felt better?	☐	☐	☐	☐
10. Did you miss taking your medicine because you felt sick?	☐	☐	☐	☐
11. You just did not bother to take your medicine.	☐	☐	☐	☐
12. Did you fail to do your prescribed exercise/walking?	☐	☐	☐	☐

Please turn over

	Always (1)	Most of the time (2)	Sometimes (3)	Never (4)
13. Did you miss your exercise/walking because you felt tired?	☐	☐	☐	☐
14. You just did not bother to do your exercise/walking.	☐	☐	☐	☐
15. Did you cut short your exercise/walking for different reasons (e.g., you woke up late, you felt tired or someone who takes care of you could not give time, etc.)?	☐	☐	☐	☐
16. Did you avoid consulting your doctor though you noticed some symptom that bothered you (e.g., pain in wound, swelling in ankles, breathlessness, chest pain, headache, etc.)?	☐	☐	☐	☐
17. Did you eat any one of the following high-calorie foods (such as bakery products, sweets, butter, potatoes, cheese, etc.)?	☐	☐	☐	☐
18. Did you eat red meat/egg yolk?	☐	☐	☐	☐
19. Did you consume alcohol?	☐	☐	☐	☐
20. Did you smoke/chew tobacco?	☐	☐	☐	☐

Thank you

హైదరాబాద్ విశ్వవిద్యాలయం

సెంటర్ ఫర్ హెల్త్ సైకాలజీ

ఆడ్స్‌క్యాప్–20

తేదీ:	**రోగి పేరు:**	**రోగి ఐ.డి.:**
ఆసుపత్రి:	**డాక్టరు:**	**సర్జరీ తేదీ:**

సూచనలు: మీరు మీ గుండె పరిస్థితిని క్రమబద్ధంగా ఉంచుకునేందుకు మీ డాక్టరు సలహాలు ఎంతవరకు పాటిస్తున్నారో తెలుసుకునేందుకు మేము ఆసక్తితో ఉన్నాము. క్రింద ఇవ్వబడిన ప్రతి ప్రశ్ననూ జాగ్రత్తగా చదివి గడిచిన నాలుగు వారాలలో మీ ప్రవర్తనను బాగా వర్ణించే సరైన **సమాధానాన్ని (✓) గుర్తుతో** తెలియజేయండి.

గత నాలుగు వారాలలో ఎంత **తరచుగా** మీ విషయంలో ఈ క్రిందివి జరిగాయి?

	ఎల్లప్పుడు (1)	**చాలా ఎక్కువగా** (2)	**కొన్నిసార్లు** (3)	**ఎప్పుడు కాదు** (4)
1. మీరు మందులు వేసుకోవడం మరిచిపోయారా?	☐	☐	☐	☐
2. మీరు మందులు వేసుకోవద్దు అనే నిర్ణయం తీసుకున్నారా?	☐	☐	☐	☐
3. మీరు ఉప్పు ఎక్కువగా ఉన్న ఆహారం తిన్నారా (ఉదాహరణకి, నిలవ పచ్చళ్ళు, రోటి పచ్చళ్ళు మొదలైనవి)?	☐	☐	☐	☐
4. మీరు నూనె ఎక్కువగా ఉన్న ఆహారం తిన్నారా (ఉదాహరణకి, అప్పడాలు, చిప్స్ మొదలైనవి)?	☐	☐	☐	☐
5. తినాలని అనిపించక పోవడం వలన భోజనం చేయడం మానేశారా?	☐	☐	☐	☐
6. మీకు నిర్దేశించిన దానికంటే ఎక్కువ పరిమాణంలో ఆహారం తిన్నారా?	☐	☐	☐	☐
7. మీకు నిర్దేశించిన దానికంటే తక్కువ పరిమాణంలో ఆహారం తిన్నారా?	☐	☐	☐	☐
8. మందులు అయిపోయిన పరిస్థితి ఎదురయిందా?	☐	☐	☐	☐
9. ఆరోగ్యం మెరుగుగా అనిపించడం వలన మందులు తీసుకోకపోవడం జరిగిందా?	☐	☐	☐	☐
10. అనారోగ్యంగా అనిపించడం వలన మందులు తీసుకోకపోవడం జరిగిందా?	☐	☐	☐	☐

దయచేసి పేజీ తిప్పండి

	ఎల్లప్పుడు (1)	చాలా ఎక్కువగా (2)	కొన్నిసార్లు (3)	ఎప్పుడు కాదు (4)
11. మందులు తీసుకోవడం నిర్లక్ష్యం చేసారా?	☐	☐	☐	☐
12. మీకు చేయాల్సిన వ్యాయామం/వాకింగ్ చేయడంలో విఫలమయ్యారా?	☐	☐	☐	☐
13. మీరు అలసటగా అనిపించడం వలన మీ వ్యాయామాన్ని/వాకింగ్ ని మానేశారా?	☐	☐	☐	☐
14. మీరు మీ వ్యాయామాన్ని/వాకింగ్ ని నిర్లక్ష్యం చేసారా?	☐	☐	☐	☐
15. వివిధ కారణాల వలన (ఉదా: మీరు ఆలస్యంగా నిద్రలేవడం, అలసటగా భావించడం, లేదా మీ పట్ల శ్రద్ధ చూపేవారు సమయాన్ని కేటాయించలేక పోవడం మొదలైనవి) వ్యాయామాన్ని/వాకింగ్ ని తగ్గించారా?	☐	☐	☐	☐
16. మిమ్మల్ని ఆందోళనకి గురిచేసే లక్షణం ఏదైనా (ఉదా: గాయంలో నొప్పి, మడిమల వాపు, శ్వాస ఆడకపోవడం, ఛాతిలో నొప్పి, తలనొప్పి మొదలగునవి) గమనించినప్పటికీ మీ డాక్టరును సంప్రదించకుండా ఉన్నారా?	☐	☐	☐	☐
17. ఎక్కువ పిండిపదార్థం కలిగిన ఆహారం (ఉదాహరణకి, బేకరీ పదార్థాలు, తీపి పదార్థాలు, వెన్న, ఆలుగడ్డ, జున్ను మొదలైనవి) తిన్నారా?	☐	☐	☐	☐
18. మీరు మాంసం/గుడ్డులో పచ్చసోన తిన్నారా?	☐	☐	☐	☐
19. మీరు మద్యం తాగారా?	☐	☐	☐	☐
20. మీరు పొగ తాగడంగాని పొగాకు తినడంగాని చేసారా?	☐	☐	☐	☐

ధన్యవాదాలు

University of Hyderabad
Centre for Health Psychology

Doctor's Rating Scale of CABG Prognosis (DORSCAP)

Date:	**Hospital:**	**Doctor:**
Patient's name:	**Patient ID:**	**Surgery date:**

Instructions: This rating scale aims to identify your evaluation of this patient's prognosis, 5–6 weeks after CABG. Please **tick (✓) the option** that, you think, best describes the patient's status.

How do you rate the following parameters for this patient?

	Very Good (4)	**Good (3)**	**Bad (2)**	**Very Bad (1)**
1. Recovery from surgery	☐	☐	☐	☐
2. Resumption of daily activities	☐	☐	☐	☐
3. Clinical symptoms	☐	☐	☐	☐
4. Mood state	☐	☐	☐	☐
5. Overall prognosis	☐	☐	☐	☐

Please use this space for any remarks.

____

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____

____

Thank you

Semi-structured Interview Schedule

The following questions were posed to the participants during individual interviews. They were encouraged to describe their experiences and reflections in as much detail as they could.

1. What factors affected your adjustment and recovery during the period of surgery in the hospital?

   మీరు ఆసుపత్రిలో ఉన్నప్పుడు మీరు కోలుకోవడానికి సర్దుబాటుని ఏ కారకాలు దోహదపడ్డాయి?

2. What factors influenced your adjustment and recovery at home?

   ఇంట్లో మీరు కోలుకోవడంలో, సర్దుబాటులో ఏ కారకాలు ప్రభావం చూపాయి?

3. What did you think about the video programme/relaxation sessions that you were offered?

   మీకు ఇవ్వబడిన వీడియో కార్యక్రమం/రిలాక్సేషన్ సెషన్లు గురించి మీరేమనుకుంటున్నారు?

4. How has the overall experience of being a part of this research study been?

   ఈ పరిశోధనలో ఒక భాగంగా మొత్తంమీద మీ అనుభవం ఎలా ఉంది?

5. Do you have any suggestions for us?

   మాకేపైనా సూచనలిస్తారా?

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The adherence scale for cardiac patients: Development and initial testing

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The objective was to construct a self-report Adherence Scale for Cardiac Patients (ADSCAP), which measured the level of adherence to multiple aspects of self-care in heart disease. Through five phases, involving 450 patients and 100 caregivers altogether, the development and initial testing of the psychometric properties of ADSCAP were carried out. Based on the findings of exploratory factor analyses using principal component analyses with varimax rotation, ADSCAP was finalised to have 17 items with a 5-factor structure Adherence to exercise, Avoidance of health risk behaviours, Adherence to medication, Adherence to diet, and Planned adherence and emergency care. The reliability and validity analyses revealed satisfactory results. The limitations and recommendations, seeking testing of model-fit in future research, are presented.

Keywords: adherence, cardiac patients, exploratory factor analysis, self-care, self-report scale

We are in an age wherein the success of healthcare rests upon patient accountability (Kemper, 2010). The likes of chronic disease have shifted the site of treatment/management from the clinic to the home where the individual is expected to practise self-care by following the medication, diet and exercise regimen agreed upon by the doctor and the individual (Sabaté, 2003). In other words, adherence or the extent to which patients practice their doctors' advice is the focal point of contemporary medicine. Surprising however, is that although our hospitals boast of state-of-the-art diagnostics, little is said and done about measuring and focussing on adherence behaviour.

Heart conditions ranging from rheumatic heart disease to coronary artery disease have triggered an epidemic of morbidity and mortality in India (Bhandari, Subramanyam, & Trehan, 2007; Sharma, Bhairappa, Prasad, & Manjunath, 2014). Naturally so, the rates of cardiac medication regimen as well as related invasive treatment procedures have risen sharply in the country (Kasliwal, Kulshreshtha, Agrawal, Bansal, & Trehan, 2006). Self-management is the forerunner to good prognosis in chronic heart diseases. The reason is that medical professionals cannot terminate the disease per se, but can help the patient in halting its progression and preventing its consequences through a long-term care plan (Hamine, Gerth-Guyette, Faulx, Green, & Ginsburg, 2015). In case of coronary heart disease, for instance, where blockages in the arteries prevent adequate blood supply to the heart, treatment procedures such as angioplasty and coronary artery bypass grafting (CABG) aid in clearing up the existing blockages or creating alternate circulation routes (NHS Choices, 2014). Atherosclerosis, which is the process of the formation of blocks in the arteries, is however, not reversed or arrested by these procedures (Hoffmeister, Grüntzig, & Wenger, 1986). The only means to healthy living is for the patient to consume the prescribed drugs that reduce the potential for formation of blockages, and to concurrently modify one's lifestyle in the form of diet and exercise (Platt, Green, Jayasinghe, & Morrissey, 2014).

Achieving adherence has been noted to be a greater challenge in the developing world in light of factors such as socio-economic burdens and myths about non-communicable diseases (e.g., heart disease being 'cured' by surgery rather than being made 'manageable') (Sabaté, 2003). Another major influence on adherence behaviour is mental health. Symptoms of anxiety and depression (i.e., psychological distress) are known to hinder cardiac patients from adequately following their medication regimen along with secondary prevention strategies such as exercising, diet control, and symptom monitoring (Bauer, Caro, Beach, Mastromauro, Lenihan, Januzzi, & Huffman, 2012; Luyster, Hughes, & Gunstad, 2009). One research group reported that half of the patients who had enrolled for a cardiac rehabilitation programme dropped out during the study. The drop-outs had significantly higher psychological distress scores besides low quality of life, relative to those who finished the programme (McGrady, McGinnis, Badenhop, Bentle, & Rajput, 2009). Adherence, thus, is not a mere product of doctor's prescription, but a dynamic process dependent upon the patient's background and circumstances (Chakrabarti, 2014). Gathering first-hand information from the patient regarding her or his adherence is an invaluable means to understanding this process.

From the perspective of healthcare providers, the success of their interventional efforts to contain chronic cardiac diseases lies in monitoring the trends of adherence among patients. It would, thus, be meaningful to have a handy tool that quantifies adherence in the cardiac patient population. Other countries have employed an array of methods like diaries, self-report questionnaires, pill count, and electronic monitoring (Nemes, Helena, Caraciolo, & Basso, 2009; Vitolins, Rand, Rapp, Ribisl, & Sevick, 2000). Self-report instruments have been widely employed by researchers plausibly because of its economical value and first-hand nature of information. To our knowledge, available scales and findings (e.g., Khanderia, Townsend, Erickson, Vlasnik, Prager, & Eagle, 2008; Pakpour, Gellert, Asefzadeh, Updegraff, Molloy, & Sniehotta, 2014) relate merely to medication compliance with little or no emphasis on lifestyle aspects (i.e., diet, physical activity and health behaviours). Some studies have looked at the latter (e.g., Pomeshkina, Borovik, & Barbarash, 2013; Vanchenauer, Grün-enfelder, Plass, Slankamenak, Pantic, Kisner, & Genoni, 2008),

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yet not in conjunction with the former. It would be worthwhile to adopt a holistic evaluation of adherence. However, the accuracy of data from self-reports has been challenged, since patients may be affected by the pressure of social desirability, for example (Holtgraves, 2004; van de Mortel, 2008). Yet, it may also be argued that the patient knows best about her or his behaviour, and can inform us from her or his experience. We, nonetheless, propose that the caregiver's report of the patient's level of adherence can be a useful testimony when taken in addition to the patient's self-report. A holistic adherence scale assumes significance not only as a measurement tool but also as an educational tool. When the tool is routinely administered on the patient during every review visit, it inadvertently communicates to the patient the significance attached to lifestyle for effective management and control of cardiac problems.

Here, we report the development and preliminary psychometric evaluation of a self-report instrument Adherence Scale for Cardiac Patients (ADSCAP) which examined patients' efforts in managing their cardiac health, primarily with reference to their adherence behaviour. The study unfolded in five phases, Item construction, Content validation, Identification of latent factors and reliability, Assessment of criterion validity, and Establishment of efficacy of ADSCAP.

Item construction: We used four primary and secondary sources of information while creating the item pool for ADSCAP. At the outset, we reviewed relevant scientific literature on aspects of adherence in cardiac patients. We then referred to existing tools such as the Hypertension Compliance Scale (HYCOMPS) that was reported in a study by Swain, Hariharan, Rana, Chivukula, and Thomas (2015). Further, through case studies of 10 cardiac patients, information was collected about the nature and dimensions of adherence. Discussions were also held with medical professionals in the departments of cardiology and cardio-thoracic surgery about the different domains and criteria for favourable adherence. With data from these sources, we were able to write 32 items for the new scale.

Content validation: A panel of five experts (three medical doctors and two Health Psychologists) were given the 32-item form so that they marked whether each item was 'Relevant', or 'Not relevant'. To retain the items, we chose the criterion of absolute agreement among the experts. Through this process, a scale containing 20 items evolved, which was given the name, Adherence Scale for Cardiac Patients (ADSCAP).

Description of ADSCAP: The newly developed self-report instrument consisted of 20 items that were measured on a 4-point scale (1 = Always, 4 = Never). The items were in the form of questions about behaviours of non-adherence specific for cardiac patients (e.g., Did you fail to do your prescribed exercise/walking?). The instructions required the respondent to indicate the frequency of these behaviours in her or his case during the previous four weeks (recall method). By means of translation and back-translation, a local language version of the scale was developed.

ADSCAP: Identification of Latent Factors and Reliability: In order to extract factors and examine reliability coefficients of ADSCAP, we undertook a study with cardiac patients so as to apply exploratory factor analyses and internal consistency to the obtained data.

Method

Participants

A two-stage sampling method was used here such that hospitals and patients formed the respective units in sampling. Written permission was sought from five private hospitals in _ (blinded for review). Then, we approached patients for participation when they visited cardiologists or cardiothoracic surgeons in these hospitals for review consultation. The inclusion criterion indicated that patients should have been undergoing treatment for cardiac conditions since at least four weeks before recruitment. We recruited 200 cardiac out-patients with a mean age of 54.6 years (SD = 8.4). Among them, 80.5% were men and 19.5% were women. They were non-literate (12.5%), or had completed primary school (21%), middle school (12%), secondary school (18.5%), senior secondary school (10.5%) or college (25.5%). The sample comprised of employed persons (34.5%), retired persons (18.5%), business men (18%), housewives (14.5%), farmers (10.5%), and unemployed persons (4%). The participants were visiting the hospital for a follow-up for CABG (63%), angioplasty (21%), medical management (9.5%), and other types of cardiac surgery (6.5%).

Procedure

This study was approved by the Institutional Ethics Committee at the university where the authors work. ADSCAP was administered on eligible patients who were willing to respond to the scale. In context of non-literate participants, items in the scale were read out one after the other and filled in either by the investigator or the attendant of the patient. The assessment took 15 to 20 minutes.

Results

Exploratory Factor Analyses. In order to identify factors, exploratory factor analysis (EFA) was taken up by applying the principal component analysis extraction method with varimax rotation. The assumptions for executing EFA were met by the data. Specifically, we found that Bartlett's Test of Sphericity was significant ($p < .001$), and Kaiser-Meyer-Olkin measure of sampling adequacy (.71) was satisfactory. By examining the covariance values however, it was noted that item 7 (Did you eat less than what was prescribed?) had a value below .50. Hence, the item was deleted. We re-ran EFA through the principal component analysis extraction method with varimax rotation using 19 items. Bartlett's Test of Sphericity was observed to be significant ($p < .001$), and Kaiser-Meyer-Olkin measure of sampling adequacy (.71) was also achieved. In respect of covariance, the value of item 5 (Did you avoid your meal because you did not feel like eating?) was seen to be less than .50. Accordingly, the item was deleted. EFA, using the principal component analysis extraction method with varimax rotation, was run again with 18 items. With a significant Bartlett's Test of Sphericity ($p < .001$) and Kaiser-Meyer-Olkin measure of sampling adequacy (.72), the assumptions of EFA were satisfied. Further, the 18 items had covariance values above .50. The communalities are given in Table 1. Item 6 (Did you eat more than what was prescribed?) had a communality value below .30. The item was, thus, deleted. In the fourth round of EFA with 17 items, applying the principal component analysis extraction method with varimax rotation, it was found that Bartlett's Test of Sphericity was significant ($p < .001$), and Kaiser-Meyer-Olkin measure of sampling adequacy (.72) was acceptable. Covariance values of the 17 items were found to be greater than .50. In Table 2, communalities along with factor loadings are presented. All communality values were above .30.

Table 1: Communalities for the 18-item ADSCAP

Item no.	Initial	Extraction
1.	1.00	.51
2.	1.00	.73
3.	1.00	.34
4.	1.00	.67
6.	1.00	.10
8.	1.00	.68
9.	1.00	.61
10.	1.00	.83
11.	1.00	.73
12.	1.00	.88
13.	1.00	.74
14.	1.00	.84
15.	1.00	.72
16.	1.00	.66
17.	1.00	.68
18.	1.00	.34
19.	1.00	.67
20.	1.00	.70

Table 2: Communalities, factors loadings, eigenvalues, percentage of variance explained, number of items, coefficient alpha, and mean inter-item coefficient for the 17-item ADSCAP

Original item's no.	Communalities	Factor loadings				
		1	2	3	4	5
Item 12	.88	.923				
Item 14	.84	.890				
Item 13	.73	.834				
Item 15	.72	.827				
Item 11	.73		.841			
Item 20	.70		.790			
Item 19	.67		.786			
Item 1	.53		.576			
Item 10	.83			.913		
Item 2	.73			.851		
Item 9	.61			.774		
Item 17	.68				.816	
Item 4	.67				.707	
Item 3	.35				.512	
Item 18	.34				.361	
Item 8	.70					.827
Item 16	.66					.811
Reliability estimates	1	2	3	4	5	
Eigenvalue	3.88	2.41	2.06	1.63	1.40	
% of variance explained	18.93	14.97	13.50	9.80	9.68	
No. of items	4.00	4.00	3.00	4.00	2.00	
Coefficient alpha	.90	.73	.79	.44	.57	
Mean inter-item correlation	.70	.47	.60	.22	.46	

Two criteria were employed for identifying factorsthe scree plot (Fig. 1) and Kaiser's eigenvalue > 1 (Table 2). Accordingly, five factors were found, which accounted for a total of 66.88% of variance. This factor structure emerged after six iterations. For factor loadings, we used the criterion of > .30. Items that cross-loaded on more than one factor were considered a part of the factor where they loaded the highest and also held theoretical significance.

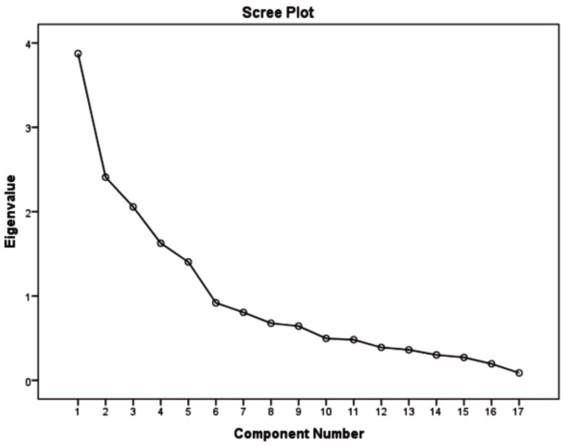

Fig. 1. Scree plot based on exploratory factory analysis for ADSCAP

In order to name the factors, the items within each were examined. Factor 1 explained 18.93% of variance and was called 'Adherence to exercise'. The four items here explored different reasons such as inability, lethargy, fatigue and indifference that may have prevented the respondent from following the exercise regimen (e.g., Did you miss your exercise/walking because you felt tired?). Factor 2 which contributed 14.97% of variance was labelled 'Avoidance of health risk behaviours'. There were four items which described behavioural patterns such as forgetting medicine, and intake of alcohol and tobacco that could have potentially jeopardised one's health (e.g., Did you smoke/chew tobacco?). Factor 3 accounted for 13.50% of variance, and was referred as 'Adherence to medication'. The three items here were related to non-intake of prescribed drugs for reasons like deliberate choice, and perceiving better or worse health (e.g., Did you miss taking your medicine because you felt better?). Factor 4 which explained 9.80% of variance was termed 'Adherence to diet'. It had four items that dealt with the consumption of fat-rich, salt-rich, and calorie-rich foods against advice (e.g., Did you eat salty food (such as pickles, chutneys, etc.)?). Factor 5 contributed 9.68% of variance, and was identified as 'Planned adherence and emergency care'. There were two items pertaining to neglect in situations such as when one's stock of medicines was over, and when faced with post-surgical complications (e.g., Did you avoid consulting your doctor though you noticed some symptom that bothered you (e.g., pain in the wound, swelling in ankles, breathlessness, chest pain, headache, etc.)?).

The preliminary reliability coefficients of ADSCAP in the form of internal consistency were examined. The 17-item scale had a Cronbach's alpha value of .75, which satisfied the standard endorsed by Nunnally (1978). The internal consistency values for the five factors varied between .44 and .90 (Table 2). Given that the items had loaded above .30 in their respective factors, the presence of convergent validity was indicated. To determine whether the scale demonstrated discriminant validity, factor scores were computed using the factor-based scale approach, following which inter-correlations were calculated (Table 3). None of the factors had high correlations (> .70) with the remaining factors (r ranged from -.04 to .35). Therefore, ADSCAP was found to have discriminant validity.

Table 3: Correlations between factors by taking factor-based scale scores

		1	2	3	4	5
1.	Adherence to exercise	1	.26***	.08	.14*	.03
2.	Avoidance of health risk behaviours		1	-.04	.35***	.07
3.	Adherence to medication			1	.03	.05
4.	Adherence to diet				1	.02
5.	Planned adherence and emergency care					1
M		14.14	15.76	11.96	14.57	7.84
(SD)		(3.19)	(0.93)	(0.31)	(1.31)	(0.53)

*Note. *p < .05, ***p < .001*

By means of One-way repeated measures ANOVA, we sought to examine the differences across the five factors of ADSCAP. The factor-based scales scores were observed to be significantly different, $F(4, 796) = 802.81$, $p < .001$. Through post-hoc pair-wise comparisons (Bonferroni), Factor 1 or 'Adherence to exercise' (M = 14.14, SD = 3.19) differed significantly ($p < .001$) from Factor 2 or 'Avoidance of health risk behaviours' (M = 15.76, SD = 0.93), Factor 3 or 'Adherence to medication' (M = 11.96, SD = 0.31), and Factor 5 or 'Planned adherence and emergency care' (M = 7.84, SD = 0.53). Factors 2, 3 and 5 differed significantly ($p < .001$) from all the remaining factors. Factor 4 or 'Adherence to diet' (M = 14.57, SD = 1.31) differed significantly ($p < .001$) from all the others except Factor 1.

ADSCAP: Assessment of Criterion Validity

In this phase, we aimed to establish criterion validity, wherein ADSCAP scores would be expected to match scores of existing scales. However, we were unable to trace a similar multi-dimensional adherence scale in scientific literature. As an alternative, we identified constructs such as psychological distress which tend to have negative relationships with the construct of adherence (see Introduction) as measured by the newly developed ADSCAP. Thus, we investigated the concurrent validity of ADSCAP by administering it along with the Hospital Anxiety and Depression Scale (HADS) and verifying if negative relationships existed between the scores of the two scales.

Method

Participants

We adopted the two-stage sampling method wherein hospitals and patients formed the respective units, as described in the previous phase. The sample consisted of 150 out-patients (82% men and 18% women) who had undergone CABG about a month prior to assessment. Their mean age was 56.3 years (SD = 7.6). In terms of educational level, participants had dropped out of school (30%), had completed schooling (35.3%), had finished graduation and above (28.7), or were non-literate (6%). There were employed persons (37.4%), retired persons (24.7%), housewives (13.3%), business persons (14%), farmers (5.3%), labourers (3.3%), and unemployed persons (2%).

Instruments

The 17-item ADSCAP was administered along with HADS. The internal consistency of ADSCAP in this sample (N = 150) was found to be .59.

Hospital Anxiety and Depression Scale (HADS). This 14-item scale was developed by Zigmond and Snaith (1983). HADS assessed the level of anxiety and depression reported for the preceding 7 days. It had a 4-point scale ranging between 0 and 3 (responses varied item to item). Two sub-scales of 7 items each respectively examined anxiety (e.g., Worrying thoughts go through my mind) and depression (e.g., I have lost interest in my appearance). Scores above 7 on the sub-scales indicated the presence of anxiety and/or depression. The total score of the 14 items has been known to indicate the level of overall psychological distress (Pallant & Tennant, 2007; Turner, Hambridge, White, Carter, Clover, Nelson, & Hackett, 2012). The score for the whole scale ranged between 0 and 42; the sub-scales scores varied from 0 to 21. The internal consistency of the anxiety and depression sub-scales was reported to be .83 and .82 respectively (Bjelland, Dahl, Haug, & Neckelmann, 2002). In the current sample (N = 150), the internal consistency of the anxiety sub-scale was .55, and of the depression sub-scale was .66.

Procedure

We met patients in the out-patient department where they were visiting their respective doctors for review. Those willing to participate by signing the informed consent form were requested to respond to ADSCAP and HADS. Administration of the two scales lasted approximately 30 minutes. For non-literate participants, either the investigator or the caregiver read out the items and filled in the responses expressed by the participant. All participants were debriefed after the assessment.

Results

The overall adherence score and the five factor-based scale scores of ADSCAP were correlated with the scores of overall psychological distress, anxiety, and depression, obtained from HADS (Table 4). It was found that Overall adherence, Adherence to exercise, and Planned adherence and emergency care each had significant negative correlations with overall psychological distress, anxiety and depression. Avoidance of health risk behaviours was significantly and negatively related with overall psychological distress, and anxiety. Among all factors, Adherence to exercise had the strongest correlation with psychological distress. Adherence to medication, and Adherence to diet did not show any significant correlation with the psychological distress scores. Nonetheless, as majority of the adherence scores had significant negative relationships with the psychological distress scores, the presence of criterion validity can be inferred.

Table 4: Product-moment correlations between ADSCAP scores and HADS scores

	M (SD)	Overall Psychological Distress	Anxiety	Depression
Overall adherence	65.62 (2.67)	-.53***	-.40***	-.45***
Adherence to exercise	14.35 (2.02)	-.59***	-.39***	-.56***
Avoidance of health risk behaviours	15.95 (0.28)	-.16*	-.21*	-.07
Adherence to medication	11.98 (0.18)	-.05	-.09	-.003
Adherence to diet	15.43 (1.01)	-.08	-.15	.001
Planned adherence and emergency care	07.91 (0.34)	-.24**	-.21**	-.18*
M (SD)		-4.13 (3.44)	1.85 (1.90)	2.27 (2.32)

Note. *p < .05, **p < .01, ***p < .001

ADSCAP: Establishment of Efficacy of ADSCAP

In this phase, we included caregivers in addition to patients so that the congruence of responses to ADSCAP between patients and caregivers could be assessed. The purpose was to examine the statistical significance or non-significance of difference in the adherence scores of the two groups.

Method

Participants

A three-stage sampling method with hospitals in the first unit, patients in the second unit, and caregivers in the third unit was employed. We recruited 100 out-patients who had undergone CABG, as well as their respective caregivers. The patient sample consisted of 83% men and 17% women whose mean age was 56.6 years (SD = 7.0). Their educational status was non-literacy (19%), incomplete schooling (26%), complete schooling (25%), graduation (26%), and post-graduation (4%). The patients were employees (29%), retired persons (25%), housewives (16%), farmers (12%), labourers (8%), businessmen (8%), or unemployed persons (2%). The caregivers included children (53%), spouses (37%), children-in-law (5%), siblings-in-law (3%), and siblings (2%).

Instrument

Besides the newly developed ADSCAP, we used a parallel form for the caregivers called ADSCAP-Caregiver. The 17 items from ADSCAP were re-phrased for the caregiver in this form (e.g., Did your patient eat oily food (such as papad, chips, etc.)?). Through translation and back-translation, a local language version of the form was developed.

Procedure

Out-patients were contacted when they visited the hospital for review consultation. ADSCAP was administered individually on willing patients, while ADSCAP-Caregiver was individually administered on the respective caregivers separately. In case a patient or caregiver was non-literate, the investigator read out the respective scale and filled in the responses given by the patient or caregiver. Following the assessments, patients and caregivers were debriefed.

Results

Independent samples t-tests were computed to verify whether there were differences in the responses given by the patients and caregivers. The statistics were applied to the overall adherence score and the factor-based scale scores obtained from ADSCAP and ADSCAP-Caregiver. The findings are presented in Table 5. There was no significant difference seen between patients and caregivers for the overall adherence score and four of the five scale-based factor scores. Under the 'Adherence to medication' factor, since the standard deviation for patients and caregivers' scores was 0.00, t-test was not calculated. Altogether, these results supported the congruence of scores concerning adherence between patients and caregivers.

Table 5: Means, standard deviations, and t-test values for ADSCAP and ADSCAP-Caregiver scores

	M (SD)		t(198)
	ADSCAP	ADSCAP-Caregiver	
Overall adherence	66.21 (1.87)	66.31 (1.91)	-0.37
Adherence to exercise	14.69 (1.61)	14.71 (1.76)	-0.08
Avoidance of health risk behaviours	15.99 (0.10)	15.99 (0.10)	0.00
Adherence to medication	12.00 (0.00)	12.00 (0.00)	-
Adherence to diet	15.71 (0.64)	15.77 (0.53)	-0.72
Planned adherence and emergency care	7.82 (0.41)	7.84 (0.40)	-0.35

Note: t was not computed for 'Adherence to medication' because the SDs were 0.00

Discussion

With the aim to measure adherence behaviour in its various dimensions as relevant for cardiac patients, our study devised a self-report measure called ADSCAP. Through preliminary investigations of the scale's psychometric properties, we found that the 17-item ADSCAP, with a 5-factor structure, demonstrated reliability and validity.

The five factors of ADSCAP identified through EFA were 'Adherence to exercise', 'Avoidance of health risk behaviours', 'Adherence to medication', 'Adherence to diet', and 'Planned adherence and emergency care'. Considering scores according to these factors can be informative about specific areas of adherence. Items in the factors related to diet, exercise, and medication explore intentional and unintentional non-adherence, thus shedding light on potential motivators and deterrents of patients' self-care. In addition, the other two factors (Avoidance of health risk behaviours, and Planned adherence and emergency care) deal with life-threatening recklessness and indifference concerning one's medication, diet, substance use and medical consultation. Low scores in these areas particularly can alert healthcare professionals to intervene, educate, and reform the attitude of the patient. Further, repeated administration of this scale during every review can function as reinforcement for patients to enhance their adherence.

In terms of reliability, the whole scale of 17 items as well as three factors ('Adherence exercise', 'Avoidance of health risk behaviours', and 'Adherence to medication') showed high coefficient alpha values that were above .70. ADSCAP also achieved convergent and discriminant validity, as was evident in the results of EFA, and the correlations between factor-based scale scores. Pertinently, the non-significant difference between patients' scores and caregivers' scores indicated that the self-report nature of ADSCAP did not disadvantage its goal of measuring adherence. Moreover, we found that ADSCAP scores, in general, shared significant negative relationships with the psychological distress scores of HADS. This concurred with the assertions in empirical literature that anxiety and depression inhibit cardiac patients' potential for rigorous self-care (e.g., Bauer et al., 2012). The strongest relationships were found between psychological distress and exercise adherence. Mental distress induces lethargy and complacence to learn and sustain self-care activities that require deliberate effort such as walking or exercising (Moser & De Jong, 2006). McGrady et al. (2009) evidenced that the completion of exercise-based cardiac rehabilitation, in fact, lowered anxiety and depression although these forms of psychological distress had themselves interfered with participants' completion of the programme. These justify the necessity to quantify adherence holistically and domain-wise, so that the trends can be studied across cardiac conditions, treatments, and interventions.

Implications of the study

ADSCAP serves as a handy self-report tool for research and clinical purposes. Healthcare professionals can employ the scale to explore various reasons that might be inhibiting their patient's potential for self-care. Such profiling would allow us to package interventions according to individual needs. The adherence scores obtained from ADSCAP may be used to establish the strength of the impact of cardiac self-care promotion programmes. The use of parallel forms for patients and caregivers can help corroborate the authenticity of patients' self-report. Furthermore, scores on ADSCAP may help healthcare professionals in relating poor prognosis to adherence behaviour. Those found low on adherence behaviour can then be recommended for counselling. Thus, healthcare can assume the much advocated holistic approach.

Limitations of the study

The study had certain shortcomings. Although our initial validation through EFA of ADSCAP was based on a diverse cardiac patient sample, the phases related to criterion validity and efficacy of response were confined to patients who had experienced CABG. Secondly, the reliability coefficients of two factors (Adherence to diet, and Planned adherence and emergency care) were not high. The lack of significant relationship of diet, and medication adherence with psychological distress in our study also merits further perusal. Follow-up investigations with a larger number and a wider range of cardiac patients may help address these issues, by using confirmatory factor analysis to test the model-fit.

Conclusion

The five phases of this study evidenced that the newly developed self-report ADSCAP is a reliable and valid tool to measure cardiac patients' adherence in the various dimensions of self-care for heart diseases. The scale is applicable in clinical and empirical research settings that ought to quantify adherence in order to intervene and optimise this modifiable health behaviour.

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References

Bauer, L. K., Caro, M. A., Beach, S. R., Mastromauro, C. A., Lenihan, E., Januzzi, J. L., & Huffman, J. C. (2012). Effects of Depression and Anxiety Improvement on Adherence to Medication and Health Behaviors in Recently Hospitalized Cardiac Patients. *American Journal of Cardiology*, *109*, 1266-1271. doi: 10.1016/j.amjcard.2011.12.017

Bhandari, S., Subramanyam, K., & Trehan, N. (2007). Valvular Heart Disease: Diagnosis and Management. *Journal of the Association of Physicians of India*, *55*, 575-584.

Bjelland, I., Dahl, A. A., Haug, T. T., & Neckelmann, D. (2002). The Validity of the Hospital Anxiety and Depression Scale: An Updated Literature Review. *Journal of Psychosomatic Research*, *52*, 69-77. doi: 10.1016/S0022-3999(01)00296-3

Chakrabarti, S. (2014). What's in a Name? Compliance, Adherence and Concordance in Chronic Psychiatric Disorders. *World Journal of Psychiatry*, *4*, 30-36. doi: 10.5498/wjp.v4.i2.30

Hamine, S., Gerth-Guyette, E., Faulx, D., Green, B. B., & Ginsburg, A. S. (2015). Impact of mHealth Chronic Disease Management on Treatment Adherence and Patient Outcomes: A Systematic Review. *Journal of Medical Internet Research*, *17*. doi: 10.2196/jmir.3951. Retrieved from http://tinyurl.com/qzaqkzr

Hoffmeister, J. M., Grüntzig, A. R., & Wenger, N. K. (1986). Long-term Management of Patients following Successful Percutaneous Transluminal Coronary Angioplasty and Coronary Artery Bypass Grafting. *Cardiology*, *73*, 323332. doi: 10.1159/000174024

Holtgraves, T. (2004). Social Desirability and Self-reports: Testing Models of Socially Desirable Responding. *Personality and Social Psychology Bulletin*, *30*, 16172. doi: 10.1177/0146167203259930

Kasliwal, R. R., Kulshreshtha, A., Agrawal, S., Bansal, M., & Trehan, N. (2006). Prevalence of Cardiovascular Risk Factors in Indian Patients undergoing Coronary Artery Bypass Surgery. *Journal of the Association of Physicians of India*, *54*, 371-375.

Kemper, D. (2010). *It's Time: The Era of Patient Accountability*. Retrieved from http://tinyurl.com/qaruq3n. Accessed 19 November 2014.

Khanderia, U., Townsend, K. A., Erickson, S. R., Vlasnik, J., Prager, R. L., & Eagle, K. A. (2008). Medication adherence following coronary artery bypass graft surgery: assessment of beliefs and attitudes. *Annals of Pharmacotherapy*, *42*, 192-199. doi: 10.1345/aph.1K497

Luyster, F. S., Hughes, J. W., & Gunstad, J. (2009). Depression and anxiety symptoms are associated with reduced dietary adherence in heart failure patients treated with an implantable cardioverter defibrillator. *Journal of Cardiovascular Nursing*, *24*, 10-17. doi: 10.1097/01.JCN.0000317469.63886.24

McGrady, A., McGinnis, R., Badenhop, D., Bentle, M., & Rajput, M. (2009). Effects of Depression and Anxiety on Adherence to Cardiac Rehabilitation. *Journal of Cardiopulmonary Rehabilitation and Prevention*, *29*, 358-364. doi: 10.1097/HCR.0b 013e3181be7a8f

Moser, D. K., & De Jong, M. J. (2006). Anxiety and Heart Disease. In E. Molinari, A. Compare, & G. Parati (Eds.), *Clinical Psychology and Heart Disease* (pp. 121-147). Milan: Springer-Verlag.

Nemes, M. I. B., Helena, E. T. S., Caraciolo, J. M. M., & Basso, C. R. (2009). Assessing Patient Adherence to Chronic Diseases Treatment: Differentiating between Epidemiological and Clinical Approaches. *Cadernos de Saúde Pública*, *25*, S392S400. doi: 10.1590/S0102-311X2009001500005

NHS Choices. (2014). *Coronary Artery Bypass Graft*. Retrieved from http://tinyurl.com/q6cox99. Accessed 20 August 2015.

Nunnally, J. C. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.

Pakpour, A. H., Gellert, P., Asefzadeh, S., Updegraff, J. A., Molloy, G. J., & Sniehotta, F. F. (2014). Intention and Planning predicting Medication Adherence following Coronary Artery Bypass Graft Surgery. *Journal of Psychosomatic Research*, *77*, 287-295. doi: 10.1016/j.jpsychores.2014.07.001

Pallant, J. F., & Tennant, A. (2007). An Introduction to the Rasch Measurement Model: An Example using the Hospital Anxiety and Depression Scale (HADS). *British Journal of Clinical Psychology*, *46*, 118. doi: 10.1348/014466506X96931

Platt, I., Green, H. J., Jayasinghe, R., & Morrissey, S. A. (2014). Understanding Adherence in Patients with Coronary Heart Disease: Illness Representations and Readiness to engage in Healthy Behaviours. *Australian Psychologist*, *49*, 127-137. doi: 10.1111/ap.12038

Pomeshkina, S., Borovik, I. V., & Barbarash, O. L. (2013). Adherence to Non-medication Treatment in Patients undergoing Coronary Artery Bypass Surgery. *European Heart Journal*, *34*, 306. doi: 10.1093/eurheartj/eht308.P1566

Sabaté, E. (2003). *Adherence to Long-term Therapies: Evidence for Action*. Geneva: World Health Organization.

Sharma, R., Bhairappa, S., Prasad, S. R., & Manjunath, C. N. (2014). Clinical Characteristics, Angiographic Profile and In Hospital Mortality in Acute Coronary Syndrome Patients in South Indian Population. *Heart India*, *2*, 65-69.

Swain, S., Hariharan, M., Rana, S., Chivukula, U., & Thomas, M. (2015). Doctor-Patient Communication: Impact on Adherence and Prognosis among Patients with Primary Hypertension. *Psychological Studies*, *60*, 25-32. doi: 10.1007/s12646-014-0291-5

Turner, A., Hambridge, J., White, J., Carter, G., Clover, K., Nelson, L., & Hackett, M. (2012). Depression screening in stroke: a comparison of alternative measures with the structured diagnostic interview for the diagnostic and statistical manual of mental disorders, Fourth Edition (Major Depression Episode) as Criterion Standard. *Stroke*, *43*, 1000-1005. doi: 10.1161/STROKEAHA.111.643-296

van de Mortel, T. F. (2008). Faking it: Social Desirability Response Bias in Self-report Research. *Australian Journal of Advanced Nursing*, *25*, 40-48.

Vanchenauer, R., Grünenfelder, J., Plass, A., Slankamenak, K., Pantic, L., Kisner, D., & Genoni, M. (2008). Changing Lifestyle Habits as Secondary Prophylaxis after Coronary Artery Bypass Grafting. *Heart Surgery Forum*, *11*, E243-E247.

Vitolins, M. Z., Rand, C. S., Rapp, S. R., Ribisl, P. M., & Sevick, M. A. (2000). Measuring Adherence to Behavioral and Medical Interventions. *Controlled Clinical Trials*, *21*, S188-S194.

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, *67*, 361-370.

Detailed Report of Pilot Study

The pilot study was carried out with three objectives: (i) To test the effectiveness and feasibility of psychosocial intervention with patients undergoing CABG (ii) To examine the feasibility of applying the proposed research design (iii) To test the existing and newly developed tools.

Design

A pretest-posttest non-equivalent control groups design was used for the pilot study to compare three experimental groups with a control group (Table 1). The first experimental group received the PACE intervention and was called the 'PACE group', the second received the Relaxation intervention and was called the 'Relaxation group', the third received the PACE and Relaxation interventions making it the 'P+R group', while the fourth group received only standard hospital treatment and was called the 'Control group'.

Sample

A total of 131 patients undergoing CABG were recruited from the five hospitals where permissions were granted. Due to subject drop-out, the final pilot sample had 100 participants. The mean age was 55.2 years (*SD* = 7.5). Among the participants, 85% were men and 15% were women. It was observed that the fifth hospital had low CABG patient volume whereby, only 2% of the pilot sample belonged to this hospital despite multiple visits over 4–5 months by the investigator. The remaining four hospitals provided more than 5% of the pilot sample. These four hospitals were thus finalised for the larger data collection during the main study.

Table 1

Plan and design of the pilot study

Group	**Pre-surgery assessment** (Day before CABG)	**Intervention**		**Post-surgery assessment**	
		Pre-surgery (Day before CABG)	Pre-discharge (Day before discharge)	First review (1 week after discharge)	Second review (6 weeks after discharge)
PACE	a) Psychological distress	PACE part 1	PACE part 2	Psychological distress	a) Psychological distress
(n_1 = 25)	b) Perceived social support				b) Adherence
	c) Health locus of control				c) Prognosis (patient's and doctor's reports)
Relaxation	a) Psychological distress	Guided Imagery	Guided Imagery	Psychological distress	a) Psychological distress
(n_2 = 25)	b) Perceived social support				b) Adherence
	c) Health locus of control				c) Prognosis (patient's and doctor's reports)
P+R	a) Psychological distress	PACE part 1	PACE part 2	Psychological distress	a) Psychological distress
(n_3 = 25)	b) Perceived social support	Guided Imagery	Guided Imagery		b) Adherence
	c) Health locus of control				c) Prognosis (patient's and doctor's reports)
Control	a) Psychological distress	No intervention	No intervention	Psychological distress	a) Psychological distress
(n_4 = 25)	b) Perceived social support				b) Adherence
	c) Health locus of control				c) Prognosis (patient's and doctor's reports)

Tools

The scales that were a part of pilot testing included Hospital Anxiety and Depression Scale (HADS), Multidimensional Scale of Perceived Social Support (MSPSS), Multidimensional Health Locus of Control–Form C (MHLC–Form C), 20-item Adherence Scale for Cardiac Patients (ADSCAP–20), Biopsychosocial Prognosis Scale for CABG (BIPROSCAB), and Doctor's Rating Scale of CABG Prognosis (DORSCAP). Patient Personal Details Form was also used. The descriptions of HADS, MSPSS, BIPROSCAB, and Patient Personal Details Form have been previously provided under the Tools section in the Method chapter (pp. 98–106). MHLC–Form C and DORSCAP were initially used during pilot testing but were later excluded from the main study. ADSCAP–20 underwent item deletion after pilot testing to emerge in its final form (ADSCAP).

Multidimensional Health Locus of Control–Form C (MHLC–Form C). MHLC–Form C (Wallston, Stein, & Smith, 1994) assessed 18 items on a 6-point rating scale about the level of agreement (1 = Strongly Disagree, 6 = Strongly Agree) concerning different sources of attribution. The items in MHLC–Form C (Appendix A7) were in the form of statements about various issues relating to one's current health condition. The scale aimed to identify the extent to which the respondent attributed the health condition to oneself, chance, doctors, and other people. It had four sub-scales. The Internal sub-scale had 6 items—1, 6, 8, 12, 13, and 17 (e.g., Whatever goes wrong with my condition is my own fault). The Chance sub-scale had 6 items—2, 4, 9, 11, 15, and 16 (e.g., Most things that affect my condition happen to me by chance). The Doctors sub-scale had 3 items—3, 5, and 14 (e.g., If I see my doctor regularly, I am less likely to have problems with my condition). The sub-scale for Other People had 3 items—7, 10, and 18 (e.g., The type of help I receive from other people determines how soon my condition improves). Each item was scored between 1 and 6. The total score on Internal and Chance sub-scales ranged between 6 and 36, while the total score of Doctors and Other People sub-scales varied between 3 and 18. Higher total score in a given sub-scale implied higher locus of control therein.

20-item Adherence Scale for Cardiac Patients (ADSCAP–20). ADSCAP–20 (Appendix A8) was the preliminary version of ADSCAP, used during pilot testing. In addition to the 17 items for ADSCAP, as described in the Tools Section of the Method chapter (pp. 102–104), ADSCAP–20 had three items relating to diet (i.e., Did you avoid your meal because you did not feel like eating?, Did you eat more than what was prescribed?, Did you eat less than what was prescribed?) which were presented on the 4-point rating scale (1 = Always, 4 = Never). The sum of the 20 items, ranging between 20 and 80, was considered as the overall adherence score. Higher this score, higher was the adherence interpreted to be.

Doctor's Rating Scale of CABG Prognosis (DORSCAP). DORSCAP (Appendix A9) was specifically developed for this study. This scale had 5 items, measured on a 4-point rating scale (1 = Very Bad, 4 = Very Good). DORSCAP was to be filled in by the doctor whom the patient had consulted for the second medical review (six weeks after discharge from hospital following CABG). The doctor rated how the patient was doing in terms of "recovery from surgery", "resumption of daily activities", "clinical symptoms", "mood state", and "overall prognosis". Each item had a score between 1 and 4. The total score, ranging between 5 and 20, was the sum of the five item scores. The higher the score, the better was the prognosis.

Interventions

The pilot study included four groups—PACE, Relaxation, P+R, and Control. The PACE and Relaxation interventions have been elaborately explained in the

Method Section (pp. 107–112). The third intervention group (P+R) that received both PACE and Relaxation modules was included in the pilot to determine whether a combination of two psychosocial interventions was more beneficial than a single intervention.

Procedure

Data was collected from five hospitals in Hyderabad where permissions were granted. On obtaining informed consent from eligible patients, their details were taken down using the Patient Personal Details Form. The pre-surgery assessment using HADS, MSPSS, and MHLC–Form C was individually conducted for participants a day before CABG. Participants were sequentially assigned to the four groups in the order of PACE group, Relaxation group, P+R group, and Control group. There were 25 patients in each of the four groups. The respective interventions were individually administered to participants a day before surgery and a day before discharge. At the time of discharge, participants in the three intervention groups were given a DVD (PACE group), CD (Relaxation group), or both (P+R) containing their respective interventions so that they could use it at home. The Control group received no psychosocial intervention, CD, or DVD. These participants received the standard hospital treatment only. Reminders were provided weekly once to the Relaxation and P+R groups for using the Relaxation CD which contained the Guided Imagery module for practice. One reminder was given to the PACE and P+R groups during the month following discharge in respect of using the PACE DVD which contained the pre-discharge intervention for reinforcement of affective support and health cognitions. At the first medical review (a week after discharge from hospital), patients individually completed HADS. At the second medical review (six weeks after discharge from hospital), HADS, ADSCAP–20 and BIPROSCAB were individually administered. In addition, the doctor whom the patient was consulting filled in DORSCAP. The participants were thanked and debriefed after this final assessment. Based on the recommendations of the Institutional Ethics Committee, a DVD containing the pre-discharge intervention of PACE was offered to each Control group participant.

Results

The statistical findings and the investigator's qualitative observations in relation to the psychosocial interventions, research design, and scales are presented here.

1. Effectiveness of psychosocial intervention. First, results pertaining to the two interventions were examined in terms of the differential impact on psychological distress, adherence and prognosis. The mean scores of the three groups for MSPSS, MHLC–Form C, HADS–A (anxiety) and HADS–D (depression) at the pre-surgery assessment, along with the mean scores of HADS–A and HADS–D during the review assessments were computed (Table 2). Using one-way between groups ANOVA, no significant effect of the groups was found on the mean scores of perceived social support measured by MSPSS, in total and on the dimensions of family, friends and significant other. Similarly, no significant group differences were found in the mean scores of health locus of control measured by MHLC–Form C on the dimensions of internal, doctors, and chance. There was however a significant effect of the groups on the mean scores in the dimension of others on MHLC–Form C, $F(3, 96) = 3.23$, $p < .05$. Post-hoc analyses based on Tukey's HSD are given in Table 3. It was revealed that only the mean score of the PACE group ($M = 15.32$, $SD = 3.44$) was significantly higher than that of the Control group ($M = 11.88$, $SD = 5.48$), $p < .05$. The means of the P+R and Relaxation groups did not each significantly differ from the means of the other three groups.

In terms of psychological distress, the groups did not exert a significant effect on the mean scores of HADS–A and HADS–D before surgery. However, this trend reversed during the reviews after surgery. There was a significant effect of the groups on the mean scores for HADS–A at the first review, $F(3, 96) = 3.57$, $p < .05$. Post-hoc analyses using Tukey's HSD indicated that only the PACE group had a significantly lower mean anxiety score ($M = 0.76$, $SD = 1.42$) than the Control group ($M = 2.72$, $SD = 3.01$), $p < .01$. The means of the P+R and Relaxation groups did not each significantly differ from the means of the other three groups. There was a significant effect of the groups on the mean scores of HADS–A at the second review, $F(3, 96) = 3.50$, $p < .05$. Results of post-hoc analyses using Tukey's HSD revealed that the mean anxiety score of the PACE group ($M = 0.92$, $SD = 1.19$) was significantly lower than those of the Relaxation group ($M = 2.40$, $SD = 2.12$), $p < .05$, and the Control group ($M = 2.48$, $SD = 2.37$), $p < .05$. The mean of the P+R group did not significantly differ from those of the remaining three groups. With regard to HADS–D, there was a significant effect of the groups on the mean scores at the first review, $F(3, 96) = 5.21$, $p < .01$. Post hoc-analyses using Tukey's HSD indicated that the mean depression score of the Control group ($M = 3.60$, $SD = 4.04$) was significantly higher than that of the P+R group ($M = 0.96$, $SD = 0.98$), $p < .01$. The Control group ($M = 3.60$, $SD = 4.04$) also scored significantly higher than the PACE group ($M = 1.76$, $SD = 2.09$), $p < .05$. However, the P+R group did not significantly differ from the PACE and Relaxation groups in the mean depression score at the first review. For mean depression scores at the second review, no significant effect of the groups was found.

Table 2

Mean scores on MSPSS, MHLC–Form C, HADS–A, and HADS–D across the groups

	PACE	**Relaxation**	**P+R**	**Control**	***F*(3, 96)**
MSPSS					
Total	67.92 (11.54)	67.88 (9.57)	71.76 (14.34)	64.40 (13.10)	1.50
Family	25.72 (3.31)	25.96 (2.34)	25.08 (4.72)	23.68 (6.67)	1.26
Friends	16.60 (8.47)	16.32 (8.58)	21.04 (7.54)	15.72 (8.37)	2.19
Significant other	25.60 (3.85)	25.60 (3.04)	25.64 (3.48)	25.00 (3.67)	0.19
MHLC–Form C					
Internal	32.88 (4.26)	34.56 (2.38)	34.80 (1.87)	34.56 (2.57)	2.32
Doctors	17.80 (0.65)	17.68 (0.75)	17.96 (0.20)	17.80 (1.00)	0.66
Others	15.32 (3.44)	14.48 (4.55)	12.40 (4.60)	11.88 (5.48)	3.23*
Chance	33.60 (3.40)	31.12 (8.28)	34.16 (4.05)	29.96 (8.72)	2.32
HADS–A					
Pre-surgery	4.64 (3.65)	5.36 (4.50)	4.72 (3.46)	4.88 (4.30)	0.16
First review	0.76 (1.42)	1.60 (1.61)	1.44 (2.20)	2.72 (3.01)	3.57*
Second review	0.92 (1.19)	2.40 (2.12)	1.64 (1.96)	2.48 (2.37)	3.50*
HADS–D					
Pre-surgery	3.96 (3.48)	4.12 (3.28)	3.96 (3.40)	4.36 (3.24)	0.80
First review	1.76 (2.09)	1.80 (1.50)	0.96 (0.98)	3.60 (4.04)	5.21**
Second review	0.72 (1.14)	1.44 (2.14)	1.00 (1.96)	1.88 (1.79)	2.00

Note. Figures in parentheses indicate standard deviations
**p* < .05, ***p* < .01

Table 3

Post-hoc analyses for MHLC–Form C (Others), HADS–A, and HADS–D scores

	P – R	**P – (P+R)**	**P – C**	**R – (P+R)**	**R – C**	**(P+R) – C**
MHLC–Form C (Others)	0.84	2.92	3.44*	2.08	2.60	0.52
First review HADS–A	-0.84	-0.68	-1.96**	0.16	-1.12	-1.28
Second review HADS–A	-1.48*	-0.72	-1.56*	0.76	-0.08	-0.84
First review HADS–D	-0.04	0.80	-1.84*	0.84	-1.80	-2.64**

Note. **p* < .05, ***p* < .01

The mean scores on ADSCAP–20, BIPROSCAB, and DORSCAP (Table 4) were evaluated using one-way between groups ANOVA. Results on adherence, measured by ADSCAP–20, revealed a significant effect of the groups on the mean scores, $F(3, 96) = 2.83$, $p < .05$. Post-hoc analyses using Tukey's HSD are presented in Table 5. It was found that only the mean score of the Relaxation group ($M = 77.40$, $SD = 1.89$) was significantly higher than that of the Control group ($M = 75.28$, $SD = 3.85$), $p < .05$. The respective means of the PACE and P+R groups did not significantly differ from those of the remaining groups. With reference to prognosis (BIPROSCAB), the effect of the groups was significant, $F(3, 96) = 4.61$, $p < .01$. Post-hoc analyses using Tukey's HSD showed that only the mean score of the PACE group ($M = 110.04$, $SD = 9.09$) was significantly higher than that of the Control group ($M = 100.08$, $SD = 11.41$), $p < .01$. The respective means of the Relaxation and P+R groups did not significantly differ from those of the remaining groups. There was no significant effect of the groups on the DORSCAP scores.

Table 4

Mean scores on ADSCAP–20, BIPROSCAB, and DORSCAP across the groups

	PACE	**Relaxation**	**P+R**	**Control**	***F*(3, 96)**
ADSCAP–20	76.40 (2.58)	77.40 (1.89)	77.12 (2.57)	75.28 (3.85)	2.83*
BIPROSCAB	110.04 (9.09)	102.24 (13.27)	107.64 (8.68)	100.08 (11.41)	4.61**
DORSCAP	16.20 (1.89)	16.44 (2.22)	16.50 (2.54)	15.92 (1.75)	0.39

Note. *$p < .05$, **$p < .01$

Table 5

Post-hoc analyses for scores on ADSCAP–20 and BIPROSCAB

	P – R	P – (P+R)	P – C	R – (P+R)	R – C	(P+R) – C
ADSCAP–20	-1.00	-0.72	1.12	0.28	2.12*	1.84
BIPROSCAB	7.80	2.40	9.96**	-5.40	2.16	7.56

Note. *$p < .05$, **$p < .01$

On average, it took 10 minutes each to administer HADS, MSPSS and MHLC–Form C, and 15 minutes each for ADSCAP–20 and BIPROSCAB. The PACE and Relaxation groups were comfortably able to participate in the 60-minute assessment+intervention session. However, the P+R programme typically needed 90 minutes in order to administer the PACE and Relaxation interventions consecutively after assessment. At times, this interfered with the hospital schedule for patients as they had to be shifted to labs for pre-CABG medical investigations. While the attending hospital staff permitted up to 60 minutes altogether for psychological assessment+intervention, they required the P+R programme to be suspended in between, for medical investigations. In such instances, the investigator had to wait up to three hours for the patient's return to resume the administration of the Relaxation intervention. It also resulted in the intervention being provided in the late evening or the night before CABG, which was again interrupted if the patient had visitors. The patient was also observed to experience fatigue due to two successive interventions. The pilot results revealed that the PACE and Relaxation interventions showed significant effects on prognosis and adherence respectively, yet the group which received the combined intervention of P+R did not demonstrate any significant difference from the other groups either on adherence or prognosis. The only aspect wherein the P+R group differed from the Control group was in depression at the first review. Thus, the P+R group failed to differ on the main dependent variables, i.e., adherence and prognosis. The observations of the investigator recorded a number of practical problems in administering the two consecutive interventions for the P+R group that resulted in interruption and fatigue for participants. Thus in view of statistical results and investigator's observations, it was inferred after weighing the gain (of new insight in research) and pain (of the participant) that the combined intervention group of P+R be dropped from the design.

2. Feasibility of the design. The results revealing the limitations of the combined intervention group (P+R) led to the decision of dropping this group for the main study. Thus, the design of the study was modified (as shown in Table 3.1, p. 92) so as to enhance its feasibility.

3. Efficacy of the tools. The third objective of pilot testing was to examine the efficacy of tools. Being the first measurement, reliability analyses of the scales were carried out. Results are presented in Table 6. HADS and MSPSS were found to be reliable for use. HADS, as a whole, had Cronbach's alpha of .80, while the subscales of anxiety and depression had Cronbach's alpha of .75 and .65 respectively. The subscales of MSPSS had Cronbach's alpha ranging between .74 and .89, while that of the whole scale was .84. Participants reported no difficulty in responding to HADS and MSPSS. These two scales were retained without any change as they demonstrated acceptability in terms of reliability as well as participants' ease of reporting.

The reliability of ADSCAP–20 was tested on 200 cardiac out-patients. The report was published by Hariharan *et al.* (2015a; Appendix B1). The internal consistency or Cronbach's alpha was found to be .67 for ADSCAP–20. Exploratory factor analyses (EFA), using principal component analyses with varimax rotation, were applied. After deleting three items, the internal consistency of the final 17-item

ADSCAP was noted to be .75. Further, the results of EFA revealed a 5-factor structure indicating five dimensions for adherence, viz., adherence to exercise, avoidance of health risk behaviours, adherence to medication, adherence to diet, and planned adherence and emergency care. The investigator observed that when responding to items 3, 4 and 17 on ADSCAP–20, participants had asked for examples of salty food, oily food and high-calorie food for clearer understanding. In the final version of ADSCAP which was used for the main study, examples were given in these items.

The reliability of BIPROSCAB was assessed in the pilot study on a sample of 200 out-patients who had undergone CABG. The detailed report is under peer review for publication (Hariharan *et al.*, 2015b). The sample of 200 respondents had a mean age of 53.7 years (*SD* = 8.5). The internal consistency or Cronbach's alpha was found to be .73 for this scale. No item was dropped. Exploratory factor analysis (EFA), using principal component analysis with varimax rotation, was run. Nine dimensions of prognosis evolved, viz., post-CABG affect state, post-CABG anxiety, post-CABG physical pain, discomfort in surgical sites, worry about return to normalcy, discomfort in the leg, CABG bio-social by-products, constraints in socialising, and infection and interference to routine life. Based on the observation that the participants sought clarification for certain items while responding to BIPROSCAB, those items were elaborated and rephrased in simpler language for the final version which was used in the main study (e.g., item 10 which originally read, "Palpitations (racing heart beat)", was reframed to read, "I felt my heartbeat going fast"). All the 25 items were retained with language being simplified.

Table 6

Internal consistency of HADS, MSPSS, MHLC–Form C, ADSCAP–20, and BIPROSCAB

	Cronbach's alpha
HADS	
Anxiety	.75
Depression	.65
Total	.80
MSPSS	
Family	.87
Friends	.89
Significant other	.74
Total	.84
MHLC–Form C	
Internal	.50
Doctors	.05
Others	.72
Chance	.87
ADSCAP–20	.67
BIPROSCAB	.73

The reliability analyses for MHLC–Form C revealed the unsuitability of the scale for the study. Two out of the four sub-scales (internal and doctors), which constituted important dimensions in context of surgery patients, had low Cronbach's alpha such as .50 and .05 respectively. Hence, MHLC–Form C was not satisfactorily reliable for use in the current target population. Further, participants demonstrated ambiguity in responding to the scale. For instance, 45 participants strongly agreed with item 7 which stated, "Other people play a big role in whether my condition improves, stays the same, or gets worse". Simultaneously, these 45 participants strongly agreed to item 13 which stated, “I deserve the credit when my condition improves and the blame when it gets worse”. The participants’ response set was compromising the authenticity of responses. When these conflicting responses were probed by the investigator, participants pointed out that the family was important for the outcomes during surgery as the patient was not independent, although one’s own self was ultimately responsible for credit and blame relating to one’s condition. Further, items 7 and 13 were each double-barrelled as they put together improvement or credit and worsening or blame in the same item. Such aspects led to a trend of high mean scores in the pilot sample on at least two out of the four sources of attribution, i.e., internal and doctors (Table 7). It was thus difficult to clearly identify discrete locus of control trends for the current sample using MHLC–Form C. In view of this, a new tool, Locus of Control checklist for CABG (LOCOCAB), was developed by modifying MHLC–Form C for use in the main study. It was ensured that LOCOCAB did not replicate the problems of double-barrelled items and ineffective response format. Instead, similar aspects related to one’s health condition were investigated in LOCOCAB as in MHLC–Form C, but the respondent had to single out the major source of control for the aspect described in the item. LOCOCAB is given a full description under Tools in the Method chapter (pp. 100-102).

Table 7

Mean scores and highest possible scores on the MHLC–Form C sub-scales

	Mean score	**Highest possible score**
Internal	34.20 (2.97)	36
Doctors	17.81 (0.71)	18
Others	13.52 (4.73)	18
Chance	32.21 (6.70)	36

Note. Figures in parentheses indicate standard deviations

The results of pilot testing revealed that DORSCAP lacked the power to discriminate among participants on the dependent variable of doctor-rated prognosis. The means scores of the four groups (PACE, Relaxation, P+R, and Control) on DORSCAP were not significantly different although the groups significantly differed on the patient-reported BIPROSCAB scores, as seen in the analyses (Table 4). Further, no significant correlation was found between the total scores on BIPROSCAB and DORSCAP in the study sample (r = .13, p > .05). Ideally since DORSCAP and BIPROSCAB measured prognosis, the scores on both scales should have statistically reflected a similar trend across groups. However, this was not the case. Two factors may have influenced this contradiction in findings of the two scales. First, doctors may have assessed their patients only in terms of bio-physical aspects of recovery while patients were responding to items relating to biopsychosocial wellness. Second, the investigator found that the doctors hastily responded to DORSCAP at the end of consultation with the concerned patient, as they had to attend to other patients awaiting consultation or had to leave for surgery with other patients. Owing to such aspects, there was a trend of averaging bias in the doctors' ratings, i.e., the four groups had mean scores ranging between 15.92 and 16.50 on a scale of 5–20 despite the groups having significantly varying scores of prognosis on BIPROSCAB (Table 4). DORSCAP was hence not found to be informative about group differences. For the main study, DORSCAP was excluded and the assessments were confined to patient-reported outcome measures. The tools which were finalised for the main study, based on the results of pilot testing, were Hospital Anxiety and Depression Scale (HADS), Multidimensional Scale of Perceived Social Support (MSPSS), Locus of Control checklist for CABG (LOCOCAB), Adherence Scale for Cardiac Patients (ADSCAP), and Biopsychosocial Prognosis Scale for CABG (BIPROSCAB).

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Psychological Distress as Predictor of Adherence and Prognosis among Patients undergoing Coronary Artery Bypass Grafting

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This study examined the role of psychological distress—anxiety and depression—in adherence and prognosis among patients subjected to Coronary Artery Bypass Grafting (CABG). By using an interrupted time-series design with one group, 100 patients were observed. They responded to the Hospital Anxiety and Depression Scale before surgery, at the first review (a week after hospital discharge), and at the second review (a month after first review). Participants also completed the Adherence Scale for Cardiac Patients, and the Biopsychosocial Prognosis Scale for CABG at the second review. Hierarchical multiple linear regression analyses revealed that anxiety and depression at three time-points before and after surgery together predicted participants' outcomes by significantly explaining up to 21% of variance in adherence and 52% of variance in prognosis. However, simple linear regression analysis showed that adherence significantly explained only 5% of variance in prognosis. Psychological distress, thus, affects how effectively patients follow the post-operative care regimen and how well they recover after CABG.

Keywords: Adherence, CABG, Interrupted time-series design with one group, Prognosis, Psychological distress

The exponentially rising rate of Coronary Artery Disease (CAD) has met with the growing popularity of revascularisation treatments such as Coronary Artery Bypass Grafting (CABG) in developing and developed nations alike (Centers for Disease Control and Prevention, 2015; Kasliwal, Kulshreshtha, Agrawal, Bansal, & Trehan, 2006; NHS Choices, 2014a). The procedure involves surgically creating blood vessel graft(s) on the heart to re-route the flow of blood, which otherwise is constricted by blockages (Cleveland Clinic, 2010). Being invasive, CABG generates the need for patients' preparation for surgery and their coping with the accompanying psychological distress namely, anxiety and depression. Addressing these psychological needs of the mushrooming cardiac population is a pressing yet often ignored concern in healthcare (Chivukula, Hariharan, Rana, Thomas, & Swain, 2014; Mental Health Foundation, 2011). Anxiety and depression are not only reported frequently by these patients but are further evidenced to impede their recovery and well-being (Ebadi, Moradian, Feyzi, & Asiabi, 2011). Adherence and prognosis after surgery are two notable outcomes that are affected by anxiety and depression. Adherence (also referred to as compliance) is the extent to which patients follow their doctor's advice about medication and lifestyle, while prognosis is the estimation of the course and outcome of a disease (Christakis, 1999; Jin, Sklar, Oh, & Li, 2008). Typically, adherence and prognosis are considered as parameters that are judged by a doctor. In this era of chronic diseases, patient-reported outcomes are gaining momentum given that the patient can inform about the first-hand experience and impact of the illness and/or treatment in the various domains of everyday life (Deshpande, Rajan, Sudeepthi, & Nazir, 2011; Murri et al., 2004). We, thus, investigated the role of psychological distress in adherence and prognosis as reported by patients subjected to CABG.

Psychological distress among medical patients generally refers to the presence of anxiety and depression (Russ et al., 2012). Anxiety is a prominent experience prevalent among hospital patients, presenting in two ways—first, as a natural outcome of being subject to possibly threatening and/or invasive medical protocols; secondly, such worry may blow out of proportion and disrupt recovery due to erroneous beliefs coupled with real and potential losses (House & Stark, 2002). A research group stated that 72% of patients awaiting CABG were feeling moderate to severe anxiety (McCormick, Naimark, & Tate, 2006). Given that CABG is a complex and invasive surgery, depression is also commonly encountered by patients. One study revealed that 40.8% of patients in the pre-operative phase demonstrated borderline depression while 10.8% were found to manifest case depression. Further, 44.1% of patients were found to have borderline anxiety and 11.8% had case anxiety (Ebadi et al., 2011). Another study detailed that 43.3% of patients demonstrated anxiety before CABG, and that this rate reduced to just 36.7% a week after surgery. Additionally, 30% of the sample demonstrated depression in the pre-operative phase while 40% reported depression after CABG (Chaudhury et al., 2006). The prevalence rates of anxiety and depression cited above are considerably high, and necessitate the examination of their subsequent effects in patients' well-being.

Unaddressed psychological distress holds enduring consequences for patients' self-care and recovery. Research findings show that patients with anxiety are less likely to comply with their treatment regimen, maintain a healthy lifestyle, and effectively return to their normal life (Moser, 2007). Depression likewise worsens prognosis in patients with CAD. In a 5-year longitudinal study on 1,000 cardiac patients, Whooley and colleagues found that depressive symptoms at the baseline were associated with adverse events over the follow-up through behavioural factors namely physical inactivity (Whooley et al., 2008). Here, depression-related lethargy decisively influenced physical well-being. These findings demonstrate that psychological distress in the form of anxiety and depression, if not identified, would prolong and hence may decrease patients' well-being. Additionally, these point out the need for clarity in terms of the time continuum of anxiety and depression around the period of CABG, and the impact thereof on patients' well-being. For instance, do pre- and post-operative psychological distresses exhibit distinctive roles in the process and outcomes of CABG, or do they function in union rather than progression? Evidence on these issues will aid in drawing guidelines concerning the nature, timing, and frequency of psychological assessments and interventions essential for patients undergoing CABG.

Objectives

The first objective of the study was to assess whether psychological distress (anxiety and depression) at different time-points (before and after surgery) played a role in adherence as well as prognosis among patients who had undergone CABG. The second objective was to understand the individual and combined predictive roles of anxiety and depression in adherence and prognosis separately. The third objective was to investigate the contribution of adherence towards prognosis.

Method

Participants

As the study involved an interrupted time-series design with one group, initially 150 patients who were undergoing CABG for the first time were contacted at five corporate hospitals in Hyderabad, India. Out of them, 131 patients who had provided their informed consent were recruited. Owing to subject mortality, 100 patients were finally considered as participants in the analyses. The age of the participants ranged between 35 and 68 years (M = 55.2, SD = 7.5). Men made up 85% of the sample, while women constituted 15%. The educational qualifications of the participants were: primary school (15%), middle school (17%), secondary school (22%), senior secondary school (17%), graduation (17%), post-graduation (3%), and non-literacy (9%). The sample consisted of employees (42%), retirees (19%), businessmen (17%), housewives (12%), farmers (7%), and unemployed persons (3%).

Measures

Three scales were used—Hospital Anxiety and Depression Scale, Adherence Scale for Cardiac Patients, and Biopsychosocial Prognosis Scale for CABG. Demographic details were collected from the participants after obtaining their informed consent.

Hospital Anxiety and Depression Scale (HADS). With 14 items on a 4-point scale of 0–3 (response categories varied item wise), HADS (Zigmond & Snaith, 1983) was a self-report measure used to assess the severity of anxiety and depression in the hospital population. The scale comprised two subscales—Anxiety (e.g.: Worrying thoughts go through my mind) and Depression (e.g.: I have lost interest in my appearance). The scores of each sub-scale ranged between 0 and 21. Scores above 7 on the sub-scales suggested the presence of anxiety and depression. For this study, the degree of anxiety and depression was taken into consideration while interpreting the score, such that higher the score in a sub-scale, higher was the anxiety or depression. The internal consistency was found to be .83 and .82, respectively for the anxiety and depression sub-scales (Bjelland, Dahl, Haug, & Neckelmann, 2002). Within the current sample, the internal consistency of the anxiety sub-scale was seen to be .75, and of the depression sub-scale was .65. In order to use HADS, the required licence was purchased from GL Assessment, and the translation into the local language was obtained from Mapi Research Trust.

Adherence Scale for Cardiac Patients (ADSCAP). It is a self-report measure developed by the investigators for this study following the standard procedure for the construction of a scale. The aim of the scale was to measure the patient's adherence to medication, diet, exercise, avoidance of health risk behaviours, and consultation for complications. Initially, 32 items were written, which were presented to an expert panel of doctors and psychologists. Using the criterion of absolute agreement about item relevance among the experts, 20 items were finalised for ADSCAP. The items were in the form of questions (e.g.: Did you fail to do your prescribed exercise/walking?), on a 4-point scale (1 = Always, 4 = Never). The composite score, ranging between 20 and 80, was calculated to find out the patient's level of adherence. The higher the score, the greater was the adherence behaviour. This scale was translated and back-translated for the local language version using the standard procedure. The reliability of ADSCAP was checked, and Cronbach's alpha was found to be .67.

Biopsychosocial Prognosis Scale for CABG (BIPROSCAB). The self-report BIPROSCAB was developed by the investigators for this study following the standard procedure for the construction of a scale. The objective was to measure the patient's subjective post-surgical experience of recovery and functional capacity in bio-physical and psychosocial domains. During scale construction, a pool of 47 items was developed and presented to an expert panel consisting of doctors and psychologists. Using the criterion of absolute agreement concerning item relevance among the experts, 25 items were retained in BIPROSCAB. The items were in the form of statements (e.g.: I noticed swelling in both my feet) to evaluate the patient's perception of physical symptoms and abilities, and psychosocial experiences during the month after CABG, on a 5-point scale (1 = Very often, 5 = Never). The composite score, varying between 25 and 125, was calculated to find out the nature of the patient's prognosis. Higher score indicated better prognosis. This scale was translated and back-translated for the local language version using the standard procedure. The reliability of the scale was verified, and Cronbach's alpha was found to be .73.

Procedure

This study was approved by the Institutional Ethics Committee of the university where the authors work. Written permission for conducting the research study was taken from five corporate hospitals in Hyderabad, India. Informed consent from the concerned cardiothoracic surgeons and the patients awaiting CABG were obtained. During the study, the assessment of psychological distress using HADS was done in three phases—prior to CABG (n = 131), at the first review, which was about a week after participants' discharge from the hospital (n = 117), and at the second review, which was about a month after the first review or approximately six weeks after the participants were discharged from the hospital (n = 100). At the second review, participants were additionally requested to complete ADSCAP and BIPROSCAB along with HADS. The assessment before surgery and at the first review lasted about 15 minutes, whereas the duration of the assessment at the second review was about 50 minutes. On completion of the assessment, the participants were debriefed.

Results

The data were analysed in order to determine the levels of and changes in psychological distress (anxiety and depression) across the three assessment phases, and to understand their role in adherence and prognosis among patients undergoing CABG. In view of this, descriptive statistics (means and standard deviations), and inferential statistics (one-way repeated measures ANOVA, Pearson's product-moment correlation coefficients, and regression analyses) were computed.

From the analyses (see Table 1), it was found that although the mean scores of anxiety and depression were less than 8 (i.e., the cut-off score for clinical diagnosis of anxiety and depression), the mean scores in the pre-operative phase were higher in comparison with the mean scores of the subsequent phases. To understand the nature of variation across the three phases, one-way repeated measures ANOVAs were computed for anxiety and depression separately. A significant difference in mean scores across the three phases was found for anxiety, $F(2, 198) = 64.18$, $p < .001$, and depression, $F(2, 198) = 36.22$, $p < .001$. By means of post-hoc analyses (Bonferroni), the mean anxiety score in the pre-operative phase ($M = 4.90$, $SD = 3.95$) was observed to be significantly higher ($p < .001$) than that of the first review ($M = 1.63$, $SD = 2.23$), and the second review ($M = 1.86$, $SD = 2.03$), although no significant difference was found between the mean anxiety scores of the two post-surgery reviews. For depression, the mean score at the pre-operative phase ($M = 4.10$, $SD = 3.30$) was significantly higher ($p < .001$) than the mean score during the first review ($M = 2.03$, $SD = 2.60$), and the second review ($M = 1.26$, $SD = 1.82$). The mean depression score of the first review was also significantly higher ($p = .019$) than that of the second review.

Table 1. Pearson's product-moment correlation coefficients between predictor variables and criterion variables

Predictors	M^a	SD^a	Adherence	Prognosis
Anxiety				
Pre-operative	4.90	3.95	–.16	–.53***
First review	1.63	2.23	–.25*	–.42***
Second review	1.86	2.03	–.24*	–.62***
Depression				
Pre-operative	4.10	3.30	–.06	–.27**
First review	2.03	2.60	–.44***	–.30**
Second review	1.26	1.82	–.33**	–.47***
M^b	-	-	76.55	105.00
SD^b	-	-	2.89	11.35

Note. [a]Means and standard deviations of predictor variables.

[b]Means and standard deviations of criterion variables during second review.

*p < .05, **p < .01, ***p < .001

Using Pearson's product-moment correlation coefficients (Table 1), we determined the relationships between the predictors—anxiety and depression—at the three time-points and the criterion variables—adherence and prognosis. Significant, negative correlations were found between adherence and anxiety at the first review, $r(98) = -.25$, $p < .05$, and the second review, $r(98) = -.24$, $p < .05$. There were significant, negative correlations between adherence and depression at the first review, r(98) = –.44, p < .001, as well as the second review, r(98) = –.33, p < .01. In addition, significant, negative correlations were found between prognosis and anxiety in the pre-operative phase, r(98) = –.53, p < .001, at the first review, r(98) = –.42, p < .001, and the second review, r(98) = –.62, p < .001. Similarly, there were significant, negative correlations between prognosis and depression in the pre-operative phase, r(98) = –.27, p < .01, at the first review, r(98) = –.30, p < .01, and the second review, r(98) = –.47, p < .001.

In order to explore the predictive role of psychological distress in adherence and prognosis, hierarchical multiple linear regression analyses were undertaken. Before computing these, the assumptions of the presence of normality, linearity and homoscedasticity, along with the absence of multicollinearity were tested. Thereafter, we assessed the role of anxiety and depression in adherence and then in prognosis.

Role of anxiety and depression in adherence

A 3-block hierarchical multiple linear regression analysis for adherence using enter method was computed (see Table 2), wherein pre-operative anxiety and pre-operative depression were entered in Model 1. The resulting model was not found to be significant, F(2, 97) = 1.39, p = .254. In Model 2, anxiety at first review and depression at first review were added. This model significantly explained 17% of variance in adherence, adjusted R^2 = .17. Thus, Model 2 was found to be significant, F(4, 95) = 6.06, p < .001. Finally, when anxiety at second review and depression at second review were entered in Model 3, it significantly explained 5% of more variance in adherence than Model 2, F change (2, 93) = 3.26, p = .043; thereby

Table 2. Hierarchical multiple linear regression model of adherence

	B	SEB	β	t	p
Model 1					
Constant	77.07	.50	-	-	-
Pre-operative anxiety	–.14	.09	–.18	1.57	.120
Pre-operative depression	.04	.10	.04	0.34	.735
Model 2					
Constant	77.65	.48	-	-	-
Pre-operative anxiety	–.08	.09	–.10	0.87	.387
Pre-operative depression	.06	.09	.07	0.61	.546
Anxiety at first review	.01	.16	.003	0.03	.977
Depression at first review	–.48	.12	–.43	4.02	< .001
Model 3					
Constant	78.02	.50	-	-	-
Pre-operative anxiety	–.06	.09	–.08	0.67	.504
Pre-operative depression	.04	.09	.05	0.47	.640
Anxiety at first review	.12	.16	.09	0.76	.451
Depression at first review	–.46	.12	–.41	3.89	< .001
Anxiety at second review	–.12	.15	–.08	0.77	.446
Depression at second review	–.33	.16	–.21	2.01	.048

Note. B = Unstandardised Beta Coefficient, SEB = Standard Error of Beta, β = Standardised Beta Coefficient, t = t-test, p = probability accounting for a total of 21% of significant variance in adherence, adjusted $R^2 = .21$. Model 3 was also observed to be significant, $F(6, 93) = 5.32$, $p < .001$. Two significant individual predictors emerged in Model 3 in respect of adherence—depression at first review ($\beta = -.41$, $t = 3.89$, $p < .001$), and depression at second review ($\beta = -.21$, $t = 2.01$, $p = .048$).

Role of anxiety and depression in prognosis

A 3-block hierarchical multiple linear regression analysis for prognosis using enter method was run (see Table 3) for understanding the role of anxiety and depression in prognosis. In Model 1, the role of pre-operative anxiety and pre-operative depression was evaluated. This model significantly explained 27% of variance in prognosis, adjusted $R^2 = .27$. Thus, Model 1 was found to be significant, $F(2, 97) = 18.91$, $p < .001$. Anxiety at first review and depression at first review were added in Model 2, which significantly explained 5% of more variance in prognosis, when compared with Model 1, F change $(2, 95) = 3.25$, $p = .043$; thereby accounting for a total of 30% of significant variance in prognosis, adjusted $R^2 = .30$. Therefore, Model 2 was observed to be significant as well, $F(4, 95) = 11.52$, $p < .001$.

Table 3. Hierarchical multiple linear regression model of prognosis

	B	*SEB*	*β*	*t*	*p*
Model 1					
Constant	112.37	1.70	-	-	-
Pre-operative anxiety	–1.54	.29	–.54	5.31	< .001
Pre-operative depression	0.05	.35	.01	0.14	.892
Model 2					
Constant	113.21	1.73	-	-	-
Pre-operative anxiety	–1.29	.31	–.45	4.11	< .001
Pre-operative depression	0.10	.34	.03	0.30	.765
Anxiety at first review	–0.69	.56	–.14	1.23	.222
Depression at first review	–0.59	.43	–.13	1.36	.177
Model 3					
Constant	116.56	1.52	-	-	-
Pre-operative anxiety	–1.01	.26	–.35	3.84	< .001
Pre-operative depression	–0.07	.28	–.02	0.24	.812
Anxiety at first review	0.39	.50	.08	0.78	.438
Depression at first review	–0.51	.36	–.12	1.41	.163
Anxiety at second review	–2.27	.47	–.41	4.80	< .001
Depression at second review	–1.34	.50	–.22	2.69	.008

Note. B = Unstandardised Beta Coefficient, SEB = Standard Error of Beta, β = Standardised Beta Coefficient, t = t-test, p = probability.

Finally, in Model 3, anxiety at second review and depression at second review were also included. This model, combining anxiety and depression at the three time-points as predictors, significantly explained an added 22% of variance in prognosis as compared with Model 2, F change (2, 93) = 22.59, $p < .001$; thereby accounting for a total of 52% of significant variance in prognosis, adjusted $R^2 = .52$. Model 3, too, was noted to be significant, $F(6, 93) = 18.70$, $p < .001$. There were three significant individual predictors in this model with respect to prognosis, i.e., pre-operative anxiety ($\beta = -.35$, $t = 3.84$, $p < .001$), anxiety at second review ($\beta = -.41$, $t = 4.80$, $p < .001$), and depression at second review ($\beta = -.22$, $t = 2.69$, $p = .008$).

Relationship between adherence and prognosis

Having found Model 3, which was inclusive of psychological distress at the three time-points, to be significant for adherence and prognosis, we further attempted to understand the relationship between adherence and prognosis. The correlation was observed to be significant ($r = .23$, $p < .05$). Owing to this result, it was found from simple linear regression analysis, taking adherence as a predictor and prognosis as a criterion, that adherence significantly explained 5% of variance in prognosis, $F(1, 98) = 5.57$, $p = .020$.

In summary, the findings indicated that anxiety and depression before and after CABG had acted in conjunction as a significant model to predict patients' adherence behaviour and prognosis. The contribution of psychological distress from across three time-points towards prognosis was relatively higher than that of adherence towards prognosis.

Discussion

The study set out to determine the level of psychological distress and its significance for patients' adherence and prognosis in context of CABG. The results depicted a reduction in anxiety and depression from before to after surgery. Yet, pre- and post-operative anxiety and depression had a significant effect on patients' level of adherence and prognosis even six weeks after they were discharged from the hospital.

Psychological distress prior to CABG was significantly higher than psychological distress following surgery. Indeed, the mean anxiety and depression scores did not warrant clinical diagnoses. Yet, the trends of change in these scores across time alongside their significant contributions to adherence and prognosis scores imply the need for periodical psychological assessment with intervention for patients during the period of surgery.

Adherence is touted as the cornerstone of prognosis after CABG, and involves following the doctor's advice concerning medication and lifestyle on returning home (Zarani, Sarami, & Sadeghian, 2014). Interestingly, we observed that adherence could explain, albeit significantly, only 5% of variance in prognosis. Conversely, a model comprising pre- and post-operative psychological distress significantly predicted prognosis, explaining up to 52% of significant variance. The same model involving psychological distress before and after surgery also significantly predicted adherence and accounted for a considerable 21% of significant variance. The low amount of variance explained by adherence in context of prognosis hints at the possibility that other variables besides adherence had played a role in predicting prognosis six weeks after the participants had been discharged from the hospital. For instance, factors such as age, co-morbidities, severity of illness, and personality have been found to impact upon patients' recovery and well-being (Karimi et al., 2008; NHS Choices, 2014b). Within the framework of this study, psychological distress was a significant predictor of prognosis. In line with Moser's (2007) argument, the current findings underline that psychological distress shapes the process and outcomes of recovery among patients subjected to CABG.

While anxiety and depression across the three time-points were found to operate as a combined significant model predicting adherence and prognosis through hierarchical multiple linear regression analyses, the individual roles played by the two forms of psychological distress are also worth deliberating upon. Relative to anxiety, depression at the first and second reviews each acted as a significant individual predictor of adherence. One of the principal symptoms of depression is reduced interest and engagement in one's activities (American Psychiatric Association, 2013). Such anhedonia or loss of motivation can have an adverse effect on adherence to one's self-care regimen, thus, revealing the impact of depression on adherence among the current participants. Research evidences suggest that depressed patients are less likely to consume their prescribed medicines regularly (Carney, Freedland, Eisen, Rich, & Jaffe 1995; Gehi, Haas, Pipkin, & Whooley, 2005). These findings justify our results. In case of prognosis, anxiety experienced in the pre-operative phase and at the second review alongside depression at the second review each stood out as a significant individual predictor. Larsen and Christenfeld (2009) posited that the propensity for rumination and cognitive inflexibility among anxious individuals impedes healing and can provoke cardiovascular damage. These observations only restate the need to assess and address psychological distress so that the goals of CABG are achieved.

The results provided by this study come at a time when the world is being cautioned about the CAD pandemic, i.e., heart disease tops the charts for mortality and years of life lost prematurely (World Health Organisation, 2014; 2015). The success of the concurrently rising CABG procedures should, however, not be blunted by unaddressed and far-reaching psychological distress. The findings, therefore, must trigger remedial action. Assessment of psychological distress may be mandated in the biomedical healthcare. Pertinently, assessment needs to be repeatedly undertaken (before and after surgery) for a comprehensive evaluation of patients' psychological status. This would foster an understanding of patients' vulnerabilities and support needs at different points during the period of surgery. Acknowledging psychological distress should prompt the development and implementation of timely and cost-effective interventions in healthcare.

Psycho-education is one example found suitable in other studies; educating patients during the phase of CABG led to minimal psychological distress and higher ability for self-care, culminating in better recovery (Cebeci & Çelik, 2008; Martin & Turkelson, 2006). Psychological techniques such as relaxation can also be beneficial. Reports indicate that patients experience reduced pain and anxiety when they use a relaxation technique (Dehadri, Heidarnia, Ramezankhani, Sadeghian, & Ghofranipour, 2009; Firoozabadi & Ebadi, 2014; Miller & Perry, 1990). The long-term effects of relaxation (e.g., after hospital discharge) await further investigation. Social support is another relevant factor when discussing patients' well-being during the period of surgery. It promotes health behaviours and adherence, while low support is linked to the onset and exacerbation of depression and physiological dysregulation (Lett et al., 2005). One study testified to this proposition in finding that perceived social support significantly predicted anxiety and depression, thus, indicating that social support is critical for psychological well-being (Chivukula, Swain, Rana, & Hariharan, 2013). It may be worthwhile to combine psycho-education and social support such as to explore the role of peer patients who have undergone CABG in educating new patients as they await surgery. Evidence-based psychosocial interventions, thus, must be validated and implemented.

Implications

The present study shows that self-report measures constitute an appropriate and satisfactory means to quantify the experience pattern of patients in medical settings where diagnostic scans and tests are typically preferred

(Verghese & Horwitz, 2009). The focus, as the findings highlight, should also be drawn to patients' psychological well-being, which influences clinical outcomes of self-care and recovery. The current design facilitated the linking of these variables across time. This study additionally underlines that information on psychological distress before and after CABG can help to design individualised psychological interventions.

Limitations

There are a few potential limitations in the study. We relied on correlational data to understand the research problem. A relatively small sample in five corporate hospitals was recruited and retained, which might have affected the statistical analyses. In addition to measurement, qualitative method could have been used to understand the lived experiences of patients undergoing CABG. The current findings merit further research, based across cultures, to establish how psychological distress can be sensitively attended to and attenuated.

Conclusion

Psychological distress, stirred up by the event of CABG, reduced between pre-surgery and post-surgery assessments, yet acted as a significant predictor of adherence and prognosis for the participants. Anxiety and depression before and after surgery worked in combination to influence the variance in adherence behaviour and overall prognosis, six weeks after surgery. The contribution of anxiety and depression across time to prognosis was higher in comparison with that of adherence to prognosis. Timely psychological assessment and individualised psychosocial intervention during the period of surgery and convalescence are essential to optimise the therapeutic benefits of CABG.

References

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Washington: American Psychiatric Association.

Bjelland, I., Dahl, A. A., Haug, T. T., & Neckelmann, D. (2002). The Validity of the Hospital Anxiety and Depression Scale: An Updated Literature Review. *Journal of Psychosomatic Research, 52*, 69–77. doi: 10.1016/S0022-3999(01)00296-3

Carney, R. M., Freedland, K. E., Eisen, S. A., Rich, M. W., & Jaffe, A. S. (1995). Major Depression and Medication Adherence in Elderly Patients with Coronary Artery Disease. *Health Psychology, 14,* 88–90. doi: 10.1037/0278-6133.14.1.88

Cebeci, F., & Çelik, S. Ş. (2008). Discharge Training and Counselling increase Self-care Ability and reduce Postdischarge Problems in CABG Patients. *Journal of Clinical Nursing, 17*, 412–420. doi: 10.1111/j.1365-2702.2007.01952.x

Centers for Disease Control and Prevention. (2015). *Inpatient Surgery*. Retrieved from http://tinyurl.com/p9fnfpm. Accessed 30 April 2015.

Chaudhury, S., Sharma, S., Pawar, A. A., Kumar, B. K., Srivastava, K., Sudarsanan, S., & Singh, D. (2006). Psychological Correlates of Outcome after Coronary Artery Bypass Graft. *Medical Journal Armed Forces India, 62*, 220–223. doi: 10.1016/S0377-1237(06)80004-3

Chivukula, U., Hariharan, M., Rana, S., Thomas, M., & Swain, S. (2014). Role of Psychosocial Care on ICU Trauma. *Indian Journal of Psychological Medicine, 36*, 312–316. doi: 10.4103/0253-7176.135388

Chivukula, U., Swain, S., Rana, S., & Hariharan, M. (2013). Perceived Social Support and Type of Cardiac Procedures as Modifiers of Hospital Anxiety and Depression. *Psychological Studies, 58*, 242–247. doi: 10.1007/s12646-013-0199-5

Christakis, N. A. (1999). *Death Foretold: Prophecy and Prognosis in Medical Care*. Chicago: University of Chicago Press.

Cleveland Clinic. (2010). *Bypass Surgery*. Retrieved from http://tinyurl.com/c8shv9h. Accessed 21 September 2015.

Dehdari, T., Heidarnia, A., Ramezankhani, A., Sadeghian, S., & Ghofranipour, F. (2009). Effects of Progressive Muscular Relaxation Training on Quality of Life in Anxious Patients after Coronary Artery Bypass Graft Surgery. *Indian Journal of Medical Research, 129,* 603–608.

Deshpande, P. R., Rajan, S., Sudeepthi, B. L., & Nazir, C. P. A. (2011). Patient-reported

Outcomes: A New Era in Clinical Research. *Perspectives in Clinical Research, 2*, 137–144. doi: 10.4103/2229-3485.86879

Ebadi, A., Moradian, S. T., Feyzi, F., & Asiabi, M. (2011). Comparison of the Hospital Anxiety and Depression among Patients with Coronary Artery Disease based on Proposed Treatment. *Iranian Journal of Critical Care Nursing, 4*, 97–102.

Firoozabadi, M. D., & Ebadi, A. (2014). Effect of Relaxation on Postoperative Pain in Patients after Coronary Artery Bypass Grafting (CABG) Surgery. *NationalPark-Forschung in Der Schweiz (Switzerland Research Park Journal), 103,* 185–191.

Gehi, A., Haas, D., Pipkin, S., & Whooley, M. A. (2005). Depression and Medication Adherence in Outpatients with Coronary Heart Disease: Findings from the Heart and Soul Study. *Archives of Internal Medicine, 165*, 2508–2513. doi: 10.1001/archinte.165.21.2508

House, A., & Stark, D. (2002). Anxiety in Medical Patients. *British Medical Journal, 325*, 207. doi: 10.1136/bmj.325.7357.207

Jin, J., Sklar, G. E., Oh, V. M. S., & Li, S. C. (2008). Factors affecting Therapeutic Compliance: A Review from the Patient's Perspective. *Therapeutics and Clinical Risk Management, 4,* 269–286.

Karimi, A., Ahmadi, H., Davoodi, S., Movahedi, N., Marzban, M., Abbasi, K.,... Fallah, N. (2008). Factors affecting Postoperative Morbidity and Mortality in Isolated Coronary Artery Bypass Graft Surgery. *Surgery Today, 38*, 890–898. doi: 10.1007/s00595-007-3733-z

Kasliwal, R. R., Kulshreshtha, A., Agrawal, S., Bansal, M., & Trehan, N. (2006). Prevalence of Cardiovascular Risk Factors in Indian Patients undergoing Coronary Artery Bypass Surgery. *Journal of the Association of Physicians of India, 54*, 371–375.

Larsen, B. A., & Christenfeld, N. J. S. (2009). Cardiovascular Disease and Psychiatric Comorbidity: The Potential Role of Perseverative Cognition. *Cardiovascular Psychiatry and Neurology,* 2009. doi: 10.1155/2009/791017. Retrieved from http://tinyurl.com/o5jqjrh

Lett, H. S., Blumenthal, J. A., Babyak, M. A., Strauman, T. J., Robins, C., & Sherwood, A. (2005). Social Support and Coronary Heart Disease: Epidemiologic Evidence and Implications for Treatment. *Psychosomatic Medicine, 67,* 869–878. doi: 10.1097/01.psy.0000188393.73571.0a

Martin, C. G., & Turkelson, S. L. (2006). Nursing Care of the Patient undergoing Coronary Artery Bypass Grafting. *Journal of Cardiovascular Nursing, 21*, 109–117.

McCormick, K. M., Naimark, B. J., & Tate, R. B. (2006). Uncertainty, Symptom Distress, Anxiety, and Functional Status in Patients awaiting Coronary Artery Bypass Surgery. *Heart & Lung, 35*, 34–45. doi: 10.1016/j.hrtlng.2005.08.002

Mental Health Foundation. (2011). *Physical Health and Mental Health.* Retrieved from http://tinyurl.com/nqwgsft. Accessed 30 April 2015.

Miller, K. M., & Perry, P. A. (1990). Relaxation Technique and Postoperative Pain in Patients undergoing Cardiac Surgery. *Heart & Lung, 19,* 136–146.

Moser, D. K. (2007). "The Rust of Life": Impact of Anxiety on Cardiac Patients. *American Journal of Critical Care, 16*, 361–369.

Murri, R., Ammassari, A., Trotta, M. P., De Luca, A., Melzi, S., Minardi, C.,... AdICoNA Study Group. (2004). Patient-reported and Physician-estimated Adherence to HAART. *Journal of General Internal Medicine, 19*, 1104–1110. doi: 10.1111/j.1525-1497.2004.30248.x

NHS Choices. (2014a). *Coronary Artery Bypass Graft*. Retrieved from http://tinyurl.com/q6cox99. Accessed 30 April 2015.

NHS Choices. (2014b). *Coronary Artery Bypass Graft – Risks*. Retrieved from http://tinyurl.com/osk7x4m. Accessed 21 September 2015.

Russ, T. C., Stamatakis, E., Hamer, M., Starr, J. M., Kivimäki, M., & Batty, G. D. (2012). Association between Psychological Distress and Mortality: Individual Participant pooled Analysis of 10 Prospective Cohort Studies. *British Medical Journal, 345*, E4933. doi: 10.1136/bmj.e4933

Verghese, A., & Horwitz, R. I. (2009). In Praise of the Physical Examination. *British Medical Journal, 339*, B5448. doi: 10.1136/bmj.b5448

Whooley, M. A., de Jonge, P., Vittinghoff, E., Otte, C., Moos, R., Carney, R. M.,... Browner, W. S. (2008). Depressive Symptoms, Health Behaviors, and Risk of Cardiovascular Events in Patients with Coronary Heart Disease. *Journal of the American Medical Association, 300*, 2379–2388. doi: 10.1001/jama.2008.711

World Health Organization. (2014). *World Health Statistics 2014*. Geneva: World Health Organization.

World Health Organization. (2015). *Cardiovascular Diseases (CVDs)*. Retrieved from http://tinyurl.com/br89ujf. Accessed 30 April 2015.

Zarani, F., Sarami, G., & Sadeghian, S. (2014). Adherence in CABG Patients: An Empirical Test of a Health Behavior Model. *International Journal of Clinical Medicine, 5*, 225–233. doi: 10.4236/ijcm.2014.55036

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica, 67*, 361–370. doi: 10.1111/j.1600-0447.1983.tb09716.x

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Conflict of Interest:
The authors declare that they have no conflict of interest.

Informed Consent:
Informed consent was obtained from all the individual participants included in the study.

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Suvashisa Rana, Assistant Professor, Centre for Health Psychology, University of Hyderabad, Hyderabad, Telangana, INDIA

Test comparing Fit of Full and Reduced Models
(Multiple Regression-based Path Analyses)

Fit of full model

$1 - \Pi(\text{error}^2)$, where Π represents product

$1 - [(.96)^2\ (.74)^2\ (.66)^2\ (.77)^2\ (.62)^2]$

$1 - [(.922)\ (.548)\ (.436)\ (.593)\ (.384)]$

$1 - [0.05] = 0.95$

Fit of reduced model

$1 - \Pi(\text{error}^2)$, where Π represents product

$1 - [(.97)^2\ (.75)^2\ (.67)^2\ (.79)^2\ (.64)^2]$

$1 - [(.941)\ (.563)\ (.449)\ (.624)\ (.410)]$

$1 - [0.06] = 0.94$

Relative fit of reduced model to full model

Q = (1 – fit of full model)/(1 – fit of reduced model)

$Q = (1 - 0.95)/(1 - 0.94)$

$Q = (0.05)/(0.06) = 0.833$

Significance test

$W = -(N - d) \times \log_e Q$, where N = sample size, d = number of paths dropped in reduced model

$W = -(300 - 36) \times \log_e(0.833)$

$W = -264 \times -0.183 = 48.312$

W is interpreted as chi-square (χ^2) with $df = d$ (number of paths dropped). The value of *W* in this analysis (48.312) was lesser than the critical value (50.998) of χ^2 distribution for $df = 36$ at $p < .05$, indicating no significant difference in the fit of the two models. This implies that the reduced model (with 36 paths lesser than the full model) did not significantly differ from the full model in terms of encapsulating the criterion variables.

Institute Ethics Committee, University of Hyderabad

Justice R. Rangarajan
Chairperson

Prof. Geeta K. Vemuganti
Member Secretary

Decision Letter of Institute Ethics Committee, University of Hyderabad

IEC No Application No:	**UH/IEC/2014/18**	**Date of review**	**21.4.2014**
Project Title:	**Impact of Psychosocial Intervention on Adherence, Prognosis and well -being of Cardiac patients**		
Principal Investigator/ Co-PI:	**Prof. Meena Hariharan** **Marlyn Thomas**		
Participating Institutes if any	**Care Hospital, KIMS, Sunshine Heart Institute, Yashoda Hospital,Apollo Hospital**	**Approval from Participating Institute**	**yes**
In case of renewal submission of update	**Protocol,ICF,Questionnaire/Tools**		
Decision of the IEC:	**Approved** **Duration of Approval: One year from date of approval**		
Any other Comments Requirements for conditional Approval	---		

Please note:

a. Any amendments in the protocol must be informed to the Ethics committee and fresh approval taken.
b. Any serious adverse event must be reported to the Ethics Committee within 48 hours in writing (mentioning the protocol No. or the study ID)
c. Any advertisement placed in the newspapers, magazines must be submitted for approval.
d. The results of the study should be presented in any of the academic forums of the hospital annually.
e. If the conduct of the study is to be continued beyond the approved period, an application for the same must be forwarded to the Ethics Committee.
f. It is hereby confirmed that neither you nor any of the members of the study team participated in the decision making/voting procedures.

Chairperson

(Justice Rangarajan)

Member Secretary

(Prof. Geeta K Vemuganti)

Member Secretary
Institutional Ethics Committee (IEC)
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University of Hyderabad
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GL assessment

Appendix C3

PROF. MEENA HARIHARAN
Director

CENTRE FOR HEALTH PSYCHOLOGY
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Date: 03/01/2014

To

____

____

____

____

Dear Sir/Madam,

Ms. Marlyn Thomas is pursuing PhD at our Centre under my supervision on the topic, “Impact of Psychosocial Intervention on Adherence, Prognosis and Well-being of Cardiac Patients”. She now has to collect data for her study. In connection with this, she is required to interact with cardiothoracic surgeons and their patients who are undergoing coronary artery bypass graft (CABG) surgery. She will be administering questionnaires to doctors and patients, collecting information from patients’ medical records, and facilitating psychosocial intervention programmes for patients. The data collection is expected to range for the period of one year. The data will be used purely for academic purposes. I, therefore, request you to kindly grant Ms. Marlyn Thomas the permission to collect data in your hospital.

Thanking you.

Sincerely,

(PROF. MEENA HARIHARAN)

University of Hyderabad
Centre for Health Psychology

DOCTOR INFORMATION SHEET

Project title: **Impact of Psychosocial Intervention on Adherence, Prognosis and Well-being of Cardiac Patients**

You are invited to participate in this research study spanning over a period of one year. The study is being undertaken to fulfil the requirements of PhD by Ms. Marlyn Thomas under the guidance of Prof. Meena Hariharan. Your participation is purely voluntary. In order to help yourself decide whether to participate or not, please make yourself familiar with the purpose of the study, what it involves and what it will be used for by reading the information given below carefully. To help you understand what your patients will be requested to do, the *Patient Information Sheet* is enclosed. You are welcome to clarify with the investigator anything concerning the study, your participation and your patients' participation.

1. What is the purpose of the study?

The study aims to find out how effective psychosocial intervention programmes can be in helping patients who undergo CABG surgery to achieve favourable health outcomes and to sustain positive well-being through strict adherence to prescription.

2. Why am I requested to take part?

In order to provide psychosocial intervention in addition to standard care and medical treatment given by you to your patients, your approval is sought. Further, your permission for obtaining data from their medical records is solicited. Separate consent from the patient on these aspects is also being obtained.

The decision to participate is entirely voluntary. It is up to you to decide whether or not to take part. If you decide to participate, you are still free to withdraw at any time and without giving a reason.

3. How do my patients and I participate in the study?

Only when both you and your patients give consent will your patients undergoing CABG surgery be made a part of the study. **Your patients' participation in this study will not require them or you to change your standard treatment procedure. All that the study involves is to provide non-invasive psychosocial intervention in addition to standard treatment.**

Your patients, who are willing to participate, will randomly be assigned to any of the three groups described below:

Group 1 will get to watch two videos of discussions between a surgeon and a patient who has already undergone bypass surgery and has recovered successfully. The videos will be shown before surgery and before discharge to give the patient information about the do's and don'ts

Please turn over

concerning her/his health from a doctor's as well as an experienced patient's perspective. Patients in this group will also receive a DVD at the time of discharge so that they can watch the discussions at home.

Group 2 will be given two sessions in relaxation through what is called 'Guided Imagery'. The aims of this intervention are to make the patient feel fully relaxed and to bring down her/his anxiety before surgery and also before s/he goes home from the hospital. Patients in this group will also receive a CD at the time of discharge so that they can practise relaxation at home.

Group 3 is called the Control Group. Patients assigned to this group will only receive medical treatment like any other patient who is not participating in this study.

Irrespective of the group patients are assigned to, we will request them to fill in a few questionnaires (appended for reference) that measure a number of aspects related to their physical, psychological and social dimensions before the surgery, at the first review and at the second review.

4. Are there any benefits or risks attached to my participation?

There are **no direct benefits or payments** for your participation. Nonetheless, your contribution may lead to better healthcare practices for surgery patients in the future.

No risks are anticipated for this study. In the unlikely event that you feel worried at any point during this study, you are free to withdraw your participation.

5. Will my taking part in this study be kept confidential?

Information collected from you will have your name and address removed, and would be identified by an identity number so that your details remain confidential. All personal details will be confidential within legal limits.

6. How will the results of the research study be used?

The results obtained through analysis based on the data collected from you, other doctors and patients will form a part of the research at the Centre for Health Psychology, University of Hyderabad, and may be published later in a scientific journal. However, the results pertaining to you will be made available to you on request.

Any further information related to this study can be obtained by contacting this phone number (9502381825) or email address (marlynthomas@uohyd.ac.in).

Thank you for taking time to read this. If you are willing to participate, kindly sign the *Doctor Informed Consent Form* given on the following page.

Appendix C5

University of Hyderabad
Centre for Health Psychology

DOCTOR INFORMED CONSENT FORM

Project title: **Impact of Psychosocial Intervention on Adherence, Prognosis and Well-being of Cardiac Patients**

1. I confirm that I have read and understood the *Doctor Information Sheet* and the *Patient Information Sheet* for the said study, and that I have had the opportunity to clarify doubts.

2. I understand that my participation is voluntary, and that I am free to withdraw at any time without giving any reason.

3. I am willing to permit the investigator to recruit my CABG patients (who fulfil the inclusion criteria) as participants for this study, to administer questionnaires and psychosocial interventions to them, and to seek information from their medical records.

4. I understand that information concerning me collected during this study may form part of future publications, and that such information would be anonymous.

____________________________ ____________________ _________

Name of doctor Signature Date

Phone: _______________________ Email: ____________________________

Address: ____

____

____

University of Hyderabad
Centre for Health Psychology

DOCTOR CONSENT FORM FOR VIDEO RECORDING

Project title: **Impact of Psychosocial Intervention on Adherence, Prognosis and Well-being of Cardiac Patients**

1. I am willing to participate in the discussion wherein I, as a medical expert, will provide necessary suitable information about CABG surgery.

2. I give my consent for this discussion to be video recorded.

3. I understand that the video of this discussion will be used for academic purposes, and may be shown to doctors, patients, caregivers and students.

______________________________	______________________	__________
Name of doctor	Signature	Date

Phone: _________________________ Email: ______________________________

Address: ____

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Appendix C6.2

University of Hyderabad
Centre for Health Psychology

PATIENT CONSENT FORM FOR VIDEO RECORDING

Project title: **Impact of Psychosocial Intervention on Adherence, Prognosis and Well-being of Cardiac Patients**

1. I am willing to participate in the discussion wherein I will share my experience of bypass surgery.

2. I give my consent for this discussion to be video recorded.

3. I understand that the video of this discussion will be used for academic purposes, and may be shown to doctors, patients, caregivers and students.

______________________________	________________________	___________
Name of patient	Signature	Date

Telephone number Mobile: ___________________ Residence: ________________

Address: _______________________________ Email: ________________________

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Appendix C6.3

University of Hyderabad
Centre for Health Psychology

MODERATOR CONSENT FORM FOR VIDEO RECORDING

Project title: **Impact of Psychosocial Intervention on Adherence, Prognosis and Well-being of Cardiac Patients**

1. I am willing to moderate the discussion on Coronary Artery Bypass Graft (CABG) surgery.

2. I give my consent for this discussion to be video recorded.

3. I understand that the video of this discussion will be used for academic purposes, and may be shown to doctors, patients, caregivers and students.

______________________________ ________________________ ___________

Name Signature Date

Phone: __________________________ Email: _____________________________

Address: ____

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____

University of Hyderabad
Centre for Health Psychology

CONSENT FORM FOR AUDIO RECORDING

Project title: **Impact of Psychosocial Intervention on Adherence, Prognosis and Well-being of Cardiac Patients**

1. I am willing to have my session on Guided Imagery audio recorded.

2. I understand that the audio of this session will be used for academic purposes, and may be presented to doctors, patients, caregivers and students.

____________________ ____________________ __________

Name Signature Date

Phone: ____________________ Email: ____________________

Address: ______________________________

____

____

University of Hyderabad
Centre for Health Psychology

PATIENT INFORMATION SHEET

Project title: **Impact of Psychosocial Intervention on Adherence, Prognosis and Well-being of Cardiac Patients**

You are invited to participate in this research study, spanning over a period of two months. The study is being undertaken to fulfil the requirements of PhD by Ms. Marlyn Thomas under the guidance of Prof. Meena Hariharan. Your participation is purely voluntary. In order to help yourself decide whether to participate or not, please make yourself familiar with the purpose of the study, what it involves and what it will be used for by reading the information given below carefully. You are welcome to clarify with the researcher anything concerning the study and your participation.

1. What is the purpose of the study?

The study aims to find out how effective psychosocial intervention programmes can be in helping patients who undergo bypass surgery to achieve favourable health outcomes and to sustain positive well-being through strict adherence to prescription.

2. Why am I requested to take part?

Your age, your health status and the fact that you are undergoing bypass surgery for the first time have been considered to determine your suitability to participate in this study.

The decision to participate is entirely voluntary. It is up to you to decide whether or not to take part. If you decide to participate, you are still free to withdraw at any time and without giving a reason.

3. How do I participate in this study?

Only after you and your doctor agree will you be a part of this study. **Your participation will not affect your medical treatment in any way.** You will be assigned to one of the three groups in this study that are described below, by the method of random selection. This means that your chance of being included in any of the three groups is 1/3rd. Random selection helps to reduce bias in the research findings.

Group 1 will get to watch two videos of discussions between a surgeon and a patient who has already undergone bypass surgery and has recovered successfully. The videos will be shown to you before your surgery and before your discharge to give you information about the do's and don'ts concerning your health from a doctor's as well as an experienced patient's perspective. This lasts for 20 minutes. You will receive a DVD at the time of discharge so that you can watch the discussions at home. We may remind you by phone to use the DVD at home. You will not have to pay any money for the DVD.

Please turn over

Group 2 will be given two sessions in relaxation through what is called 'Guided Imagery'. These sessions will take place before your surgery and once again before your discharge. The psychologist will train you in relaxing your body and mind through suggestions to help you visualise a calming situation with your sense organs. This lasts for 20 minutes. The aims of this intervention are to make you feel fully relaxed and to bring down your anxiety before surgery and also before you go home from the hospital. You will receive a CD at the time of discharge so that you can practise relaxation at home. We may remind you by phone to use the CD at home. You will not have to pay any money for the CD.

Group 3 is called the Control Group. In case you are assigned to this group, you will only receive medical treatment like any other patient who is not participating in this study.

Irrespective of the group you are assigned to, we will request you to fill in a few questionnaires that measure a number of aspects related to your physical, psychological and social dimensions.

4. When do I have to respond to questionnaires?

You will be requested to fill in questionnaires on three occasions as explained here –

On admission: We will give you three questionnaires to understand your beliefs about your health condition, the extent of support you receive from your near and dear ones, and your mental state.

At first follow-up: We will give you a questionnaire to examine your mental state.

At second follow-up: We will give you three questionnaires to determine how you have been doing after surgery, the extent to which you follow your doctor's recommendations, and your mental state.

5. Are there any benefits or risks attached to my participation?

There are **no direct benefits or payments** for your participation. Nonetheless, if you are assigned to Group 1 or Group 2, there is a possibility of lowering your anxiety level which, in turn, may help in your positive recovery. If you are a part of Group 3 that receives the medical treatment only, your contribution to this study may lead to better healthcare practices for surgery patients in the future.

No risks are anticipated for this study. In the unlikely event that you feel worried at any point during this study, you are free to withdraw your participation.

6. Will my taking part in this study be kept confidential?

Information collected from you during the course of this study will be known only to the research team. The information will have your name and address removed, and would be identified by an identity number so that your details remain confidential. All personal details will be confidential within legal limits.

Please turn over

7. How will the results of the research study be used?

The results obtained through analysis based on the data collected from you and other participants will form a part of the research at the Centre for Health Psychology, University of Hyderabad, and may be published later in a scientific journal. However, the results pertaining to you will be made available to you on request.

Any further information related to this study can be obtained by contacting this phone number (9502381825) or email address (marlynthomas@uohyd.ac.in).

Thank you for taking time to read this. If you are willing to participate, kindly sign the *Patient Informed Consent Form* given on the following page.

హైదరాబాద్ విశ్వవిద్యాలయం

సెంటర్ ఫర్ హెల్త్ సైకాలజీ

రోగికి ఇవ్వబడే సమాచార పత్రం

ప్రాజెక్టు: **గుండె జబ్బు గల వారి చికిత్స పట్ల పాటింపు, మెరుగుదల, సంక్షేమంపై సామాజిక-మానసిక విధానపు ప్రభావం**

రెండు నెలలపాటు సాగే ఈ పరిశోధనలో పాల్గొనడానికి మిమ్మల్ని ఆహ్వానిస్తున్నాం. ఈ పరిశోధన ప్రొఫెసర్ మీనా హరిహరన్ గారి మార్గదర్శకత్వంలో కుమారి మార్లిన్ థామస్ పి.హెచ్.డి. పట్టా కోసం చేయబడుతున్నది. మీరు ఇందులో పూర్తిగా స్వచ్ఛందంగా పాల్గొనవలసి ఉంటుంది. ఈ పరిశోధనలో పాల్గొనాలో వద్దో నిర్ణయించుకోడానికి ముందుగా ఈ పరిశోధన ఉద్దేశ్యం ఏంటో, అందులో ఏమి ఉంటుందో, ఎందుకోసం చేయబడుతున్నదో ఈ క్రింది సమాచారం జాగ్రత్తగా చదవడం ద్వారా తెలుసుకోవచ్చు. ఈ పరిశోధన గురించి కానీ అందులో మీ పాత్ర గురించి కానీ ఇంకేమైనా సందేహాలుంటే మీరు పరిశోధకురాలిని అడిగి తెలుసుకోవచ్చు.

1. ఈ పరిశోధన ఉద్దేశ్యం ఏంటి?

బైపాస్ సర్జరీ చేయించుకున్న రోగులకు వారి డాక్టరు సలహాలను తూచ తప్పకుండా పాటించడం వల్ల మెరుగైన ఆరోగ్య ఫలితాలను సాధించడానికి, ఆరోగ్య సంక్షేమాన్ని నిలబెట్టుకోడానికి, సామాజిక-మాససిక విధానాలు ఎంత ప్రభావవంతంగా సహాయపడతాయో తెలుసుకోవడం ఈ పరిశోధన లక్ష్యం.

2. నేను పాల్గొనమని ఎందుకు అడుగుతున్నారు?

మీ వయసు, మీ ఆరోగ్య పరిస్థితి, మీరు మొదటిసారిగా బైపాస్ సర్జరీ చేయించుకుంటున్నారన్న విషయాలు మిమ్మల్ని ఈ పరిశోధనలో పాల్గొనేందుకు అర్హులను చేశాయి.

మీరు పాల్గొనేందుకు తీసుకునే నిర్ణయం పూర్తిగా స్వచ్ఛందంగా తీసుకొనేది. ఇందులో పాల్గొనాలా వద్దా అని నిర్ణయించుకోవలసింది మీరే. మీరు పాల్గొనేందుకు నిర్ణయం తీసుకున్నాక కూడా మీరు ఏ కారణం చెప్పకుండా ఎప్పుడైనా ఈ పరిశోధన నుండి వెళ్ళిపోయే స్వేచ్ఛ మీకుంది.

3. నేను ఏ వధంగా ఈ పరిశోధనలో పాల్గొనవచ్చు?

మీరు, మీ డాక్టరు అంగీకరించిన తర్వాతనే మీరు ఈ పరిశోధనలో భాగంగా ఉంటారు. **మీరు ఈ పరిశోధనలో పాల్గొనటం మీ వైద్య చికిత్స పై ఎటువంటి ప్రభావం చూపదు**. ఈ పరిశోధనలో మూడు గ్రూపులుంటాయి. మీరు ఈ మూడు గ్రూపుల్లో ఏదో ఒక దానిలోకి యాదృచ్ఛిక ఎంపిక పద్ధతి ద్వారా

కేటాయింపబడతారు. అంటే, ఏ ఒక్క గ్రూపులో నైనా మీరు కేటాయింపబడటానికి అవకాశం 1/3గా ఉంటుంది. ఇలా యాదృచ్ఛిక ఎంపిక పరిశోధనా ఫలితాలలో ఏ పక్షపాతం లేకుండా సాయపడుతుంది.

గ్రూప్ 1 ఒక సర్జన్ కి, బైపాస్ సర్జరీ చేయించుకుని విజయవంతంగా కోలుకున్న రోగికి మధ్య చర్చని ప్రదర్శించే రెండు వీడియోలని చూస్తారు. ఈ వీడియోలు మీ సర్జరీకి ముందు, అలాగే సరిగ్గా ఆసుపత్రి నుండి ఇంటికి వెళ్ళబోయే ముందు చూపబడతాయి. వీటి ద్వారా ఒక డాక్టరు మరియు ఒక అనుభవజ్ఞుడైన రోగి ద్వారా ఏమి చేయవచ్చు, ఏమి చేయకూడదు అనే సమాచారాన్ని పొందుతారు. ఇది 20 నిమిషాల వరకు ఉంటుంది. మీరు ఆసుపత్రి నుండి ఇంటికి వెళ్ళబోయేముందు మీకు ఇంట్లో ఈ చర్చలు చూసేందుకువీలుగా డి.వి.డి. (DVD) ఇవ్వబడుతుంది. ఇంట్లో డి.వి.డి. వాడేందుకు మేము మీకు ఫోన్ ద్వారా గుర్తుచేస్తాము. ఈ డి.వి.డి. కోసం మీరు డబ్బేమీ కట్టనవసరం లేదు.

గ్రూప్ 2 'గైడెడ్ ఇమేజరీ' అనే పద్ధతి ద్వారా రెండు సెషన్ల 'రిలాక్సేషన్' ఇవ్వబడుతుంది. ఈ సెషన్లు మీ సర్జరీకి ముందు, అలాగే సరిగ్గా మీరు అసుపత్రినుండి ఇంటికి పంపబడేముందు ఇవ్వబడతాయి. ఈ రిలాక్సేషన్ పద్ధతిలో సైకాలజిస్ట్ తన సూచనల ద్వారా మీరు ఒక విశ్రాంతి పూర్వక పరిస్థితిని మీ జ్ఞానేంద్రియాల సహకారంతో ఊహించే విధంగా మీ శరీరం, మనసు విశ్రాంతి పొందే విధంగా శిక్షణ ఇస్తారు. ఇది 20 నిమిషాల వరకు ఉంటుంది. మీరు పూర్తిగా రిలాక్స్ అవడం, అలాగే మీ సర్జరీకి ముందు మరియు అసుపత్రినుండి ఇంటికి తిరిగి వెళ్ళేముందు మీలో ఆందోళన తగ్గించడం ఈ విధానపు లక్ష్యాలు. ఆసుపత్రినుండి ఇంటికి వెళ్ళాక కూడా మీరు రిలాక్సేషన్ అభ్యాసం చేసుకోడానికి మీకొక సి.డి. (CD) ఇవ్వబడుతుంది. ఇంట్లో సి.డి. వాడేందుకు మేము మీకు ఫోన్ ద్వారా గుర్తుచేస్తాము. ఈ సి.డి. కోసం మీరు ఏమీ డబ్బు కట్టనవసరం లేదు.

గ్రూప్ 3ని కంట్రోల్ గ్రూప్ (నియంత్రిత గ్రూప్) అంటాము. మీరు ఈ గ్రూపులో ఎంపికైతే మీకు ఈ పరిశోధనలో పాల్గొనని ఇతర సాధారణ రోగులలాగానే వైద్య చికిత్స మాత్రమే ఇవ్వబడుతుంది.

మీరు ఏ గ్రూపులో ఎంపికైనా సరే, మీ శారీరిక, మానసిక, సామాజిక కొలతలకు సంబంధించిన అనేక అంశాలను గ్రహించడానికి మేము మిమ్మల్ని కొన్ని ప్రశ్నావళులు నింపమని కోరుతాము.

4. నేను ప్రశ్నావళులుని ఎప్పుడు నింపాలి?

మీరు ఈ క్రింది వివరింపబడిన విధంగా మూడు సందర్భాల్లో ప్రశ్నావళులు నింపవలసి ఉంటుంది –

ఆసుపత్రిలో చేరినప్పుడు: మీ ఆరోగ్య పరిస్థితి గురించి నమ్మకాలు, మీ ఆప్తులనుండి మీరు పొందుతున్న ఆసరా, మీ మానసిక స్థితి వంటివి అర్థం చేసుకునేందుకు మూడు ప్రశ్నావళులు ఇస్తాము.

మొదటి సమీక్ష సమయంలో: మీ మానసిక స్థితి తెలుసుకోడానికి మీకొక ప్రశ్నావళిని ఇస్తాము.

దయచేసి పేజీ తిప్పండి

రెండవ సమీక్ష సమయంలో: మీరు సర్జరీ తర్వాత ఎలా ఉన్నారు, మీరు డాక్టరు సలహాలు ఎంత వరకు పాటిస్తున్నారు, మీ మానసిక స్థితి వంటివి నిర్ణయించే మూడు ప్రశ్నావళులు ఇవ్వబడతాయి.

5. నేను పాల్గొనడం వలన లాభాలు కానీ నష్టాలు కానీ ఉంటాయా?

మీరు పాల్గొనడం వలన ప్రత్యక్షంగా లాభాలు కానీ డబ్బుకానీ లభ్యం కావు. కానీ మీరు గ్రూప్ 1లో లేదా గ్రూప్ 2లోకి ఎంపికైతే మీ మానసిక ఆందోళన తగ్గించే అవకాశాలున్నాయి. దాని వలన కోలుకోవడానికి సానుకూలంగా ఉండేందుకు అవకాశాలున్నాయి. మీరు గ్రూప్ 3లో కేవలం ఆసుపత్రి చికిత్స మాత్రమే పొందే వారిలో భాగంగా ఎంపికైతే, మీ పాత్ర భవిష్యత్తులో సర్జరీ చేయించుకొనే వారికి మరింత మెరుగైన వైద్యసేవా విధానాలకు దారి తీసేందుకు సాయపడవచ్చు.

ఈ పరిశోధన వలన ఏమి ఇబ్బందులు ఎదురు కావు. అసాధ్యమైన విషయమే అయినా ఒక వేళ ఈ పరిశోధనలో ఏదో ఒక సమయంలో మీకు ఆందోళన అనిపించినా మీరు స్వేచ్ఛగా ఈ పరిశోధన నుండి వైదొలగవచ్చు.

6. నేను ఈ పరిశోధనలో పాల్గొంటున్న విషయం గోప్యంగా ఉంచబడుతుందా?

ఈ పరిశోధనలో భాగంగా మీనుండి సేకరించే సమాచారం కేవలం ఈ పరిశోధనా బృందానికి మాత్రమే తెలుస్తుంది. సమాచారంలో మీ పేరు, చిరునామా తొలగించి మీకొక గుర్తింపు సంఖ్య ఇవ్వటం వలన మీ వివరాలు గోప్యంగా ఉంటుంది. అన్ని వ్యక్తిగత వివరాలు చట్టబద్ధమైన పరిధుల్లో గోప్యంగా ఉంచబడతాయి.

7. ఈ పరిశోధన ఫలితాలను ఎలా వాడతారు?

ఈ పరిశోధనలో మీ అందరి నుండీ సేకరించే వివరాలు విశ్లేషిస్తే పొందే ఫలితాలు, సెంటర్ ఫర్ హెల్త్ సైకాలజీ, హైదరాబాద్ విశ్వవిద్యాలయం పరిశోధనలో భాగమౌతాయి. అటు తర్వాత వైజ్ఞానిక పత్రికలో ప్రచురితం కావచ్చు. మీ కోరికమేరకు మీకు సంబంధించిన ఫలితాలు మీకు లభ్యమౌతాయి.

ఈ పరిశోధనకి సంబంధించిన ఏ ఇతర సమాచారమైనా ఈ ఫోన్ నెంబర్ (9502381825) లేదా ఈ–మెయిల్ చిరునామా (marlynthomas@uohyd.ac.in) ద్వారా పొందవచ్చు.

ఈ పత్రం చదవడానికి సమయం కేటాయించినందుకు ధన్యవాదాలు. మీరు ఈ పరిశోధనలో పాల్గొనడానికి అంగీకరిస్తే దయచేసి దీనితో జతపరచిన *రోగి సమ్మతి పత్రం* పై సంతకం చేయండి.

University of Hyderabad
Centre for Health Psychology

PATIENT INFORMED CONSENT FORM

Project title: **Impact of Psychosocial Intervention on Adherence, Prognosis and Well-being of Cardiac Patients**

1. I confirm that I have read and understood the *Patient Information Sheet* for the said study, and that I have had the opportunity to clarify doubts.
2. I understand that my participation is voluntary, and that I am free to withdraw at any time without giving any reason.
3. I am willing to be randomly assigned to one of the psychosocial intervention groups or to the control group while being aware that such an assignment is determined by the method of random selection, and not by me or the research team.
4. I understand that information concerning me (personal details, health aspects and responses to questionnaires) that is collected during this study may form part of future publications, and that such information would be anonymous.
5. I agree to take part in the said study by answering the required questionnaires, and partaking in the activities if I am assigned to one of the psychosocial intervention groups.

______________________________ ________________________ ___________

Name of patient Signature Date

Telephone number Mobile: ___________________ Residence: ________________

Address: ______________________________ Email: ________________________

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హైదరాబాద్ విశ్వవిద్యాలయం

సెంటర్ ఫర్ హెల్త్ సైకాలజీ

రోగి సమ్మతి పత్రం

ప్రాజెక్టు: **గుండె జబ్బు గల వారి చికిత్స పట్ల పాటింపు, మెరుగుదల, సంక్షేమంపై సామాజిక-మానసిక విధానపు ప్రభావం**

1. ఈ పరిశోధనకి సంబంధించిన *రోగికి ఇవ్వబడే సమాచార పత్రం* నేను చదివి అర్థం చేసుకున్నానని, నాకు సందేహాలు తీర్చుకోడానికి అవకాశం లభించిందనీ నేను నిర్ధారిస్తున్నాను.
2. నేను పాల్గొనటం స్వచ్ఛందమనీ, నేను ఏ కారణమూ లేకుండా ఎప్పుడైనా పరిశోధన విడిచి వెళ్ళే స్వేచ్ఛ ఉందని నేను అర్థం చేసుకున్నాను.
3. నేను మూడు గ్రూపుల్లో సామాజిక-మానసిక విధానం పాటించే రెండు గ్రూపుల్లోకానీ నియంత్రణ గ్రూప్ లోకి కానీ యాదృచ్ఛిక ఎంపిక ద్వారా కేటాయింపబడటానికి సిద్ధంగా ఉన్నాను. ఇది యాదృచ్ఛిక కేటాయింపు పద్ధతి మాత్రమే నిర్ణయింపబడుతుంది కానీ నా చేత కానీ, పరిశోధనా బృందం చేత కానీ కాదు అనే విషియం నా అవగాహనలో ఉన్నది.
4. ఈ పరిశోధనలో భాగంగా నా గురించి సేకరించిన సమాచారం (వ్యక్తిగత వివరాలు, ఆరోగ్య విషయాలు, ప్రశ్నావళులకి సమాధానలు) భవిష్యత్తు ప్రచురణల్లో భాగం కావచ్చనీ, అటువంటి సమాచారం నా పేరుతో కాక అనామక విధానంలో ఉంటుందని నేను అర్థం చేసుకున్నాను.
5. అవసరమైన ప్రశ్నావళులకి సమాధానమివ్వడం ద్వారా ఏదైనా సామాజిక-మాససిక విధాన గ్రూపుల్లో భాగంగా నేను ఎంపికైతే అందులో నేను చేయవలసిన కృత్యాలను చేయడం ద్వారా ఈ పరిశోధనలో పాల్గొనడానికి నేను అంగీకరిస్తున్నాను.

______________________ ______________________ ___________

రోగి పేరు సంతకం తేదీ

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విలాసము: ______________________ ఈ–మెయిల్: ______________________

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Appendix D

PLAGIARISM STATISTICS REPORT

Impact of Psychosocial Intervention on Adherence and Prognosis

by Marlyn Thomas

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Impact of Psychosocial Intervention on Adherence and Prognosis

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Participation and Productivity in the Intermediate Grades", The Journal of Educational Research, 1997.

Publication

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