Health Communication between Doctors and Patients:
Impact on Patient Adherence and Disease Prognosis

A Thesis Submitted to the
University of Hyderabad
for the Degree of
Doctor of Philosophy in Psychology
at the Centre for Health Psychology

by
Sunayana Swain

CENTRE FOR HEALTH PSYCHOLOGY
UNIVERSITY OF HYDERABAD
HYDERABAD - 500046

September, 2013

Health Communication between Doctors and Patients:

Impact on Patient Adherence and Disease Prognosis

A Thesis Submitted to the
University of Hyderabad
for the Degree of
Doctor of Philosophy in Psychology
at Centre for Health Psychology

by
Sunayana Swain
Regn. no: 09CPPH02
Senior Research Fellow
Indian Council of Medical Research

Under the guidance of
Prof. Meena Hariharan

CENTRE FOR HEALTH PSYCHOLOGY
UNIVERSITY OF HYDERABAD
HYDERABAD - 500046

September, 2013

DECLARATION

Date: _____

This is to certify that I, Ms. Sunayana Swain, have carried out the research embodied in the present thesis for the full period prescribed under PhD ordinances of the University. I declare to the best of my knowledge that no part of this thesis was earlier submitted for the award of research degree of any University.

Signature of the candidate

Name: **Sunayana Swain**

Regn. No: 09CPPH02

Signature of the Supervisor   **Signature of the Director**

Centre for Health Psychology
University of Hyderabad
Gachibowli, Hyderabad
India

Date: _____

CERTIFICATE

I certify that the research adopted in this Ph.D. Thesis: "Health Communication between Doctors and Patients: Impact on Patient Adherence and Disease Prognosis" is the original work of Sunayana Swain. The design and conduction of this research and writing of this thesis were done under my supervision and guidance.

(Meena Hariharan)

Professor

ACKNOWLEDGEMENTS

I would like to express the deepest gratitude to my guide and mentor Professor Meena Hariharan. She continually and persuasively encouraged, motivated and helped me in this journey called PhD. Under her ingenious guidance and mentoring, this thesis could see the light of the day. Her passion, boundless enthusiasm, undying patience and most importantly her faith in me made me believe in myself and inspired me to pursue my dreams and achieve them. She has been a guide in the truest sense.

I would like to express the deepest appreciation to Dr. Suvashisa Rana who helped me made sense out of the data with his statistical acumen. The data would have been just a bunch of numbers, had he not been there to introduce me to the fascinating world of 'statistics' and 'SPSS'.

In addition, a thank you to Prof. C.R.Rao, School of Computer and Information Sciences who with his par excellence mathematical skills and passion for statistics made the analysis of the data possible.

I would also like to thank all the members of the Doctoral Committee – Dr. Meera Padhy, Prof. Vinod Pavarala, and Dr. Usha Raman, who with their valuable inputs and suggestions helped me in keeping sight of my goal.

I take this opportunity to thank the hospitals in Hyderabad, Secunderabad and Bhubaneswar where the study was carried out. I thank all the doctors and the patients for participating in this study and cooperating to their best.

A huge note of appreciation and thanks to Indian Council of Medical Research, New Delhi that provided me with the financial assistance, with the fellowship program motivating me to give my best to my PhD.

A thank you to the other faculty members and the staff at the Centre for Health Psychology, University of Hyderabad, who have supported me throughout these years.

I would like to express my thanks to University of Hyderabad for providing me with the infrastructural support to help me carry out my doctoral work.

A unique source of support over these years is this city i.e. Hyderabad that welcomed me with open arms and made me feel at home right from day one.

Without the constant support of my family, this journey would not have been possible. I take this opportunity to thank my parents and my sister who has been there for me always and kept me going. My friends, who have been a source of comfort and cheers, whenever I needed it, I thank them.

Last, but not the least, I bow my head in gratitude to God. All these time, His presence in my life, has helped to stay strong and made me realize that faith and passion is the most important ingredient to fulfill your dreams.

ABSTRACT

Health Communication is the crucial link that keeps the health care system running and delivering effective service. Doctor-patient communication is one form of health communication which has a direct impact on treatment and prognosis, particularly in Non-Communicable Diseases (NCDs) like Hypertension, Diabetes, Arthritis, etc. The present study investigates into the impact of Quality of Communication between doctors and patients diagnosed with primary hypertension on their adherence to treatment and prognosis of the disease. The objective is to determine if doctor-patient communication has an effect on the treatment adherence and prognosis of the patients with primary hypertension and the impact of adherence on prognosis. For this a mixed approach of correlational design, between-subjects and Simple Mixed factorial design was adopted. A sample of 30 doctors and 300 hypertensive patients forming 30 nests, each with one doctor and 10 patients was studied. Quality of communication was measured with a unique method using similarity index that took into account the transaction between the doctor and the patient as a whole. Adherence was measured through self report while prognosis was measured by pre and post Blood Pressure readings as well as doctors' ratings. Results revealed that quality of communication plays a significant role in adherence to treatment and prognosis. Results also revealed that adherence plays an important role in deciding the prognosis. Further, the impact of quality of communication on prognosis suggested a definite pathway through adherence. The implications discussed included the need for scientific approach to study the quality of doctor-patient communication, and the analysis of cost-effectiveness of training the doctors in effective communication to address the disease burden of Hypertension.

CONTENTS

List of tables

List of figures

Abbreviations

ANOVA	Analysis of Variance
BP	Blood Pressure
CVD	Cardiovascular Disease
df	Degrees of freedom
DoDPRS	Doctor's Disease Prognosis Rating Scale
HCC	Health Communication Checklist
HSD	Honestly Significant Difference
HTN	Hypertension
HYCOMPS	Hypertension Compliance Scale
M	Mean
NCD	Non-Communicable Disease
p	Probability value
SD	Standard Deviation
SI	Similarity Index
SPSS	Statistical packages for Social Sciences
WHO	World Health Organization
$\varkappa^2$	Chi-square

CHAPTER I
INTRODUCTION

CHAPTER I
INTRODUCTION

"The patient, though conscious that his condition is perilous, may recover his health simply through his contentment with the goodness of the physician". This statement of Hippocrates in 400 BC is probably the first emphasis on communication and relation between doctor and patient. The communication between the doctor and patient is one kind of health communication. Health communication is an umbrella term that refers to all aspects of human communication pertaining to health. Health Communication is defined as "a multifaceted and multidisciplinary approach to reach different audiences and share health-related information with the goal of influencing, engaging and supporting individuals, communities, health professionals, special groups, policy makers and the public to champion, introduce, adopt, or sustain a behaviour, practice or policy that will ultimately improve health outcomes" (Schiavo, 2007). Health communication employs the concepts of numerous disciplines, including health education, mass and speech communication, marketing, social marketing, psychology, anthropology, and sociology (Bernhardt, 2004; Institute of Medicine, 2003; World Health Organization (WHO), 2003), making it multidisciplinary and multidimensional. The concept of health communication is based on various communication activities or action areas, comprising of interpersonal communications, public relations, public advocacy, community mobilization, and professional communications (Bernhardt, 2004; World Health Organization, 2003). Rogers (1996) defines health communication as "any type of human communication whose content is concerned with health" with the focus on health-related transactions and the factors that influence these.

Health Communication is a trans-disciplinary field that is integral to a variety of fields including public health, health care, global health and community development. Health Communication is commonly understood as a field of theory, research and practice which studies and uses communication strategies, methods, programmes and interventions as a mean to inform and influence patients' decisions leading to positive health behaviour with a goal of enhanced health. However, in the context of this study, health communication refers to the communication between the doctor and the patient in the process of consultation. Thus, Health Communication, in the context of doctor-patient interaction encompasses the ability to gather information that facilitates accurate diagnosis, to apply appropriate counseling skills which include basic empathy, provide therapeutic instructions in a simple non-technical language so as to be easily comprehensible by the patient, and establish a caring relationship with the patient. These are the core clinical skills to be applied by the doctor in his/her health communication during consultation process so as to achieve the ultimate goal of best treatment outcome and patient satisfaction (Brinkman et al., 2007; Herndon & Pollick, 2002). Health Communication is different from basic communication skills in the sense that processing competence in basic communication skills will not be adequate for the doctor to attain the goal of optimal patient health behaviour and sense of satisfaction in the patient.

Communication is central to understanding human behaviour. The area of health behaviour is no exception. Health communication is an important component in shaping human behaviour to adapt, accept and cope with different health conditions (Berry, 2007). Two important milestones in the history of health communication are the *Patients' Charter* (Department of Health, 1992) and the Toronto Consensus Statement (Simpson et al., 1991). The Department of Health (1992, UK) stated that

the patients had a right to be given a clear explanation of any treatment proposed, including the risks involved, and alternative treatment plans. The conference on health communication led to the development of the Toronto Consensus Statement that emphasized on the relationship between communication practices and health outcomes for a positive result. The salient features referred to the fact that communication problems in medical practices are critical and common. It also pointed out the fact that patient anxiety and dissatisfaction are related to uncertainty and lack of information, explanation and feedback and that explaining and understanding patient concerns, even when they cannot be resolved achieves a fall in anxiety. The summary of the Toronto Consensus Statement is a clear call for higher emphasis on psychosocial factors in patient care which gets attention through communication. This can be appreciated by delineating the salient features of the Statement.

1. Doctors often misperceive the amount and type of information that patients want to receive.

2. Improved quality of clinical communication is related to positive health outcomes.

3. Greater participation by the patient in the encounter improves satisfaction, compliance and treatment outcomes.

4. The level of psychological distress in patients with serious illness is less when they perceive themselves to have received adequate information.

5. Beneficial clinical communication is routinely possible in clinical practice and can be achieved during normal clinical encounters, without unduly prolonging them, provided that the clinician has learned the relevant techniques.

The basic elements of doctor-patient communication are to build the relationship, to create a path for the discussion between the doctor and the patient and to gather information about the patient's problems and issues (Kalamazoo Consensus Statement, Makoul, 2001). The communication between the doctor and the patient is also useful to understand the patient's perspectives, share information and to mutually decide the plan of action to handle the patient's problems (Makoul, 2001). A substantial body of evidence shows that effective communication between the doctors and the patients can lead to positive outcomes for patients, for doctors and others. A healthy doctor-patient communication leads to creating a good interpersonal relationship, exchange of information between the doctor and patient, and facilitates the decision-making process (Ha, Anat, & Longnecker, 2010). Effective communication results in improved patients' health and medical care (Duffy et al., 2004). Studies give evidence that links effective physician-patient communication to desirable health outcomes such as improved adherence to treatment, lower patient stress levels and higher physician satisfaction (Guadagnino & Branch, 2006). In a classic study by Greenfield, Kaplan, Ware, Jr.Yano, and Frank (1985), informing patients and involving patients in the treatment process led to significant reductions in Blood Pressure (BP) and improvements in diabetic control that were comparable with the introduction of new drug. According to Schofield (2004), *'effective communication was a drug that could be prescribed!'*

The ultimate goal of doctor-patient communication is to improve patient's health and optimize medical care (Duffy et al., 2004). In the contemporary context where the doctor is considered to be service provider and the patient a consumer, patient satisfaction constitutes a prime factor in health care. Research evidence in the past four decades has proved that doctor patient communication plays a pivotal role in

delivery of high quality patient-centered health care (Golin, Thorpe, & DiMatteo, 2007). Such high quality health care cannot be achieved with only professional knowledge and competence because here it is the patient, but not the disease that is seeking health care. The patients will never care how much you know until they know how much you care. In order to ensure high quality patient-centered health care, the essential prerequisite is a shift from biomedical to biopsychosocial approach in diagnosis and treatment (Mead & Bower, 2000). This is because the patient who suffers from a disease and seeks treatment does so in a psychosocial context. It is essential to know if he/she is high on anxiety and depression (which impacts the cognition and thus the memory to be regular with medication) has a social support network of family and friends to aid in therapeutic adherence (that includes diet, exercise and other lifestyle factors) and the economic status to afford the medication and other treatment regimen prescribed. Such considerations can play a role in treatment line only when the doctor-patient communication in the initial consultation is effective to provide an insight to the doctor on the patient's psychosocial background. Once this is achieved, further process of health care ropes in the patient and family in major decision making which successfully enforces sharing of responsibility on both the patient and the doctor. Such patient-centered care through biopsychosocial approach helps in developing a therapeutic alliance between the doctor and the patient, where inputs on patients' preferences and physicians' professional advice receive considerable assessment in the best of optimal outcome. In this process the doctor and the patient develop a bond where the patients' trust in the doctor goes beyond the perceived components like clinical competence and describes the doctor as supportive and humane. Thus, while endorsing the doctor as a professional the patient also perceives the important human face in the doctor which

is very essential in developing a relationship. Thus, the health communication that takes a biopsychosocial approach forms a reciprocal relationship between the doctor and the patient. Patients' emotion and attitude towards illness is often traced back to his/her belief system. As per the Health Belief Model (Becker & Rosenstock, 1984), the health behaviour is guided by five constructs, viz. patients' perceived susceptibility, perceived severity, perceived benefits (of adopting the health behaviour), perceived barriers and cues of action. The health communication, particularly the communication from the health provider has to address all the five aspects related to patients' belief. In other words, when the doctor explains to the patient the existing health status in terms of seriousness (severity), and vulnerability or risks (susceptibility) a sense of fear is created in the patient that may in turn motivate the patient towards initiation of desirable health behaviour or suspending a behaviour that is considered to cause health hazard.

Further, explanations that highlight the benefits of treatment, adherence, and optimal health behaviour may be perceived as incentives by the patient. Thus, the communication on treatment benefits and the fear of vulnerability functions as push (towards health behaviour) and pull (from the unhealthy behaviour) factors to place the patient on desirable health behaviour path. Supplementary to this, cautioning or forewarning the patient on the possible barrier or hurdles in sustaining health behaviour (for example possible side effects of medicines or alarm signals that warrant emergency consultation) helps in creating a readiness in the patient to circumvent problematic situations. In addition to this some tips from the doctor for sustaining health behaviour (e.g. brining the medicine to the dining table while laying the table) may function as a preventive measure against non-adherence.

To summarize, going by Health Belief Model, in order to address the belief system of the patient, the health communication from the doctor should be parallel to that of a psychological counselor, who aims at cognitive reorientation, emotional ventilation and behavioural change in the client. Similar to the scenario of psychological counseling, the communication of the doctor targeting patients' health belief model fulfills three important functional goals, viz. exchanging relevant information, initiating interpersonal sensitivity and building a partnership in optimizing the treatment outcomes.

While doctor-patient communication is important in all health contexts, it assumes special significance in the context of chronic illness or Non-Communicable Diseases (NCDs) such as hypertension (HTN), diabetes, etc. These diseases, particularly, HTN is asymptomatic and is called a silent killer. Unless the doctor impresses upon the patient the asymptomatic nature of the disease and the devastating impact it causes on the health, it is very likely that the patient will not understand the importance of compliance. Unless the physicians do not educate the patient on the alarm signals that warrant immediate medical help there is every possibility that the patient ignores them, thus landing in serious and sometimes irreversible adversities such as cerebral hemorrhage and paralysis of the body that may leave the patient permanently handicapped.

Effective doctor-patient communication serves three basic purposes: creating good interpersonal relationship, exchange of information and decision-making pertaining to the health issues (Ong, de Haes, Hoos, & Lammes, 1995). The relationship between the doctor and patient can be better viewed from the perspective of Carl Rogers' 'client-centered therapy'. Similar to a psychotherapist, a doctor needs to have few core characteristics in fulfilling the purposes of an effective doctor-patient

communication viz. empathy, respect, genuineness, unconditional acceptance and warmth. Armed with these qualities, a doctor can pave the path for a good inter-personal relationship that will lead to complete exchange of information which in turn will help the doctor and the patient to make informed decisions regarding the medical issues. Empathy in doctor-patient relationship is crucial in eliciting feelings of the patient, and helping the doctor to paraphrase and reflect. An empathic doctor is able to listen to what the patient is saying and more importantly what he/she is unable to say. An ideal doctor-patient relationship is one where there is an integration of both patient-centered and disease-centered approach and that will facilitate exchange of information between the doctor and the patient. The patients come for consultation with information about the symptoms, concerns, etc. while the doctors contribute through their expertise regarding the details of the disease and treatment (Smith & Hoppe, 1991). It is logical that only when there is effective exchange of medical information both from the patient's and the doctor's side, informed decisions can be taken for improving the health condition of the patient. Only when there is a shared-decision making where both the doctor and patient are active participants, there is sense of shared responsibility to enhance the health condition.

Effective doctor-patient communication is instrumental for a number of desirable health outcomes. The most important of this is a feeling of satisfaction in the patient. Apart from this, effective communication is also found to reduce psychological distress in patients along with higher rate of symptom redemption and better prognosis (Golin et al., 2007). Studies have proved that direct communication and support have a significant role in reducing visits to emergency department (Bolton, Tilley, Kuder, Reeves, & Schutz, 1991) and control of chronic illness (Tildesey, Mair, Sharpe, & Piaseczny, 1996). An important but often missed out

factor is the terminology involved in the communication process between the doctor and the patient which more often than not has an impact on the patient's understanding of the doctor's explanations. Often the doctors fail to remember that individual on the other side may or may not be familiar with the medical "jargons" which the doctors use. Effective communication can be difficult in the best of circumstances. Extensive empirical studies have shown that the patients do not, typically, understand medical terms in the same way as doctors' (Helman, 1984; Richman, 1987; Freidson, 1988; Lupton, 1994). Patients' understanding of whatever the doctor is prescribing or advising forms the crux of the doctor-patient communication and of course, the medical regimen. For example, a patient's understanding of diabetes will definitely not be the same as the doctor's. When the patient is emotionally distressed, extra effort is required to ensure that the patient accurately perceives what is being communicated. And hence to achieve this, the doctors should focus on helping the patients understand and comprehend the situation they are in and use such words which enhance the patient's understanding.

The study of doctor-patient communication is based on the idea that patients have unique life histories and perspectives and that taking these perspectives into account leads to improved health outcomes (Zandbelt, Smets, Oort, Godfried, & DeHaes, 2006). Effective communication from doctors in terms of explanation, feedback, sharing of medical data was found to have enhanced adherence in patients (Beck, Daughtridge, & Sloane, 2002; Arora, 2003; Tongue, Epps, & Forese, 2005; Platt & Keating, 2007; Chen et al., 2007). Among all the consequences of doctor-patient communication, the most outstanding effect is seen in the form of adherent behaviour in the patients and subsequently improved prognosis. Adherence is defined as the regularity and punctuality with which the patients takes the prescribed

medication, follows the diet and exercise regimen. While adherence can be said to be the means through which health condition improves, prognosis of the disease is a function of not only the right diagnosis and treatment extended by the doctor but it is equally determined by the compliance with the treatment and health behaviour of the patient or health-seeker. Prognosis is defined as the outcome of treatment in terms of clinical symptoms as well as objective measures such as BP reading. While improved adherence is seen as a direct effect of effective doctor-patient communication, the impact on prognosis takes a pathway through various immediate and intermediate outcomes like patient's understanding, patient satisfaction, quality of decision-making, commitment to treatment, trust in the system and most importantly increased adherence to the treatment regimen.

Adherence to clinical therapy forms an important component of health behaviour and is the major health outcome and critical parameter of the health care services. Adherence is defined as the extent to which patients take drugs as prescribed by their health care providers (Osterberg & Blaschke, 2005). A major contributor of healthcare costs is non adherence or partial adherence to treatment regimen (Dunbar-Jacob & Schlenk, 2001) which is described as the extent to which a person's health behaviour does not coincide with the health or medical advice (Vermeire, Hearnshaw, VanRoyen, & Denekens, 2001). The rate of adherence is usually measured in terms of percentage of medication actually taken by the patient over a specified period of time (Osterberg & Blaschke, 2005).

Adherence can be understood with better clarity with reference to non-adherence. Non-compliance or non-adherence on the other hand refers to the patient's ignoring, forgetting, or misunderstanding the regimen as directed by the medical professional and thus carrying it out incorrectly or not at all (Dimatteo & Martin,

2010). The potential benefits of treatment regimen are negated because of poor adherence. Poor adherence may lead to further complications and result in poor prognosis. For instance, poor adherence to anti-hypertensive medication may lead to stroke, renal failure for which further treatment is required. Adherence to medication is different from therapeutic adherence which means adherence to prescribed diet, exercise, or lifestyle changes along with prescribed medication (Jin, Sklar, Oh Sen, & Li, 2008).

Medication non-adherence is the extent to which a person's behaviour does not coincide with medical or health advice. It is now accepted as a public health issue and was estimated to cost $100 billion, contributing to nearly 125,000 deaths each year in the United States (Vermeire et al., 2001). Non-adherence to medication and lifestyle regimes in chronic diseases have been found to be associated with increased hospitalizations and mortality (Ho et al., 2006), yet many patients fail to adhere to treatment recommendations (Cramer, 2004). The prevalence of medication non-adherence as well as the cost associated with it is immense. Though it is very significant, concrete statistics on India patients on these aspects are not available. It is important to understand the causes for non-adherence. Sustained level of optimal adherence to the treatment regimen is of utmost importance in the context of disease management, more so in case of NCDs or chronic illnesses which involves life-long dependency on pharmacotherapy. The ramifications of poor adherence or non-adherence in chronic illnesses are severe and in many cases fatal too. In the effective management of chronic illnesses like diabetes, arthritis, HTN, etc. adherence to the prescribed treatment regimen plays a crucial role, along with lifestyle changes like diet control and physical exercise.

The contemporary global scenario presents a paradigm shift in the nature of health concerns, with the developing countries joining the developed countries in a progressive increase in the incidence of NCDs. Chronic illness or NCDs like diabetes, HTN, asthma, cancer or HIV/AIDs which are also called life style diseases are found to have become a prime health concern globally and particularly in Indian context.

The NCDs are viewed as epidemic posing the greatest global challenge to the 21st Century (Murray & Lopez, 1996; Reddy, 2003). Collectively, NCDs account for 63% of all deaths worldwide with 80% of those taking place in developing countries (Narayan, Ali, & Koplan, 2010; WHO, 2013a). According to a report by WHO (2002), it is expected that chronic diseases will account for 73% of deaths and 60% of the global disease burden by 2020, and also for major percentage of diseases and death in India. This trend is likely to continue given the growing urbanization, increased economic levels, and disintegration of informal social support, sedentary job requirements and increased vulnerability to stress.

Among the NCDs, HTN is found to have affected 20-40% of the urban population and 12-17% of the rural adults (Reddy, Shah, Varghese, & Ramadoss, 2005). HTN is a chronic condition where the BP remains at an elevated level beyond 120/80 mm Hg of systolic and diastolic readings respectively. Because of its asymptomatic characteristic a significant numbers of individuals who have HTN are unaware of their condition. Being asymptomatic increases the risk factor in hypertensive patients making it fatal. The complications associated with HTN include heart attack, congestive heart failure, brain stroke, kidney failure, peripheral artery disease, and aortic aneurysms (weakening of the wall of the aorta, leading to widening or ballooning of the aorta), and retinal hemorrhage. Of those who are diagnosed, the treatment is often inadequate (Kearney, Whelton, Reynolds, Kristi, Whelton & He,

2004). The prevalence of HTN in developed countries shows that 25% of urban population and 10 % of rural population have HTN. This roughly amounts to 31.5 million rural and 34 million urban populations suffering from HTN. Of this 70% are estimated to be in Stage 1 which carries a significant cardiovascular risk (Gupta, 2004). According to a study by Das, Sanyal, and Basu (2005) out of 35.8% of participating subjects having pre-hypertensive systolic BP (120-139mm of Hg) and 47.7% sharing pre-hypertensive diastolic BP ranging between 80-89mm of Hg, 40.9% were found to have systolic HTN and 29.3% were found to have diastolic HTN. India is witnessing an alarming rise in the prevalence of chronic diseases like HTN, diabetes, etc. over-burdening the country's health care system in terms of economy, productivity and quality of life of the population. HTN is one such chronic disease which is becoming an epidemic in the world. Around 1.5 million deaths occur annually due to cardiovascular diseases (Gaziano, Reddy, Paccaud, Horton, & Chaturvedi, 2006), out of which HTN is directly responsible for 57% of all stroke deaths and 24% for all coronary heart diseases death (Gupta & Gupta, 2009). In 90% of people with HTN, the etiology of high BP is not known and is referred to as primary or essential HTN. In an analysis of worldwide data, Kearney et al. (2005) reported the number of hypertensive adults in 2000 was 972 million worldwide, 50% of them being from developing countries. The report also predicted that the number is likely to increase by about 60% by the year 2025 to a total of 1.56 billion.

HTN is identified as a disease closely associated with lifestyle. The treatment package includes lifelong anti-hypertensive medication, regulated diet, adequate physical exercise and efficient stress management. Every dimensions of this treatment package is vital in view of the high cardiovascular risk involved in the condition. To ensure strict adherence to the treatment regimen the health communication from the

doctor has to be highly efficient from the stage of taking the history to the stage of treatment follow up. The doctor has to explain to the patient, in non-technical language the present state of health, the need for strict adherence to medication, diet and exercise and the role of each of them in keeping the BP under control, the repercussions of non-adherence in terms of high vulnerability to cardiovascular disease.

In addition to this, the doctor also must motivate the patient not only to initiate but also to sustain strict adherence. This can be done by feedback techniques where the doctor gives his/her feedback on the prognosis in every review visit of consultation.

The physicians must incorporate the communication practice because owing to the high prevalence of HTN where the patient finds almost every third or fourth person hypertensive, and because of the very asymptomatic nature of the disease, there is every probability for the patient to get complacent about adherence to treatment. Research evidence established a strong positive relationship between doctor-patient communication and its impact on patient adherence to anti-hypertensive medication, maintenance of lifestyle change and control of BP. Jolles, Clarke and Braam (2010) highlighted the fact that poor doctor communication is correlated with higher risk of non-adherence. They advocated that in case of hypertensive patients, effective communication from doctor must ascertain three aspects viz. patient's comprehension, acceptance and translation into action with respect to medical advice. Further these should be followed up for long term retention. The role of the doctor is very crucial in creating a sound cognitive base in the patient. Hence the responsibility of verifying correct comprehension of the shared communication, the commitment of the patient to adhere to medical advice and

helping the patient to translate the commitment to action is the responsibility of the doctor. This demands enormous health communication skill on the part of the doctor, whose influence on the patient has a stimulating impact to get involved in communication process. Naik, Kallen, Walder, Richard and Street (2008) in their study identified three common factors in communication between the doctor and patient significantly associated with control of HTN. They are the doctor's decision making style patient's proactive communication and the doctor's collaborative communication in setting treatment goal, which, in combination impacted the control of HTN. The pathway analysis indicated that the doctor's collaborative communication in setting the treatment goal cast an indirect impact on HTN control through the doctor's decision making and the patient's proactive communication which directly predicted the HTN control.

The research evidence clearly indicated the high impact that doctor-patient communication casts on the management of diseases in general, and HTN in particular. At the same time the scientific pragmatism demands that there is also a need to assess the condition in which the efforts are invested to optimize doctor patient communication quality. A recent Indian statistics reveals that India because of its dramatic doctor patient ratio of 1:1800 (Deo, 2013) is listed under countries with critical shortage of health service providers. The average time a physician interacts with a patient is progressively shorter across the globe and more so in India, While the reason in Indian scenario can be attributed to the disproportionately large number of patient the doctor has to see in a day compared to his/her counterpart in the west, one cannot ignore the fact that technology dependence in health care is compelling the doctors to distribute the time between the patients and computers and other electronic gadgets. This has reduced the average doctor-patient interaction time to something

between two to ten minutes. Given these circumstances attempts at quality communication intervention remains a challenge.

Health communication is a skill and hence one can acquire and improve through training programmes. Travaline, Ruchinskas, and D'Alonzo (2005) discussed the salient major aspects to be covered in training or health education. They strongly recommended that the doctors gather adequate information on the patients' existing knowledge base so as to build upon that. They opined that there should be a match between the information the patient desired to have and the information the doctor provides. This helps in avoiding information overload or deprivation. Further they recommended that the context of communication should be accompanied with empathy at a pace that suits the patients' cognitive capacity and emotional state. The training must necessarily include the skills of reading patients' non verbal communication, and communication in non-medical language. In addition, there should be adequate emphasis on the act of communicating the truth while holding on to being hopeful. While applying all these skills the doctors, just as counselors, must also be trained to be prepared for and encounter patient reactions.

Given the Indian context of doctor-patient ratio, it may not be feasible to expand the consultation time to match the western standards, but the real challenge lies in optimal utilization of the available time with quality communication. It may be pertinent to mention here that for the purpose of the existing baseline level of communication, there is a need to standardize the method of measuring doctor-patient communication. Identification of a valid method of measuring communication is also a prerequisite to facilitate a process that is predictive in estimating patient adherence and prognosis through doctor-patient communication.

Past researches adopted varied methods in quantifying doctor-patient communication. A number of studies measured the quality of communication based on patient satisfaction while a few studies approached doctor-patient communication from what the doctor informed the patient. There are studies which measured the health literacy of patients by measuring the patient's comprehension of technical expression used by the doctor. The recent attempt to quantify communication between the doctor and patient is computer assisted quantitative measures of words used in the communication during consultations. However, while developing a method to measure doctor–patient communication the most critical aspect related to reliability and validity to endorse that communication is a two way process. Hence the quantification remains incomplete as long as it restricts the input to either the initiator or the receiver. A holistic approach in evolving a measurement of communication must take into account whether and to what extent the intended communication of the perpetrator (doctor) has been received by the listener (patient). When it comes to health communication between the doctor and the patient with HTN, what determines the quality is when the doctor includes all aspects to create a cognitive base such as the present condition, schedule of medication, restriction on diet, significance of exercise, need for self monitoring, time of review visit and alarm signals for emergency consultation, and the patient endorses that such information is communicated by the doctor and that it is understood by him/her. The entire communication with the extent of mutuality can quantify the transaction of information and determine the quality of communication. Only when the communication is thus measured in its entirety, it would be meaningful to inquire into its impact on adherence and prognosis. If the quality of communication between the doctor and the patient of HTN is enriched, it can prevent medical emergencies and

cardio-vascular deaths in large proportion that is happening mainly because of the progressive increase in the incidence of HTN.

According to data in Global Burden of Diseases, Injuries and Risk Factors, published by Lancet, it was reported that by the end of 2008, there were 139 million hypertensive patients in India, contributing to 14% of the global disease burden of uncontrolled HTN (Lim et al., 2012), leading to increased associated cardiovascular risks. In addition to the above, India is now faced with the risk of increasing prevalence of pre-hypertensive population and the chances of that section of population developing HTN at a later stage is high. In a recent study by Yavagal et al. (2013), it was reported that 45% of the urban population are prehypertensives and live with a high risk of developing HTN in the future. The researchers also reported that almost 47.4% of the urban population in Chennai, 44.3% in Kerala and 50% in West Bengal are prehypertensives. The risk of the prehypertensives turning into patients with HTN looms large. Hence providing the necessary health care services will be challenging task. Issues like huge population, low levels of health literacy and high patient-doctor ratio plague the Indian health care system which falls short of providing a holistic approach to disease management, prevention of diseases, and promotion of health. In this scenario, effective doctor-patient communication takes a back seat. In the backdrop of over-burdened Indian health care system and rising prevalence of chronic diseases and to lay down a greater emphasis on promotion of effective health communication aspect in the management of chronic illnesses which are becoming epidemics in the country, the present study was undertaken. An extensive review of past research findings is presented in the next section.

CHAPTER II

REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

The scope of research related to doctor-patient communication is wide. The available literature relates to doctor-patient communication in the context of a number of health problems such as terminal illness like cancer, Invasive Medical procedure like cardiac surgery, pediatric illness like asthma and chronic illness like hypertension. Studies, particularly Indian studies are very few on these aspects, and particularly on a sample of primary HTN. The review of literature presented here is divided into three main sections viz. research studies on Health Communication, studies on Patient Adherence Behavior, and Health Communication and Adherence in the context of Hypertension. The section of Health Communication discusses the concept of Health Communication as a process with its aims and objective and role of communication in health care with specific focus as doctor-patient communication in health care and the impact of effective doctor-patient communication. The review also includes predictors and measurement of doctor-patient communication. The section on adherence discusses the concept of adherence and non-adherence, prevalence of adherence, barriers to adherence, interventions to improve adherence and measurement of adherence. This is followed by a section that emphasizes the relationship between doctor-patient communication and adherence in the context of the NCD namely, HTN. The literature concludes with a brief summary of studies reviewed.

Health Communication

The term 'Health Communication' has multiple connotations. The meaning of Health Communication varies from context to context and assumes significance according to its functionality, leading to various definitions. Communication in the context of health that pertains to sharing meanings or exchanging of information, informing & influencing individuals or communities, motivating people to change behaviors, and that supports and sustains the change, forms the crux of health communication. With the growing importance of Health Communication (Parrott, 2004), numerous definitions of health communication, were proposed by many researchers and organizations. Centers for Disease Control and Prevention and National Cancer Institute (n.d), have defined health communication as "the study and use of communication strategies to inform and influence individual decisions that enhance health".

In addition to informing and influencing, the process of health communication aims at changing the behavior of the individuals and communities with the aim of improving their health. A definition by Clift and Freimuth (1995) captures this in their statement that "Health communication, like health education, is an approach which attempts to change a set of behaviors in a large-scale target audience regarding a specific problem in a predefined period of time".

In order to bring about a change at the behavioral level, motivating individuals and communities is an important aspect of health communication. This is reflected in the definition given by Ratzan, Sterans, Payne, Amato, and Madoff (1994). They stated that health communication is "the art and technique of informing, influencing and motivating individual, institutional, and public audiences about important health

issues. Its scope includes disease prevention, health promotion, health care policy, and business, as well as enhancement of the quality of life and health of individuals within the community"

The purpose of health communication is to make the people aware about the concept of health and diseases. For this, the sharing and exchange of health related information is required. The very essence of health communication is two-way dialogue and is more common in one-on-one context which applies appropriately in a doctor-patient communication set-up where the interchange of information benefits the doctor in his/her diagnosis and the patient by facilitating appropriate medical advice.

Doctor-Patient Communication in Health Care

The objective of health care service system is to provide the best possible care to its patients. In today's age where the medical technology has advanced and holistic health is promoted in a big way, where patients as health seekers have every right to demand best possible care in hospitals, the onus of providing the above becomes the responsibility of the health care professionals. The relationship between patients and doctors forms the crux of every health care delivery system. The life-line of the doctor-patient relationship is the communication between the doctors and the patients which has to be effective and precise. Effective and active communication from the patient to doctor about the symptoms, discomfort, pain, and intensity is important for the doctor to decide the line of investigation for diagnosis. The communication from the doctor to the patient cannot be undermined. The treatment adherence of patient and disease prognosis to a large extent is determined by patients' understanding of the severity of the problem and significance of adherent behavior, which needs to be

communicated by the doctor. In other words the health communication between the doctor and the patient has to be complete and effective, taking the bio-psychosocial framework into consideration during the consultation or treatment process. Literature has shown that effective communication in medical treatment leads to improved health, functional and emotional status, adherence to treatment regimen, doctors' satisfaction, and reduced medical malpractice risk (Wong & Lee, 2006). Effective doctor-patient communication is also essential for exchanging information so that both parties understand each other and the nature of the situation, develop a therapeutic relationship which fosters mutual honesty and trust, and make treatment decisions that are in the best interest of and are acceptable to the patient (Allen Petrisek, & Laliberte, 2001)

Various reports show the growing emphasis on the need for the health care professionals to have effective communication skills in rendering their services. Medical programmes are known to include courses that train the doctors in communication skills to deal with the patients. Communication Skills Training is now considered to be a core subject in medical school curricula (Laidlaw, Mac Leod, Kaufman, Langile, & Sargeant, 2002; Shapiro, Lancee, & Richardson-Bentley, 2009). In a review by Asnani (2009), it was reported that having medical knowledge alone is not sufficient to help the patient and that effective communication skills are found to be lacking in the physicians. Tongue et al. (2005), in a study on orthopedic surgeons found that the patients rated the surgeons high on their operating skills but were low on listening and communication skills. The researchers stressed on the improvement of the communication skills of the doctors. Effective communication skills are required for a patient-centered approach, emphasizing on building rapport through the use of empathy, listening skills and non-verbal communication skills (Platt & Gordon,

2004). Lewis, Pantell, and Sharp (1999) conducted a study to investigate the effectiveness of an educational intervention to promote effective doctor-patient communication and see its impact on health outcomes in the patients. This randomized trial of the intervention required the doctors to share more medical information with the pediatric patients and their parents, to encourage more participation of the children and make more efforts to build rapport with the children and reduce their anxiety. It was seen that the children of the intervention group i.e. the doctors who were trained, reported greater satisfaction and a preference for active health role. However the same results were not reported for the control group doctors who did not receive the training.

A similar study was conducted to see the effects of a continuing medical education programme in interpersonal communication skills on doctor practice and patient satisfaction in Trinidad and Tobago (Roter, Rosenbaum, de Negri, Renaud, Diprete-Brown, & Hernandez, 1998). It was reported that the trained doctors encouraged their patients to involve themselves in the health care service through improved facilitation and more of open ended questions. The results revealed that the patients of the trained doctors reported greater satisfaction with the doctors and found the doctors to be more friendly, responsive and understanding compared to the doctors who were not trained.

Several studies have reported that training the doctors in communication skills to meet the biopsychosocial needs of the patients is imperative (Chatterjee & Choudhury, 2011). The Medical Council of India stresses on the importance on communication skills training of the doctors in its report titled, Vision 2015 (Medical Council of India, 2011). The need of the hour is acknowledging and training the health care professionals in effective communication skills leading to improved health

care system. The positive impact of effective doctor-patient communication has been studied and proved by past researches.

Impact of Doctor-Patient Communication

Doctor-patient communication has been known to influence health and its related aspects in a variety of ways. Doctor-patient communication has a strong impact on health outcomes, even to the extent of the outcomes evident through basic physiological changes (Stewart, 1995).

Impact on Physical and Psychological State

Active doctor-patient communication facilitates communication of doctor's empathy to the patient. This lays the foundation for the trust in the relationship, while it also helps the patients in ventilating his/her fears, anxiety, and apprehension. Such interaction provides a scope for the doctor to effectively address the patients' emotions. This process helps in easing the emotional state of the patient. Further, the effective communication of the doctor, through information exchange enhances the knowledge base of the patient about the disease, adherence requirements, etc. which in turn helps in giving desirable direction to the health behavior of the patient. While the doctor's communication skills contributes in the ways described above, it is also true that equal participation of the patients creates a sense of partnership and involvement in decision making. This in turn contributes to the internal locus of control. Once the internal locus of control is stimulated and reinforced the adherence behavior is likely to be high and sustained. The following review supports the arguments presented above.

The communication between the doctors and the patients has been seen to be significantly associated with the health status, psychological outcomes, quality of life,

work disability, and emotional status of patients. Effective doctor-patient communication is where the physicians encourage patients to actively participate in the decision making process related to the treatment process. Adams, Smith, and Ruffin (2001) in their study on asthma patients reported that physicians who scored high on participatory decision style had patients who were more satisfied with the treatment regimen. They also found that patients who scored the physicians low on the participatory decision style, reported significantly lower quality of life. In another study by Fallowfield, Hall, Maguire and Baum (1990) on breast cancer patients, it was reported that the patients of the surgeons who were offered a choice in deciding whether to go for lumpectomy or mastectomy and actively participated in the decision making process are reported to have better health outcomes in terms of lower levels of depression than those patients who were not given a choice. A study conducted by Hall, Horgan, Stein, and Roter (2002), revealed that the sample of diabetic patients' self-reported health behavior and a positive affective state was significantly associated with their liking the physicians. It was also reported that the patients liked physicians who communicated in an optimal way. Patient centered communication is associated with improved health status in terms of better mental health, less discomfort, less concerns (Stewart et al., 2000).

Effective communication has been shown to manage post-operative pain in surgical patients (Sugai, Deptula, Parsa & DonParsa, 2013). In the study of two groups, the experimental group of surgical patients received pre-operative oral and written forms of patient education on how the body responds to pain, how the endorphins work like natural analgesics and also the negative effects of narcotics on the production & mechanism of endorphins in the body, as well mechanisms of non-opioid analgesics. The control group did not receive any patient education. The results

revealed that 90% of the experimental group patients did not take narcotics to manage the pain while 100% of the control group patients filled their complete prescriptions of painkillers. The control group patients also reported average pain scores that were significantly greater than the experimental group patients and also a significantly longer duration of the pain. The study brilliantly demonstrates the importance of communication in health care.

Impact on Doctor's Diagnostic Accuracy

The skills that the doctors use to communicate with the patients form the most basic tool in eliciting information from the patient about the health concerns of the patient. The skills that the doctors used in taking the medical history of the patient initiate the path to effective doctor-patient communication. To achieve a clear understanding of the health status of the patient and make an accurate diagnosis, the communication between the doctor and patient has to be effective. The process of making a diagnosis involves three sequential and overlapping steps viz. data gathering, data integration and verification of diagnosis (Kuhn, 2002). Data gathering entails collecting critical diagnostic information during a physician–patient interaction primarily through history-taking, physical examination, and review of medical records which necessitates the presence of effective doctor-patient communication skills. Inaccurate data collection would lead to errors in clinical reasoning and subsequently in data integration as well. The third step, diagnosis verification, entails the confirmation or rejection of diagnostic hypotheses by obtaining further data viz. laboratory tests, imaging, or pathology specimens. Thus, all three of the above steps, particularly data gathering and diagnosis verification, rely on good communication in order to improve the process of making a correct diagnosis. Groopman (2007) in his book explains how the communication skills of the doctors can have a profound

impact on the patients' health. It is also found that a patient on an average is given just 18 seconds, to describe the symptoms before the physician interrupts which greatly increases the scope of doctors making errors in diagnosis and treatment plans. A study by Peterson, Holbrook, VonHales, Smith, and Staker (1992) aimed at quantifying the relative contribution of medical history, physical examination and laboratory testing in diagnosing the patients' health issues. It was reported that medical history contributed to 76% in diagnosing the health problem, implicating the importance of having effective communication skills to elicit detailed medical history of the patient. The fundamental prerequisite of effective doctor-patient communication is time. Ineffective communication is increasingly recognized as a preventable factor in medical mishaps including incorrect diagnose. Emerging data suggest a high prevalence of communication breakdowns among physicians, patients, and important members of the health care services who assist with the diagnostic process (Gandhi, 2005; Singh, Arora, Vij, Rao, Khan, & Peterson, 2007; Sutcliffe, Lewton, & Rosenthal, 2004). In a study on patients with abnormal mammograms, it was reported a third of the women studied did not receive any appropriate follow-up (Poon et al., 2004), indicating a communication breakdown.

In a health care process, diagnosis by the doctor forms the basic component of the treatment process leading to the subsequent steps to cure the patient. Hence effective communication between the doctor and the patient is imperative in starting the treatment plan on a correct note.

While initial communication between the doctor and patient has a determining effect on diagnosis, the post-diagnosis communication sets the path for adherence behavior. Behavior is guided by cognitive base and emotional appeal. In the context

of diagnosis leading to treatment, the doctor's communication needs to enrich the cognition and appeal the emotions of the patient so as to optimize adherence behavior.

Impact on Adherence Behavior

Adherence to the prescribed treatment regimen is the most important outcome of a medical encounter. Doctor-patient communication has a huge influence on the adherence behavior of patients. Communication has been identified as the most important factor in determining patients' adherence to treatment (Zolnierek, Kelly, & DiMatteo, 2009). Doctor-patient communication, as a component of doctor-patient relationship has been found to be one of the major predictors in adherence to the treatment regimen (Delamater, 2006; Hampson, McKay, & Glasgow, 1996) and better doctor-patient communication is an important factor for improving patient adherence to treatment (Vermeire et al., 2001). In an extensive review to identify the predictors of medication non-adherence, it was reported that the quality of doctor-patient communication is one of the major predictors of non-adherence (Vermeire et al., 2001; Vik, Maxwell, & Hogan, 2004).

In a study Hausman (2001), reported that communication in the form of information exchange, social support and participative decision making, play a significant role in improving patient adherence. The study also emphasized on the notion that for the communication to be effective there needs to be a bi-directional exchange of information and active listening by both the doctor and the patient. Friedman et al. (2008) conducted a study on enlisting the determinants of patients' adherence to topical ocular hypotensive therapy and included 300 patients and 103 physicians. Out of the 300 patients who participated in the study, it was reported that patients who received less information from their doctors showed poor adherence. These findings indicated that doctor-patient communication is a major factor in

determining the adherence to the therapy apart from the patients' level of knowledge regarding the medication, the patients' health related beliefs and potential risks associated with glaucoma that contribute to patient adherence. The researchers also noted that the non-adherent patients who were passive and more dependent on doctors tend to miss the critical knowledge of potential vision loss due to non-adherence.

Adherence or non-adherence to treatment regimen is related to a number of factors including non-health related economic considerations. Unless the doctor is open to listen to all such factors patient adherence may suffer leading to undesirable consequences such discontinuing medication, switching to alternatives or withdrawing from treatment.

Gaps in the doctor-patient communication like one-dimensional decision making, and physicians' lack of knowledge of patients, indicating sub-optimal communication, lead to non-adherence that adversely affects the health status of patients (Wilson et al., 2007; Safran, Taira, Rogers, Kosinski, Ware, & Tarlov, 1998). Wilson et al. (2007) in their study on elderly chronic patients reported that almost 32% of the patients did not talk to their physicians about their medicines on a 12 month time period. Of the patients skipping doses or stopping a medication because of a side-effect or perceived non-efficacy 27% had not talked with the physicians. Of those reporting non-adherence because of cost-related issues, 39% skipped talking to their physician about it while 38% switched to a lower priced drug without consulting the physician, indicating a gap in the doctor-patient communication.

According to WHO (1993), effective communication facilitates the sharing of relevant health information, and motivating patients to pursue healthier lifestyles, enhancing the doctor's role in health promotion and disease prevention. In a study by Wong and Lee (2006) receiving an explanation of the symptom, cause, likely

duration, and lack of unmet expectations were found to be the key predictors of patient satisfaction and adherence to medical treatment.

The above studies substantiate the significance of effective doctor-patient communication in improving one of the major health outcomes of treatment process i.e. adherence.

In health set-up where the patient consults a doctor, there may be need for crucial decisions that involves risks, huge expenditure, etc. Such situations can be waded through only when the doctor enjoys the trust of the patient. Trust is a factor that develops through available information about the doctor which is reinforced by the doctor's communication quality.

Increased Trust in the Clinician

Studies have shown that effective doctor-patient communication increases the patients' trust in their clinicians. In a study by Schattner, Rudin and Jellin (2004), it was reported that 38% of patients selected physicians on the basis of their professional expertise while 30% selected on the basis of physicians' patience and attentiveness, informing the patient, representing the patient's interests, being truthful and respecting patient's preferences. Except the professional expertise, rest of the factors can be translated as outcomes of effective communication between the doctor and the patient.

A study by Thom in association with Stanford Trust Study Physicians (2001) was carried out to assess the relative strength of physician's behavior in predicting patient's trust. It was reported that patients' level of trust was strongly associated with the physicians demonstrating competency and encouraging the patients to ask questions and addressing those questions, indicating effective communication.

The studies cited above broadly indicate that the content of communication assumes significance in establishing the professional competence of the doctor. However, trust is not the byproduct of the single factor related to competence, specifically in the context of health where the doctor is expected to treat the patient as a human being rather than the disease in the patient. In order to instill trust in the patient, the doctor, alongside his/her professional competence also needs to express his concern for the patient and communicate his/her empathy for the patient. This, not only helps in developing trust in the doctor, but also brings a sense of satisfaction in the patient which is an important constituent of wellbeing.

Doctor-Patient Communication and Patient Satisfaction

Patient satisfaction is one of the major parameters against which the effectiveness of doctor-patient communication is studied. Studies have shown that effective doctor-patient communication improve patient satisfaction. In a qualitative study by Anden, Andersson and Rudebeck (2005), it was reported that the patients' perception of the outcome of clinical consultation is greatly determined by the patients' understanding of communication leading to improved satisfaction. A survey conducted by Davis et al. (2002), revealed that the patient satisfaction with the quality of health care is often associated with the physician-patient communication, indicating the importance of effective doctor-patient communication.

The interaction style between the doctor and the patient is one of the predictors of patient satisfaction with the care received. A cross-sectional observational study conducted on 2881 patients and 138 family physicians found that physicians with person-focused interaction style were rated highest on the quality of physician-patient relationship and patient satisfaction (Flocke, Miller & Crabtree, 2002). The same results were reported in another study by Jackson, Chamberlin and

Kroenke (2001) on 500 adult patients visiting 38 participating clinicians. The results of the study revealed that predictors of satisfaction reflected aspects of doctor-patient communication (receiving an explanation of the symptoms, cause, likely duration, lack of unmet expectations).

A review of 17 studies for examining the impact of interventions that are intended to promote patient-centered care within clinical consultations supported the correlation between patient-centered care and patient satisfaction. The review reported studies revealing that patient-centered care during consultations reported a positive impact of the same on patient satisfaction with the health care received (Lewin, Skea, Entwistle, Zwarenstein, & Dick, 2001).

In a review study of interventions on cancer patients, the results revealed the importance of effective doctor-patient communication in promoting patient satisfaction with the health care (Bredart, Bloulec, & Dolbeault, 2005). The results of the review emphasized on the use of various strategies that improved patient satisfaction and resulted in positive health outcomes, effective doctor-patient communication being one of the major strategy.

The above studies cement the fact that effective doctor-patient communication definitely improves patient satisfaction and closely related to the patient's satisfaction is the physician's satisfaction.

Impact of Communication on Doctors

Effective doctor-patient communication works both ways in the sense that not only the patients derive benefits from it but also the physicians gain from effective communication. Studies have shown that effective communication leads to increased job satisfaction on the part of the physicians that in turn leads to increased productivity and efficiency. Physician satisfaction more often than not is linked to

patient satisfaction with the health care service that they receive. A study conducted to see the association between patients' satisfaction and physician satisfaction, reported that physicians who were professionally satisfied with their job had patients who were satisfied with the overall health care service and with their health status (Haas et al., 2000).

Empathy is one of the major components of effective doctor-patient communication that leads to improved patient satisfaction and physician satisfaction. In a theoretical article by Larson and Yao (2005), it was emphasized that empathetic doctors are effective healers.

Suchman, Roter, Green and Lipkin (1993) conducted a study on 124 physicians to investigate the correlates of physician satisfaction. It was reported that physician-patient relationship was the major predictor of physician satisfaction that has been shown to be correlated to patient satisfaction. The researchers emphasized on the improvement of communication skills of the doctors to promote effective communication with the patients that would lead to patient satisfaction and professional satisfaction of the physicians.

The discussion till now argues with research evidence that the communication between the doctor and patient is very crucial for optimizing health outcomes in terms if adherence behavior, developing mutual trust and satisfaction in health seeker and provider. While the fact is accepted, it calls for understanding the various factors that contribute to effective doctor-patient communication.

Predictors of Doctor-Patient Communication

Doctor-patient communication is a complex interactional process that encompasses interplay between various factors, affecting the quality of

communication. The Four Model of Health Care by Ferlie and Shortell (2001) as the name suggests, delineates four models or factors that play a role in the interaction between the doctors and the patients. The four models in the system are the individual patient, the care team that includes professional care providers (e.g. doctors, nurses, pharmacists, family members, etc.), the organization that supports the development and work of care teams by providing infrastructure and complementary resources (the hospitals, clinics, etc.), and the health care system that includes the political and economic environment (e.g., regulatory, financial, payment regimes, and markets), the conditions under which organizations, care teams, individual patients, and individual care providers operate.

Of the four mentioned above the patient and doctor have direct involvement in communication process. Thus, they assume greater significance.

The Patient

The individual patient is the most important stakeholder in the health care system. In this era of globalization where doctors are seen as health care providers and patients as health care consumers, the patients' needs and preferences are taken into account. Therefore various factors pertaining to the patients influence the basic health care process of doctor-patient communication. In the context of doctor-patient communication, various socio-economic factors like age, gender, and educational qualification are seen to affect the communication.

The age of the patients has been found to shape the doctor's communication with their patients, how they listen to patients and the degree to which they believe and interpret what patients say to them (Govender & Penn-Kekana, 2008; Bradley, Sparks, & Nesdale, 2001). In a study on elderly patients, it was found that doctors tend to communicate more in a patient-centered style with patients over the age of 65

years (Peck, 2011).In the study, the pre and post-visit questionnaire data of 177 patients pertaining to the satisfaction with the communication, were taken. Audio recordings of the doctor-patient encounter were coded and analyzed through the Roter Interaction Analysis System (RIAS), one of the most commonly used methods for coding doctor and patient encounters (Roter & Larson, 2002). The results showed that patient age moderated the association between the doctors' interaction style and the patient satisfaction.

The influence of gender of the patient on the communication between doctor and patient has not been consistent. However, it has been reported that male and female patients differed in their communicative style. A study conducted by Thorson and Johansson (2004) showed that women patients of low income and status were described as 'shy', 'hesitant' with 'limited knowledge in health care seeking matters' and often 'not following their doctor's prescription mainly because of a need to double-check with their husband, family and neighbors. Men in comparison were described as 'daring and open', 'willing to follow directions and prescriptions and, being the primary breadwinners, also have more access to money and have a decision-making power of their own, independent of the rest of the family' (Thorson & Johansson, 2004, as cited in Govender & Penn-Kekana, 2007).

While the above study reported on differential behavior by patients of two genders, the study by Bertakis, Franks, and Epstein (2009), focused on doctor's varying style of communication while communicating with male and female patients. The study revealed that with female patients, the doctors were more likely to have patient-centered style of interaction in comparison to male patients, suggesting that, women are more likely than men to express their feelings and talk about psychosocial issues.

Educational level of the patient assumes importance because of its role in gaining knowledge from written documents on health. Patients with a higher educational level have more skills and confidence in talking to their doctors and tend to provide more information, ask more questions and speak longer than other patients (Willems, De Maesschalck, Deveugele, Derese, & De Maeseneer, 2005). The researchers also reported that patients who are educated are found to be more expressive and opinionated and receive more diagnostic and health information than less educated people. They strongly believe in patient involvement and have more knowledge about health issues and medical technology. More educated patients communicate more actively (they ask more questions, are more opinionated) and show more affective expressiveness, eliciting more information from their physician. Because patients with a higher education experience a smaller cultural distance between them and the doctor, they might have fewer difficulties when interacting with the doctor (Street, 1991).

Hence, more educated, higher income, older, and female or male patients may receive more information because they have communicative styles that elicit information from the doctors. They are more assertive, express more concerns, ask more questions, and conceivably elicit more information from doctors than less educated patients do.

Health literacy is another factor that can impact the doctor-patient communication to a great degree. Health literacy is the ability to understand health information and to use that information to make good decisions about one's health and medical care. Health information can overwhelm even people with advanced literacy skills. It has been reported that patients with inadequate health literacy are more likely to be hospitalized than patients with adequate skills (Safeer & Keenan,

2005). In a recent study on 84 in-patients it was found that hospitalized patients with limited health literacy reported poor communication in the domains of general clarity, responsiveness to patient concerns, and explanations of care compared with patients with higher health literacy (Kripalani, Jacobson, Mugulla Cawthon, Niesner, & Vaccarino, 2010). Research has shown that low health literacy is associated with low self-efficacy (Baker et al., 1996) and less interaction in physician patient encounters (Katz, Jacobson, Veladar, & Kripalani, 2007), which in combination with physicians' use of complex medical language (Castro, Wilson, Wang, & Schillinger, 2007) may contribute to poor physician-patient communication.

The level of education may not always be a significant determining factor. The personality factors sometimes may play a very dominant role in the quality of communication which may sometimes even camouflage the other factors such as age, gender, education, or socio-economic factors.

The quality of doctor-patient communication is not singularly impacted by the patient. The doctor as the health provider has a significantly high contribution in the quality of communication.

The Doctor

The second important factor in the health care system is the doctor who is responsible to great extent for the delivery of effective health care service to the patients. The doctors' communication style assumes an important role as it is the basic tool with which they have to interact with patients, family members and other health professionals in the delivery of care to the patients. As the primary care givers in the care team, the responsibility of a doctor is to support, encourage, and promote the well-being of a patient with a holistic approach. They are responsible for providing

clinical information to the patients and other care givers, chart out the possibilities for restoring the health of the patient, involve the patient in the health care process and in emergencies, help the patient take critical decisions. The role of the doctor is to provide a patient centered care. To deliver patient-centered care (i.e., care based on the patient's needs and preferences), the physician must be equipped and educated to serve as trusted advisor, educator, and counselor, as well as medical expert, and must know how to encourage the patient's participation in the design and delivery of care.

It is not adequate for the doctor to know 'what' to inform but, more important factor that contributes to quality of communication is to 'how' to deliver the relevant information. This part is very closely related to doctor's communication style that can range from disease-centered to patient-centered (Byrnes & Long, 1976).

The doctors with disease-centered communication style are more focused on the biomedical aspects of the patient and have a paternalistic approach that is based on the assumption that the doctor is the expert and the patient is expected to cooperate. In patient-centered communication style, doctors facilitate and encourage the patients to participate in the consultation. Patient-centered communication style has been found to be best communication style for doctors (Stewart et al., 2000) and is characterized by high levels of caring and sharing (Emanuel & Emanuel, 1992; Roter et al., 1997). Past literature has shown that caring in the physician's speech can lead to improved patient satisfaction (Beck et al., 2002), more adherence to treatment (DiMatteo & Lepper, 1998) and better psychological adjustment to illness (Roberts, Cox, Reintgen, Baile, & Gilbertini, 1994). The caring component in doctor-patient communication is visible through the doctors expressing empathy, reassuring, supporting, through positive reinforcements, psychosocial talk, laughing and joking, and courtesy (Beck et al., 2002). Low sharing behaviors on the part of the physician are non-encouragement

for patient's questions, disregard for the patient's views, less sharing of medical data with the patient, less discussion of the treatment effects, responding less to the patient's remarks, more interrupting and more speech directivity (Beck et al., 2002). A recent study conducted on 167 patients who interacted on computer with virtual physicians simulated to show high and low caring, reported the same findings (Cousin, Mast, Roter, & Hall, 2012), where the researchers reported that high caring led to higher patient satisfaction.

The style of communication is not so much a matter related to the time, but a factor linked to attitude. However, on the face, it may appear that the paternalistic model where the doctors play an authoritarian role, less amount of time is consumed in comparison to other models such as the informed model, and the shared model. Such assumptions sometimes may drive the doctors to choose the model based on the workload and time available.

In a recent study, it was reported that doctors' increased work load and pressure is directly proportional to an increase in hospital mortality (Tarnow-Mordi, Hau, Warden, & Shearer, 2000). The major reason behind the increased work pressure among doctors is the high patient-doctor ratio and the lack of hospital facilities that contribute significantly to poor doctor-patient communication (Kazmi, Amjad, & Khan, 2008). The doctors, more often than not, are deluged with the demands that the patients make on them. Often the patients complain about the duration of consultation that remains inadequate and hurried (Swaminathan, 2007). The pressure is felt more in times when there is a shortage of medical personnel. Given these circumstances, the doctors tend to fasten or even cut down on the consultation time. The lack of time is a constant factor associated with the doctors and unfortunately the patients who consult them are in knowledge of this fact (Pollock &

Grime, 2002). In this situation, communication is the casualty. Several studies have been conducted to determine the length of the consultations. A study by Deveugele, Derese, van den Brink-Muinen, Bensing, and Maeseneer (2002) revealed the consultation length in six different European countries. From each country, 27 general practitioners with 15 patients each were included in the study. The multilevel analysis reported that in Germany, the mean duration of medical consultation was 7.6 minutes, in Spain it was 7.8 minutes, United Kingdom 9.4 minutes, and for Netherlands it was 10.2 minutes. The doctors from Belgium and Switzerland clocked the maximum consultation length with 15 and 15.6 minutes respectively. On an average European doctors had a consultation length of 10.7 minutes. Studies conducted in United States and Canada, reported a greater consultation length (Wilson & Child, 2002; Cape, 2002). In USA, the mean consultation length of the doctors in 1983 was reported to be 17.6 minutes which came down to 16.7 minutes in 1994. In Canada, the average consultation length was revealed to be 17.6 minutes. Deveugele et al. (2002) also reported that as the workload goes up, the consultation length decreases. A hurried-up consultation can lead to the doctor missing out the psychosocial aspects of the patient's talk, leaving the patient dissatisfied and left-out. Unfortunately there is no such data base in India.

A very crucial factor related to doctors is the use of medical language during consultations. In a clinical setting, it has been seen that the doctors tend to use medical jargons, not only with their counterparts, but also with patients. This phenomenon is known as 'Doctor-talk" or "Medspeak" (DiMatteo & DiNicola, 1982) that leads to patient dissatisfaction (Philips, 1996). The ability to use and to understand medical terminology demarcates one as a member of the "in group" i.e. the doctors and as someone "in the know" (Christy, 1979). The patients, more often

than not feel left out because of their inability to understand complex medical jargons. In a classic study by Samora, Saunders, and Larson (1961), 125 hospitalized patients were asked to explain the meaning of some commonly used medical terms. It was reported that none of the patients could explain all the words correctly and there were no patients who could define all the words correctly. Hadlow and Pitts (1991), in their research reported that patients correctly interpreted medical words only about 36% of the time. What is more shocking is that, about 30% of the time doctors themselves used words that were technically incorrect. Thompson and Pledger (1993) carried out a study similar to Samora et al., (1961) and Thompson and Pledger, reported that there was not a single word that the 224 adult participants could define correctly. A recent study on 96 perioperative patients revealed similar results (Fields, Freiberg, Fickenscher, & Shelley, 2008). The participants were asked to define 10 terms that were commonly used during the preoperative interview. Out of the 10 terms, only four had a greater than 80% correct response rate and the terms were *EKG*, *IV*, *general anesthesia* and *regional anesthesia.* Terms like *NPO*, *MI*, *pulse OX*, *GERD*, *hypertension*, and *intubate* were least understood. The findings of this study are consistent with previous studies by Lerner, Jehle, Janicke, and Moscati (2000) and Lehmann, Brancati, Chen, Roter, and Dobs (1997). The usage of jargons distances the doctors from their patients. Fields et al. (2008) suggested that the emphasis should be on interaction with the patients rather than telling the patients.

The use of such language leaves the patient confused and mystified, leading to poor comprehension of the doctor's instructions and consequently, inappropriate health behavior that may bring about adverse health effects.

The most important ingredient in any communication is the communication skill. Likewise, doctors' communication skills can predict the quality of the doctor-

patient communication. It has been observed that communication skills tend to decline as medical students progress through their medical education, and over time doctors in training tend to lose their focus on holistic patient care (DiMatteo, 1998). Moreover, the stringent medical training can result in suppressed empathy, where doctors substitute techniques and procedures for talk, and may even result in derision of patients (DiMatteo, 1998). Ineffective communication between the doctor and patient can result in dissatisfied patients and doctors, non-adherence and may lead to therapeutic failure.

Research has shown that apart from the patient and doctor factors, many other phenomena such as patient's personality factors, doctor's personality factors, etc. influence the communication between the doctor and the patient, for e.g. the social status of the patient. It is beyond the scope of the present study to enlist all the possible variables involved in this complex process.

What is relevant to this study is the quality of doctor-patient communication in the context of consultation. The most significant concern in this context is the technique of measuring this quality of communication. The literature review threw light on many approaches in measuring doctor-patient communication quality. The following section highlights the methods adopted by few relevant studies.

Measurement of Doctor-Patient Communication

Measuring communication is a challenging task. However, health communication researchers have devised numerous ways to identify, measure, quantify and categorize doctor-patient communication. Doctor-patient communication can be studied using qualitative and quantitative approaches. Quantitative approaches have focused on measuring concepts such as information exchange, shared decision

making, patient enablement, verbal dominance, and communication control (Collins, Britten, Ruusuvori, & Thomson, 2007). In qualitative approaches, the focus is on professional responsibility and behavior, and on details of observed and recorded communication in consultations, as well as on the structure of consultation and its phases (Collins, et al., 2007). Quantitative approaches have used Interaction Analysis System (IAS), also called as observational instruments like the *Roter Interaction Analysis System (RIAS)*, *Brown University Interpersonal Skill Evaluation (BUISE), Communication Assessment Tool (CAT), Doctor-Patient Communication Inventory (DPCI), etc.* RIAS developed by Roter, Hall, and Katz (1988), facilitates coding medical dialogues during doctor-patient interactions during consultations. It provides reasonable depth, sensitivity, and breadth while maintaining practicality, functional specificity, flexibility, reliability, and predictive validity to a variety of patient and provider outcomes. RIAS was evolved from Interaction Process Analysis (Bales, 1950) that was developed for analysis of small group interactions. In RIAS, each discernable segment of speech or verbal utterance forms a unit of analysis. An utterance conveys only one thought or is related to one item of interest and may vary in length from a single word to a lengthy sentence. Utterances are assigned to one of 34 mutually exclusive content categories like socio-emotional, business category, etc. as laid out in the RIAS manual.

In a study by Kubota et al. (2011), the RIAS was used to measure the clinical communication competence of pharmacy students with simulated patients. The results revealed that the RIAS could assess the socio-emotional aspect of the students' interview skills. Studies by Ford, Fallowfield, and Lewis (1996), Ishikawa, Takayama, Yamazaki, Seki, and Katsumata (2002), Ishikawa, Roter, Yamazaki, and Takayama (2005) have used RIAS to study doctor-patient interaction. In the study by

Ford et al. (1996), the structure and content of bad news cancer consultations of 117 cancer patients and measured the patient-centeredness of the communication of five oncologists. The RIAS in this study was employed to see whether the doctors addressed the psychosocial concerns of the cancer patients. The style of communication, with small variation among the oncologists was also studied.

BUISE, developed by Burchard and Rowland-Morin (1990), measured the interpersonal skills of surgeons and the appropriateness of physician's behavior for a particular clinical encounter. The BUISE used the method of coding the videotaped content of clinical encounters. It studied both the verbal and non-verbal behavior of the surgeons. The coding systems provide useful information like, the extent to which patients talk in the consultation, factors influencing the interpersonal effectiveness of the health professional, such as length of consultation or continuity of care, communication competence of the physicians, etc.

The problem with the coding systems is that they fail to convey how the coded actions are related to one another, for example how the doctor's communication style is related to the patient's level of information about their diagnosis, prognosis and treatment options, etc. or how the length of the consultation might have influenced the discussion of issues between the doctor and the patient. The foci of these methods are more on the instrumental aspect of the interaction, aiming at the 'cure' of the disease. What these methods fail to capture are the functional aspects related to the exchange of information about the present health status of the patient, dosage of medication, adverse effects, alarm signals, etc which contribute to a strong logical base for adherence.

There are also methods which labeled and classified doctors' communication style. For example, Makoul, Krupat and Chang (2007) by developing the CAT

measured the interpersonal and communication skills of physicians as perceived by patients. The CAT is a 15-items standardized instrument that has been used to measure doctor-patient communication. The patient rates the doctors on a 5-point scale ranging from 5 to 0, with 5 being excellent. The CAT covered aspects like treating the patient with respect, paying attention to the patient, showing care and concern, greeting the patient appropriately, encouraging the patient to ask questions, showing interest in the patient's ideas about his or her health, involving the patient in decisions as much as he or she wanted, etc. This, at best measures patient's perceptions and satisfaction with the physician and is subjective.

Schneider and Tucker (1992) developed a 28-items DPCI, where the patient was required to respond. The patient gives the response to four aspects – Relationship Maintenance, Professional Competence, Waiting Time, and Social Etiquette of the doctor. This method is certainly an effort at quantification involving certain degree of objectivity. Campbell, Lockyear, Laidlaw, and Macleod (2007) developed a Matched-Pair Instrument (MPI) to measure the communication skills of the doctor in terms of process and content. The MPI is a 19-items Likert scale with the responses ranging from strongly agree to strongly disagree. In a study on physician-patient communication behavior, on HIV patients in Kenya, by Wachira, Middlestadt, Recee, Peng, and Braitstein (2013), reported that the MPI failed to capture the patient's role in the communication behaviors as usually the case with patient-centered communication measures.

The major qualitative approach for analyzing doctor-patient communication is through the use of content analysis. Conversation Analysis (CA) is one such method of content analysis that measured the communication using themes from the content, for instance, the themes that discussed the interrelationship between the patient's

concerns and the biomedical agenda. Mishler's (1984) work in this area is related to the two 'voices' in the consultation – one, the voice of the 'Lifeworld' that represents the natural attitude of everyday life and the voice of the 'Medicine', representing the technical-scientific assumptions of medicine. The qualitative approach basically works towards developing themes from the medical consultations based on these 'voices' and how often the doctors and patients used the 'voices'. Barry, Stevenson, Britten, Barber and Bradley (2001) applied Mishler's concept and analyzed data that included interviews with patients and doctors and a measure of consultation outcomes. Barry et al. (2001) identified four themes that demonstrated a complex interaction of these two voices. There were interactions that were 'Strictly Medicine' in which both doctor and patient used the voice of medicine exclusively. Used mostly in case of acute problems, these consultations were mostly effective, although it sometimes resulted in major misunderstandings on diagnosis and prescription. In the second theme, 'Lifeworld Blocked', though the patient revealed his/her concerns, it was not taken up by the doctor. In 'Lifeworld Ignored', the voice used was predominantly voice of medicine. The fourth pattern showed that both the doctor and the patient used the voice of the 'Lifeworld', having a much more relaxed feel to these consultations.

In CA research, the consultation is regarded as consisting of phases of activities based on video or audio recordings of actual consultations. The phases observed in doctor–patient consultations are the opening of the consultation, the problem presentation, verbal examination (including history-taking), physical examination, discussions of treatment and closing. Various studies have used CA to study doctor-patient communication quality (Gafaranga & Britten, 2003; Heritage & Robinson, 2006). For example, in terms of diagnosis and treatment decisions,

Heritage and Maynard's (2006) review of the CA literature on patients' participation in the consultations revealed that patients had less opportunity to participate in diagnosis than in the treatment phase. A study by Stivers (2002) through CA demonstrated that how the particulars of taking turn during the consultation can endanger patient's participation in treatment decisions. Through CA, the researchers were also able to identify the style of terminating the clinical encounter. The CA research's predominant focus is in the areas such as primary care and doctors' consultations, and on activities such as diagnosis and treatment discussion. CA studies concentrate on analyzing the process of interaction and cannot adequately deal with other equally relevant dimensions of the process of patient participation, such as what the patient could not reveal in the consultation, like what the patient said '*between the lines*'.

The two approaches to measure and study doctor-patient communication can be categorized into two divisions. The quantitative methods with its coding system, focused on information exchange, shared-decision making, and professional behavior, linking it to health outcomes, while sidelining the importance of mutuality in the doctor-patient communication. The qualitative approaches talked about the structure of communication in consultation and details of the interaction and were mute on the related health outcomes. Communication is a two-way process and the degree of the quality of communication is dependent on whether the receiver comprehended the message the way the sender intended it to be. In clinical context, it transforms into whether the patient comprehended what the doctors communicated. In a way, the patient has to validate his/her understanding about the doctor's instructions. Only a method that matches these two aspects can be considered as the one that is complete and objective. A reliable and valid method for measuring communication is the need

of the hour, in view of the fact that adherence to a large extent depends on the quality of communication.

The direct and major impact of doctor-patient communication is patient's adherence to treatment regimen. In order to optimize adherence in patients, the doctor has to provide adequate information on the status of the patient's health, how and why of medication, diet, exercise and monitoring function in preventing adversity by explaining the physiological system, and also drive the point as to how non-adherence may lead to medical emergencies. Such communication in simple, non-technical, effective way not only creates a cognitive base but also fear of consequences of non-adherence. A combination of such cognitive base and emotional appeal leads to positive behavior of high adherence.

Adherence forms the crux of disease management, more so in a chronic illness like HTN. Hypertensive patients are required to strictly adhere to the prescribed treatment regimen. Despite the availability of drugs that effectively treat hypertension, many a time patients fail to follow their doctor-prescribed medication regimens. This behavior, called non-adherence, puts patients at risk for cardiovascular diseases like stroke, paralysis, heart attack, etc. With delayed patient response to the ramifications of the disease, management becomes more complex, necessitating effective communication between the doctors and the patients throughout hypertension diagnosis and treatment (Jolles, Padwal, Clark, & Braam, 2013).

Patient Adherence Behavior

Adherence or compliance in terms of health is the extent to which a person's health behavior coincides with medical or health advice. Adherence to medication is different from therapeutic adherence which means adherence to prescribed diet,

exercise, or lifestyle changes along with prescribed medication (Jin et al., 2008). Non-compliance or non-adherence on the other hand refers to the patient's ignoring, forgetting, or misunderstanding the regimen as directed by the medical professional and thus carrying it out incorrectly or not at all (Dimatteo & Martin, 2010). With the rising healthcare costs, most healthcare professionals are now advising for therapeutic adherence rather than adherence to medical advice.

Optimal health outcomes require optimal adherence to those treatments. The adherence behavior involves taking medication properly, making and keeping health care appointments, or self-managing other behaviors that influence the onset, course or prognosis of an illness. The emphasis on adherent behavior is to ensure that the treatment for chronic illnesses encompasses behavior that is prescribed. However, many studies have consistently found that levels of compliance or adherence are often far from optimal. Reportedly, in developed countries, patients suffering from chronic illnesses on an average show only 50% adherence (Haynes, 2001). In China, only 43% of the patients with hypertension adhere to the anti-hypertensive medication (Guo, He, & Jiang, 2001). Countries like the Gambia and Seychelles, report all the more adherence rates of 27% (van der Sande, 2000) and 26% (Bovet et al., 2002; Graves, 2000) respectively. Adherence is the single most important modifiable factor that compromises treatment outcome. The best treatment can be rendered ineffective by poor adherence.

With a paradigm shift in the nature of diseases in developing countries from acute to chronic illnesses called NCDs, the treatment demands are long term or lifelong, demanding optimum adherence in order to reap best prognosis.

Medical conditions require correct diagnosis and effective medical treatment and are essential to a patient's survival and quality of life. Patient non-adherence i.e.

the patient's failure to follow the recommendations of his or her physician forms a significant barrier to effective medical treatment. Patient non-adherence (sometimes called noncompliance) can result because of poor or wrong understanding of the advice given to patients by their healthcare professionals to cure or control disease, incorrectly following or forgetting the advice, or even completely ignoring the medical advice which happens because the communication is ineffective. Non-adherence brings a huge economic burden resulting in yearly expenditures that is estimated to be in hundreds of billions of US dollars (DiMatteo, 2004). Apart from the most obvious direct costs, non-adherence is also a risk factor for a variety of subsequent poor health outcomes, like mortality (Smith, 1989; Burman et al., 1997; Christensen & Ehlers, 2002; Kane, Huo, Aikens & Hanauer, 2003).

While discussing adherence and non-adherence it is very essential to understand what is called adherence and what is non-adherence in quantitative terms. Total adherence is a conceptual ideal. There may be wide variations in the levels of adherence related to the type of illness. What are the factors that determine levels of adherence? What is the contribution of communication in level of adherence? What percentage of adherence can be considered as acceptable? What is the cut-off to be termed as non-adherence? In order to answer these questions, an attempt was made to review the surveys that studied the measurement, rate and prevalence of adherence.

Methods to Measure Adherence

There are many direct and indirect methods of measuring adherence among the patients. Researchers however point out that there is no gold standard to measure adherence. Direct methods to measure adherence includes biological assay where a

metabolite or marker is detected in the bodily fluids like urine or blood. Though it is accurate, the methods are intrusive, expensive and not quite feasible.

The indirect methods of measuring medication adherence are more frequently used in studies and include patient interviews, diaries, self reporting questions, pill counts, pharmacy records, prescription claims, clinical outcomes, and electronic monitoring. Self-reporting measures are prone to underestimation of non-adherence and this underestimation is reported to be over 20% (Haynes et al., 1980). Almost 25.5% of studies on non-adherence have used self-reporting methods to measure non-adherence. Haynes and Sackett (1979) reported that there is considerable agreement between self-report and pill count in case of non-adherers whereas a discrepancy existed between these two measures among adherers. Self-reporting provides a "relative understanding of the patient on the adherence dimension" and is inexpensive (Horne & Weinman, 1999). Moreover, self-reporting is the only method to determine the reason/s why individuals are exhibiting this behavior.

Morisky Adherence Scale (Morisky & Green, 1986), Medication Adherence Scale (Brooks et al., 1994), and Reported Adherence to Medication (Horne & Weinman, 1999) scale are some self-reported instruments to measure adherence. These scales are based on the classification of non-adherence as intentional and unintentional and have only items relating to forgetfulness and carelessness in taking medications and stopping medications when feeling better or worse. The Morisky scale takes only four reasons for non-adherence into consideration while leaving out other reasons such as concerns about side effects, cost of medications, etc. The Medication Adherence Scale is similar to Morisky scale in the sense that it uses the same reasons of non-adherence as in Morisky scale with the time frame as three months. The Reported Adherence to Medication Scale adapted from Morisky scale

uses two reasons of non-adherence viz. forgetfulness in taking medications and altering the medication to suit the patient's needs, measuring the agreement to these reasons and also the frequency of these reasons.

Pharmacy records and prescription claims are other frequently used indirect methods that are applied to measure adherence and that are economical and feasible (Vik et al., 2004; DiMatteo, 2004b; Morrison & Wertheimer, 2004; Van Wijk, Klungel, Heerdink, & deBoer, 2005; Kripalani, Yao, & Haynes, 2007). However, the disadvantage with this method is that whether the patients actually consumed the medications or not cannot be determined. Pill count is an objective measure of adherence. However, it fails to give any actual consumption of the medication (Vik et al., 2004) and also often overestimates adherence. The Medication Event Monitoring System (MEMS) can estimate the number of tablets missed, frequency and time of opening of medication bottle (Vermeire et al., 2001; Vik et al., 2004). Still, it does not give any indication of the actual consumption of the medication and is also expensive. This method is often adopted in clinical trials to ensure that the patient takes the medicine (Farmer, 1999).

The Hill-Bone Compliance to Hypertension Therapy Scale (Kim, Hill, Bone, & Levine, 2000) is another scale used to measure adherence in hypertensive patients. The Hill-Bone scale is one of the most broadly used scales to measure adherence to anti-hypertensive medications.

While studying and reporting adherence, few studies report the rate of adherence while few others refer to the prevalence. While rate of adherence is important in the context of benefit to the patient, prevalence gains importance from the point of Public Health as it is an index of health communication reaching the public.

Adherence Rate

The rate of adherence is usually measured in terms of percentage of medication actually taken by the patient over a specified period of time (Osterberg & Blaschke, 2005). Non-adherence rates are usually higher in chronic conditions rather than in acute conditions (Jackevicius, Mamdani, & Tu, 2002; Haynes, McDonald, & Garg, 2002). In clinical trials of treatment of chronic conditions, the average adherence rates are reported to be only 43% to 78% (Cramer, Rosenheck, Kirk, Krol, & Krystal, 2003; Waeber, Leonetti, Kolloch, & McInnes, 1999; Claxton, Cramer, & Pierce, 2001). Average rate of non-adherence has been found to be 24.8% of the patients (DiMatteo, 2004b). High rate of adherence were found in cancer patients (80%), followed by cardiovascular diseases, infectious diseases, chronic diseases (75%) and lowest with 51% in chronic obstructive pulmonary diseases (Claxton et al., 2001). Adherence to medication is an ambiguous concept because the rate of adequate adherence differs from condition to condition (Osterberg & Blaschke, 2005). For instance, the adequate rate of adherence in treatment for Human Immunodeficiency Virus (HIV) patients is a mandatory 95% whereas some other treatment manage with 80% of adherence rate (Osterberg & Blaschke, 2005). Hence, it is important to mention here that adherence can vary along a continuum from zero to more than 100% sometimes (Rudd et al., 1988; Pullar, Kumar, Tindall, & Feely, 1989; Spiker, 1991). From various studies it has been found that the adherence rate in hypertensive patients ranges from 9 to 37% (Wetzels, Nelemans, Schouten, & Prins, 2004).

Non-adherence is an important health care problem with as many as 50% of individuals being non-adherent. It has been reported that non-adherence contributes to $100 billion health care costs annually (Sullivan, Kreling, & Hazlet, 1990; Vermeire

et al., 2001; Cleemput, Kesteloot, & DeGeest, 2002; Wroe, 2002; Haynes et al, 2002).

The prevalence of medication non-adherence is 8 to 71% and is the cause for 10% of

hospital admissions and 23% of admissions to nursing homes (Donovan, 1995;

Vermeire et al., 2001). In a study by Bond and Hussar (1991), the prevalence of

medication non-adherence was reported to be between 13 to 93%, with an average

rate of 40% across different ages and ethnic groups. DiMatteo (2004b) conducted a

meta-analysis and reported the average non-adherence rate as 24.8%. In case of acute

disease conditions, the non-adherence rate with medications ranged from 23 to 40%,

while that with long term or chronic medications, the non-adherence rates ranged

from 6 to 67% (Haynes & Sackett, 1979). According to Gladman (1997), it has been

estimated that 43% of the general population, 55% of the elderly, and 54% of children

and teenagers are non-adherent. The rate of medication non-adherence in elderly

population was between 40 and 75% (Salzman, 1995). Among medical professionals,

the medication adherence rate was generally higher, with 77% for short term

medications and 84% for long term medications (Corda, Burke, & Horowitz, 2000). It

is disappointing that Indian health care system has no such database. The variation in

non-adherence rate can be due to several reasons such as absence of a single

operationalization of the term medication non-adherence, and variation of non-

adherence rate with different medications and different populations. Medication non-

adherence can lead to serious consequences, including poorer health, additional health

care costs and loss of independent living. Medication non-adherence has been linked

to poorer outcomes, in that individuals with high medication adherence have 20%

better outcomes than individuals with low medication adherence (DiMatteo,

Giordani,, Lepper, & Croghan, 2002). In addition to reducing treatment benefits, poor

prognosis is a major consequence of medication non-adherence (Irvine et al., 1999).

Non-adherence or inability to administer medications is one of the components associated with medication errors, lead to admission to hospitals and long term care institutions, increased physician visits and, in some cases, death (Dennehy, Kishi, & Louie, 1996; Gray, Mahoney, & Blough, 1999; White, Arakelian, & Rho, 1999). Various studies have shown that non-adherence was the cause for 8% of admissions to emergency rooms (63% of it being intentional non-adherence), it attributed to 11% of admissions to acute care hospitals (Col, Fanale, & Kronholm, 1990; Malhotra, Karan, Pandhi, & Jain, 2001). For patients aged 75 years and older, non-adherence leads to 26% of hospital admissions (Chan, Nicklason, & Vial, 2001). Thus, medication non-adherence remains an important issue and understanding the complex predictors of medication non-adherence is imperative (Bharucha, Pandav, Shen, Dodge, & Ganguli, 2004; Ellenbecker, Frazier, & Verney, 2004). The adherence rate among diabetic patients has been found to vary from 65% to 85% for patients taking oral medicines and 60% to 80% for insulin (Rubin, 2005). A research study found the adherence rate for diabetic medication to be better in comparison to lifestyle changes (Anderson, Fitzgerald, & Oh, 1993).

In case of chronic diseases, although adherence to medication is important, adherence to the prescribed diet and physical exercise is equally crucial. Incorporating dietary changes and physical exercise in the treatment regimen is an effective way to improve the disease burden associated with chronic diseases like diabetes and hypertension (Bacon, Sherwood, Hinderliter, & Blumenthal, 2004; Brownell, 1998; Conlin, 1999; Miller et al., 2002; Roberts & Barnard, 2005). Adherence to prescribed lifestyle changes have also been shown to improve glucose levels, to lead to decreased blood pressure and to correct lipid abnormalities which are factors associated with the micro and macro-vascular complications of diabetes (U. S. Dept. of Health & Human

Services, National Center for Chronic Disease and Health Promotion, 1996; Boule, Haddad, Kenny, Wells, & Sigal, 2001). The rates of non-adherence to diet and exercise recommendations were estimated to range from 35% – 75% and 35% – 81% respectively (Cawood, 2006; Wanko et al., 2004). Various studies have reported suboptimal adherence to dietary habits (Denhaerynck, Manhaeve, & Dobbels, Garzoni, Nolte, & DeGeest, 2007; Desroches, Lapointe, Rattè, Gravek, Lègarè, & Turcotte, 2013) and physical activity as recommended by the clinicians (Iversen, 2010). In a study by Scotto, Waechter and Rosneck (2011) on 174 cardiac patients, it was reported that in post cardiac rehabilitation phase, the degree of adherence to diet and exercise were found to be suboptimal. Although participants gained and retained knowledge about necessary dietary changes and improved their exercise activity tolerance during the cardiac rehabilitation program, most failed to translate the information into health promoting behavior changes beginning in the immediate discharge period. The take-home message in almost all treatment regimens is not only related to medication taking behavior but the patients are also recommended to lifestyle changes that are crucial in optimizing the health outcomes. More often than not, it has been found that poor adherence to lifestyle recommendations leads to poor control of the condition, especially in chronic conditions, and that as a result lead to complications. In a cross-sectional descriptive study (Ganiyu, Mabuza, Malete, Govender, & Ogunbanjo, 2013) on 104 patients with type II diabetes mellitus, it was reported that the rates of non-adherence to diet and exercise were 37% and 52% respectively. In case of following the prescribed diet, the main reasons for non-adherence were found to be poor self-discipline (63.4%), followed by lack of information (33.3%) and lastly, the tendency to eat out (31.7%). The main reasons for non-adherence to exercise were reported to be lack of information (65.7%), the wrong

perception that exercise exacerbates their illness (57.6%) and lack of an exercise partner (24.0%). In both the cases of non-adherence to diet and exercise, lack of information figures prominently as a reason for non-adherent behavior, highlighting the role of effective doctor-patient communication. The stress on following recommended dietary habits and physical activity are well-documented modifiable risk factors in reducing the complications associated, especially with chronic conditions (Lye, Kuan, Ewe, Fung, & Liong, 2009; Tapsell et al., 2004; Mensink & Katan, 1992). The perceptions of patients that behavioral modifications are less important than medication taking behavior can be one of the major predictors of low rate of adherence to diet and physical activity. In a recent randomized controlled trial on 18909 patients with acute coronary syndrome Chow et al. (2010) found that 28.5% of patients failed to adhere to both dietary and physical activity recommendations, while a 41.6% reported to adhere to either one of two. A mere 29.9% reported to adhere to both diet and physical activity as prescribed. Diet and exercise adherence was associated with a decreased risk of myocardial infarction compared with non-adherence. In case of non-adherence, it was found that risk of myocardial infarction went up to 3.8 fold in comparison to non-smoker patients who were adherent to diet and exercise. In other words, adherence to the diet and exercise regimen, improved the prognosis of the disease (Chow et al., 2010).

Khan, Al-Abdul Lateef, Al Aithan, Bu-Khamseen, Al Ibrahim, and Khan (2012), Misra and Khurana (2008) investigated the predictors behind non-adherence to lifestyle behavior modifications. The identified predictors were found to be lack of information, unwillingness, lack of support from spouse, and/or family, negative health beliefs, and perceptions, etc. which can be dealt with by the doctor during the

consultations itself, requiring effective communication between the doctor and the patient.

Predictors of Adherence

In a study Haynes, Ackloo, Sahota, McDonald, and Yao (2008), showed the reasons for non-adherence to medical regimen, few of which are, problems such as adverse effects, poor instructions, poor doctor-patient relationship, inability to pay for the treatment, etc. Pound et al. (2005) explained the various reasons why patients modify regimens including minimizing medication intake, minimizing adverse effects and addiction, making it fit their daily schedule, decreasing costs, and replacing medicines with non-pharmacologic treatments. The most frequently reported reasons for non-adherence as reported by Vik et al. (2004) were adverse effects, forgetting, asymptomatic/thinking the drug is not needed/feeling well without medication, prescription running out, drug is ineffective, taking too many drugs, unclear about proper administration, difficulty in swallowing, problems opening containers, and stopping drug to see whether it is still needed. As evidenced, numerous factors particularly those related to costs of medications, specific disease or functional conditions, characteristics of the medication regimen, and psychosocial issues such as perceived necessity of medications, confidence to take medications as prescribed and acceptance of illness/diagnosis are important in predicting medication non-adherence. What is important to note here is that all these factors leading to non-adherence or poor adherence are factors that can be addressed effectively through improved doctor-patient communication.

Socio-demographic factors like age, marital status, occupation, living arrangements were found to be poor predictors of adherence (Vermeire et al., 2001;

Vik et al., 2004). However gender and age were better predictors of non-adherence among pediatric patients compared to adults (DiMatteo, 2004b). Race has been found to be a significant predictor of medication adherence (Balkrishnan, 1998), with White race more associated with adherence as compared to Blacks. African Americans have been found to be non-adherent due to several reasons such as medication beliefs, low literacy, lack of trust in physicians, and poor access to health care (Vlasnik, Aliotta, & DeLor, 2005). In this context it is relevant to recall that education and literacy were also found to be the predictors of quality of communication. Thus these factors may be the contributors. It is interesting to note that a busy life style and middle age have been reported to be good predictors of non-adherence (Park et al., 1999).

Economic factors such as cost of medications and health insurance were found to be predictors of non-adherence. Non-adherence in one-fourth of the elderly was reported because of cost of medications (Osterberg & Blaschke, 2005; Safran et al., 2005; Hutchison, Jones, West, & Wei, 2006). Again economic factor such as cost of medication is found to be the predictor of adherence. This can be neutralized with high quality doctor-patient communication following the Shared model where the doctor encourages the patient to actively participate in communication and decision-making. When the patient freely communicates with the doctor, without inhibition, there is every likelihood that the patient informs the doctor about the non-affordability of the medication that triggers the doctor's plan to consider alternatives which would be less burdensome, thus mitigating the economic factors for low or non-adherence. Researchers have noted that restricting the access to medications to three paid prescriptions per month caused a drop of 30% in the number of prescriptions filled (Soumerai, Avorn, Ross-Degnana, & Gortmaker 1987).

Disease factors like cognitive impairment, increased co-morbidity, poor quality of life, and impaired activities of daily living have been found to have inconsistent associations with non-adherence while there is positive association between depression and non-adherence (DiMatteo, 2004b; Morrison & Wertheimer, 2004; Vik et al., 2004; Osterberg & Blaschke, 2005).

Sabaté (2003) identified four clusters that influence adherence the most: treatment and disease characteristics, intra-personal and inter-personal factors as well as environmental factors. Doctor-patient communication, as a component of doctor-patient relationship has been found to be one of the major predictors in adherence to the treatment regimen (Osterberg & Blaschke, 2005; Delamater, 2006; Hampson et al., 1996). Better doctor-patient communication is an important factor for improving patient adherence to treatment (Vermeire et al., 2001). The barriers to optimal adherence can be dealt by improving the health communication between the doctors and the patients.

Complexities of regimen as well as an increased number of daily doses were strong predictors of medication non-adherence. Use of poly-pharmacy and having multiple prescriptions to drugs was found to be associated with non-adherence and can be due to poor communication between the patient and physician (Vermeire et al., 2001; Vik et al., 2004; Osterberg & Blaschke, 2005). Lau et al. (1996) reported that prescription from a specialist led to greater adherence than when the prescription was by a General Practitioner. Rate of non-adherence was higher with new medications compared to existing medications (Barber, Parsons, Clifford, Darracott, & Horne, 2004). Factors like patient's unresolved concerns about diagnosis, absence of symptoms, and time between taking the drug and its effect were considerable

predictors of medication non-adherence (Vermeire et al., 2001; Morrison & Wertheimer, 2004; Osterberg & Blaschke, 2005).

Psychosocial factors like beliefs in medications, necessity beliefs (perceived role of medication in protecting against deterioration of the present and future health status of the patient) and concern beliefs (perceived potential for the medication to cause problems for the patient such as developing dependency on the medications) have been identified as a significant predictor of non-adherence (Horne & Weinman, 1999). Patients lay evaluation of medications in intentional adherence was based on whether the treatment regimen will fit their daily schedules, weighing the undesirable effects of the medication to decide whether it is worth continuing, stopping the medicine to see what happens, obtaining information about medicines from others, and using objective indicators such as blood pressure monitoring and subjective indicators such as feeling good or bad (Pound et al., 2005). Identity of the illness, patients' acceptance of illness, patients' perceptions of illness are reported to be reasons for non-adherence (Pound et al., 2005; Morrinson & Wertheimer, 2004). Christensen and Smith (1995) reported that personality trait conscientiousness was a predictor of non-adherence. Conscientiousness included will to achieve dependability or self-control. Social factor like positive attitude of others in the community has a positive influence on adherence (DiMatteo, 1994). Self-efficacy, self-regulation, and locus of control are other psychosocial variables that predict non-adherence (Ogedegbea, Mancuso, Allegrante & Charlson, 2003; Kanfer & Goldstein, 1986; Atkins & Fallowfield, 2006). Non-adherence still remains a major contributor to ineffective treatment (Burke, Dunbar-Jacob, &Hill, 1997).

If non-adherence is identified as an important matter of concern in treatment, it is a priority of medical research to indentify the factors influencing non-adherence. They can be called 'barriers to adherence'.

Barriers to Adherence

Optimal adherence is crucial in effective disease management. However, there are many factors associated with poor adherence. A phenomenon referred to as "White-coat adherence" has been reported wherein adherence to medication improves five days before and after the consultation and thereafter declines (Feinstein, 1990; Cramer, Scheyer, & Mattson, 1990).

Adherence is a highly determining factor in management of primary hypertension. The level of adherence depends on three factors namely- the patient factors, doctor factors, and health care system factors. Svensson, Kjellgren, Ahlner, and Saljo (2000), listed out factors both for adherence and non-adherence to anti-hypertensive medication. The major factors for adherence were trust in physician, fear of complications of hypertension, to avoid myocardial infarction and stroke, to keep blood pressure under control. The factors associated with non-adherence were side-effects, or symptoms ascribed to medication, general dislike of drugs, assumed normal blood pressure, etc. In a recent study by Derose et al. (2013), it was seen that non-adherence may also be caused in situations where the doctor prescribes new medications. A review conducted by Osterberg and Blaschke (2005), summarized the barriers under the three inter-dependent factors related to patient, doctors and health care system factors. The main factor in the mutuality of doctor and patient is poor communication. They have laid heavy emphasis on patient's poor comprehension of disease, benefits of treatment and risks of non-adherence. While these factors have to

be endorsed it is appropriate to mention here that the responsibility of the doctor in making the patient understand also needs to be emphasized.

Since adherence is found to be a determining factor for treatment outcomes, enhancing adherence through appropriate intervention should be given serious consideration.

Interventions to optimize adherence

There are many studies which have tested the efficacy of various kinds of interventions to improve the adherence rate of patients. The interventions gave mixed results i.e. while some interventions promoted better adherence, few other interventions did not affect the adherence rate.

Interventions involving care at the worksite, special pill containers, counseling, reminders, self-monitoring, support groups, feedback, reinforcement reported positive effects on adherence and patient outcomes as well (Haynes et al., 1976; Friedman et al., 1996; Rudd et al., 2004; Schroeder, Fahey, Hollinghurst, & Peters, 2005; MarquezContreras et al., 2005, 2006; Lee, Grace, & Taylor, 2006). The interventions which involve patients in the medical decisions making process and followed a dynamic provider-patient interaction helped improve adherence rate among hypertensive patients (Feldman, Bacher, Campbell, Drover, & Chockalingam, 1998; Golin, Dimatteo, & Gelberg, 1996). Simplifying instructions to the patient and medication schedules are also found to be helpful. Further, also minimizing the total number of daily doses has been found to be more important in promoting adherence than minimizing the total number of medications (Eisen, Miller, Woodward, Spitznagel, & Przybeck, 1990; Schroeder, Fahey, & Ebrahim, 2004).

Researches now stress upon the importance of providing multifaceted and tailored interventions to reduce medication non-adherence (Haynes, McKibbon, & Kanani, 1996; McDonald, Garg, & Haynes, 2002; Haynes et al., 2002; Van Wijk et al., 2005). In an Indian study by Palanisamy and Sumathy (2009), it was seen that a mixed intervention program of counseling, medication schedule reminders and telephonic reminder from the pharmacist helped in reducing the baseline blood pressure level of hypertensive patients, from 163/100 mmHg in the pre-intervention period to 141/90 mmHg in the post-intervention period with two-month period gap.

Development of tailored interventions to reduce non-adherence is the need of the hour to understand and manage the issue of non-adherence. Most of the previous interventions studies have involved combinations of behavioral interventions and reinforcements in addition to increasing the convenience of care, providing educational information about the patient's condition and the treatment, and other forms of supervision or attention. They show a multi-factorial and eclectic approach to improve the adherence rate among patients.

Poor adherence remains a major cause behind worsening of disease, death and healthcare costs contributing to psychosocial and economical burden. There is a pressing need to investigate and evolve holistic interventions to improve adherence. Adherence to the treatment regimen including the diet and physical exercise, ultimately, is the patient's responsibility. However, the provider i.e. the doctors and other healthcare professionals along with the healthcare system should strive through interventions to inculcate adherence behavior in patients. Here, it is important to mention that doctors play a major role in emphasizing on the value of adherence to medical regimen and motivating and guiding the patient to better adherence. Doctors

with effective communication can inculcate and sustain adherence behavior in patients. Efforts should be made to involve the patients at every level of decision making and medical care. With involvement, comes awareness and internal locus of control in patients which in turn would lead to better adherence. Improving doctor-patient communication would go a long way in maintaining optimal adherence rate. Adherence to treatment regimen results in sustainable improved disease prognosis which is of utmost importance in NCDs like hypertension, diabetes, etc.

The review of studies presented so far has endorsed the significance of doctor-patient communication in ensuring adherence of patients, thereby, a desirable outcome for patients in general. It is of great significance to review studies that have focused on the impact of doctor-patient communication on adherence and prognosis in management of hypertension where the treatment is prolonged. Hence, long term adherence and disease management being concomitant outcomes are to be examined. The following section presents a review of studies related to doctor-patient communication and patient adherence with reference to hypertension.

Health Communication, Adherence and Prognosis in the context of Hypertension

HTN is a condition related to blood circulation in the body. When the arterial walls feel the impact of the blood pumped into the blood vessels it is called BP. HTN, or high BP, a chronic illness, is defined as systolic blood pressure (SBP) of 140mm Hg or greater and/or diastolic blood pressure (DBP) of 90mm Hg or greater or any level of blood pressure in patients taking anti-hypertensive medication. According to the Dorland's Illustrated Medical Dictionary (Saunders, 2012), HTN means high arterial BP. The optimal range of BP is 110/70 mm Hg, while <130/85 mm Hg is considered normal. According to the recent guidelines laid down by Joint National

Commission (JNC 7, Chobanian et al., 2003), if the individual's BP ranges from 130/85 mm Hg to 139/89 mm Hg, then he/she is pre-hypertensive. There are three stages of HTN. In stage 1 HTN, the BP ranges from 140/90 mm Hg to 159/99 mm Hg; stage 2 HTN, it ranges from 160/100 mm Hg to 179/109 mm Hg, while in stage 3, the BP is above 180/110 mm Hg. Approximately there are 45 million prehypertensives globally (Textor, Schwartz, & Frye, 2003). The objective behind the usage of the term 'prehypertensive' is to stress on the importance of making lifestyle changes in order to prevent progression to overt HTN in this large group of people who presently are unaware of this risk (Kottke, Stroebel, & Hoffman, 2003). JNC 7 while laying emphasis on the systolic reading of the BP as studies have reported a greater concordance of uncontrolled SBP reading and cardiovascular risks (Staessen et al., 2001), calls for modifications in lifestyle, food habits, etc. to manage HTN.

Based on the etiology, HTN may be classified as Idiopathic or Essential HTN and Secondary HTN. In 90% of the patients the etiology is unknown making it as idiopathic HTN. Idiopathic HTN is otherwise known as primary HTN. Secondary HTN is due to or associated with a variety of primary diseases such as renal disorders, disorders of the central nervous system, endocrine diseases, and vascular diseases (Saunders, 2012).

Developing countries are home to almost three quarters of people living with hypertension who have a very low awareness of hypertension and poor blood pressure control (WHO, 2002, 2005). There is an increasing trend seen in the prevalence of hypertension, which is predicted to reach 500 million by 2025 (Kearney et al., 2004; Fuentes, Ilmaniemi, Laurikainen, Tuomilehto, & Nissinen, 2000). In India, the prevalence of HTN has increased by 30 times in urban population over 25 years and by 10 times in rural population over 36 years (Padmavati, 2002). The underlying

factors for developing HTN can be categorized into non-modifiable and modifiable factors. Apart from these two, some other factors are associated with HTN. Non-modifiable factors that increase or are associated with high blood pressure are advanced age (Rao, Kamath, Shetty, & Kamath, 2012), genetic predisposition (International Consortium for Blood Pressure Genome-Wide Association Studies, 2011), family history (Rao et al., 2012), susceptible ethnic origin (Harding, Maynard, Cruickshank & Gray, 2006), dark skin color (Burt et al., 1995), etc. Modifiable factors include overweight & obesity (Rao et al., 2012; Doll, Paccaud, Bovet, Burnier, & Wietlisbach, 2002; Abolfotouh, Sallam, Mohammed, Loutfy, & Hasab, 2011), excess visceral/abdominal fat (Rao et al., 2012), excess salt intake (He & MacGregor, 2009; He et al., 1991; Poulter et al., 1990; Rao et al., 2012), unhealthy diet (Johnson et al., 2007), low potassium intake (Krishna, 1990), excess alcohol (Miller, Anton, Egan, Basile & Nguyen, 2005), sedentary lifestyle (Beilin, 1999), reduced physical activity (Sun et al., 2010), psychological stress (BeLue et al., 2009),smoking, urban living (BeLue et al., 2009), migration from rural to urban areas (Poulter et al., 1990), etc. Other factors that may be associated with HTN are dyslipidemia (Dalal, Padmanabhan, Jain, Patil, Vasnawala, & Gulati, 2012; Halperin, Sesso, Ma, Buring, Stampfer, & Gaziano, 2006), increased triglycerides (Laaksonen et al., 2008), hyperuricaemia (Feig, Kang, & Johnson, 2008), increased arterial stiffness (Adji, O'Rourke, & Namasivayam, 2011), under nutrition in childhood (Sawaya, Sesso, Florencio, Fernandes, & Martins, 2005) sleep deprivation (Knutson et al., 2009) and long term exposure to noise (Bodin, Albin, Ardo, Stroh, Ostergren, & Bjork, 2009).

Most of the hypertensive patients require pharmacological treatment wherein adherence to the prescribed treatment regimen is essential. In hypertension, patients who take 80% or more of their prescribed medication are considered as compliant.

Because it is assumed that the minimum required medication to reduce the blood pressure is 80% of the prescribed dosage (Sackett et al., 1975). It has been reported that 50-70 % of the patients do not take their anti-hypertensive medication as prescribed (Mant & McManus, 2006). The efficacy of non-pharmacological therapy, including reduction in dietary salt intake, weight reduction, moderation of alcohol intake and increased physical activity, in lowering blood pressure has been reported by several studies (Jeffery et al., 1984; Nugent, Carnahan, Sheehan, & Myers, 1984). It has been shown that small, well-supervised and motivated groups of patients when received counseling on moderate salt restriction, most of the patients followed the regimen (Jeffery et al., 1984; Weinberger et al., 1988; Feldman et al., 1998). It may be reiterated here that counseling involves two-way communication resulting in cognitive reorientation and when it is effective it results in behavior change. Thus, the enhanced adherence here may be attributed to effective communication. The incidence of non-adherence or partial adherence is more in a chronic disorder like hypertension because of its asymptomatic nature (Lahdenpera & Kyngas, 2000). According to the WHO (2003), poor adherence is the main cause behind uncontrolled BP. Poor doctor-patient interaction has been reported to be one of the contributing factors in patient non-adherence (Lipkin, 1996; Svensson et al., 2000; Tsiantou et al., 2010).

Although effective medical and life-style management of hypertension can reduce the risk of adverse outcomes, uncontrolled hypertension remains a persistent problem. Positive hypertension self-management includes optimal adherence to prescribed medication regimens and life-style recommendations such as engaging in moderate intensity exercise, reducing smoking, decreasing alcohol intake, reducing sodium and losing weight (Egan et al., 2010).

To promote sustainable behavioral change, researchers stress that the focus should be primarily on the individual, to help them make conscious and intentional choices, so as to modify and adapt health management behaviors within the context of their daily lives (Aarts, Paulussen, & Schaalma, 1997; Chapman & Ogden, 2009; Cohn et al., 2011) People who have chronic illnesses, such as hypertension, are required to make changes to the daily habits and routines they have been following for years. Yet the role of habits and routines is silent in interventions designed to promote self-management of chronic diseases (Charmaz, 2002).

In the effective management of chronic illnesses like hypertension, diabetes mellitus, etc. adherence to the medication plays a crucial role, along with lifestyle changes like diet control and physical exercise. Patient adherence to a large extent is dependent on clarity of the communication between the doctor and the patient. Interaction between the doctor and the patient forms the crux of the treatment process and decides the prognosis as a function of patient adherence. When the communication between the doctor and the patient effectively addresses the significance of necessary treatment regimen, desirable outcomes like better patient adherence is likely to follow. Various interventions introduced to improve patient adherence, draw on the derived benefits of quality doctor-patient communication (Feldman et al., 1998; Golin et al., 1996).

The present study on the impact of doctor-patient communication on adherence and prognosis is conducted on patients diagnosed with primary hypertension.

Summary of Review of Literature

Health communication is a powerful medium for promoting health, addressing health issues and preventing health calamities that plague the population. The importance of communication in health care context is imperative. Effective communication in health care has numerous benefits both for the doctor and the patients. The results are seen in improved health, emotional and functional status, improved health outcomes such as adherence, satisfaction with the health care, etc. and results in job satisfaction in case of doctors. Doctor-patient communication in most studies have been conducted on patients with cancer, AIDS, psychiatric disorders and NCDs. Specific studies on HTN are also conducted. The review presents studies that support the aforementioned statements. Doctor-patient communication is a complex process and is difficult to measure. A certain gap in the literature is that the measurement of doctor-patient communication has always focused on the patient's perspective in terms of themes and content explored or qualitative analysis. Hence, there is a need to study the quality of communication in a holistic way that is based on the most basic characteristic of communication which is that the communication is a dynamic process and a clear understanding is imperative in making the communication effective. The various instruments used in the measurement of the communication in doctor-patient communication fails to capture the very essence of this aspect of communication. The second missing element that is brought forth by this literature review is a dearth of Indian studies. Further, studies connecting doctor-patient communication with adherence and prognosis are also scarce and untraceable. Though, there are studies related to adherence to medication, diet, exercise, etc. taken up individually, studies designed to examine them as a package could not be located. Indian studies on patients with HTN are found to the

extent of prevalence and rate, establishing the fact that incidence of HTN is on progressive rise. Given this fact, a comprehensive study on Indian sample that focuses on adherence and prognosis as dependent variables is on the right track to provide inputs for effective disease management.

Hence the present study was taken with the following set of Research questions, Hypotheses and Objectives.

Research Questions

The study was initiated with the following set of research problems

1. Does Doctor-Patient Communication have an effect on patients' Adherence to treatment and disease Prognosis in patients with primary hypertension?

2. Does the Quality of Communication between doctors and patients have an impact on level of Adherence and Adherence to Medicine, Diet, Exercise, and Self-monitoring?

3. Does the doctor's Quality of Communication influence patient Adherence and disease Prognosis in patients with primary hypertension?

4. Is Prognosis a function of therapeutic Adherence in patients with primary hypertension?

5. Does the Doctor-Patient Communication follow a pathway in impacting Prognosis?

6. Is there an objective method of quantifying the Quality of Communication between the doctor and the patient?

Hypotheses

It was hypothesized that

1. Doctor-Patient Communication will have a positive impact on the Adherence and Prognosis on patients with primary hypertension.

2. The Quality of Communication will have a significant effect on the level of Adherence in general and Adherence to Medicine, Diet, Exercise and Self-monitoring in patients with primary hypertension.

3. The doctor's Quality of Communication will have a significant association with Adherence to treatment and Prognosis in patients with primary hypertension

4. Prognosis will be a function of Adherence to treatment in patients with primary hypertension.

5. The impact of Doctor-Patient Communication on Prognosis will follow a pathway.

Objectives

The study was carried out with the following objectives

1. To find out if Doctor-Patient Communication during consultation process has an effect on Adherence and Prognosis in patients with primary hypertension.

i. To evolve a method of quantifying the quality of Health Communication between the doctors and patients taking the mutuality into consideration.

ii. To investigate the effect of Quality of Communication between doctors and patients on patients' Therapeutic Adherence that includes Adherence to Medication, Diet, Exercise, and Self-monitoring.

iii. To examine the influence of Doctor-Patient Communication Quality on Prognosis of primary hypertension.

iv. To find out the effect of Adherence to treatment on Prognosis.

2. To identify factors those contribute to Doctor-Patient Communication Quality.

3. To indentify factors and find out the factors those predict patient Adherence and Prognosis.

4. To explore if the impact of Doctor-Patient Communication on Adherence and prognosis suggests a pathway.

CHAPTER III

METHOD

CHAPTER III

METHOD

Plan and Design

The major objective of this study was to find out the impact of Health Communication between the doctors and the patients with primary HTN on their Adherence and Prognosis of the disease.

To meet this objective the study was planned in two phases. In Phase I the Quality of Health Communication was measured based on the initial doctor-patient communication during the consultation. Therapeutic Adherence of the patients with primary HTN was also measured during consultation. In addition to this BP readings were also recorded as baseline for evaluation of Prognosis. Six weeks after the first phase, the patients visited the doctors for review. Phase II of the study was this consultation. During Phase II the patients were assessed by the doctors on prognosis based on the reported clinical symptoms (as reported by patients). BP readings were also recorded during this phase. Thus, while Phase I of the study involved assessment of Quality of Communication, Phase II consisted of evaluation of Prognosis.

The study primarily adopted correlational design involving Quality of Communication as predictor of Adherence and Prognosis. Then, Adherence was also taken as predictor of Prognosis. The study also included between-subjects design to find out the effect of Quality of Communication (High, Medium and Low) on the level of Adherence, Prognosis (as measured by doctors' ratings) in patients with primary HTN, and also to determine the effect of level of Adherence (High, Medium and Low) on prognosis. In addition to this a 3X2 Simple Mixed Factorial design was

adopted to find out the effect of Quality of Communication (between-subjects) on Prognosis by studying the difference in BP readings between the pre and post Adherence Phase. The same design was adopted to study the effect of level of Adherence (High, Medium and Low) on Prognosis measured by BP readings.

In the present study, Health Communication i.e. the communication between the doctor and patient has been defined as the explanation from the doctor about the present condition of the patient vis-à-vis the norm, need and schedule of medication, diet and exercise, hazards of not following them, follow-up schedule and the alarm signals warranting the patient to visit the doctor, and the patient's extent of comprehension of the same. The match between the doctor's explanation and the patient's comprehension determined the Quality of Communication.

Patient Adherence has been operationally defined as the regularity, with which the patient takes the prescribed medication, sticks to the restrictions of diet and duration and type of exercise and the punctuality with which the review visits to the doctor are made.

Prognosis was operationally defined as the relative condition of the patient compared to that of pre-Adherence Phase in terms of BP readings and doctor's ratings on the reported clinical symptoms such as palpitation, breathlessness, headaches, heaviness in the head, swelling in the foot and free urination, etc.

Participants

The sample for this study was initially organized as 30 nests. By applying survey method, 30 groups were taken into the study, each group consisting of one doctor and 10 patients with primary HTN. The term 'nest' implies that each group is a

unit where the ten patients were attended by a single doctor who is expected to cater to their health needs.

Sampling of hospitals, doctors and the patients were done in multiple stages. The first unit of sample is the hospital and the last units of sample are the doctors and their patients. The hospitals were selected through the method of convenience sampling technique. The study was conducted in the hospitals in Bhubaneswar, Odisha because the investigator is well versed with the native language Odia. A list of all hospitals in Bhubaneswar was obtained. Out of them the hospitals which had minimum of ten General Physicians and Cardiologists were identified. The hospitals which met the following inclusion criteria were selected to be included in the sample.

Inclusion Criteria of Hospitals

1. The hospital must have a total of at least 10 or more General Physicians/ Cardiologists who provide consultation to outdoor patients.

2. There must be a cardiology unit where there must be a minimum of four cardiologists offering consultations.

Out of the four hospitals that met the above inclusion criteria, the authorities representing of two particular hospitals expressed interest and were willing to let the hospitals be included in the study. Out of these two hospitals, one hospital consisted of 15 General Physicians and four Cardiologists who held consultation for the patients in the morning and evening, while the other had six General Physicians and five Cardiologists who held consultations in the morning and evening. On an average, the doctors provided consultation to 40 patients per day.

The following inclusion criteria were used to recruit the doctors and patients in the sample.

Inclusion Criteria for Doctors

1. Doctors handling outdoor patients on a regular basis.

2. Doctors willing to allow the investigator in the consultation room when the patients consulted the doctor.

3. Doctors willing to sign the informed consent form.

Specialists from other departments were excluded from the study. The recruited sample of doctors included a total of 30 General Physicians and Cardiologists. Out of these nine were Cardiologists and 21 were General Physicians. The following inclusion and exclusion criteria were used to recruit patients.

Inclusion Criteria for Patients

1. Out patients who are diagnosed with primary hypertension.

2. Hypertensive patients between the age group of 20-65 years.

3. Patients willing to sign the informed consent form.

Exclusion Criteria for Patients

1. Patients with secondary hypertension.

2. Patients with a history of psychiatric problem.

3. Patients under treatment for any other medical complications.

4. Patients below 20 years and above 65 years.

A total of 30 groups constituted the sample. Every group is also called a nest. Each nest consisted of one doctor and ten patients diagnosed with primary HTN. This totaled to 30 doctors and 300 patients. The sample characteristics are presented in Table 3.1.

Table 3.1
Sample Characteristics

	Doctors ($n = 30$)	Patients ($n = 300$)
Age range (in years)	38-65	28-63
Mean (SD)	56.73 (6.51)	47.07 (7.32)
Gender		
Male	30 (100)	265 (85)
Female	Nil	35 (15)
Qualification		
Post-graduate & above	9 (30)	36 (12)
Graduate	21 (70)	222 (74)
Higher secondary/High School	NA	42 (14)
Type of Doctor		
General Physicians	21 (70)	NA
Cardiologists	9 (30)	NA
Type of Patient		
Old	NA	242 (80.67)
New	NA	58 (19.33)

Note. Figure in parentheses represent percentage.

The age range of the doctors varied from 38-65 years ($M = 56.73$, $SD = 6.51$). All the doctors were male. There were 21 General Physicians, comprising 70% and nine Cardiologists, forming 30% of the doctors' sample. The age group of the patients ranged between 28-63 years ($M = 47.07$, $SD = 7.32$). Out of the 300 patients, 85% were men and 15% were women. The patients' educational level varied from Higher secondary to Post-graduation and above. As presented in Table 3.1, 12% of the patients had a qualification of post-graduate and above, 74% were graduates while 14% had a high school level qualification. The table indicates that a large proportion of patients had a qualification of graduation. Out of the 300 patients, the old and new patients formed 80.67% and 19.33% respectively of the sample.

Instruments

The instruments used for the study included were Health Communication Checklist (HCC), Hypertension Compliance Scale (HYCOMPS), and Doctor's Disease Prognosis Rating Scale (DoDPRS). All the instruments are enclosed in *Appendix Ia – Id.* The instruments were initially constructed in English. The instruments that were administered on the patients were translated into the local languages of Odia, Telugu, and Hindi. This was done to help the patient understand the instrument. For this purpose, the scales were given to language experts (for Odia, Hindi and Telugu), for translation. The translated versions of scales were then back translated into English with the help of an English language expert to ensure that the meaning of the contents remained the same and was not lost in the process of translation. It was ascertained that there was no discrepancy in the meaning of any of the items. The instruments used for the study are described below in detail.

In addition to these, demographic details such age, gender, qualifications of both, the doctors and the patients were collected in a separate sheet.

Health Communication Checklist (HCC). The HCC consisted of 12 items related to five dimensions on communication between the patient and the doctor (*Appendix I-a, I-b*). This has a parallel form, one to be responded by the doctor and the other by the patient. Out of the 12 items, there were two items under the dimension of Medication (item 4 and 10). The next dimension on Diet had two items (item 5 and 11). The dimension on Exercise and Emergency signals comprised of two items each. Item numbers 6 and 12 covered the Exercise dimension while item numbers 8 and 9 covered the dimension of Emergency. The fifth dimension on Present status and Cautions encompassed four items (item no. 1, 2, 3, and 7). The doctors were required

to tick (√) those items which they claimed to have communicated to the patients. In the parallel form, the patients were required to tick (√) those items which they had to confirm that they were explained to their satisfaction on those aspects by the doctor.

The two parallel forms of the checklist were scored independently. A score of 1 was assigned to those items ticked (√) by the doctor. Similarly a score of 1 was assigned to those items ticked (√) by the patients.

The score of the quality of communication was evolved on the basis of the similarity of response between the doctor and the patients i.e. match between the doctor's and patient's response. When the patient's score is 1 and doctor's score is 1, the communication is said to be highly matching. In cases where only either the doctor or the patient had checked the item the scores are 1 and 0. The quality of communication was measured by evolving similarity index by matching the responses of the doctor and the patient. The similarity indices of quality of communication on each item ranged between 0 and 1. The process of arrival at similarity index is appended (*Appendix II*). The HCC was run through the pilot testing and it was found to have a strong internal consistency, Cronbach's α = .75

Hypertension Compliance Scale (HYCOMPS). The Hypertension Compliance Scale (HYCOMPS) was a 5-point scale ranging in frequency of behavior (*Appendix I-c)*. The scale consisted of positive and negative statements related to compliance with the clinical prescription. The patients were required to read each item and indicate the frequency of the non-adherent behavior on his/her part (None of the time = 4, some of the time = 3, Most of the time = 2, All the time = 1, Do not know/ Not applicable = 0). For the positive items the scores are reversed. Thus higher scores indicated higher compliance. The scale was developed taking Hill-Bone Compliance to High Blood

Pressure Therapy Scale (Kim, Hill, Bone & Levine, 2000) as the base. HYCOMPS had four domains, namely – Medication (items 1,2,7,8,9,10,11), Diet (item 3,4,5), Exercise (item 13,14,15) and Self-monitoring (item 6,12). For the dimension of Medication, the score ranged from 0 to 28. For the domain of Diet, the score ranged between 0 to12. On the dimension of Exercise, the score ranged from 0 to 12. With two items under the dimension of Self-monitoring, the scores ranged from 0 to 8. The total score on the scale ranged from 0 to 60. For the total score as well as the dimensions, higher score indicated better compliance. The internal consistency of the scale was established and the Cronbach's α was found to be .67.

Doctor's Disease Prognosis Rating Scale (DoDPRS). The DoDPRS (*Appendix I-d*) was a single-item scale where the doctor rated the overall prognosis after six weeks (Adherence Phase) post the first consultation when the investigator collected the data on doctor-patient communication. This scale represented the overall evaluation of the doctor on the patient's prognosis of primary hypertension. Here the doctor examining the patient, as per his clinical assessment on patient reported clinical symptoms such as palpitation, breathlessness, headaches, heaviness in the head, swelling in the foot and free urination, etc. rated the prognosis on a 3-point scale having the options – Bad Prognosis (1), Status Quo (2), and Good Prognosis (3).

In addition to this the BP readings were recorded in the first consultation and also six weeks later i.e. post-Adherence Phase.

Participant Demographic Details. The demographic details of the participants viz. age, gender, and educational qualification were taken. The demographic details were noted in the instruments itself. For the doctors, it was also recorded whether the doctor was General Physician or a Cardiologist. Apart from these details, it was also

noted whether the patient was a new patient or an old patient of the doctor and also the order of the entry of the patient i.e. whether the patient was among the first five of the patients to consult that particular doctor or among the last five.

Procedure

The procedure is discussed in two parts viz. pilot study and the main study. It is important to mention here that prior to the initiation of the study clearance was sought from the Institutional Ethics Committee (IEC), University of Hyderabad. The pilot study was carried out after the study was cleared by the IEC. Permissions were sought from the administrative departments of the hospital prior to the initiation of the study *(Appendix III).*

Pilot Study

The tools developed were pilot tested in four hospitals in Hyderabad. A total of five doctors and 50 patients were taken for the pilot study. After obtaining the administrative clearance and informed consent of the doctors (*Appendix IV*) and the patients (*Appendix V*) the investigator sat in the consultation room of the doctors during the consultation of the patients. After completion of the interaction, the doctor advised the patients to come for a review consultation after six weeks.

The doctors were given the HCC to be filled regarding their communication with the patient, following which the investigator accompanied the patient out of the consultation room and administered the HCC on the patient. Prior to this rapport was established with the patient. In addition to the written instructions, the doctors and the patients were orally explained about the criteria of filling the checklist. The patient was then administered the HYCOMPS. On an average each consultation took 10

minutes. It took two to three minutes for the doctor to respond to the checklist. The patients took approximately 20 minutes to respond to HCC and HYCOMPS.

The pilot study helped in establishing the suitability of the instruments and the method. The analysis of the results of the pilot study was used to determine the internal consistency of the instruments. It was found that the Health Communication Checklist has a strong internal consistency where the alpha was .75. The HYCOMPS was found to have the internal consistency with the alpha .67. The item analysis did not suggest deletion of any item. The results of the analysis of HCC and HYCOMPS are appended (*Appendix VI* and *VII*).

The method followed in observing the doctor-patient communication was found to be acceptable for the doctor and the patients. The only problem that the investigator encountered in the pilot study was the language used between the doctors and the patients. Since the investigator had no knowledge of the local language Telugu, she had to drop all those patients who could not converse in any language except Telugu. This led to the decision of conducting the main study in Bhubaneswar so that the inclusion of sample will be unbiased and scientific.

Main Study

The study was conducted in four stages. In the first stage, a survey was taken up on the hospitals in Bhubaneswar and the hospitals meeting the inclusion criteria were shortlisted, the hospital managements were approached and consent was sought from the hospital authorities to conduct the study. In the second stage the physicians and cardiologists were contacted and explained about the study. Those willing to participate in the study were given Informed Consent Form and a schedule was drawn for the investigator's visit. In the third stage, the investigator visited the doctors

concerned on the scheduled day. The list of patients, who had appointment with the doctor, was scrutinized and the patients consulting for primary hypertension were identified. These patients were contacted in the waiting lounge and explained about the study. Those patients meeting the inclusion criteria were requested to participate in it on voluntary basis and rapport was established accordingly. Those willing to participate were given Informed Consent Form to sign. The investigator accompanied them to the consultation room whenever their turn came. The consultation ended with the doctor advising the patients to come for a review consultation after six weeks. At the end of the consultation, the investigator handed over the HCC to the doctor and requested to complete it. Before the consultation was terminated, the BP reading was taken by the doctor and noted down by the investigator.

The investigator accompanied the patient out of the consultation room and administered the HCC. In addition to the written instructions, the doctors and the patients were orally explained about the criteria of filling the checklist. Followed by the administration of the HCC, the HYCOMPS was administered on the patient. At the end of six weeks the patient's prognosis was rated by the doctor. The BP reading was taken by the doctor and noted by the investigator as a record of BP was required for the follow-up visit six weeks later.

This procedure was followed until 10 patients with primary hypertension from the identified doctors were recruited into the sample. In case of drop-out patients, more patients were recruited to fulfill the desired sample size. On an average it required four visits to each doctor for Phase I of data collection and three visits for collecting data on follow up visit i.e. Phase II. At the end of the assessment, the doctors as well as the patients were debriefed.

CHAPTER IV

RESULTS

CHAPTER IV

RESULTS

The results studied the impact of doctor-patient Communication Quality on Adherence and Prognosis, where the Quality of Communication was independent variable and patient Adherence and disease Prognosis were the dependent variables. The study also investigated the role of patient Adherence in determining Prognosis. Here patient Adherence was the independent variable and Prognosis, the dependent variable. Adherence was studied in detail by separately looking into Adherence to Medication, Diet, Exercise and Self-monitoring, in addition to overall Adherence. Prognosis was studied taking into account the overall doctors' ratings based on patient reported clinical symptoms and also by taking the Systolic and Diastolic BP readings during the pre and post-Adherence Phase. Taking the quality of the doctor-patient Communication as the independent variable and patient Adherence and disease Prognosis as the dependent variables, analyses were done to see the effect of Quality of Communication on Adherence and Prognosis by applying ANOVA and post-hoc analyses using Tukey's Tests of HSD. Contingency tables were drawn up and chi-square tests of independence were carried out to see the association between the doctor's Quality of Communication and Adherence and also Prognosis. Further analyses were taken up to explore the role that Adherence plays in determining the Prognosis of the disease using ANOVA and post-hoc analyses (Tukey's Tests of HSD). Following this, an attempt was made to identify factors that contributed to Doctor-Patient Communication, Patient Adherence and Disease Prognosis by applying Regression Analyses (Simple and Multiple). Subsequently, attempts were

made to investigate if there is a pathway that follows from Doctor-Patient Communication Quality to Prognosis. Statistical analyses taken up to meet the aforementioned objectives and the detailed findings are presented in this chapter. The Statistical Package for Social Sciences (SPSS 19.0) was the software used for the analysis of the data. The results are presented in the following pages.

The results are discussed in four parts. The first part presents the index that was developed to measure doctor-patient Quality of Communication. Further, the role of Quality of Communication in patient Adherence and disease Prognosis is presented. The second part presents the method that was evolved to assess the Quality of Communication of doctors per se, and the classification of the patients treated under High, Medium and Low Communication Quality doctors. In this part the effect of doctors' Quality of Communication on patient Adherence and Prognosis was examined. The third part explored the effect of level of Adherence on Prognosis. The last part i.e. the fourth part presents the factors that predict the Quality of Communication, Adherence and Prognosis. This section ends with the presentation of the assessment of the relative contribution of Quality of Communication and Adherence in Prognosis while trying to trace a pathway.

Role of Doctor-Patient Communication in Patient Adherence and Disease Prognosis

Doctor–Patient Communication Quality Scores: Similarity Index

Since the study relates to the Quality of Communication, the first task in the results section was to quantify the doctor-patient Communication Quality. The method of quantification of Quality of Communication adopted in this study fills the research gap in measuring communication in totality. Past researches have measured

quality of communication from either the communicator's point of view or from the receiver's point of view. This study, by taking mutuality of communication into consideration, has quantified communication in a holistic way.

There was a dire need to develop an index of Quality of Communication by examining the confluence of communication intended with the communication received. This was done by scoring the parallel forms of HCC that was responded to by both the doctor and the patients. The investigator had two checklists of parallel form – one administered on the doctor with reference to the communication directed from the doctor to the patient and the other responded to by the patient indicating the communication received from the doctor. A score of 1 was assigned to every item checked by the concerned respondent. The responses were matched. When both the doctor and the patient checked a particular item it received a score of 1 and 1 from the respective respondents. When the patient's score is 1 and doctor's score is 1, the communication is said to be matching. In case of a mismatch in the communication, the score of the patient and doctor is either 1 and 0 or 0 and 1 respectively. To score the Quality of Communication by taking both doctor's and patient's score, statistical technique of Similarity Index (SI) was applied. The SI refers to the extent of similarity of responses between two groups of participants measuring the same variable. In the present study, the SI of responses was calculated between the responses of the doctors and patients on each of the items of the HCC. The values of SI are the scores indicating the Quality of Communication. The formula and process of evolving the Quality of Communication scores is explained in detail and appended (*Appendix II*).

Figure 1 depicts the distribution of scores of Quality of Communication for the sample (*N* = 300)
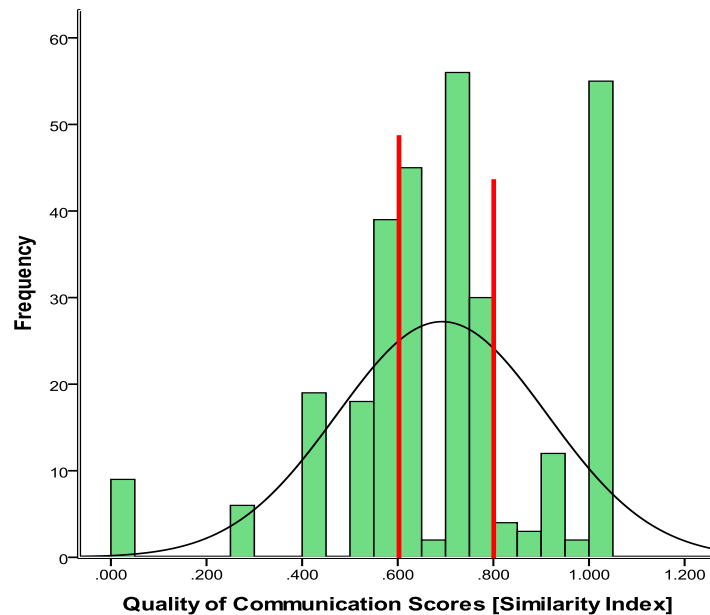
Figure 1. Histogram showing the distribution of scores of Quality of Communication

Based on the distribution of the values of SI, Quality of Communication was classified using the process of binning. Scores of quality of communication having similarity index score more than 0.801were brought under High Communication Quality group (the right part of the figure). This specified that patients under this group could comprehend ≥80.1% of the communication that happened between the doctor and the patient. Communication scores between .601 - .800 were grouped as Medium Quality of Communication (the medium part of the figure), indicating that the patients under this group understood and comprehended 60.1% to 80% of the communication that transpired between the doctor and the patient. Communication scores less than or equal to .600 (the left part of the figure) indicated that the patients could comprehend ≤60%, of what the doctor communicated to them. Hence the Quality of Communication is labeled as Low for this group. Table 1 presents the three

groups showing three levels of communication (High, Medium and Low) based on the similarity indices of the Quality of Communication between the patients and the doctors.

Table 1
Distribution of patients into three groups of Quality of Communication

Quality of Communication Group	Quality of Communication Scores	n
High	≥.801	76 (25.3)
Medium	.601 - .800	133 (44.3)
Low	≤.601	91 (30.3)
Total		300

Note. n = number of patients; Figures in parentheses represent the percentages

It may be observed from Table 1 that out of 300 patients 76 (25.3%) patients were classified under the High Communication Quality group while 91 (30.3%) patients belonged to the Low Communication Quality group. A relatively large number i.e. 133 (44.3%) patients were found to be in the group of Medium Quality of Communication.

Effect of Quality of Communication on Adherence

After grouping the patients into three levels of Quality of Communication, an attempt was made to investigate if Quality of Communication had an effect on Adherence of patients. Patient Adherence was measured by HYCOMPS. The scale generated five scores viz. one composite score giving the measure of overall Adherence and four scores giving the measure of the dimensions of Adherence viz. Adherence to Medication, Diet, Exercise and Self-monitoring respectively.

Five separate ANOVAs were done to find out if the patients belonging to three levels of Communication Quality differed in their level of overall Adherence and the dimensions of Adherence viz. Medication, Diet, Exercise and Self-monitoring.

The results of ANOVAs and the corresponding Ms and SDs scores are presented in Table 2.

Table 2
Effect of Quality of Communication on Adherence

Source	**Quality of Communication**						ANOVA		
	High		Medium		Low		Mean square		$F(2,297)$
	M	SD	M	SD	M	SD	Between	Error	
Adherence	42.50	5.96	40.77	5.57	38.36	3.25	364.81	25.98	14.04**
Medicine	21.62	3.42	20.74	2.79	19.04	1.81	147.30	7.41	19.89**
Diet	8.86	1.70	8.32	1.57	8.02	1.10	14.60	2.18	6.70**
Exercise	8.38	1.52	8.18	1.82	8.29	1.29	1.01	2.55	<1
Self-monitoring	3.53	1.19	3.41	1.32	3.00	0.89	6.86	1.38	4.97**

*Note. N = 300; **p<.01*

The results of the ANOVA showed a significant difference between the three groups with regard to their level of overall Adherence, $F(2,297) = 14.04$, $p<.01$. A comparison of Ms and SDs revealed that patients under High Quality of Communication group had the highest level of Adherence ($M = 42.50$, $SD = 5.96$), in comparison to the level of Adherence of patients in Medium Quality of Communication group ($M = 40.77$, $SD = 5.57$), and patients in Low Quality of Communication group ($M = 38.36$, $SD = 3.25$).

While the three groups of patients differed significantly on overall Adherence, separate ANOVAs were done on each dimension of Adherence to find out if there is

significant difference among the groups on specific dimensions. With regard to their level of Adherence to Medicine, a significant difference was observed among the groups, $F(2,297) = 19.89$, $p<.01$. It may be observed that patients under the group of High Communication Quality showed high level of Adherence to Medication ($M = 21.62$, $SD = 3.42$), with patients under the Medium Communication Quality group having comparable scores on Adherence to Medication ($M = 20.74$, $SD = 2.79$). A low level Adherence to taking medication ($M = 19.04$, $SD = 1.81$) was seen in the patients under the Low Quality of Communication group. Whether these differences in Ms are statistically significant is tested by carrying out post-hoc analyses using Tukey's HSD tests, the results of which are presented in Table 3.

The next dimension was the Adherence to Diet. It is evident from Table 2 that Quality of Communication had a significant effect on Adherence to Diet as indicated by the results of ANOVA, $F(2,297) = 6.70$, $p<.01$. An examination of the mean scores revealed that patients under High Quality of Communication group, was found to have high level of Adherence to Diet ($M = 8.86$, $SD = 1.70$), while patients in the group of Low Quality of Communication showed low level of Adherence to Diet ($M = 8.02$, $SD = 1.10$) and patients in the Medium Communication Quality group had M of 8.32 and SD of 1.57, indicating a medium level of Adherence to Diet.

The next dimension on the HYCOMPS was the patient's Adherence to Exercise. ANOVA was carried out to determine the effect of Quality of Communication on Adherence to Exercise. The results can be read from row 4 of Table 2. The results show that there is no significant effect of Quality of Communication on the dimension of Adherence to Exercise.

The last dimension was the Adherence to Self-monitoring. The groups differed significantly on this dimension too, $F(2,297) = 4.97$, $p<.01$. The Ms and SDs showed that patients belonging to High Quality of Communication group had a high level of Adherence to Self-monitoring ($M = 3.53$, $SD = 1.19$), with patients in Medium Quality Communication group having scores comparable to the patients in High Quality of Communication group with respect to their level of Adherence to Self-monitoring ($M = 3.41$ $SD = 1.32$). Patients in Low Communication Quality group exhibited low level of Adherence to Self-monitoring ($M = 3.00$, $SD = .89$).

While the results of ANOVAs indicated that the three groups significantly differed on overall Adherence and its dimensions, it may be of interest to examine which pairs of groups showed significant differences. In order to find this, post-hoc comparisons using Tukey's HSD tests were applied. The results of Tukey's HSD tests are presented in Table 3.

Table 3
Mean comparisons using Tukey's HSD test between three groups of Quality of Communication on Adherence and its dimensions scores

Variables	Quality of Communication		
	High – Medium	High – Low	Medium – Low
Adherence	-	4.14**	2.41**
Medicine	-	2.57**	1.69**
Diet	.53*	.83**	-
Self-monitoring	-	.53*	.41*

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

The results clearly revealed that the High Communication Quality group patients significantly differed from the Low Communication Quality group patients on overall Adherence and all its dimensions while they differed from Medium

Communication Quality group patients only with respect to Adherence to Diet. The following paragraph gives a clear analysis of the results.

It is observed from Table 3 that in case of overall Adherence patients in High Communication Quality group significantly differed from the patients in the Low Communication Quality group ($p<.01$) while the patients in Medium Quality Communication group significantly differed from patients in Low Communication Quality ($p<.01$). The same trend was observed in case of Adherence to Medicine and Self-monitoring. It was found that patients in High Communication Quality showed higher Adherence to Medication compared to those in Low Communication Quality group ($p<.01$) while those belonging to Medium Communication Quality group showed higher Adherence in comparison to patients in the Low Communication Quality group ($p<.01$) in their Adherence to Medication. It was also found that even in Adherence to Self-monitoring, patients in High Quality Communication group differed significantly from patients in the Low Communication Quality group ($p<.05$) while the patients in the Medium Quality of Communication group differed significantly from patients in Low Quality of Communication group ($p<.05$). Interestingly, in case of Adherence to Diet, High Communication Quality group patients were found to be significantly different from those belonging to Medium Communication Quality group ($p<.05$) and Low Communication Quality group ($p<.01$). From Table 2, it is observed that the level of Adherence of patients in Medium Communication Quality group was comparable to those in High Communication Quality group in case of overall Adherence, Adherence to Medicine, and Self-monitoring while in case of Adherence to Diet, the mean score of patients belonging to Medium Communication Quality group was comparable to those of Low Communication Quality group.

In order to get a complete visual picture of the three groups on overall Adherence and its dimensions a bar diagram (Figure 2) was plotted for all the scores comparing the scores of three groups on Adherence and its dimensions. The differences in Adherence among the three groups can be clearly perceived in case of overall Adherence and Adherence to Medicine

.
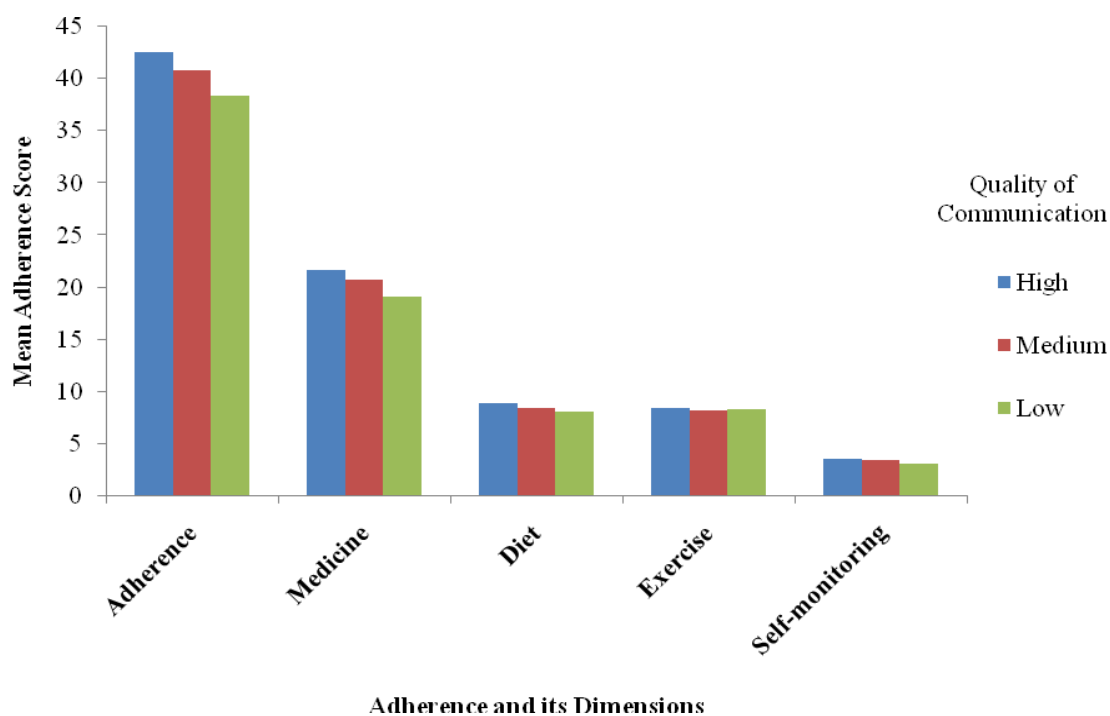
Figure 2. Graph showing the differences among the three groups of Communication Quality with respect to Adherence and its dimensions

In order to get a clearer picture of impact of Quality of Communication on Adherence and on its dimensions separate mean plots are presented. Figure 3 shows the *M*s and variance of the scores on overall Adherence at 95% Confidence Interval (CI), across the three groups differing in Quality of Communication. The plot shows a downward slope of mean Adherence scores with the highest point in the plot

belonging to the patients of High Quality of Communication group and patients under Low Quality of Communication group having the lowest point in the Mean plot with the mean score of the patients under Medium Quality of Communication group lodged between the two groups.
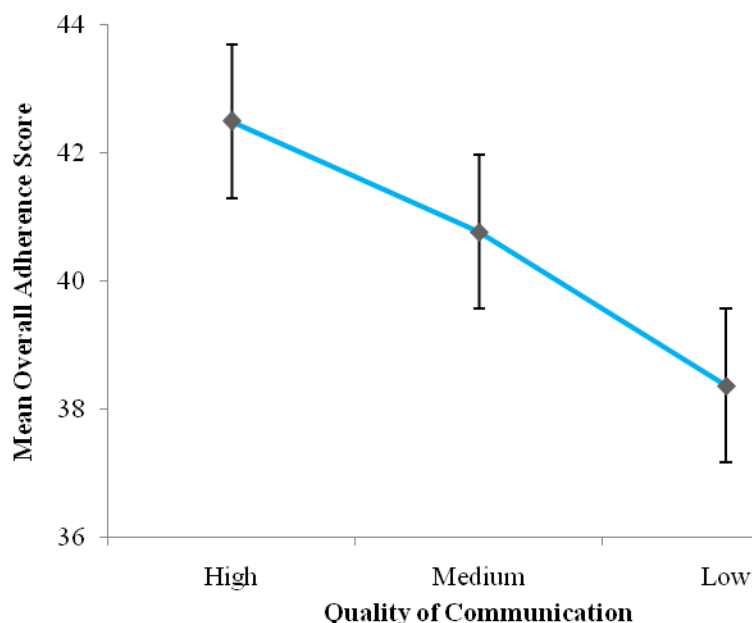
*Figure 3.*Mean plot showing the mean scores of overall Adherence (and 95% CI) of the three groups differing in Quality of Communication

Figure 4 presents the mean scores of Adherence to Medication across the three groups of Quality of Communication, along the variance of the scores at 95% CI. It is evident from the figure that there is a downward slope in the curve indicating that the patients in High Communication Quality group had high level of Adherence to Medicine while the patients belonging to Low Communication Quality group had low level of Adherence with the patients under Medium Communication Quality group positioning itself in between.
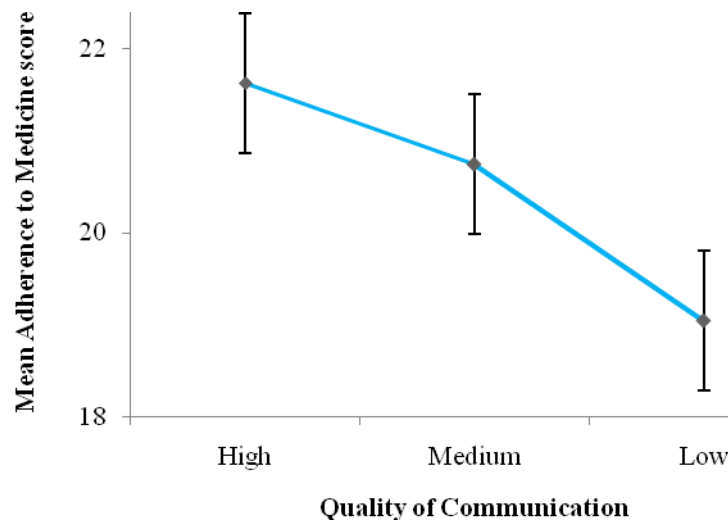
Figure 4. Mean plot showing the mean scores of Adherence to Medicine (and 95% CI) of the three groups differing in Quality of Communication

Figure 5 shows the distribution of the *M*s of the three groups differing in the Quality of Communication on the level of Adherence to Diet, along with the variance of the scores at 95% CI. It is evident from Figure 5, that the downward slope of the curve is not sharp between High and Medium Communication Quality groups while it is not so between Medium and Low Communication Quality groups.
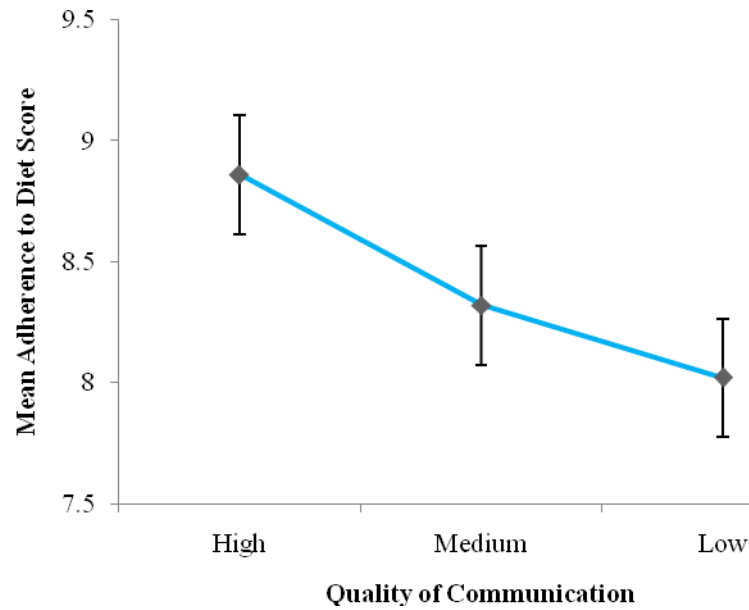
Figure 5. Mean plot showing the mean scores of Adherence to Diet (and 95% CI) of the three groups differing in Quality of Communication

Figure 6 shows the means and the variance of the scores (at 95% CI) of Adherence to Self-monitoring of the three groups differing in Quality of Communication. The figure shows the line between High and Medium Communication Quality groups, though slopes down, is not sharp, indicating that the difference between the two groups is not significant. However, the slope shows a sharp downward trend between Medium and Low Communication Quality groups, indicating that the Medium Communication Quality group is higher on Adherence to Self-monitoring compared to Low Communication Quality group.
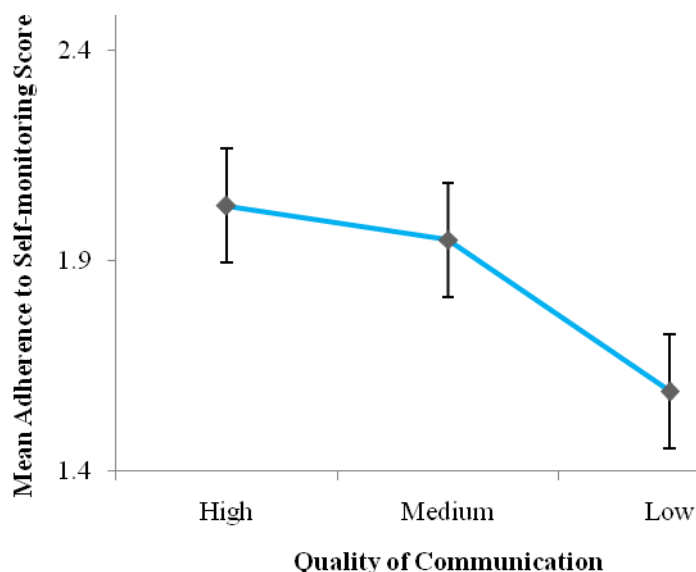
Figure 6. Mean plot showing the mean scores of Adherence to Self-monitoring (and 95% CI) of the three groups differing in Quality of Communication

The results discussed so far indicated that when the Quality of Communication is high, patients' Adherence to medical advice is also high, indicating that the Quality of Communication has a determining role in Patient Adherence. The goal of any treatment line is good prognosis. It may be of relevance to examine the effect of Communication Quality on Prognosis of the disease. In other words, to what extent Quality of Communication is helpful in good Prognosis is of importance.

Effect of Quality of Communication on Prognosis

Prognosis was measured six weeks after the initial contact during which the health communication between the doctor and the patient was assessed. This time gap of six weeks is referred to as 'Adherence Phase'. In this study, Prognosis was measured by two parameters- one, the patient reported clinical symptoms such as palpitation, breathlessness, headaches, heaviness in the head, swelling in the foot and

free urination, etc. The second parameter was the BP reading with the Systolic and Diastolic measures. For the patient reported clinical symptoms doctor's overall rating on a 3-point scale was taken as the measure. The actual difference in the BP readings (Systolic and Diastolic) on their initial consultation and post-Adherence Phase consultation six weeks later were taken as the second measure of prognosis.

Effect of Quality of Communication on Prognosis of Clinical Symptoms

In order to find out an improvement or status quo or worsening of clinical symptoms the doctors' ratings on prognosis was taken into account. The doctors rated the prognosis of every patient on a three point scale namely – good, bad and status quo with score of 1, 2, or 3 respectively. Taking these scores into consideration a One-way ANOVA was carried out. The results are presented in Table 4 along with the *M*s and the *SD*s of the three groups of Quality of Communication.

Table 4
Effect of Quality of Communication on Prognosis based on Clinical Symptoms

Variables	Quality of Communication						ANOVA		
	High		Medium		Low		Mean square		$F(2,297)$
	M	*SD*	*M*	*SD*	*M*	*SD*	Between	Within	
Prognosis of Clinical Symptoms	1.86	.79	1.89	.64	1.34	.50	9.10	.42	21.67**

Note. N = 300, **p* < .01

The results demonstrated that there is a significant effect of quality of communication on the prognosis, $F(2,297) = 21.67$, *p*<.01. An examination of the results revealed that patients in High Quality of Communication group had good Prognosis (*M* = 1.86, *SD* = .79) in comparison to patients in Low Quality of

Communication group (*M* = 1.34, *SD* = .50). Patients in Medium Communication Quality group (*M* = 1.89, *SD* = .64) had comparable scores on Prognosis with the scores of patients in the High Quality of Communication group. It may be mentioned here that the scores on Prognosis are based on the overall ratings of the doctor. While giving the ratings the doctor took several parameters into consideration with reference to the patient's earlier condition on the first visit six weeks earlier.

Post-hoc comparisons using Tukey's HSD test was done to see whether each group significantly differed from every other group with regard to the Prognosis of clinical symptoms. The results are presented in Table 5.

Table 5
Mean comparisons using Tukey's HSD test between the three groups of Quality of Communication on Prognosis of Clinical Symptoms

| | **Quality of Communication** | | |
Variables	High – Medium	High – Low	Medium – Low
Prognosis	-	.52**	.55**

Note. N = 300, **p* < .01

It was observed from Table 5 that among the three groups, patients under the group with Low Quality of Communication had low Prognosis in comparison to the patients belonging to the groups of High Communication Quality (*p*<.01) and Medium Communication Quality (*p*<.01). The means presented in Table 4 support the above results. In other words, patients belonging to the Low Communication Quality group differed significantly on Prognosis of clinical symptoms from the patients under High Communication Quality group and also from patients belonging to Medium Communication Quality. A look at the means (Table 4) of Prognosis scores of patients belonging to High Communication Quality and Medium Communication

Quality group indicated no difference between the two groups. Tukey's HSD test confirmed the same and no significant difference was seen between High and Medium Communication Quality group.

The results are also given a visual representation through a mean plot in Figure 7.
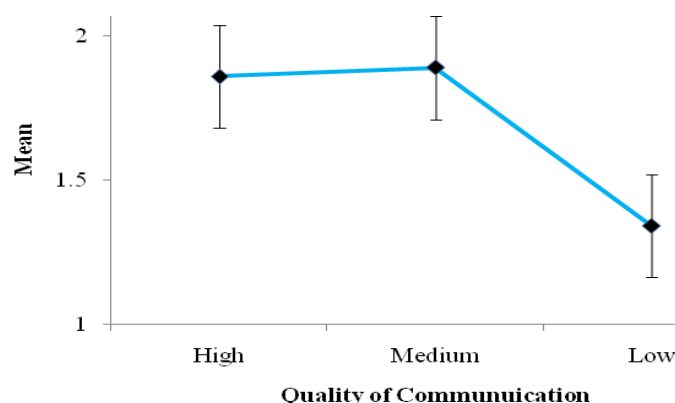
Figure 7. Mean plot showing the means of Prognosis scores (and 95% CI) of the three groups differing in Quality of Communication

Figure 7 shows the means and the variance of each mean at 95% CI of Prognosis rated on clinical symptoms of the three groups differing in Communication Quality. The line connecting the means of High Communication Quality group and Medium Communication Quality group is almost straight, indicating no significant difference between the two. However, the line takes a sharp dip from Medium Quality of Communication group to Low Communication Quality group, indicating significant difference of High and Medium Communication Quality group from Low Communication Quality group. As per the doctor's rating based on patient reported clinical symptoms the patients belonging to High Quality Communication and

Medium Quality Communication scored significantly higher on Prognosis compared to the patients belonging to Low Quality Communication.

Effect of Quality of Communication on Blood Pressure Management

The above findings were validated by the data on BP readings of the patients taken on the day of initial contact when the Quality of Communication was assessed and after the Adherence Phase of six weeks when the patient visited for a review consultation.

Patients' BP readings were taken as Systolic and Diastolic readings. For the purpose of assessing the Prognosis, the two readings were separately analyzed. An attempt was made to investigate whether the Quality of Communication had an effect on Prognosis in terms of reduced BP readings (Systolic and Diastolic). For this purpose a 3X2 Simple Mixed Design ANOVA was carried out, separately for Systolic and Diastolic BP readings in pre and post-Adherence Phase for the three groups of patients differing in their Quality of Communication. Initially the analysis of the Systolic BP reading was taken up. The *M*s, *SD*s and the results of the ANOVA are presented in Table 6 and Table 7 respectively.

Table 6
Ms and SDs of Systolic BP readings of three Qualities of Communication groups in Pre and Post- Adherence Phase

Adherence Phase	Quality of Communication							
	High ($n = 76$)		Medium ($n = 133$)		Low ($n = 91$)		Total ($N = 300$)	
	M	SD	*M*	SD	*M*	SD	*M*	SD
Pre-Systolic	173.62	31.77	169.29	28.73	179.19	28.23	173.39	29.58
Post-Systolic	156.45	31.60	155.37	29.36	170.85	26.23	160.34	29.77
Total	165.03	31.69	162.33	29.05	175.02	27.23	166.87	29.68

Table 7 presents the results of mixed design ANOVA while Table 6 presents the Ms and SDs of the Systolic readings of BP of the patients belonging to three groups of Quality of Communication in pre and post-Adherence Phase.

Table 7
Summary of the simple mixed-design ANOVA done on the Pre and Post-Adherence Phase Systolic BP readings of three Qualities of Communication Groups

Source	df	MS	F
Between-subjects			
Group	2	9040.59	5.68**
Error	297	1591.87	
Within-subjects			
Adherence Phase	1	24547.80	213.24**
Adherence Phase X Group	2	852.24	7.40**
Error	297	115.12	

Note. Group =Communication Quality Groups (High, Medium and Low)
**$p<.01$

The results revealed a significant main effect of Between and Within-subjects as well as significant interaction effect. To elaborate, the results indicated that irrespective of the Quality of Communication there was a significant drop in the BP readings of all patients between pre and post-Adherence Phase. Further, there is also a significant difference in BP readings of patients belonging to three groups of Communication Quality irrespective of pre and post-Adherence-Phase. It can be observed from Table 7 that there was a significant difference between pre and post-Adherence Phase in Systolic readings of BP in all patients, $F(1, 297) = 213.24$, $p<.01$. A further look at the mean table (Table 6) revealed that there was a significant drop in the systolic BP readings of the patients from pre-Adherence Phase ($M = 173.39$, $SD = 29.58$) to post-Adherence Phase ($M = 160.34$, $SD = 29.77$). This indicated that

irrespective of the Quality of Communication there was an improvement in the systolic BP scores of the patients in a period of six weeks of Adherence Phase. It is also found from Table 7 that there was a significant difference in Systolic BP reading between the patients belonging to different Communication Quality groups, $F(2, 297)$ = 5.68, $p<.01$. It is observed from Table 6 that the patients belonging to Low Communication Quality group have higher scores of mean Systolic BP (M = 175.02, SD = 27.23), followed by the patients belonging to High Communication Quality group (M = 165.04, SD = 31.69), while the patients belonging to Medium Communication Quality group scored lowest mean value of Systolic BP reading (M = 162.33, SD = 29.05). This indicated that the patients belonging to High Communication Quality group have mean scores that are higher than the mean scores of Medium Communication Quality group. Now it will be interesting to see from Table 7 that the interaction effect between pre-post Adherence Phase and Quality of Communication groups was found to be significant so far as the scores of Systolic BP is concerned, $F(2, 297)$ = 7.40, $p<.01$. It is observed from Table 6 that there was a sharp drop in mean Systolic values of patients belonging to High Quality Communication group (M = 173.62, SD = 31.77). While the mean value of Systolic BP was found to be 173.62 (SD = 31.77) in the first consultation, the M was found to be 156.45 (SD = 31.60), in post-Adherence Phase six weeks later. In case of patients belonging to Medium Communication Quality group though there was a drop in the mean Systolic values it was not as sharp as in case of High Communication Quality group. In case of the Medium Communication Quality group the M and SD of Systolic BP reading in pre-Adherence Phase was 169.29 (SD = 28.73) while in the post-Adherence phase the mean Systolic score was found to have dropped to 155.37 (SD = 29.36). However, in case of Low Communication Quality group, the mean

Systolic reading in the pre-Adherence Phase was 179.19 (*SD* = 28.23) and in the post-adherence phase, the mean was seen to be 170.85 (*SD* = 26.23).

The interaction effect among the three groups differing in Quality of Communication and also in their Systolic BP readings in pre and post-Adherence phase is depicted graphically in Figure 8.
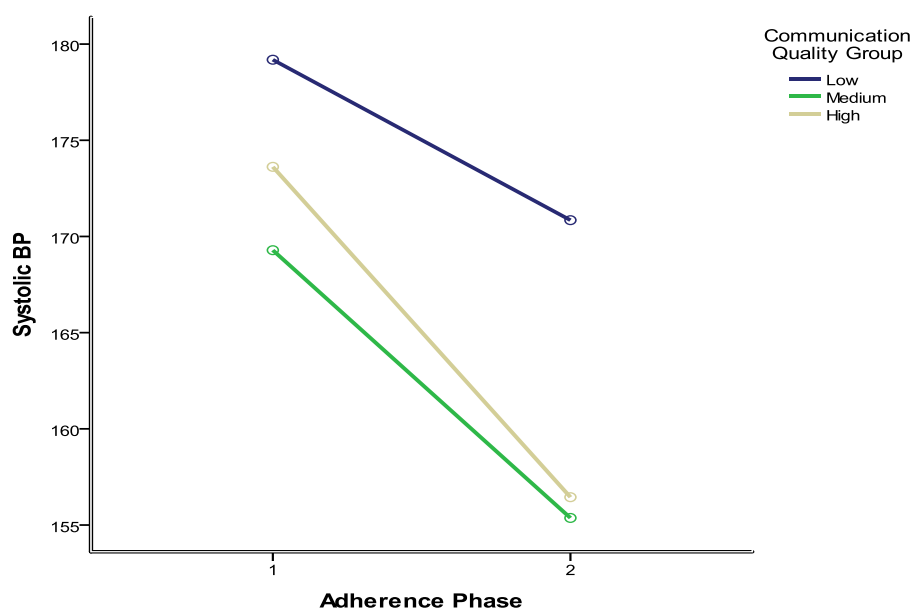
Figure 8. Line Graph showing the interaction effect between the Systolic BP readings in pre-post Adherence Phase and the three groups of patients differing in their levels of Quality of Communication

Figure 8 revealed that in the pre-Adherence Phase the patients in Low Quality of Communication group obtained high mean scores on Systolic readings of BP, followed by High Communication Quality group and Medium Communication Quality group in that order. In pre-Adherence Phase the difference between Low Communication Quality group and Medium Communication Quality is glaring. It is found to be noticeably wide between Low Communication Quality and High Communication Quality group. Similarly, there is a perceivable difference in the

mean scores of High and Medium Communication Quality groups. When it came to the post-Adherence Phase readings the difference between High Communication Quality group and Medium Communication Quality group is found to be negligible, where the two lines are almost touching each other in post-Adherence Phase. This signifies the interaction effect in the sense that in case of patients belonging to High Communication Quality group the improvement in Systolic values of BP is highly significant compared to the other two groups, suggesting that High Quality Communication has a significant effect on Prognosis in patients with primary hypertension compared to others belonging to Low and Medium Communication Quality groups as indicated by BP readings of Systolic scores.

After the detailed analysis of the systolic BP readings in the pre and post-Adherence Phase, the difference in Diastolic BP readings was taken up to find out if there is any significant difference among the three groups differing in Communication Quality levels. Table 8 presents the *M*s and *SD*s of the Diastolic readings of BP of the patients belonging to three groups of Quality of Communication in pre and post-Adherence Phase and Table 9 presents the results of the ANOVA.

Table 8
Ms and SDs of Diastolic BP readings of three Qualities of Communication groups in Pre and Post Adherence Phase

Adherence Phase	Quality of Communication							
	High (*n* = 76)		Medium 2 (*n* = 133)		Low (*n* = 91)		Total (*N* = 300)	
	M	SD	*M*	SD	*M*	SD	*M*	SD
Pre-Diastolic	124.79	34.49	120.01	28.47	128.24	34.77	123.72	32.14
Post-Diastolic	113.05	35.60	108.16	28.88	121.13	32.91	113.33	32.29
Total	118.92	35.05	114.09	28.68	124.69	33.84	118.53	32.22

Table 9

Summary of the simple mixed-design ANOVA done on the Pre and Post-Adherence Phase Diastolic BP readings of three Qualities of Communication Groups

Source	df	MS	F
Between-subjects			
Group	2	6091.62	3.10*
Error	297	1966.70	
Within-subjects			
Adherence Phase	1	14878.34	187.80**
Adherence Phase X Group	2	350.07	4.42**
Error	297	79.22	

Note. Group = Communication Quality Groups (High, Medium and Low)
*p<.05, **p<.01

The results revealed significant main effect of within-subjects, between-subjects as well as interaction effect. The results, as evident from the ANOVA presented in Table 9, revealed that there was significant difference between pre and post-Adherence Phase on the Diastolic readings of BP in all patients irrespective of Quality of Communication, $F(1, 297) = 187.80$, $p<.01$. The means presented in Table 8 give further evidence in the trend of the changes in Diastolic BP readings of the three groups of patients belonging to different Communication Quality levels between the pre and post-Adherence Phase. The trend is found to be identical to that of Systolic BP readings. Table 8 shows a significant drop in the Diastolic reading of BP from pre-Adherence Phase ($M = 123.72$, $SD = 32.14$) to post-Adherence Phase ($M = 113.33$, $SD = 32.29$). In other words, the Diastolic BP reading of the hypertensive patients was seen to drop in the span of six weeks of Adherence Phase, indicating improvement, irrespective of the Communication Quality group that the patients belonged to. It was also revealed from the results presented in Table 9 that the patients under the three groups of Quality of Communication differed significantly from each

other with respect to their Diastolic readings of BP, $F(2, 297) = 3.10$, $p<.05$. A look at the means presented in Table 8 reveals that among the three groups, the patients under Low Communication Quality group showed the higher mean of Diastolic BP readings ($M = 124.69$, $SD = 33.84$), followed by the patients under the High Communication Quality ($M = 118.92$, $SD = 35.05$) and patients under Medium Communication Quality ($M = 114.09$, $SD = 28.68$) in that order. Similar results were also observed in case of Systolic BP readings. Following this, an attempt was made to see if there existed any interaction effect between the pre and post-Adherence Phase Diastolic BP readings and the Quality of Communication groups. The results presented in Table 9, confirmed a significant interaction effect $F(2, 297) = 4.42$, $p<.01$. The means in Table 8, shows that in the pre-Adherence phase, for the patients under High Communication Quality group the mean was 124.79 ($SD = 34.49$) while the mean in the post-Adherence phase was found to be 113.05 ($SD = 35.60$), indicating a sharp drop in the Diastolic reading. For patients under Medium Quality of Communication, the mean score of pre-Adherence phase showed a sharp down ward slope from 120.01 ($SD = 28.47$) to $M = 108.16$ ($SD = 28.88$) in the post-Adherence phase. However, the patients under Low Quality of Communication registered a marginal difference in the mean scores of pre and post-Adherence Phase Diastolic BP reading. In post-Adherence phase, the mean was seen to be 121.13 ($SD = 32.91$) while in pre-Adherence Phase, it was 128.24 ($SD = 34.77$), indicating a marginal drop in the Diastolic BP reading. It is interesting to note that the mean score of patients under Low Communication Quality remained higher amongst the other two groups both in pre and post-Adherence Phase. Even though there was a drop in the reading the slope is found to be relatively flat.

For a clearer picture the interaction effect is depicted visually in Figure 9.
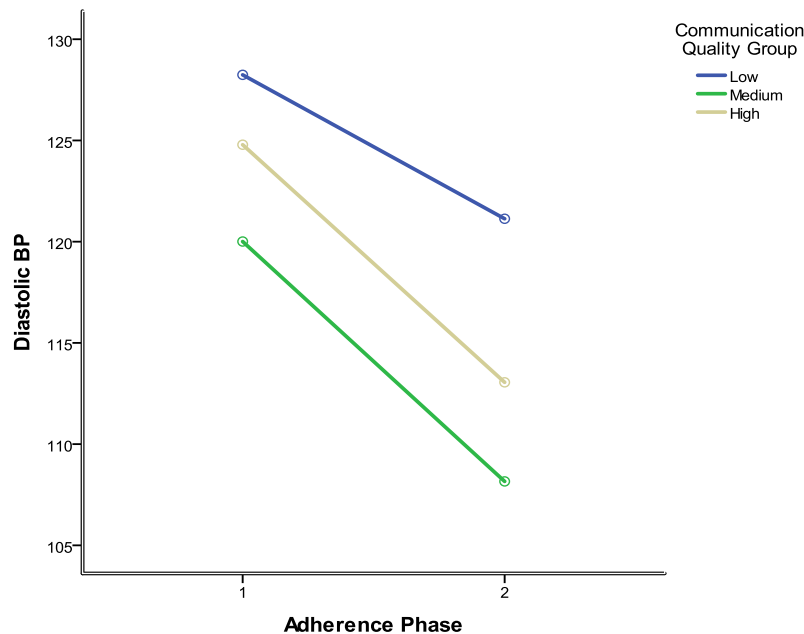
Figure 9. Line graph showing the interaction effect between the Diastolic BP readings in pre and post-Adherence Phase and the three groups of patients differing in their levels of Quality of Communication

From Figure 9, it is observed that in pre-Adherence Phase, the patients belonging to Low Communication Quality obtained high mean scores on Diastolic readings of BP followed by patients under High Communication Quality group and Medium Communication Quality group. The figure shows the huge gap in mean adherence scores at pre-Adherence Phase between the Low Communication Quality group and the Medium Communication Quality group in Diastolic BP reading, with the High Communication Quality group positioned between the two. The line indicating mean scores in pre and post-Adherence Phases of Diastolic BP readings of Medium and High Communication Quality group are found to slope as parallel lines.

However, in case of post-Adherence Phase, the gap between the Low Communication Quality group in comparison to High and Medium Communication Quality group on the mean scores of Diastolic BP reading is perceivably high. This indicates that the Quality of Communication has a significantly differential effect on the Prognosis of patients belonging to three groups of Communication Quality in terms of bringing their BP under control.

Doctors' Quality of Communication

Communication is a skill. When two people are involved in the communication, more often than not, Quality of Communication depends to a large extent on the skills of information provider, in this case the doctor. If the doctor is highly competent in his skills of communicating with the patients, majority of his patients may be able to comprehend the information provided. Further, the doctors with good communication skills may verify with the patients' comprehension of the content communicated before termination of consultation in order to ensure high adherence.

It may be of significance to find out if the communication skills of the doctors made an impact on the Adherence and Prognosis of the patients. In order to verify this, a score of Quality of Communication was evolved for each doctor by computing the means of the scores of similarity index scores of 10 patients under each doctor. Thus, each doctor had a score for his Quality of Communication. Table 10 presents the Quality of Communication scores of 10 patients under each of the 30 doctors and the mean Communication Quality score of every doctor. Table 10 presents the mean score or the Quality of Communication score of doctors, taken as the average of the similarity indices of the 10 patients under each doctor. From Table 10, it is observed

that, out of 30 doctors three doctors (Doctor 1, 2 and 20) have a larger proportion of similarity indices that are ≥.80, taking the average mean to be higher i.e. ≥.80. There were 22 (Doctor 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 19, 21, 22, 23, 25, 26, 27, 28, 29, 30) who had a larger proportion of values of similarity indices that ranged between .61 and .79, making the Quality of Communication of those doctors i.e. the mean to be between .61 and .79. The remaining five doctors (Doctor 4, 6, 17, 18, 24) had similarity indices that were ≤.60 and hence the mean or the Communication Quality score was ≤.60.

Table 10

Doctors' Quality of Communication Scores

Patients	Doctors (D)									
	D1	**D2**	**D3**	**D4**	**D5**	**D6**	**D7**	**D8**	**D9**	**D10**
1	0.913	0.707	0.707	0.707	1	0.645	0.707	0.645	0.645	0.707
2	0.798	1	0.707	0.707	1	0.645	1	0.764	0.645	1
3	0.577	0.707	0.764	0	0.5	0.408	0.577	0.645	0.707	0.645
4	0.764	0.957	0.764	0.655	0.577	0.5	0.645	0.707	0.5	0.5
5	0.707	0.764	0.894	1	0.707	0.935	0.707	0.577	0.645	0.408
6	0.707	1	1	0.577	0.577	0.548	0.645	1	1	0.935
7	0.866	1	0.408	1	0.764	0.603	0.707	0.645	0.645	0.707
8	1	0.408	0.289	0.5	0.408	0.577	0.707	0.764	0.764	0.577
9	0.764	0.764	1	0	0.707	0.5	1	0.816	0.764	0.645
10	1	0.707	0.935	0.289	0.645	0.577	0.577	1	0.707	0.764
M	**0.81**	**0.801**	**0.747**	**0.543**	**0.688**	**0.594**	**0.727**	**0.757**	**0.702**	**0.689**

Table continues

Table 10 (continued)
Doctors' Quality of Communication Scores

Patients	Doctors (D)									
	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
1	1	0.645	0.577	0.577	0.645	0.645	0.5	0.577	0.577	0.707
2	0.913	0.5	0.408	0.289	0.645	1	0.408	0.577	0.408	1
3	0.5	0.577	1	0.408	0.707	0.408	0.707	0.577	1	0.707
4	0.707	0.707	0.603	1	0.5	0.935	0	0.707	0.603	0.957
5	0.408	0.707	0.645	0.577	0.645	0.632	0	0.577	0.645	0.764
6	1	0.577	1	1	1	0.548	0.577	0.577	1	1
7	0.645	1	1	0.577	0.816	0.603	0.577	1	1	1
8	0.577	0.577	0.577	0.645	0.764	0.577	0.935	0	0.577	0.408
9	0.791	1	0.913	0.707	0.764	0.5	0.866	0	0.913	0.764
10	0.645	0.707	0.707	0.707	0.707	0.577	0.845	0.577	0.707	0.707
Mean	**0.719**	**0.699**	**0.743**	**0.649**	**0.719**	**0.643**	**0..542**	**0.517**	**0.743**	**0.801**

Table continues

Table 10 (continued)
Doctors' Quality of Communication Scores

Patients	Doctors (D)									
	D21	D22	D23	D24	D25	D26	D27	D28	D29	D30
1	0.707	1	0.645	0.707	0.707	0.764	0.707	0.707	0.764	0.645
2	1	0.913	0.645	0.707	1	1	0.707	0.707	1	0.645
3	0.645	0.5	0.707	0	0.645	0.577	0.764	0.764	0.577	0.707
4	0.408	0.707	0.5	0.655	0.408	0.645	0.764	0.764	0.645	0.5
5	0.408	0.408	0.645	1	0.408	0.707	1	1	0.707	0.645
6	0.935	1	1	0.577	0.935	0.645	1	1	0.645	1
7	0.707	0	0.5	1	0.707	0.707	0.408	0.408	0.707	0.816
8	0.577	0.577	0.764	0.5	0.577	0.707	0.289	0.289	0.707	0.764
9	0.645	0.645	0.764	0	0.645	1	1	1	1	0.764
10	0.764	0.577	0.707	0.289	0.764	0.645	1	1	0.577	0.707
Mean	**0.679**	**0.633**	**0.687**	**0.543**	**0.679**	**0.739**	**0.764**	**0.764**	**0.733**	**0.719**

Note. ■ - High Quality of Communication, ■ - Medium Quality of Communication, ▢ - Low Quality of Communication

doctors. The classification along with the range is presented in Table 11. Doctors who

had a mean score of $\geq .800$ were classified under High Communication Quality group.

As can be found in the table, there were three doctors who came under this category.

Those doctors whose mean scores on Quality of Communication were found to be

$\leq .600$ were classified under Low Quality of Communication category. Five doctors

were grouped under this classification. Doctors whose mean scores on Quality of

Communication was between .601 and .799 were classified into Medium

Communication Quality group. As presented in Table 11, it can be seen that 22

doctors were grouped under this category.

Table 11

Classification of Doctors based on the Quality of Communication

Quality of Communication	Doctor's Quality of Communication Score	*N* (Doctors)
High	$\geq .800$	3
Medium	.601- .799	22
Low	$\leq .600$	5
Total		30

Having classified the doctors into those with High, Medium and Low

Communication Quality, it was of interest to find out if the patients treated by the

doctors with High Communication Quality differed from those treated by doctors with

Low and Medium Quality of Communication on Adherence and Prognosis. This

called for grouping of the patients based on the doctors' Quality of Communication

and finding about their level of adherence to examine whether the patients treated by

doctors with High Quality of Communication are also those with high level of

Adherence and those treated by doctors with Low level of Communication Quality are

those with low level of Adherence. While drawing the sample, ten patients under each doctor were recruited for the study. Then the first group of three doctors (belonging to High Quality of Communication group) treated a total of 30 patients, while patients of the five doctors grouped under Low Quality of Communication were 50 and the rest 22 doctors in the Medium Communication Quality group treated 220 patients. An attempt was also made to find out if the Communication Quality of these three groups of doctors has an association with their patients' Adherence to Medication, Diet, Exercise and Self-monitoring. The patients were categorized on their Adherence levels (Overall and dimension wise) based on equal percentile ranking.

Classification of Patients' Adherence Level

Based on the total and dimension-wise score of that the patients received on the HYCOMPS, they were categorized into three different groups for the overall Adherence and Adherence to each of the dimensions. The categorization was done through equal percentile ranking and the classification is presented in Table 12.

Table 12
Classification of Patients into different Adherence Level

Adherence Groups	Range of Adherence scores and (*n*)				
	Overall Adherence	Adherence to Medicine	Adherence to Diet	Adherence to Exercise	Adherence to Self-monitoring
High	42-60 (99)	22-28 (96)	10-12 (65)	10-12 (74)	5-8 (36)
Medium	39-41 (80)	20-21 (61)	9 (76)	9 (76)	4 (65)
Low	0-39 (121)	16-19 (143)	0-8 (159)	0-8 (150)	0-3 (199)
Total			*N* = 300		

Table 12 presents the range of scores and the number of patients categorized under High, Medium and Low level of Adherence based on equal percentile ranking. The distribution of number of patients under each level of Adherence is shown for overall Adherence and also for Adherence to Medicine, Diet, Exercise and Self-monitoring separately in different columns. It may be observed from Table 12 that all patients scoring between 42 and 60 are classified under High Adherence. There are 99 patients coming under this category. Patients with a score between 39 and 41 are classified under Medium Adherence, which has 80 patients. There are 121 patients scoring 39 or less who fall under Low Adherence.

Similarly, in case of Adherence to Medicine, it is found that 96 patients with a score between 22 and 28 are in High Adherence to Medicine group while 61 patients with a score between 20 and 21 are in Medium Adherence group. A large number of 143 patients scoring between 16 and 19 are found to be under Low Adherence to Medication group.

Column 4 of Table 12 represents the High, Medium and Low Adherence group with respect to Diet. It is observed from the table that 65 patients scoring between 10 and12 are in High Adherence, 76 patients with a score of 9 are in Medium Adherence while 159 patients with a score of 8 or less are in Low Adherence to Diet group.

Similar trend is observed in the distribution of patients with High, Medium and Low Adherence to Exercise. It is observed from Table 12 that 74 patients with a score between 10 and12 are found to have High Adherence to Exercise while 76 patients with a score of 9 are found to have Medium Adherence to Exercise. A large

number of 150 patients with a score of 8 or less on Exercise are in the Low Adherence group.

With respect to Self-monitoring, 36 patients scoring between 5 and 8 are in High Adherence group while 65 patients with a score of 4 are in Medium Adherence. A total of 199 patients scoring between 0 and 3 are found to be in Low Adherence group.

Now with these classification on Adherence and classification of doctors under High, Low and Medium Communication Quality, cross tabulations and chi-square tests were applied to scrutinize how the patients with different levels of Adherence were distributed under doctors with three levels of Quality of Communication.

Association between Doctors' Quality of Communication and Patient's Overall Adherence

A 3x3 contingency table was prepared and chi-square was computed to see the association between the doctors' Quality of Communication and the overall Adherence level of patients with primary hypertension. Table 13 presents results of chi-square.

Table 13

Distribution of Patients treated by doctors with varying levels of Quality of
Communication along three levels of Adherence

Quality of Communication of Doctors		Adherence			Total
		High	Medium	Low	
High (*n* = 3)	Observed count	18	3	9	30
	Expected count	9.9	8	12.1	30
Medium (*n* = 22)	Observed Count	68	59	93	220
	Expected Count	72.6	58.7	88.7	220
Low (*n* = 5)	Observed Count	13	18	19	50
	Expected Count	16.5	13.3	20.2	50
Total	Observed Count	99	80	121	300
	Expected Count	99	80	121	300

$$\chi^2 = 13.49**$$

*Note. **p<.01*

From the results it can be seen that the there is a significant association
between the doctors' Quality of Communication and overall Adherence of the
patients, $\chi^2 = 13.49$, *p<.01*, N = 300. It may be observed from Table 13 that 18 out of
30 patients treated by doctors of High Communication Quality belonged to High
Adherence group against the expected count of 9.9 patients. In contrast to this, 3 out
of 30 patients belonged to Medium Adherence against the expected frequency of 8,
while 9 out of 30 patients against the expected count of 12.1 showed Low Adherence.
This indicated that a large proportion of patients treated by doctors with High Quality
of Communication showed high level of overall Adherence. Contrarily, only 13 out of
50 patients treated under doctors with Low Quality of Communication belonged to
High Adherence group as against 16.5 of expected frequency. In case of patients
treated under doctors with Medium Quality of Communication as many as 93 out of

220 patients belonged to Low Adherence group as against the expected frequency of 88.7, while only 68 out of 220 were found to belong to the group of High Adherence as against the expected frequency of 72.6.

The results clearly indicated a strong association between the doctors' Quality of Communication and the overall Adherence level of patients.

Association between Doctors' Quality of Communication and Patients' Adherence to Medicine

To determine the association between the doctors' Quality of Communication and the patients' level of Adherence to Medicine, a 3x3 contingency table was prepared and the chi-square was computed. Table 14 presents the results of the chi-square, along with the distribution of the patients across the three groups of doctors' Communication Quality.

Table 14
Distribution of Patients treated by doctors with varying levels of Quality of Communication along three levels of Adherence to Medicine

Quality of Communication of Doctors		Adherence to Medicine			Total
		High	Medium	Low	
High	Observed count	20	4	6	30
(*n* = 3)	Expected count	9.6	6.1	14.3	30
Medium	Observed Count	69	40	111	220
(*n* = 22)	Expected Count	70.4	44.7	104.9	220
Low	Observed Count	7	17	26	50
(*n* = 5)	Expected Count	16	10.2	23.8	50
Total	Observed Count	96	61	143	300
	Expected Count	96	61	143	300

$$\chi^2 = 27.55**$$

Note. **$p<.01$

The results revealed a significant association between the Quality of Communication of the doctors and the level of Adherence to Medicine of the patients, χ^2 = 27.55, $p<.01$, N = 300. Regarding the distribution of the patients with varying levels of Adherence across the three groups of doctors, following observations were made. Out of 30 patients who took treatment from doctors with High Quality of Communication, as many as 20 patients were found to have high level of Adherence to Medicine against the expected frequency of 9.6 patients. In contrast to the above, the table reveals that only 6 patients treated under doctors with High Quality of Communication are found to be in the group of Low Adherence, while the expected number of patients in this group is 14.3. This indicated a close association of High Adherence to Medicine with High Quality of doctors' communication. Comparing the above with the patients treated under doctors with Low Communication Quality it is found that just 7 patients of this group belonged to group showing High Adherence to Medication as against the expected number of 16, while 26 patients are found in the group of Low Adherence to Medication for which the expected frequency is 23.8. This finding indicated that when the doctors' Quality of Communication is low, only a small proportion of patients tend to have a strict Adherence to Medication.

Research findings have categorically proved that primary hypertension has a close association with sodium intake. Further patients with primary hypertension are at high risk for high cholesterol and atherosclerosis. In view of this as part of doctor-patient communication, the patients are expected to be appraised about the consequences of high calorie and high sodium diet. The health communication from the doctors in these cases includes counseling the patients on the need for compliance with prescribed diet. In this context it is highly relevant to examine whether doctors' Communication Quality has an association with patients' Adherence to Diet.

Association between Quality of Communication of Doctors and Patients'

Adherence to Diet

A 3x3 contingency table was prepared and chi-square was computed to see the association between Quality of Communication of doctors and the Adherence to Diet in patients with primary hypertension. The results are presented in Table 15.

Table 15
Distribution of Patients treated by doctors with varying levels of Quality of Communication along three levels of Adherence to Diet

Quality of Communication of Doctors		Adherence to Diet			Total
		High	Medium	Low	
High	Observed count	17	6	7	30
(*n* = 3)	Expected count	6.5	7.6	15.9	30
Medium	Observed Count	40	56	124	220
(*n* = 22)	Expected Count	47.7	55.7	116.6	220
Low	Observed Count	8	14	28	50
(*n* = 5)	Expected Count	10.8	12.7	26.5	50
Total	Observed Count	65	76	159	300
	Expected Count	65	76	159	300

$$\chi^2 = 24.95^{**}$$

Note. **$p<.01$

It may be observed from Table 15 that, there is a significant association between the Quality of Communication of the doctors and the level of Adherence to Diet in the patients, $\chi^2 = 24.95$, $p<.01$, $N = 300$. Table 15 indicates that the patients under the treatment of doctors with High Quality of Communication have High Adherence to Diet. A scrutiny of distribution of patients of doctors with High Quality of Communication reveals that out of 30 patients in this category 17 are found to have High Adherence to Diet as against the expected frequency of 6.5, while only 7 out of

30 are found to be in the group of Low Adherence to Diet as against the expected count of 15.9. Comparing this group with the patients treated by doctors with Low Communication Quality revealed that only 8 out of 50 patients are classified under the group of High Adherence to Diet while the expected frequency is 10.8. As a drastic contrast to this, 28 out of 50 patients from this category are found to be affiliated to Low Adherence to Diet group, whose expected frequency is 26.5. The above findings suggested that doctors' Communication Quality had a significantly high association with the patients' Adherence to prescribed low sodium and low calorie diet.

The prescription for the patients of primary hypertension includes an exercise regimen alongside the anti-hypertensive medication and low calorie and low sodium diet. The objective of exercising is to burn calories and prevent adipose deposits in the blood vessels, and regulate the levels of cholesterol in the blood. Exercise helps in increasing the muscle tone of the arterial walls and that contributes directly to reducing the diastolic pressure.

Regular exercise is a preventive measure in effective management of hypertension in order to prevent cardio-vascular diseases. This message needs to be effectively communicated to the patients through the communication skills of the doctor, in order to motivate the patient to adhere to exercise. Hence, it is of research interest to investigate the association between the doctors' Communication Quality and patient's Adherence to Exercise.

Association between Quality of Communication of Doctors and Patients'

Adherence to Exercise

A 3x3 contingency table was prepared and chi-square was computed to see the association between Quality of Communication of doctors and the Adherence to Exercise in patients with primary hypertension. The results are presented in Table 16.

Table 16
Distribution of Patients treated by doctors with varying levels of Quality of Communication along three levels of Adherence to Exercise

Quality of Communication of Doctors		Adherence to Exercise			
		High	Medium	Low	Total
High (n = 3)	Observed count	2	7	21	30
	Expected count	7.4	7.6	15	30
Medium (n = 22)	Observed Count	68	50	102	220
	Expected Count	54.3	55.7	110	220
Low (n = 5)	Observed Count	4	19	27	50
	Expected Count	12.3	12.7	25	50
Total	Observed Count	74	76	150	300
	Expected Count	74	76	150	300

$$\chi^2 = 19.99**$$

*Note. **p<.01*

From the results it can be seen that the there is a significant association between the Quality of Communication of the doctors and the patients' level of Adherence to Exercise, $\chi^2 = 19.99$, $p<.01$, $N = 300$. The results of association between doctor's Quality of Communication and patients' Adherence to Exercise are highly intriguing. It is observed from Table 16, that in case of patients treated by doctors with High Communication Quality, a significantly low proportion of 2 out of 30 patients were observed to belong to the group of High Adherence to Exercise against

the expected frequency of 7.4. While 21 belonged to Low Adherence group and 7 to Medium Adherence, it is seen that 68 out of 220 patients treated by Medium Quality Communication doctors are in the group of Adherence to Exercise. Looking from the other angle 70 out of 74 High Adherence patients belonged either to group High or Medium Quality of Communication doctors. Surprisingly a very high proportion of 21 out of 30 patients belonged to Low Adherence group while the expected frequency is 15. Coming to the patients treated by the Low Quality Communication doctors the distribution is in expected line. The table reveals that only 4 out of 50 patients are in the group of High Adherence to Exercise against the expected frequency of 12.3. Similarly, 27 out of 50 patients belong to the group of Low Adherence to Exercise compared to the expected frequency of 25. These results indicated that even with High Quality of Communication the doctors could not inculcate the habit of regular exercise in their patients. The results indicate that the association between Quality of Communication of doctors and level of Adherence to Exercise seems to be in expected lines only with the group of patients treated under Low Quality Communication doctors.

The medical research has emphasized on the fact that the cause of primary HTN is unknown. It is also stated that primary HTN is a manifested symptom placing the patient at high risk for cardiovascular diseases. Hence, it is imperative to closely monitor BP once a person is diagnosed with primary HTN. The significance and the need for such monitoring with vigilance towards warning signals will have to form a part of health communication to the patient. Such educative message from the doctor demands good communication skills on the doctor's part. It may be pertinent to inquire whether doctor's Quality of Communication had an association with the patients' Adherence to Self-monitoring.

Association between Quality of Communication of Doctors and Adherence to Self-monitoring

A 3x3 contingency table was prepared and χ^2 was computed to see the association between Quality of Communication of doctors and the Adherence to Self-monitoring in patients with primary hypertension. The results are presented in Table 17.

Table 17
Distribution of Patients treated by doctors with varying levels of Quality of Communication along three levels of Adherence to Self-monitoring

Quality of Communication of Doctors		Adherence to Self-monitoring			Total
		High	Medium	Low	
High (*n* = 3)	Observed count	6	5	19	30
	Expected count	3.6	6.5	19.9	30
Medium (*n* = 22)	Observed Count	30	54	136	220
	Expected Count	26.4	47.7	145.9	220
Low (*n* = 5)	Observed Count	0	6	44	50
	Expected Count	6	10.8	33.2	50
Total	Observed Count	36	65	199	300
	Expected Count	36	65	199	300

$$\chi^2 = 15.69**$$

*Note. **p<.01*

From the results it can be seen that there is a significant association between the Quality of Communication of the doctors and the level of Adherence to Self-monitoring of the patients, $\chi^2 = 15.69$, $p<.01$, $N = 300$. Table 17 revealed that out of 300 patients, 199 belonged to Low Adherence to Self-monitoring group while only 36 belonged to High Adherence. Looking at the distribution of 30 patients treated under doctors with High Quality Communication, 6 were found to be grouped under High

Adherence to Self-monitoring, while the expected frequency is 3.6. From among the patients treated by doctors with Low Communication Quality, none belonged to High Adherence group while 44 of them were grouped under Low Self-monitoring level which is very high compared to the expected count of 33.2. Contrasting the adherence of patients of High and Low Quality Communication doctors it is clearly perceived from the table that patients under High Quality Communication doctors are found in High Adherence group in larger proportion while patients treated by Low Quality Communication doctors are found in Low Adherence to Self-monitoring in larger proportion.

The results of Chi-square test point at a significant association between doctor's Quality of Communication and patient's Adherence levels in general and to specific dimensions related to life style. It is evident from the above results that the communication skills of the doctor play a vital role in influencing the adherence of the patients.

Association between Doctor's Quality of Communication and Prognosis

It was further examined to find out if doctors' Quality of Communication is associated with Prognosis of the disease. Chi-square tests were done to find if there is any association between doctors' Quality of Communication and disease Prognosis of the patients with primary hypertension. The results revealed no significant association between the Quality of Communication of the doctors and the Prognosis.

Results till now have established the fact that High Quality Communication in general has a determining effect on patients' Adherence and Prognosis. Secondly, the doctor's skill of communication has a strong association with the adherence levels of patients. The next logical task of the research investigator was to find out whether

levels of Adherence of patients influenced the Prognosis. The following section examines this question.

Role of Adherence in determining the Disease Prognosis

In this section Adherence is taken as independent variable and its influence on Prognosis of the disease is examined.

The 300 patients were divided into three groups of adherence viz. High, Medium and Low (Refer Table 12). This classification was done following the method of equal percentile ranking based on their scores in adherence. Thus, the classification of patients into High, Medium, and Low Adherence was taken up for overall Adherence and the individual dimensions. Depending upon their Adherence score on each of these dimensions, the patients came under one of these groups.

An attempt was made to investigate into the effects of levels of Adherence of the patients in disease Prognosis. It may be reiterated here that Prognosis was measured by two parameters, namely doctor's overall rating based on patients reported clinical symptoms and the difference in the BP readings (Systolic and Diastolic) of the patients between the pre and post-Adherence Phase.

One-way ANOVAS were done to find out the effect of levels of Adherence of the patients on disease Prognosis as rated by the doctors with reference to clinical symptoms reported by patients and the results are presented in Table 18.

Table 18
Effect of Adherence and its dimensions on Prognosis based on Clinical Symptoms

Adherence				ANOVA		
				Mean Square		$F(2,297)$
	Group	$\underline{M}$	$\underline{SD}$	Between	Within	
	High	2.29	.66			
Overall	Medium	1.73	.45	30.69	.27	113.95**
	Low	1.23	.42			
	High	2.25	.73			
Medicine	Medium	1.77	.42	24.50	.31	78.81**
	Low	1.33	.47			
	High	2.35	.72			
Diet	Medium	1.80	.61	21.01	.33	62.82**
	Low	1.41	.49			
	High	2.03	.70			
Exercise	Medium	1.95	.71	11.33	.40	28.34**
	Low	1.44	.55			
	High	2.25	.60			
Self-monitoring	Medium	1.78	.65	6.79	.43	15.79**
	Low	1.59	.67			

Note. N = 300
***p* <.01

The results of the ANOVAs revealed that levels of adherence of patients had a significant effect on prognosis, $F(2,297) = 113.95$, $p<.01$. It may be observed that patients with High Adherence had scored better on prognosis ($M = 2.29$, $SD = .66$), followed by patients with Medium Adherence ($M = 1.73$, $SD = .45$) and patients with Low Adherence ($M = 1.23$, $SD = .42$). Following this, attempts were made to see whether the levels of individual dimensions of Adherence viz. Medicine, Diet, Exercise and Self-monitoring had an effect on the disease Prognosis, measured by clinical symptoms.

A one-way ANOVA was carried out to see whether Adherence to Medication had an effect on Prognosis. It is observed from Table 18 that there is a significant effect of Adherence to Medicine on Prognosis, $F(2,297) = 78.81$, $p<.01$. An

examination of the *M*s and *SD*s revealed that patients with Low Adherence to Medicine had the lowest mean score of Prognosis among the three groups (*M* = 1.33, *SD* = .47). Patients of High Adherence group showed good Prognosis (*M* = 2.25, *SD* = .73) while patients with Medium Adherence level had Prognosis (*M* = 1.77, *SD* = .42) placed between the two groups. The results suggested that patients having low level of Adherence to Medicine had bad Prognosis in comparison to the other two groups of patients having high and medium level of Adherence to Medicine.

The next dimension that was investigated was the patients' Adherence to Diet. A one-way ANOVA was carried out to see the effect of level of Adherence to Diet on Prognosis. The results are presented in Table 18. The results revealed that Prognosis is significantly affected by the level of Adherence to Diet, $F(2,297) = 62.82$, $p<.01$. The results also revealed that patients with high level of Adherence to Diet had good prognosis (*M* = 2.35, *SD* = .72), followed by patients with Medium level of Adherence to Diet (*M* = 1.80, *SD* = .61), and patients with Low level of Adherence to Diet (*M* = 1.41, *SD* = .49), in that order.

One-way ANOVA was done to find out the effect of the level of Adherence to Exercise on the disease Prognosis in patients with primary HTN. The results are presented in Table 18. From the results, it can be seen that there is a significant effect of Adherence to Exercise on Prognosis $F(2,297) = 28.34$, $p<.01$. An examination of the *M*s and *SD*s revealed that patients with low level of Adherence to Exercise had the lowest mean score of Prognosis among the three groups (*M* = 1.44, *SD* = .55). Patients with High Adherence to Exercise, showed good Prognosis (*M* = 2.03, *SD* = .70) while patients exhibiting Medium level of Adherence to Exercise had a score of Prognosis, placed between the two groups (*M* = 1.95, *SD* = .71). The results suggested that

patients with high level of Adherence to Exercise had good Prognosis and patients with low level of Adherence to Exercise had bad prognosis. The patients with medium level of Adherence to Exercise showed Prognosis that ranged between the mean Prognosis scores of patients of High and Low Adherence to Exercise group.

The fourth dimension of Adherence that was investigated was the patients' Adherence to Self-monitoring. A One-way ANOVA was carried out to see the effect of Adherence to Self-monitoring on Prognosis. The results are presented in Table 18. The results revealed that Prognosis is significantly affected by the level of Adherence to Self-monitoring $F(2,297) = 15.79$, $p<.01$. The results also revealed that patients with high level of Adherence to Self-monitoring had high Prognosis ($M = 2.25$, $SD = .60$) followed by the group of patients with medium level of Adherence to Diet ($M = 1.78$, $SD = .65$) who had comparable level of Prognosis with patients exhibiting low level of Adherence to Self-monitoring ($M = 1.59$, $SD = .67$).

As observed in the above findings, Adherence plays a significant role in disease Prognosis. It may be of relevance now to see how the groups of differing in level of Adherence and its dimensions differed in their level of Prognosis from each other. In order to address this, Tukey's tests of multiple group comparison were done. The results are presented in Table 19.

Table 19
Mean comparisons using Tukey's HSD test between three groups differing in their level of Adherence and its dimensions on Prognosis scores based on clinical symptoms

	Overall Adherence			**Adherence to Medicine**		
	H–M	H–L	M–L	H–M	H–L	M–L
Prognosis	.57**	1.06**	.49**	.48**	.92**	.44**

Note. H = High Adherence Group, M = Medium Adherence Group, L = Low Adherence Group

Table 19 (continued)

Mean comparisons using Tukey's HSD test between three groups differing in their level of Adherence and its dimensions on Prognosis scores based on clinical symptoms

	Adherence to Diet			Adherence to Exercise			Adherence to Self-monitoring		
	H–M	H–L	M–L	H–M	H–L	M–L	H–M	H–L	M–L
Prognosis	.55**	.95**	.39**	-	.59**	.51**	.47**	.66**	-

Note. H = High Adherence Group, M = Medium Adherence Group, L = Low Adherence Group

The results from Table 19 revealed that in case of Overall Adherence, Adherence to Medicine, Diet, and Self-monitoring patients belonging to high Adherence group differed significantly from patients belonging to medium adherence group (*p*<.01) and also from low Adherence group (*p*<.01) on Prognosis (based on doctors' ratings of clinical symptoms). In case of Adherence to Exercise the patients belonging to high Adherence group differed significantly from patients belonging to low Adherence group, (*p*<.01) but not from medium Adherence group on their scores of Prognosis. However, in case of Adherence to Self-monitoring, patients belonging to high adherence group differed significantly from those belonging to medium adherence group and low adherence group but the patients belonging to medium Adherence group did not differ significantly from patients belonging to low Adherence group in doctor rated prognosis on patient reported clinical symptoms.

A visual representation of the results is shown in the form of bar graph in Figure 11. The results are presented in form of mean plots also from Figure 12 to Figure 16.
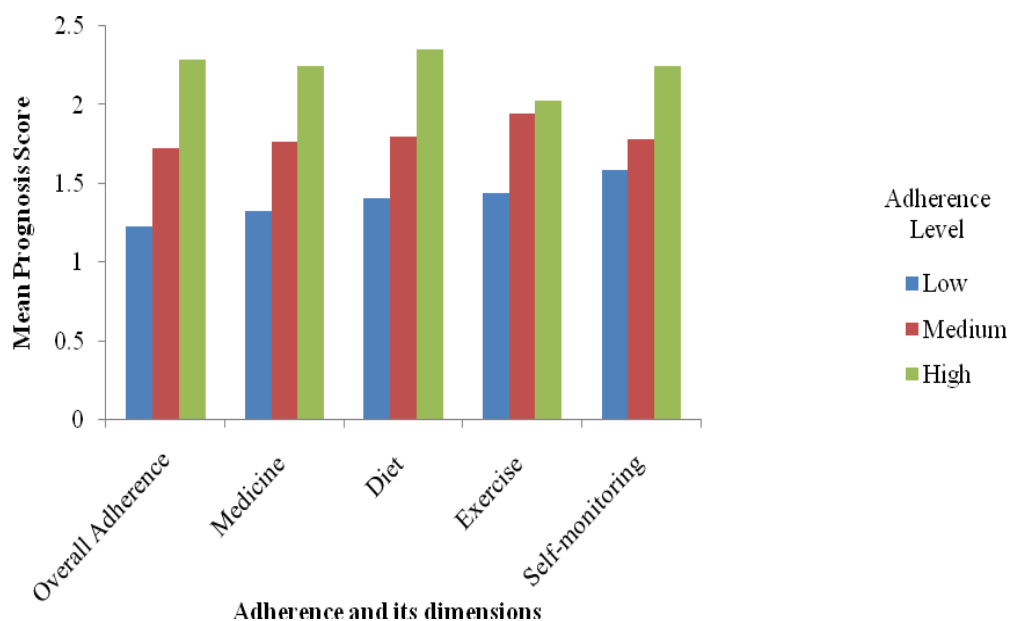
Figure 11. Graph depicting the groups differing in the level of Adherence on their Prognosis

It is observed from Figure 11 that the bars of Prognosis are clearly peaking up for high Adherence group, as well as for the group that showed high Adherence to Medicine and Diet. This indicated that when there is high Adherence in general and high Adherence to Medicine, and Diet, the Prognosis in terms of clinical symptoms is also high.

Figure 12 shows the means and the variance of the scores (at 95% CI) of Prognosis of the three groups of patients differing in their levels of overall Adherence. The plot shows a clear progressive downward trend indicating that with high level of overall Adherence, the Prognosis is also high and low level of Adherence corresponds to low level of overall Adherence.
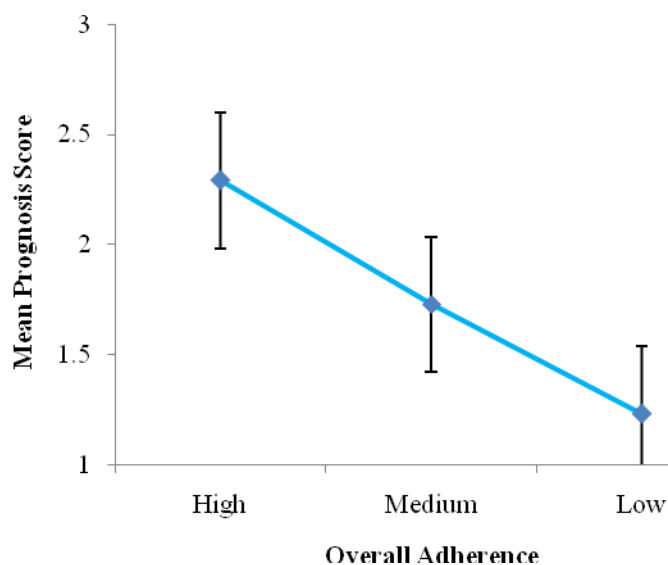
Figure 12. Mean plot showing the mean scores of Prognosis (and 95% CI) of the three groups differing in Overall Adherence

Figure 13 shows the means and the variance of the scores (at 95% CI) of Prognosis of patients belonging to the three levels of Adherence to Medicine. Similar to the trend seen in the preceding graph, this plot shows a visibly glaring downward slope indicating that with high level of Adherence to Medicine, Prognosis is also high and low level of Adherence indicates poor Prognosis in terms of clinical symptoms.
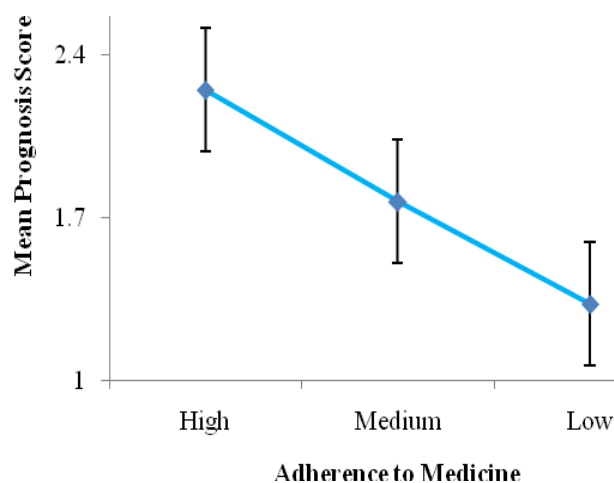
Figure 13. Mean plot showing the mean scores of prognosis (and 95% CI) of the three groups of patients differing in their level of Adherence to Medicine

Figure 14 shows the distribution of the means of the Prognosis scores of the patients belonging to three groups differing in their level of Adherence to Diet, along with the variance of the scores at 95% CI. It is evident from Figure 14, that the curve follows a sharp downward slope with the highest point in the plot belonging to patients of High Adherence level group having a good Prognosis and the lowest point showing the mean Prognosis of the patients with Low Adherence level.
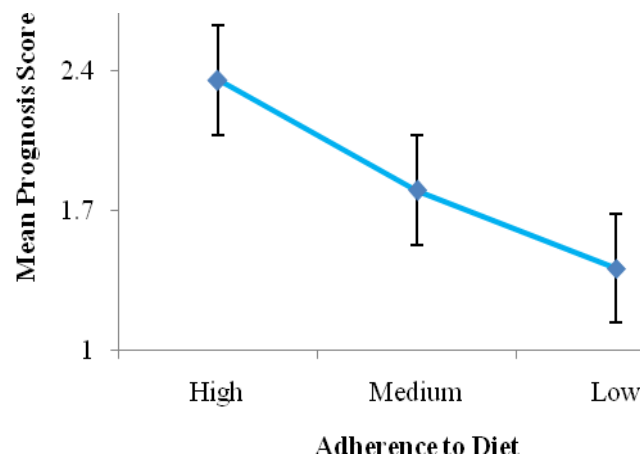
Figure 14. Graph showing the mean scores of prognosis (and 95% CI) of patients belonging to three groups differing in their level Adherence to Diet

Figure 15 shows the means and the variance of the scores (and 95% CI) of Prognosis of the patients belonging to different groups of Adherence to Exercise. The plot shows that the line connecting the mean scores of patients of High Adherence to Exercise group and patients of Medium Adherence to Exercise group is almost straight indicating a comparable score of Prognosis of the two groups. However, the line takes a sharp dip as it moves from the mean score of Medium Adherence to Low Adherence group indicating a difference in the mean score of Prognosis of the two groups.
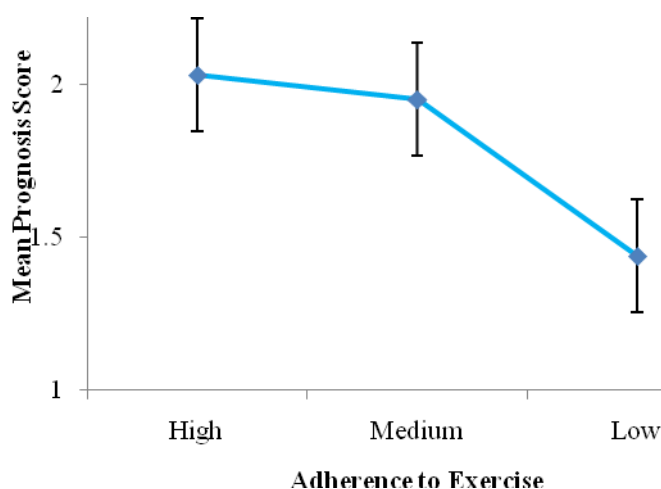
Figure 15. Graph showing the mean scores of Prognosis (and 95% CI) of patients belonging to three groups differing in their level Adherence to Exercise

Figure 16 shows the distribution of the mean scores of Prognosis of the three groups differing in their level of Adherence to Self-monitoring, along with the variance of the scores at 95% CI. It is evident from Figure 16, that the curve follows a visibly downward slope from the group of High level of Adherence to Self-monitoring to Medium level of Adherence and also to Low Adherence to Self-monitoring group. However, the curve follows just a downward slant from Medium Adherence to Low Adherence group, indicating no significant difference between these two groups in their mean Prognosis scores.
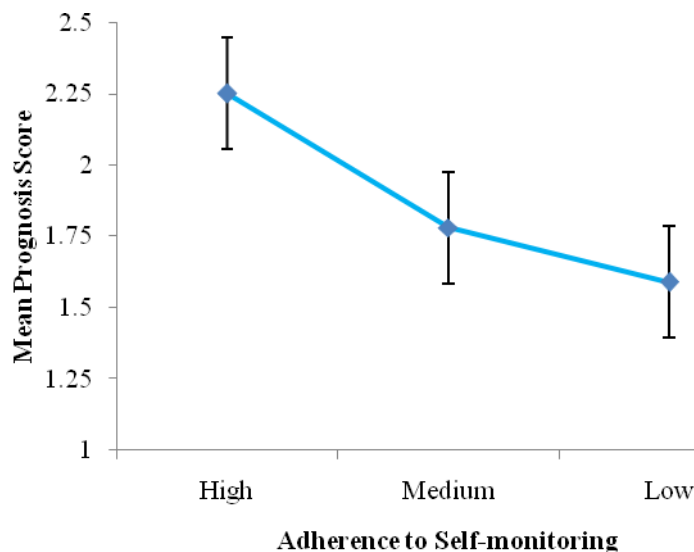
Figure 16. Graph showing the mean scores of Prognosis (and 95% CI) of patients belonging to three groups differing in their level Adherence to Self-monitoring

The results discussed till now clearly indicated that high Adherence in general and high Adherence to Medicine, Diet, Exercise, and Self-monitoring individually effected in good Prognosis as per the overall assessment of doctors based on the patient reported clinical symptoms. Apart from clinical symptoms, the basic objective indicator of Prognosis is the BP reading. In case the level of Adherence had a positive effect on prognosis it should reflect in differential changes in patients belonging to three levels of Adherence groups in BP readings in pre and post-Adherence Phase.

Effect of Adherence on Blood Pressure Management

For the purpose of investigating if the Prognosis based on BP readings differed between the three groups of Adherence levels, a 3X2 Simple Mixed Design ANOVA was planned, separately for Systolic and Diastolic BP readings of pre and post-Adherence Phase in the three groups of patients differing in their level of Adherence. First the analysis of the Systolic BP readings was taken up followed by the analysis of

the Diastolic BP readings. The *M*s, *SD*s and the results of the ANOVA are presented

in Table 20 and Table 21.

Table 20
Ms and SDs of Systolic BP readings of patients differing in their level of Adherence in Pre and Post-Adherence Phase

Adherence Phase	Adherence							
	High (*n* = 99)		Medium (*n* = 80)		Low (*n* = 121)		Total (*N* = 300)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Pre-Systolic	165.06	23.67	173.03	28.12	180.44	33.10	173.39	29.58
Post-Systolic	144.60	24.06	166.05	25.75	169.44	31.47	160.34	29.77
Total	154.83	23.87	169.54	26.94	174.94	32.29	166.87	29.68

Table 21
Summary of the simple mixed-design ANOVA done on the Pre and Post-Adherence Phase Systolic BP readings of three levels of Adherence Groups

Source	df	MS	F
Between-subjects			
Group	2	22800.76	15.21**
Error	297	1499.20	
Within-subjects			
Adherence Phase	1	23936.24	226.09**
Adherence Phase X Group	2	2225.92	21.03**
Error	297	105.87	

Note. Group = Level of Adherence (High, Medium and Low)
**p<.01

The results presented in Table 21 revealed significant difference Between-

subjects, Within-subjects and also a significant interaction effect. The results in Table

21 revealed that, there is a significant difference between pre and post-Adherence

Phase in Systolic BP readings among all patients irrespective of the groups belonging

to different level of Adherence, $F(1, 297) = 226.09$, $p<.01$. The *M*s and *SD*s presented

in Table 20, also revealed that there is a significant drop in the mean Systolic BP readings of the entire sample from a mean of 173.39 (SD = 29.58) in the pre-Adherence Phase to a mean value of 160.34 (SD = 29.77) in the post-Adherence Phase. The results suggested that irrespective of the level of Adherence of the patients, an improvement was seen in the Systolic BP readings of the patients over the six weeks of the Adherence Phase. The results of ANOVA also revealed that the three groups of patients differing in their level of Adherence significantly differed from each other in the Systolic BP readings, $F(2, 297)$ = 15.21, $p<.01$. It was seen that patients belonging to high Adherence group obtained the lowest mean score of Systolic BP reading (M = 154.83, SD = 23.87), followed by patients belonging to medium level of Adherence (M = 169.54, SD = 26.94) while patients belonging to low level of Adherence group showed the highest mean Systolic BP reading (M = 174.94, SD = 32.29). This finding pointed out that patients exhibiting low level of Adherence obtained high values of Systolic BP readings in comparison to patients who showed high and medium level of Adherence. This indicates that in general patients with high levels of Adherence had their BP levels in better control compared to those in medium and low Adherence levels.

The next logical task was to see if there was any interaction effect between the three groups differing in levels of Adherence in pre and post-Adherence Phase with regard to the systolic BP readings. From Table 21, it is revealed that there is a significant interaction effect, $F(2, 297)$ = 21.03, $p<.01$. It can be observed from Table 20, that in case of patients belonging to high level of Adherence group, there is a sharp drop in the mean Systolic BP readings from the pre-Adherence Phase (M = 165.06, SD = 23.67) to the post-Adherence Phase (M = 144.60, SD = 24.06) six weeks later. For patients belonging to medium and low level of Adherence group, a drop in

the mean Systolic BP readings was seen, though the drop was not as sharp as seen in the case of patients with high Adherence level. For patients in the medium Adherence level group, the mean Systolic BP reading dropped to a mean value to 166.05 ($SD =$ 25.75) from a mean value of 173.03 ($SD = 28.12$) over the Adherence Phase of six weeks. Patients with low level of Adherence registered a drop that was comparable to patients having medium level of Adherence. The pre-Adherence Phase Systolic BP reading for patients with low Adherence level was 180.44 ($SD = 33.10$) that dropped to 169.44 ($SD = 31.47$) in the post-Adherence Phase.

The interaction effect among the three groups in their Systolic BP readings in the pre and post Adherence Phase is presented graphically in Figure 17.
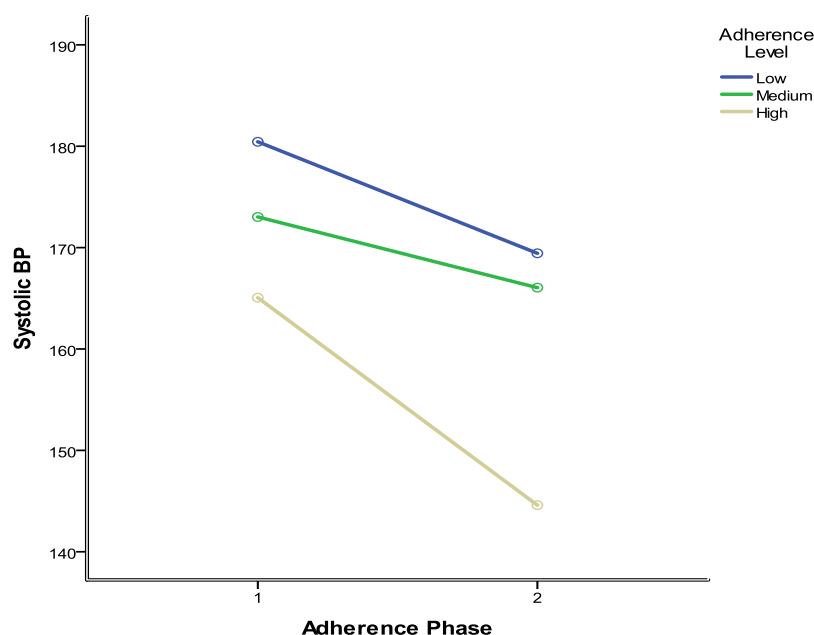
Figure 17. Line Graph showing the interaction effect between the systolic BP readings in pre-post adherence phase among the three groups of patients differing in their levels of adherence

Figure 17 reveals that the mean Systolic BP reading is the highest for the low Adherence group followed by medium Adherence group while the High adherence group scored the lowest mean Systolic BP reading in the pre-Adherence Phase. The gap between high Adherence level group and the other two groups is visually perceptible both in pre and post-Adherence phase. The gap between medium and low Adherence level group is perceivably wide. In the post-Adherence phase, the gap widens between the groups of patients with high level of Adherence and low Adherence level patients' group, with the former group showing a relatively sharp dip in the mean Systolic BP reading. The lines representing the scores of mean Systolic BP readings for low and medium Adherence group run parallel to each other with a slight dip from the pre-Adherence to post-Adherence Phase. There is a highly significant improvement in the Systolic BP readings in case of patients belonging to high Adherence level group in comparison to the other two groups suggesting a significant effect of Adherence on Prognosis.

The next analysis that was taken up was to see the effect of level of Adherence on the Diastolic BP readings of the patients over the pre and post-Adherence Phase of six weeks. A 3X2 Simple Mixed-Design ANOVA was carried out. The Ms and SDs are presented in Table 22, while the results of the ANOVA are presented in Table 23.

Table 22

Ms and SDs of Diastolic BP readings of patients differing in their level of adherence in Pre and Post-Adherence Phase

Adherence Phase	Adherence							
	High (*n* = 99)		Medium (*n* = 80)		Low (*n* = 121)		Total (*N* = 300)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Pre-Diastolic	113.47	25.52	123.29	32.67	132.38	34.30	123.72	32.14
Post-Diastolic	98.95	25.59	115.99	31.08	123.35	33.92	113.33	32.29
Total	106.21	25.56	119.64	31.86	127.86	34.11	118.53	32.22

Table 23

Summary of the simple mixed-design ANOVA done on the Pre and Post-Adherence Phase Diastolic BP readings of three levels of Adherence Groups

Source	*df*	*MS*	*F*
Between-subjects			
Group	2	25660.53	13.99**
Error	297	1834.93	
Within-subjects			
Adherence Phase	1	15425.58	200.15**
Group	2	669.89	8.69**
Error	297	77.07	

Note. Group = Level of Adherence (High, Medium and Low)
**p<.01

The results presented in Table 23 revealed a significant main effect of Within-subjects, Between-subjects as well as interaction effect. Table 23 revealed that irrespective of groups all patients differed significantly in their mean Diastolic BP readings between the pre and post-Adherence Phase, $F(1, 297) = 200.15$, $p<.01$. It is observed from Table 22 that the patients showed a significant drop in their Diastolic BP reading from pre-Adherence Phase ($M = 123.72$, $SD = 32.14$) to post-Adherence

Phase (*M* = 113.33, *SD* = 32.29), irrespective of their level of Adherence. In other words, the patient' Diastolic BP readings dropped over the Adherence Phase of six weeks, suggesting an improvement in the Prognosis. It was of relevance to see if the patients belonging to the three Adherence levels differed from each other in their mean Diastolic BP readings. The results reported a significant difference among the three groups, $F(2, 297) = 13.99$, $p<.01$. From Table 22, it may be observed that patients belonging to high Adherence group had lower mean score of Diastolic BP reading (*M* = 106.21, *SD* = 25.56) in comparison to the patients of low Adherence group (*M* = 127.86, *SD* = 34.11) with medium Adherence level patients positioned in between (*M* = 119.64, *SD* = 31.86). In other words, patients of high Adherence group had a better Prognosis in terms of their Diastolic BP readings while patients of low level of Adherence had a poor Prognosis, and medium Adherence level group of patients lodged in between these two groups.

Next it was of relevance to see whether there was an interaction effect between the groups with regard to their diastolic BP reading in the pre and post adherence phase. From Table 23, it is revealed that there is a significant interaction effect, $F(2, 297) = 8.69$, $p<.01$. it can be observed from Table 22 that in case of patients belonging to high level of Adherence group, there is a significant fall in their mean diastolic BP reading from the pre-Adherence Phase (*M* = 113.47, *SD* = 25.52) to the post-Adherence Phase (*M* = 98.95, *SD* = 25.59). In case of patients belonging to low and medium level of adherence, the drop in the mean diastolic BP readings from the pre-Adherence phase to the post-Adherence Phase was comparable. In pre-Adherence Phase, for patients with low level of Adherence, the mean diastolic BP reading was 132.38 (*SD* = 34.30) which dropped to 123.35 (*SD* = 33.92) in post-

Adherence. For patients with medium level of adherence, it was 123.29 ($SD = 32.67$) and dropped to 115.99 ($SD = 31.08$).

The interaction effect among the three groups in their diastolic BP readings in pre and post adherence phase is visually presented in Figure 18.
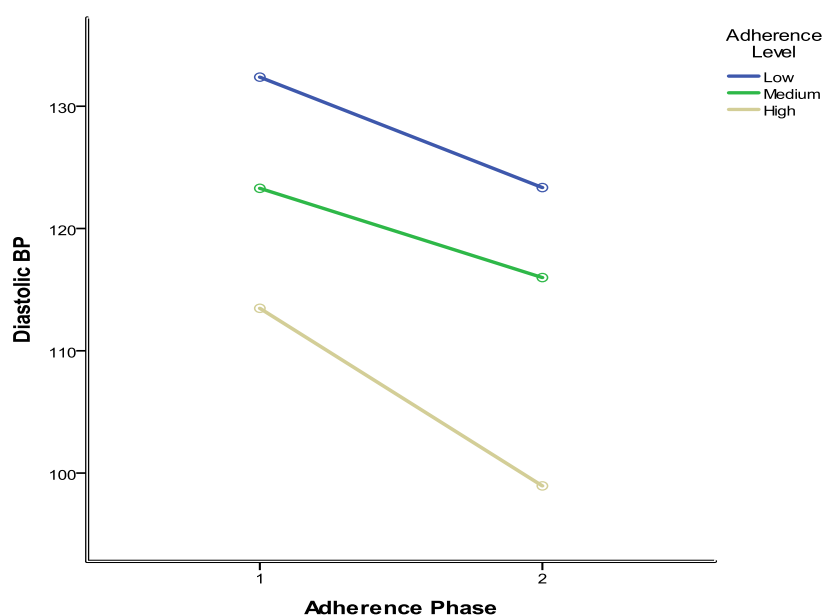
Figure 18. Line Graph showing the interaction effect between the Diastolic BP readings in pre-post Adherence Phase and the three groups of patients differing in their levels of Adherence

It is seen from the figure that the three lines representing the levels of Adherence of the three groups of patients are parallel to each other with a glaring distance between the high Adherence group and low and medium Adherence group. The mean Diastolic BP reading is the lowest for the high Adherence group in both pre and post-Adherence Phase followed by Medium Adherence group, while for the patients with low Adherence level, the mean Diastolic BP reading was the highest.

The gap between the high and low Adherence level group is perceivably wide in comparison to the gap between the medium and low Adherence group. It can be seen from the figure that though the three Adherence level groups did show a drop in their mean Diastolic BP readings, the patients under high Adherence group registered a sharper drop in comparison to the other two groups of patients.

The above findings revealed the significant effect of Adherence on Prognosis and also the interaction effect between the level of Adherence and the BP reading (Systolic and Diastolic) in the pre and post-Adherence Phase.

The results discussed till now clearly indicated a positive effect of level of Adherence in Prognosis. The results also established that the Quality of Communication and also, the level of Adherence had a significant role in the Prognosis so far as management of primary HTN is concerned. Such insight into the role of Quality of Communication and Adherence in Prognosis raises the research question related to the contribution of factors in determining the Quality of Communication, level of Adherence and Prognosis. To investigate into this, simple and multiple regression analyses were taken up.

Predictors of Quality of Communication

First of all simple regression analyses were done to find out the individual impact of seven factors on Quality of Communication. These factors taken as individual predictors of Quality of Communication were Patient's age, Patient's gender, Patient's Educational Qualification, Patient Category and Entry order, and also Doctor's Type and Qualification. The results are presented in Table 24.

Table 24

Summary of Simple Regression Analyses for variables predicting Quality of Communication

Predictors	C	B	SEB	β	t	SE	R^2	F
Patient's age	.84	-.003	.002	-.10	1.77	.22	.010	3.13
Patient's gender	.71	-.015	.036	-.03	.43	.22	.001	0.18
Patient's qualification	.79	-.034	.032	-.06	1.06	.22	.004	1.12
Patient category	**0.3-**	**.331**	**.026**	**.60**	**12.83****	**.18**	**.368**	**164.52****
Patient entry order	.64	.037	.025	.08	1.47	.22	.007	2.15
Doctor's type	.66	.029	.029	.06	1.02	.22	.003	1.04
Doctor's qualification	.66	.029	.029	.06	1.02	.22	.003	1.04

Note. Criterion: Quality of Communication, *C* = Constant, *B* = Unstandardized Beta Coefficient, SEB = Standardized Error of Beta, β = Standardized Beta Coefficient, *t* = *t*-values of Beta, SE = Standard error of the estimate
**p<.01

The results revealed that the Patient Category was the only factor that had a significant impact on the Quality of Communication, $F(1,298) = 165.52$, $p<.01$. Patient Category refers to old and new patients. Old patients are those who started consultation with their doctor prior to the study, and hence the initial Health Communication Checklist that was used to measure the Quality of Communication, was responded by recall. New patients are those who started their consultation with the doctor during the process of this study and responses of the checklist were on the spot. The results also revealed that the Patient Category explained statistically significant (36.8%) proportion of the variance in Quality of Communication, $R^2 = .368$, adjusted $R^2 = .354$. The relationship between Patient category and Quality of Communication was found to be positive, $β = .60$, $p<.01$, indicating the association between the Quality of Communication, with the Quality of Communication being

better in case of new patients than with old patients. All other factors such as patient's age, patient's gender, patient's educational qualification, entry order, or doctor's type or qualification did not contribute significantly to the Quality of Communication individually.

Predictors of Adherence

An attempt was made to determine the impact of various parameters on Adherence. Simple regression analyses was done to see the impact of the following factors viz. Patient's age, Patient's Gender, Patient's educational qualification, Patient category, Patient entry order, Doctor's type, Doctor's qualification, and the Quality of Communication on Adherence. The results are presented in Table 25.

Table 25
Summary of Simple Regression Analyses for variables predicting Adherence

Predictors	*C*	*B*	*SEB*	*β*	*t*	*SE*	*R²*	*F*
Patient's age	40.78	-.006	.04	-.009	.15	5.32	.000	.02
Patient's gender	42.36	-1.64	.86	-.11	1.91	5.29	.012	3.66
Patient's qualification	39.48	.33	.77	.03	.44	5.32	-.001	.19
Patient category	**37.26**	**2.70**	**.76**	**.20**	**3.54****	**5.22**	**.04**	**12.51****
Patient entry order	40.98	-.33	.61	-.03	.54	5.32	-.001	.29
Doctor's type	40.59	-.08	.69	-.008	.12	5.32	.000	.01
Doctor's qualification	40.59	-.08	.69	-.007	.12	5.32	.000	.01
Quality of Communication	**36.49**	**5.76**	**1.36**	**-.24**	**4.23****	**5.17**	**.06**	**17.90****

Note. Criterion: Adherence, *C* = Constant, *B* = Unstandardized Beta Coefficient, *SEB* = Standardized Error of Beta, *β* = Standardized Beta Coefficient, *t* = *t*-values of Beta, *SE* = Standard error of the estimate.
**p<.01

An attempt was made to determine the impact of various parameters on Adherence. Simple regression analyses was done to see the impact of the following factors viz. Patient's age, Patient's Gender, Patient's educational qualification, Patient category, Patient entry order, Doctor's type, Doctor's qualification, and the Quality of Communication on Adherence. The results are presented in Table 25.

The results revealed that Patient Category had a significant impact on Adherence, $F(1,298) = 12.51$, $p<.01$. The Patient Category explained statistically significant proportion (4%) of variance in Adherence, $R^2 = .04$, adjusted $R^2 = .037$. A positive relationship was found between the Patient Category and Adherence $\beta = .20$, $p<.01$, indicating the association between Adherence and the factor of old and new patients. The other factor that was found to have a significant impact on Adherence is the Quality of Communication. It may be observed from the Table that the Quality of Communication explained statistically significant proportion (6%) of the variance in Adherence, $R^2 = .06$, adjusted $R^2 = .057$. It can be seen from Table 25 that, the Quality of Communication was found to have a significant impact on Adherence, $F(1,298) = 17.90$, $p<.01$. A positive relationship was found between Quality of Communication and Adherence, $\beta = .11$, $p<.01$, indicating that with better Quality of Communication, the level of Adherence also increased. The other factors did not contribute significantly to level of Adherence.

Since two factors, Patient Category and Quality of Communication, were found to significantly predict Adherence, a multiple regression analysis was done to see the combined effect of Patient Category and the Quality of Communication. The results are presented in Table 26.

Table 26
Summary of Multiple Regression Analysis for variables – Patient Category and Quality of Communication predicting Adherence

Variables	Adherence			
	B	*SEB*	*β*	*t*
Patient Category	1.23	.94	0.09	1.30
Quality of Communication	4.44	1.69	.18	2.62
SE		5.16		
R²		.06		
C		35.94		
F		9.82**		

Note. Criterion: Adherence, *C* = Constant, *B* = Unstandardized Beta Coefficient, SEB = Standardized Error of Beta, β = Standardized Beta Coefficient, *t* = *t*-values of Beta, SE = Standard error of the estimate.
**p<.01

The results revealed that there was a significant combined impact of Patient Category and the Quality of Communication on Adherence, $F(2,297) = 9.82$, $p<.01$, and both explained statistically significant proportion (6%) of the variance in Adherence. It can be seen from Table 26 that there existed a positive relationship between Patient Category and Adherence, $β = .09$, $p<.01$. The results also revealed that a positive relationship existed between the Quality of Communication and Adherence in the hypertensive patients, $β = .18$, $p<.01$.

Predictors of Prognosis
Simple regression analyses were done to see the impact of various factors on the Prognosis among the hypertensive patients. The results are presented in Table 27.

Table 27
Summary of Simple Regression Analyses for variables predicting Prognosis

Predictors	*C*	*B*	*SEB*	*β*	*t*	*SE*	*R²*	*F*
Patient's age	1.89	-.004	.001	-.04	.68	.69	-.002	.46
Patient's gender	1.87	-.13	.11	-.07	1.20	.69	.005	1.44
Patient's qualification	1.99	-.09	.10	-.05	.93	.69	.003	.86
Patient category	1.49	.18	.10	.11	1.84	.69	.01	3.39
Patient entry order	1.93	-.15	.08	-.11	1.86	.69	.01	3.44
Doctor's type	1.69	.02	.09	.01	.23	.69	.000	.05
Doctor's qualification	1.69	.02	.09	.01	.23	.69	.000	.05
Quality of Communication	**1.30**	**.59**	**.18**	**.19**	**3.33****	**.68**	**.04**	**11.08****
Adherence	**-2.19**	**.10**	**.01**	**.74**	**19.24****	**.46**	**.55**	**370.34****
Medicine	**-1.56**	**.16**	**.01**	**.67**	**15.55****	**.51**	**.45**	**241.85****
Diet	**-.29**	**.24**	**.02**	**.53**	**10.65****	**.59**	**.28**	**113.49****
Exercise	**.03**	**.20**	**.02**	**.47**	**9.24****	**.61**	**.22**	**85.32****
Self-monitoring	**1.14**	**.17**	**.03**	**.30**	**5.41****	**.66**	**.09**	**29.37****

Note. Criterion: Prognosis, *C* = Constant, B = Unstandardized Beta Coefficient, SEB = Standardized Error of Beta, β = Standardized Beta Coefficient, *t* = *t*-values of Beta, SE = Standard error of the estimate.
**p<.01

It is observed from Table 27 that Quality of Communication was found to have a significant impact on Prognosis of the disease, $F(1,298) = 11.08$, $p<.01$. Quality of Communication explained statistically significant proportion (4%) of the variance in Prognosis, $R^2 = .04$, adjusted $R^2 = .04$, $p<.01$. It can also be seen from Table 27 that a positive association existed between Quality of Communication and Prognosis, $β = .19$, $p<.01$, indicating that with better Quality of Communication, the Prognosis also improved. Adherence was also found to have a high significant impact on Prognosis of the disease, $F(1,298) = 370.34$, $p<.01$, and explained statistically significant proportion (55%), $R^2 = .55$, adjusted $R^2 = .55$, $p<.01$. A positive

association was found between Adherence and Prognosis, $\beta = .74$, $p<.01$. The results suggested that with improved Adherence, the Prognosis also improved.

Simple regression analyses were computed to determine the impact of the dimensions of Adherence on Prognosis. The dimensions of Adherence are: Medicine, Diet, Exercise, and Self-monitoring. The results are presented in Table 27. The results showed that the Adherence to Medicine explained statistically significant proportion (45%) in Prognosis, $R^2 = .45$, adjusted $R^2 = .45$, $F(1,298) = 241.85$, $p<.01$. A positive association was found between Adherence to Medicine and Prognosis, $\beta = .67$, $p<.01$. The results suggested that better the adherence to medication, prognosis also improved. The next dimension of adherence was diet. The results revealed that adherence to diet had a significant impact on prognosis of the disease, $R^2 = .28$ adjusted $R^2 = .29$, $F(1,298) = 113.49$, $p<.01$, and explained a statistically significant proportion (28%) of the variance in Prognosis. A positive association was found between Adherence to Diet and Prognosis, $\beta = .53$, $p<.01$, suggesting that there existed a positive association between Adherence to Diet and Prognosis. The results also revealed that there is a significant impact of Adherence to Exercise on Prognosis, $R^2 = .22$, adjusted $R^2 = .23$, $F(1,298) = 85.32$, $p<.01$, which explained statistically significant proportion (22%) of the variance in Prognosis. The results further revealed that there is a positive association between Adherence to Exercise and Prognosis, $\beta = .47$, $p<.01$, indicating that better the Adherence to Exercise, better was the Prognosis in the hypertensive patients. The last dimension of Adherence is the Adherence to Self-monitoring. A simple regression analysis was computed to determine its impact on Prognosis. The results revealed that the Adherence to Self-monitoring explained statistically significant proportion (9%) of the variance in Prognosis of the disease, $R^2 = .09$, adjusted $R^2 = .09$, $F(1, 298) = 29.37$, $p<.01$. There was also found to be a small

positive association between Adherence to Self-monitoring and Prognosis, $\beta = .30$, $p<.01$. The results suggested that Adherence to Self-monitoring had a significant positive impact on the Prognosis of the disease in the hypertensive patients.

The results discussed above suggested that Quality of Communication has an impact on Adherence and Prognosis. It is also evident from the results that the level of Adherence has a determining effect on Prognosis. Based on these results it may be relevant to investigate the contribution of Quality of Communication and level of Adherence on Prognosis and also to inquire whether the impact of Quality of Communication on Prognosis follows a pathway. The following analysis attempts to trace the pathway from Quality of Communication to Prognosis via Adherence.

Prognosis as a function of Quality of Communication and Adherence

Simple and Multiple Regression Analyses were taken up to investigate the extent to which Adherence is influenced by Quality of Communication, the relative contribution of Communication Quality and Adherence to Prognosis and also their combined impact on Prognosis. The first two Simple Linear Regression analyses were computed to assess the impact of Quality of Communication on Adherence and Prognosis in the hypertensive patients. The linear relationship between Quality of Communication and Adherence and Prognosis are presented in Table 28.

Table 28

Summary of Simple Regression Analysis for variable Quality of Communication predicting the criterion Adherence and Prognosis

Criterion	*C*	*B*	*SEB*	*β*	*t*	*SE*	R^2	*F*
Adherence	36.49	5.76	1.36	.24	4.23**	5.17	.06	17.90**
Prognosis	1.30	.59	.18	.19	3.33**	.68	.04	11.08**

Note. Predictor: Quality of Communication, *C* = Constant, *B* = Unstandardized Beta Coefficient, SEB = Standardized Error of Beta, β = Standardized Beta Coefficient, *t* = *t*-values of Beta, SE = Standard error of the estimate.
**$p < .01$

The results revealed that Quality of Communication explained statistically significant (6%) proportion of the variance in Adherence, $R^2 = .06$, adjusted $R^2 = .06$, $F(1,298) = 17.90$, $p<.01$. The relationship between Quality of Communication and Adherence was positive, $β = .24$, $p<.01$, indicating that as the Quality of Communication improved, the level of Adherence in the hypertensive patients also improved. From Table 28 it can be seen that the Quality of Communication explained small but statistically significant (4%) proportion of the variance in Prognosis, $R^2 = .04$, adjusted $R^2 = .04$, $F(1,298) = 11.08$, $p<.01$. The relationship between Quality of Communication and Prognosis was found to be positive, $β = .19$, $p<.01$, indicating that Quality of Communication had a significant impact on Prognosis. The results suggested that Quality of Communication significantly predicted Adherence and Prognosis, and also have a significant positive impact on Adherence and Prognosis.

A simple linear regression analysis was computed to determine the impact of Adherence on Prognosis. The results are presented in Table 29.

Table 29

Summary of Simple Regression Analysis for variable Adherence predicting Prognosis

Predictor	C	B	SEB	β	t	SE	R^2	F
Adherence	-2.19	.10	.01	.74	19.24**	.46	.55	370.34**

Note. Criterion: Prognosis, *C* = Constant, *B* = Unstandardized Beta Coefficient, SEB = Standardized Error of Beta, β = Standardized Beta Coefficient, *t* = *t*-values of Beta, SE = Standard error of the estimate.
**p <.01

The results revealed that Adherence explained statistically significant (55%) proportion of the variance in Prognosis, R^2 = .55, adjusted R^2 = .06, $F(1,298)$ = 370.34, *p*<.01. The relationship between Adherence and Prognosis was seen to be highly correlated, *β* = .74, *p*<.01. The results suggest that Adherence significantly predicted Prognosis in the hypertensive patients. It was also revealed that Adherence had a significant positive impact on Prognosis in the hypertensive patients.

An attempt was made to see the relative contribution of Quality of Communication and Adherence on Prognosis and also their combined impact on Prognosis. A multiple regression analysis was computed to see whether Quality of Communication and Adherence, combined together significantly predicted the Prognosis. The results are presented in Table 30.

Table 30

Summary of Multiple Regression Analyses for variables Quality of Communication and Adherence predicting Prognosis

Variables	Prognosis			
	B	*SEB*	*β*	*t*
Quality of Communication	.04	.135	.01	.32
Adherence	.10	.005	.74	18.59
SE		.46		
R²		.55		
C		-2.20		
F		184.66**		

Note. Criterion: Prognosis, *B* = Unstandardized Beta Coefficient, *SEB* = Standardized Error of Beta, *β* = Standardized Beta Coefficient, *t* = *t*-values of Beta, *C* = Constant.
***p<.01*

The results revealed that Quality of Communication and Adherence had significant combined impact on Prognosis, R^2 = .55, adjusted R^2 = .55, $F(2,297)$ = 184.66, $p<.01$, explaining 55% of the variation in Prognosis. It can be seen that while the Quality of Communication had a positive significant relationship with Prognosis, $β$ = .01, $p<.01$, and also Adherence had a positive significant relationship with Prognosis, $β$ = .74, $p<.01$. The results indicate that the Quality of Communication exerted less influence on Prognosis in comparison to Adherence. The results strongly suggested that although Quality of Communication had a direct impact on Prognosis, the impact was more evident via Adherence. Hence an inference could be drawn that Quality of Communication directly impacts Adherence while the thus impacted Adherence in turn influences the Prognosis. Thus a clear path from Quality of Communication to Prognosis is traced through Adherence suggesting that Quality of Communication impacts Prognosis through its influence on Adherence. Figure 19 gives a visual representation of the pathway from Quality of Communication to Prognosis via Adherence.
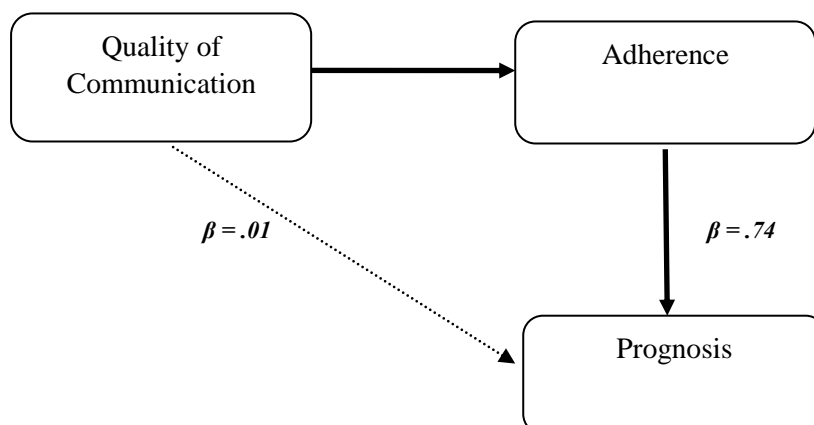
Figure 19. Pathway from Quality of Communication to Prognosis

Summary of Results

The findings of the study can be summarized into the following points.

One of the significant contributions of the study is the technique of measuring Health Communication between doctor and patients as a single unit. This was done by quantifying the communication by taking the degree of similarity between the content communicated and received.

High Quality of Communication resulted in high level of therapeutic Adherence, while Low level of Communication Quality resulted in low level of therapeutic Adherence in patients with primary hypertension. This finding was true in case of Adherence to Medicine, Diet, and Self-monitoring.

Quality of Communication was found to play a significant role in disease Prognosis. The results revealed that the patients belonging to High Quality of Communication group were not only rated high on Prognosis by the doctors based on

their reported clinical symptoms but also recorded decreased Blood Pressure reading both on Systolic and Diastolic scores which validated the doctor's ratings.

The results revealed that the Doctors' Communication Quality taken in isolation had an effective influence on patient's therapeutic Adherence while it did not have a significant role to play in Prognosis in patients with primary hypertension.

As an extension of the above, the findings related to the role of Adherence on Prognosis revealed a positive effect of the former on Prognosis. It was further learnt from the results that every aspect of Adherence, namely Medicine, Diet, Exercise and Self-monitoring were found to have a significant influence on Prognosis in patients with primary hypertension.

The highlight of the results relates to a significant impact exercised by the Communication Quality on the level of Adherence and a significant impact of Adherence on Prognosis. This indicates a pathway that follows from Communication Quality to Adherence and from Adherence to Prognosis.

Thus, to summarize the results, it may be stated that the Quality of Communication has a significant direct impact on patients' Adherence to treatment regimen which in turn predicts the Prognosis.

CHAPTER V

DISCUSSION

CHAPTER V

DISCUSSION

The study was carried with the major objective of finding out the impact of Doctor-Patient Communication on Patient Adherence and Disease Prognosis. It was hypothesized that Doctor-Patient Communication will have a positive impact on Patient Adherence and Prognosis among patients suffering from primary hypertension. This hypothesis was tested with Regression Analyses. The results not only indicated a significant positive impact of the Quality of the Doctor-Patient Communication on Adherence and Prognosis but a pathway was also traced from Doctor-Patient Communication to Prognosis. The findings clearly indicated that the Quality of Health Communication between the doctors and the patients during consultation had a powerful and significant impact on patients' level of adherence. Patients' adherence in turn had a strong direct impact on the prognosis.

High Quality of Communication involves a healthy partnership between the doctors and the patients. This can be expected when both the doctor and the patient actively participate in the process of communication. It is very important for the patients to reveal with optimum clarity the symptoms and problems encountered with respect to their health. This constitutes a critical minimum base for the doctor to decide the direction of further medical investigation leading to accurate diagnosis. Similarly it is equally important for the doctor to explain to the patient in simple non-technical language that suits the patient's comprehension regarding the existing health status, consequences of continuing without any treatment, the need for medication and the role it plays in reinstating normalcy or equilibrium in physical state – the level of BP in this case. There is also a need for the doctor to verify the extent to which this

communication is assimilated by the patient. Such cross-checking should be given due importance because it not only helps in minimizing the misunderstanding or misinterpretation but also functions as a cue, encouraging participation of the patients. Such initiative by the doctor helps in breaking the silence of the patients. This is very essential particularly in the context of Indian culture where the doctor is looked upon as an authority with ultimate competence with the sole responsibility of providing cure and relief to the patient. However, the ideal situation is a collaborative partnership between the doctor and the patient (Emanuel & Emanuel, 1992) where the decision making is an outcome of active interaction between the doctor and the patient. More the patient understands the content and spirit of stringent adherence to medical advice better will be the compliance. To elaborate further, the explanations given by the doctor about the role of anti-hypertensive medications in dilating the blood vessels and the role of diuretics (medicines that are used in treatment of hypertension to reduce the buildup of excessive fluid, increase urine output, reduce the amount of fluid in the blood stream), if prescribed, in bringing down the Blood Pressure, helps in forming a knowledge base in patients that function as a logical foundation for adherence behavior. Further the caution against low/non-adherence communicated by the doctor in terms of consequences including medical emergencies may successfully instill a desirable fear in the patient. This in combination with the knowledge base creates a strong motivation leading to optimal adherence to medication. The prescription of the doctor is not limited to medicines. Medication in isolation may not be successful in optimal prognosis. In case of hypertension, low sodium and low fat diet constitute an essential measure that prevents the condition from aggravating. Similarly the role of regular exercise including the desirable quality and quantity to sustain cardiac health also forms a part of Health Communication.

Only when the patient is given serious and clear instructions on these aspects will s/he be motivated towards a lifestyle change. While informing the patient about medication, diet and exercise, equal prominence should be given to caution the patient about alarm signals and the need for self-monitoring and review visits to the doctor which are helpful in detecting any adversity. This part of the communication must include the symptoms and situation that warrant emergency consultation and hospitalization. Patients who receive all these information on a package are more likely to be optimally adherent. The results exactly confirmed the above by indicating a significant impact of Quality of Communication on Adherence. The results of multiple regressions also indicated that Quality of Communication has an impact on Prognosis. Yet, the strength of this impact is relatively low compared to the impact that Adherence had on Prognosis. Based on this it can be argued that the impact of Quality of Communication on Prognosis is stronger only through an influence on Adherence to the treatment regimen. In other words when doctor-patient communication is of high quality, it ensures high level of adherence which in turn results in good prognosis. Based on these results, the major hypothesis that Quality of Communication will have a significant impact on Adherence and Prognosis in patients with primary hypertension is accepted.

This study hypothesized that patients with varying Quality of Communication will also have varying levels of Adherence in general and Adherence to Medication, Diet, Exercise and Self-monitoring individually. Quality of Communication plays a significant role in overall Adherence as well as Adherence to Medication, Diet, Exercise and Self-monitoring. Based on the level of overt and covert participation of doctors and patients (as communicators and listeners) in the Health Communication process, a content matching of intended and received communication was evolved.

Where there is a higher convergence between the two, the Quality of Communication is high. The Quality of Communication varied based on this mutuality. A combination of factors related to the doctor and the patients may operate in the transaction that happens during the consultation process. The Quality of Communication is an outcome of such combined influence. The results that patients belonging to the group of High Quality of Communication showed high levels of Adherence in general and high levels of Adherence to Medication, Diet and Self-monitoring in particular while the reverse is true in case of patients belonging to the low Quality of Communication group, indicated that higher the match between the intended communication of the doctor with the received communication of the patients, higher the adherence. When patients could comprehend the contents of what the doctor communicated regarding Medication, Diet and Self-monitoring, they could translate the same into adherence behavior. On the contrary, higher the mismatch between the communication of the doctor and the understanding of the patient, lower was the adherence. This can be attributed to a low priority attached to the regularity in taking medicine or complying with prescribed diet or being alert to the health condition through regular monitoring as the seriousness of these aspects are either not communicated or not assimilated properly. Thus, when the Quality of Communication is high, therapeutic Adherence was found to be high, while whenever the Quality of Communication was low, the therapeutic Adherence was found to be low. Based on the above, the second hypothesis that Quality of Communication will have a significant effect on the level of Adherence in general and Adherence to Medicine, Diet, Exercise and Self-monitoring is partially accepted. This is because while the results revealed a significant effect of Quality of Communication on Adherence and its three components namely Medication, Diet and Self-monitoring, its effect on Adherence to

Exercise was not significant. The reason could be that sufficient emphasis was not laid on aspects related to exercise during the process of consultation.

It was hypothesized that the Quality of Communication will have a significant effect on Prognosis. Prognosis was assessed in the post-Adherence Phase six weeks after the consultation where the Quality of Communication was measured. Two parameters, viz. doctors' ratings of Prognosis based on the clinical symptoms and BP readings with a six weeks gap of Adherence Phase were taken to measure Prognosis. The results revealed that patients belonging to High Quality of Communication group were not only rated high by the doctors but also showed a greater improvement in their BP readings in the post-Adherence Phase. On the other hand patients belonging to Medium and Low Communication Quality group were rated by the doctors with relatively lower prognosis and their BP readings in the post-Adherence Phase showed relatively marginal improvements. The Quality of Communication was an index of mutual participation of doctors and patients during consultation. Not all patients treated by the same doctor came under the classification of High Quality of Communication, indicating that patients' participation accounted equally in deciding the Quality of Communication. This demonstrates the role of patients' commitment, control and challenge in the entire process. Those patients with high involvement and commitment are more likely to take an active role in the consultation process. The very fact that their involvement is high, suggests an intent of managing and controlling their condition of hypertension which can happen only when they perceive it as a challenge to be met. The active participation in the process of Health Communication equips them with the knowledge of what is an achievable prognosis. This in turn aids their realistic goal setting in management of hypertension. Working towards a definite target through adherence behavior is always easier than blind

adherence to medical prescription. Further, the active participation in consultation process helps the patients of hypertension to remain informed about the measures to be taken to control, manage or subside the clinical symptoms soon after experiencing them. Thus, when they go for a review visit six weeks after the consultation, they go with minimum or no clinical symptoms and more efficiently managed BP. Thus, the Quality of Communication was found to help in better Prognosis. The results of regression analysis and also the results of ANOVA clearly indicated the significant role of Quality of Communication on both measures of Prognosis. Based on this, the hypothesis that the Quality of Communication will have a significant effect on Prognosis is accepted.

While the overall Quality of Communication during the consultation process is important in view of Adherence, the doctors' Quality of Communication is assumed to play a greater role. The study hypothesized that the doctors' Quality of Communication will have a significant association with the level of Adherence and the disease Prognosis in patients with primary hypertension. Researches in the past have supported the role of doctor in patients' adherence and prognosis (Hall & Roter, 1988; DiMatteo, 1998; Naik et al., 2008). A number of studies have proved that patients' satisfaction to a large extent rests on the doctor's communication skills and bedside behavior (Little et al., 2001; Brédart et al., 2005; Arora, 2003). Patient satisfaction is closely linked to the trust and rapport with doctor. When the patient has high trust on doctor, it has a significant influence on complying with the prescription of the doctor. Thus, patients treated by doctors with high level of professional competence and communication skills are more likely to belong to high adherence levels compared to their counterparts treated by doctors who were inadequate in communication and failed to empathize with the patients. To empathize with a patient,

is to treat the patient as a human being while limiting the communication to informing the diagnosis and writing the prescription, restricts the role of the doctor to treating the disease. Patients treated by the doctor belonging to the second category are likely to be mechanical and casual in their adherence because of lack of accountability as a result of lack of bonding between the doctor and the patient. On the other hand, patients treated by doctors with high quality of communication skills and professional competence, probably receive indications of the doctor's concern for the well-being of the patient. Such interactions are likely to trigger expectancy effect creating a sense of accountability and motivation for high adherence for better prognosis in patients. The results revealed that a significantly large number of patients treated by doctors having high Quality of Communication belong to High Adherence group and vice-versa. This proved the hypothesis that doctors' Quality of Communication will have a significant association with the level of Adherence of patients with primary hypertension. Effective communication between the doctor and the patients have been shown to reduce anxiety and psychological distress, pain relief, better functional status and symptoms resolution (DiBlasi, Harkness, Ernst, Georgiou, & Kleinjen, 2001).

According to the results, the association between the Doctors' Quality of Communication and Prognosis was not found to be significant. This could be because there is no direct association between the doctors' communication and prognosis. However, the results discussed did indicate a significant role of the overall communication Quality and the Prognosis. If we look at these two together, it gives a clear indication that the doctors' Quality of Communication alone cannot influence nor have any direct association with the Prognosis unless there is the required comprehension leading to assimilation and practice by the patient.

The study hypothesized that Adherence will have a significant role in Prognosis of primary hypertension. A number of research studies have indicated that patients' level of adherence will have a significant effect on disease prognosis that leads to better health outcomes (Dragomir et al., 2010; Perreault et al., 2009). For instance in case of diabetic patients, optimal adherence results in better glycaemic control (Liebel et al., 2002; Beckles et al., 1998). Higher the adherence of the patient with medication, diet, exercise, and self-monitoring, higher is the prognosis. This is observed in the sense that better adherence indicates better health care, naturally resulting in a better outcome. In case of patients with primary hypertension, strict adherence to medication has to be given very high prominence. Anti-hypertensive medications are administered to dilate the blood vessels which are otherwise constricted in the patients. The medication will have to be administered everyday religiously at the same time as advised by the doctor. This compliance helps in managing the blood pressure without shooting up. Irregularity in taking the medicine would result in contractions and dilation of blood vessels erratically which is medically undesirable and may lead to consequences such as stroke, heart attack, etc. Poor adherence or low level of adherence has been found to be a major cause behind suboptimal clinical benefit (Rybacki, 2002; Dunbar-Jacob & Schlenk, 2001). It causes medical and psychosocial complications of disease, reduces patients' quality of life, and wastes health care resources. Erratic schedule of medications will result in bad prognosis, while strict adherence helps in regulating the BP leading to good prognosis. Similarly, reducing the sodium and fat components in diet will be helpful in preventing atherosclerosis in turn reducing the risks of cardiovascular diseases. Further following a regular exercise regimen not only helps in healthy cardiac

functioning but also results in burning the excessive fat which places the patient of hypertension at high risk for arterial blockage, angina and heart failure.

Sometimes, in spite of strict adherence to medication, diet, and exercise the patient encounters medical emergencies because of uncontrolled hypertension related to genetic factors. In order to pre-empt such eventualities, a patient is advised to have a close monitor on the fluctuations of BP which if found alarming should warrant immediate medical consultation. Patients, who comply with such therapeutic medical advice that includes pharmacotherapy supplemented by a healthy lifestyle pattern, are more likely to have better prognosis not only in terms of clinical symptoms but also reflected in controlled level of BP. The results of the present study indicated exactly this. It is of significance to mention here that prognosis was evaluated by blinding the evaluator. In other words the doctors, while rating the prognosis based on the patient's clinical symptoms, were not aware of their level of adherence. The same doctor recorded the BP of the patients which also was an index of prognosis. The study found that patients who have showed stringent adherence to each of the aspects related to therapeutic advice, have been rated by their doctors high on prognosis. They reported relatively low or no clinical symptoms six weeks after their consultation compared to their counterparts whose compliance levels were lower. The study further proved that the BP readings of patients with high adherence levels dropped significantly between the two consultations with a gap of six weeks. The fact that the BP readings of patients with high level of Adherence was found to be significantly lower between the pre-post Adherence Phase compared to those belonging to lower Adherence group is a testimony of the role of adherence in managing primary hypertension. In a nutshell the study reiterated that adherence is an essential health

behavior for effective management of primary hypertension. The hypothesis that Adherence will have a determining effect on Prognosis is accepted.

When the significance of Adherence is categorically proved time and again by several researchers, it is pertinent to investigate the antecedents of Quality of Communication and Adherence. The results of the study as indicated by regression analyses revealed that out of seven variables tested, only one variable namely, Patient Category was found to contribute significantly to Quality of Communication. Patient Category refers to the time of their first consultation with the doctor i.e. old and new patients. Patients who had already consulted the doctor before the data collection was started in that hospital were called the old patients, while the patients who came for their first consultation after initiating the study in that hospital were called new patients. According to the results, the Quality of Communication was found to be higher in case of new patients compared to those who were already under the treatment of the doctor. This revealed that the parallel scale used for measuring the health communication between doctors and patients worked as an incidental intervention or professional health education tool for the doctors. Probably the Health Communication Checklist that required the doctors to tick the items they covered during consultation sensitized them towards detailed instructions to the patients on every aspect such as medication, diet, exercise, alarm signals, medical emergencies, etc. which they seem to have complied in their consultation with the new patients. A related encouraging finding of this study revealed that patients' therapeutic adherence is predicted by Patient Category and Quality of Communication in that order. Patient category is found to have significantly contributed to the level of Adherence, once again strengthening the fact that those patients whose consultation started after the doctors started their participation in the study had better Quality of Communication

and hence, showed higher adherence behavior. The second variable that predicted Adherence level is found to be Quality of Communication. This strongly supports the fact that the doctors are trainable in improving their communication quality so as to ensure higher adherence levels in patients. This calls for particular attention in case of doctors treating NCDs where adherence plays a strong role in disease management and quality of life.

As a sequel to the above, the findings of the present study also re-emphasized the fact that Quality of Communication and therapeutic Adherence are significant predictors of Prognosis in patients with primary hypertension. This indicates a logically arranged sequence that starts from high Quality of Communication leading to high Adherence and resulting in good Prognosis. A positive outcome of treatment in terms of effective management of hypertension, according to the study is preceded by optimal adherence and high quality of communication.

Implications

The method adopted in this study to measure Quality of Communication is a major contribution to the research in the field of Doctor-Patient Communication. Taking into consideration the research gap in quantifying the communication, the study evolved a holistic method in measuring health communication between the doctor and the patient. There is a need to measure and study the Doctor-Patient Communication from the angle of mutuality, where the quality is measured by a composite score which compares the intended content with the comprehended content. All the past studies have taken an approach either from the patient's point of view or from the doctor's perspective. Such quantification is incomplete.

Communication between the doctor and the patients is an integral component of the health care system. In the context of health, communication is instrumental in health behavior modification through cognitive mediation. This is achieved through the clarity in the communication between the doctor and the patients. Communication is said to be effective when the receiver i.e. the patient comprehends the message the way the sender i.e. the doctor intended it to be or when the intended communication matches with the comprehended communication of the receiver. Thus it is a two-way process and the importance of either cannot be denied. The method of measuring Quality of Communication by applying similarity index is innovative, holistic and hence is useful for future research.

The findings of the study indicate that primary hypertension can be effectively managed through better quality of communication. If quality of communication is a skill and one can be trained to be competent, attempts will have to be made towards it. One measure that may be adopted by the doctors is to insist on maintenance of an adherence diary by every patient. This can be made mandatory in the treatment package. This diary having column to record adherence to medication, diet and exercise has to be filled every day by the patient. In addition, space to record any significant clinical symptoms, BP reading, etc. would make it more holistic. Examination of this diary at every review visit would equip the doctor with an efficient feedback system. Communication during the consultation can be based on this feedback. The doctor can relate prognosis to specific adherence, low or non-adherence. Such inputs from the doctor may help the patient improve their therapeutic adherence leading to better prognosis.

In view of technological advancement, an electronic feedback system may be evolved between the doctor and the patient, where the doctor is connected to all the patients through a software programme. The patients may automatically receive a reminder message everyday either on their mobile phones or through internet to abide by the medication, diet and exercise. Similarly, the patient may electronically enter his/her adherence on daily basis. This process may continue until an optimum adherence level is achieved. Once this is sustained, it becomes a pattern of lifestyle and no more requires reminders. Such use of electronic communication is adopted in many clinical trials to ensure regularity in medication.

Health Communication, doctor's bedside manners, and counseling skills will have to be an integral part of medical education. The course, instead of restricted to a particular year must run along all the four years of medical graduation and include not only theoretical inputs but also be enriched with practicum. This alone can ensure both acquisition and practice of communication skills in medical profession. Compared to the estimated outcome in terms of prevention, the cost will be negligible. For instance, poor adherence to medication cost USA $105.8 billion or an average of $453 per person in 2010 (Nasseh, Frazee, Visaria, Vlahiotis, & Tian, 2012). India as a developing nation cannot afford this kind of investment. It is only logical, to work on the prevention, rather than on the cure of the growing problem. With an-already burdened health care system, managing the growing disease burden will be a challenging job.

Conclusion

The quality of communication is found to have a critical role in management of primary hypertension for positive outcome. This finding has to be viewed as a

silver lining to a number of researches that showed a progressive increase in the prevalence and incidence of primary hypertension among Indian population. Against the high projection for future, where large proportion of population are likely to be affected, and more cardiovascular deaths are seen as probability, the silver lining is the fact that quality of communication plays a significant role in promoting adherence and prognosis. This gives a hope of prevention that can happen through effective communication with quality training. India is identified as the world capital for diabetes. The increase in the incidence of primary hypertension is likely to place India at a top level with regard to this NCD too. The etiology of it can be traced back to a shift from affiliation-need to achievement-need among Indians which may be due to the impact of globalization. Having to live in the reality of highly competitive academic and occupational environment, disintegration of social support system that was natural to Indian culture, a paradigm shift in lifestyle and many environmental, social and cultural factors contributed to enhanced stress levels and increase in the incidence of primary hypertension. Studies have showed an increasing trend of primary hypertension, particularly among the age group of 20-60 years of population. Yavagal et al. (2013) reported that almost 45% in urban population Chennai (47.4%), W.B (50%), Kerala (44.3%) are pre-hypertensive. The progressive increase in the incidence rings the alarm for two reasons. First, the very fact that an increasing number of people from productive age group are affected by the disease thus enhancing the disease burden on the nation is disturbing and a matter of great national concern. High blood pressure increases the risk of overall cardiovascular complications by 2- to 3-fold (Berenson et al., 1998). The incidence of stroke increases approximately 3-fold in patients with borderline hypertension and approximately 8-fold in those with definite hypertension (Thompson & Furlan, 1996).

It has been estimated that 40% of cases of acute myocardial infarction or stroke are attributable to hypertension (al Roomi, Heller & Wlodarczyk, 1990; Borghi et al., 1999; Marmot & Poulter, 1992). Primary hypertension is one of the leading causes of Coronary Artery Disease (CAD). CADs refers to heart diseases owing to narrowing of heart arteries due atherosclerosis. Coronary Artery Disease (CAD) is a disease condition whose prevalence is found to be several folds higher in developing countries than in industrialized nations. The Global Burden of Diseases (GBD) study reported that the mortality rate estimated from CAD in India was at 1.6 million in the year 2000. (Gupta, 2005) and is predicted to increase by almost 75% in the global cardiovascular diseases burden. More alarming than this is the fact that when hypertension is progressively affecting a larger percentage of the population, the natural response towards the disease tends to be one of complacence, thus diluting the seriousness it demands. To elaborate further when the social environment around the patients has more and more people diagnosed with primary hypertension, patients tend to assume that it is not very uncommon to have hypertension which then becomes a natural part of life that does not demand special attention and care. The only way of breaking this undesirable disposition is through an unlearning and reorientation process initiated during the consultation. Hence the treating physician has the responsibility of orienting the patient to the dangerous repercussions of this asymptomatic silent killer. The Global Burden of Disease (2010) report has stated that hypertension is the single leading risk factor and it ranks six among the risk factors attributable by Disability Adjusted Life Years (DALYs) (Lim et al., 2013). Associated complications like premature death, disability, personal and family disruption, loss of income, and healthcare expenditure take a toll on the family and national finances (WHO, 2013b). Over the period 2011-2025, the cumulative lost

output in low and middle income countries associated with non-communicable diseases is projected to be US$ 7.28 trillion (WHO, 2011a). The annual loss of approximately US$ 500 billion due to major non-communicable diseases amounts to approximately 4% of gross domestic product for low- and middle-income countries. Cardiovascular disease including hypertension accounts for nearly half of the cost (WHO, 2011b). Considering that in many countries poorly controlled blood pressure represents an important economic burden (e.g. in the United States the cost of health care related to hypertension and its complications was 12.6% of total expenditure on health care in 1998, Hodgson & Cai, 2001), improving adherence could lead to health and economic improvement, from the societal (Piatrauskene, 1991), institutional (McCombs et al., 1994) and employers' point of view (Rizzo, Abbott, & Pashko, 1996). If the trend of prevalence and incidence continues in the same lines, the disease burden is likely to increase by 36% by 2025. Further, the number of cardiovascular deaths (strokes), where the origin is primary hypertension is found to be 57% in 2009. It is estimated to be 23.3 million by 2030. Majority of these are preventable if only the adherence is increased which as we found in this study can be attained through quality doctor-patient communication. In view of this, education and training to the medical professionals in health communication skills will have to be introduced as in-service program. The curricular reforms in medical education must incorporate communication skills at various levels as a continuous course throughout the entire period of graduation. The financial implications of introducing communication training will certainly be marginal when compared to the disease burden and cardiovascular deaths that can be prevented. Thus, the findings of this study strongly advocate pre-service and in-service training in communication skills for the doctors as an effective intervention measure towards optimal adherence and prognosis.

Limitations

The limitation of the study is the restriction of the sample to one capital city. Secondly, the design would have been stronger if the sample were limited only to the patients contacting doctors for first consultation. In such cases the follow-up for prognosis would have been more scientific. Finally longer follow-ups would have thrown light on the sustainability of the impact of quality of communication.

REFERENCES

REFERENCES

Aarts, H., Paulussen, T., & Schaalma, H. (1997) Physical exercise habit: on the conceptualization and formation of habitual health behaviors. *Health Education Research, 12*(3), 363–374.

Abolfotouh, M.A., Sallam, S.A., Mohammed, M.S., Loutfy, A.A., & Hasab, A.A. (2011). Prevalence of elevated blood pressure and association with obesity in Egyptian school adolescents. *International Journal of Hypertension, 2011,* 952537. doi: 10.4061/2011/952537.

Adams, R. J., Smith, B. J., & Ruffin, R. E. (2001). Impact of the physician's participatory style in asthma outcomes and patient satisfaction. *Annals of Allergy, Asthma & Immunology, 86*(3), 263-271.

Adji, A., O'Rourke, M.F., & Namasivayam, M. (2011). Arterial stiffness, its assessment, prognostic value, and implications for treatment. *American Journal of Hypertension, 24*(1)*,* 5–17. doi: 10.1038/ajh.2010.192

al Roomi, K.A., Heller, R.F., & Wlodarczyk, J. (1990). Hypertension control and the risk of myocardial infarction and stroke: a population-based study. *Medical Journal of Australia, 153,* 595-599.

Allen, S.M., Petrisek, A.C., & Laliberte, L.L. (2001). Problems in doctor-patient communication: the case of younger women with breast cancer. *Critical Public Health, 11*(1), 39-58. doi: 10.1080/09581590010028246

Anden, A., Andersson, S. O., & Rudebeck, C. E. (2005). Satisfaction is not all: Patients' Perception of outcome of general practice consultations, a qualitative study. *BMC Medical Practice, 6*(43). doi: 10.1186/1471-2296-6-43

Anderson, R.M., Fitzgerald, J.T., & Oh, M.S. (1993). The relationship of diabetes-related attitudes and patients' self-reported adherence. *Diabetes Education, 19,* 287-292.

Arora, N. (2003). Interacting with cancer patients: the significance of physician' communication behavior. *Social Science & Medicine, 57*(5), 791-806.

Asnani, M.R. (2009). Patient-physician communication. *West Indian Medical Journal, 58*(4), 357-61.

Atkins, L., & Fallowfield, L. (2006). Intentional and non-intentional non-adherence to medication amongst breast cancer patients. *European Journal of Cancer, 42*(14), 2271-2276.

Bacon, S.L., Sherwood, A., Hinderliter, A., & Blumenthal, J.A. (2004). Effects of exercise, diet and weight loss on high blood pressure. *Sports Medicine, 34*(5), 307-316.

Baker, D.W., Parker, R.M., Williams, M.V., Pitkin, K., Parikh, N.S., Coates, W., et al. (1996). The health care experience of patients with low literacy. *Archives of Family Medicine, 5*(6), 329-334.

Bales, R. F. (1950). *Interaction Process Analysis: A Method for the Study of Small Groups*. Cambridge, Massachusetts: Addison-Wesley.

Balkrishnan, R., (1998). Predictors of medication adherence in the elderly. *Clinical Therapeutics, 20*(4), 764-771. doi: 10.1016/S0149-2918(98)80139-2

Barber, N., Parsons, J., Clifford, S., Darracott, R., & Horne, R. (2004). Patients' problems with new medication for chronic conditions. *Quality and safety in Health Care, 13*(3), 172-175.

Barry, C.A., Stevenson, F.A., Britten, N., Barber, N., & Bradley, C.P. (2001). Giving voice to the lifeworld. More humane, more effective medical care? A

qualitative study of the doctor-patient communication in general practice. *Social Science and Medicine, 53*(4), 487-505.

Beck, R.S., Daughtridge, R., & Sloane, P.D. (2002). Physician-patient communication in the primary care office: a systematic review. *The Journal of the American Board of Family Practice, 15*(1), 25-38.

Becker, M.H., & Rosenstock, I.M. (1984). Compliance with medical advice, in A. Steptoe and A. Mathews (Eds.), *Healthcare and Human Behavior.* London: Academic Press.

Beckles, G.L., Engelgau, M.M., Narayan, K.M., Herman, W.H., Aubert, R.E., & Williamson, D.F. (1998). Population-based assessment of the level of care among adults with diabetes in the U.S. *Diabetes Care, 21*(9)*, 1432-1438.

Beilin, L.J. (1999). Lifestyle and hypertension–an overview. *Clinical and Experimental Hypertension, 21*(5-6), 749-762.

BeLue, R., Okoror, T.A., Iwelunmor, J., Taylor, K.D., Degboe, A.N., Agyemang, C., et al. (2009). An overview of cardiovascular risk factor burden in sub-Saharan African countries: a socio-cultural perspective. *Globalization and Health, 5*(10). doi: 10.1186/1744-8603-5-10

Berenson, G.S., Srinivasan, S.R., Bao, W., Newman, W.P 3rd, Tracy, R.E, & Wattigney, W.A. (1998). Association between multiple cardiovascular risk factors and atherosclerosis in children and young adults. The Bogalusa Heart Study. *New England Journal of Medicine, 338*(23), 1650-6.

Bernhardt, J. M. (2004). Communication at the core of effective public health. *American Journal of Public Health, 94* (12), 2051–2053.

Berry, D. (2007). *Health Communication: Theory and Practice.* Berkshire, England: Open University Press.

Bertakis, K.D., Franks, P., & Epstein, R.M. (2009). Patient-centered communication in primary care: physician and patient gender and gender concordance. *Journal of Women's Health (Larchmt), 18*(4), 539-545. doi: 10.1089.jwh.2008.0969.

Bharucha, A.J., Pandav, R., Shen, C., Dodge, H.H., & Ganguli, M. (2004). Predictors of nursing facility admission: a 12 year epidemiologic study in the United States. *Journal of the American Geriatrics Society, 52*(3), 434-439.

Bodin, T., Albin, M., Ardo, J., Stroh, E., Ostergren, P., & Bjork, J. (2009). Road traffic noise and hypertension: results from a cross-sectional public health survey in southern Sweden. *Environmental Health, 8*, 38. doi:10.1186/1476-069X-8-38

Bolton, M.B., Tilley, B.C., Kuder, J., Reeves, T., & Schutz, L.R. (1991). The cost and effectiveness of an education program for adults who have asthma. *Journal of General Internal Medicine, 6*(5), 401-7.

Bond, W.S., & Hussar, D.A. (1991). Detection methods and strategies for improving medication compliance. *American Journal of Hospital Pharmacy, 48*(9), 1978-88.

Borghi, C., Bacchelli, S., Esposti, D.D., Bignamini, A., Magnani, B., & Ambrosioni, E. (1999). Effects of the administration of an angiotensin-converting enzyme inhibitor during the acute phase of myocardial infarction in patients with arterial hypertension.SMILE Study Investigators.Survival of Myocardial Infarction Longterm Evaluation. *American Journal of Hypertension, 12*(7), 665-672.

Boule, N.G., Haddad, E., Kenny, G.P., Wells, G.A., & Sigal, R.J. (2001). Effects of exercise on gylcemic control and body mass in type 2 diabetes mellitus: a

meta-analysis of controlled clinical trials. *Journal of American Medical College, 286*(10), 1218-27.

Bovet, P., Ross, A.G., Gervasoni, J.P., Mkamba, M., Mtasiwa, D.M., Lengeler, C., et al. (2002) Distribution of blood pressure, body mass index and smoking habits in the urban population of Dar es Salaam, Tanzania, and associations with socioeconomic status. *International Journal of Epidemiology, 31*(1), 240–247.

Bradley, G., Sparks, B., & Nesdale, D. (2001). Doctor communication style and patient outcomes: gender and age as moderators. *Journal of Applied Social Psychology, 31*(8), 1749-1773. doi: 10.1111/j.1559-1816.2001.tb02749.x

Bredart, A., Bloulec, C., & Dolbeault, S. (2005). Doctor-patient communication and satisfaction with care in oncology. *Current Opinion in Oncology, 17*(14), 351-354.

Brinkman, W.B., Geraghty, S.R., Lanphear, B.P., Khoury, J.C., Gonzalez del Rey, J.A., Dewitt, T.G., et al. (2007). Effect of multisource feedback on resident communication skills and professionalism: a randomized controlled trial. *Archives of Pediatrics & Adolescent Medicine, 161*(1), 44–49.

Brooks, C.M., Richards, H.P., Kohler, C.L., Soong, S.J., Martin, B., Windsor, R.A., et al. (1994). Assessing adherence t asthma medication and inhaler regimens: a psychometric analysis of adult self-report scales. *Medical Care, 32*(3), 298-307.

Brownell, K.D. (1998). Diet, exercise, and behavioral intervention: the nonpharmacological approach. *European Journal of Clinical Investigation, 28*(Suppl 2), 19-21.

Burchard, K.W., & Rowland-Morin, P.A. (1990). A new method of assessing the interpersonal skills of surgeons. *Academic Medicine, 65*(4), 274-276.

Burke, L.E., Dunbar-Jacob, J.M., &Hill, M.N. (1997). Compliance with cardiovascular disease prevention strategies: a review of the research. *Annals of Behavioral Medicine, 19*(3), 239-263.

Burman, W.J., Cohn, D.L., Rietmeijer, C.A., Judson, F.N., Sbarbaro, J.A., & Reves, R.R. (1997). Noncompliance with directly observed therapy for tuberculosis. Epidemiology and effect on the outcome of treatment. *Chest, 111*(5), 1168-73.

Burt, V.L., Whelton, P., Roccella, E.J., Brown, C., Cutler, J.A., Higgins, M., et al. (1995). Prevalence of hypertension in the US adult population: results from the Third National Health and Nutrition Examination Survey 1988-1991. *Hypertension, 25*(3)*,* 305-313.

Byrne, P., & Long, B. (1976*). Doctors Talking to Patients*. *A Study of the Verbal Behavior of General Practitioners Consulting in their Surgeries.* London: HMSO.

Campbell, C., Lockyear, J., Laidlaw, T., & Macleod, H. (2007). Assessment of a matched-pair instrument to examine doctor-patient communication skills in practising doctors. *Medical Education, 41*(2), 123-129.

Cape, J. (2002). Consultation length, patient-estimated consultation length, and satisfaction with the consultation. *The British Journal of General Practice, 52*(485), 1004-1006.

Castro, C.M., Wilson, C., Wang, F., & Schillinger, D. (2007). Babel babble: physicians' use of unclarified medical jargon with patients. *American Journal of Health Behavior, 31*(Suppl 1), S85-S95.

Cawood J. L. (2006). Patient adherence to lifestyle change. *Alabama Practice-Based CME Network*. Alabama: The University of Alabama School of Medicine

Division of CME. Retrieved July 15, 2013 from http://www.alabamacme.uab.edu/courses/lifestyle_ change/ID0399A.asp

Centers for Disease Control and Prevention. (n.d). Health Communication Basics. *Health Communication & Social Marketing Practice.* Retrieved August 5, 2013 from

http://www.cdc.gov/healthcommunication/healthbasics/whatishc.html

Chan, M., Nicklason, F., & Vial, J.H. (2001). Adverse drug events as a cause of hospital admission in the elderly. *Internal Medicine Journal, 31*(4)*,* 199-205.

Chapman, K., & Ogden, J. (2009). How do people change their diet?: An exploration into mechanisms of dietary change. *Journal of Health Psychology, 14*(8), 1229–1242. doi: 10.1177/1359105309342289

Charmaz, K. (2002). The self as habit: the reconstruction of self in chronic illness. *Occupation, Participation and Health 22*, 31S–41S.

Chatterjee, S., & Choudhury, N. (2011). Medical communication skills training in the Indian setting: need of the hour. *Asian Journal of Transfusion Science, 5*(11), 8-10. Retrieved June 6, 2013 on

http://www.ajts.org/text.asp?2011/5/1/8/75968

Chen, W.T., Starks, H., Shiu, C.S., Fredriksen-Goldsen, K., Simoni, J., Zhang, F., et al. (2007). Chinese HIV-positive patients and their healthcare providers: contrasting Confucian versus Western notions of secrecy and support. *ANS Advances in Nursing Science, 30*(4), 329-342.

Chobanian, A.V., Barkis, G.L., Black, H.R., Cushman, W.C., Green, L.A., Izzo, J.L., et al. (2003). The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.

Journal of American Medical Association, 289(19), 2560-2571. doi: 10.1001/jama.289.19.2560

Chow, C.K., Jolly, S., Rao-Melacini, P., Fox, K.A.A., Anand, S.S., & Yusuf, S. (2010). Association of diet, exercise, and smoking modification with risk of early cardiovascualar events after acute coronary syndromes. *Circulation, 121*, 750-758. doi: 10.1161/CIRCULATION.109.891523

Christensen, A.J., & Ehlers, S.L. (2002). Psychological factors in end-stage renal disease: an emerging context for behavioral medicine research. *Journal of Consulting & Clinical Psychology, 70*(3), 712-724.

Christensen, A.J., & Smith, T.W. (1995). Personality and patient adherence: correlated of the Five-Factor model in renal dialysis. *Journal of Behavioral Medicine, 18*(3), 305-313.

Christy, N.P. (1979). English is our second language. *New England Journal of Medicine, 300,* 979-981.

Claxton, A.J., Cramer, J., & Pierce, C. (2001). A systematic review of the associations between dose regimens and medication compliance. *Clinical Therapeutics, 23*(8), 1296-310.

Cleemput, I., Kesteloot, K., & DeGeest, S. (2002). A review of the literature on the economics of noncompliance: Room for methodological improvement. *Health Policy, 59*(1), 65-94.

Clift, E., & Freimuth, V. (1995). Health communication: what is it and what can it do for you? *Journal of Health Education, 26*(2), 68-74.

Cohn, E.S., Cortés, D.E, Fix, G., Mueller, N., Solomon, J.L., & Bokhour, B.G. (2011). Habits and routines in the daily management of hypertension. *Journal of Health Psychology, 17*(6), 845-855. doi: 10.1177/1359105311424471

Col, K., Fanale, J.E., Kronholm, P. (1990). The role of medication noncompliance and adverse drug reactions in hospitalizations of the elderly. *Archives of Internal Medicine, 150*(4), 841-845.

Collins, S., Britten, N., Ruusuvori, J., & Thomson, A. (Eds.). (2007). *Patient Participation in Health Care Consultations.* Berkshire, England: Open University Press.

Conlin, P.R. (1999). The dietary approaches to stop hypertension (DASH) clinical trial: implications for lifestyle modifications in the treatment of hypertensive patients. *Cardiology in Review, 7*(5), 284-288.

Corda, R.S., Burke, H.B., & Horowitz, H.W. (2000). Adherence to prescription medications among medical professionals. *Southern Medical Journal, 93*(6), 585-589.

Cousin, G., Mast, M. S., Roter, D., & Hall, J.A. (2012). Concordance between physician communication and patient attitudes predict patient satisfaction. *Patient Education & Counseling, 87*(2), 193-197. doi:10.1016/j.pec.2011.08.004.

Cramer, J.A., Scheyer, R.D., & Mattson, R.H. (1990). Compliance declines between clinic visits. *Archives of Internal Medicine, 150*(7), 1509-10.

Cramer, J.A., Rosenheck, R., Kirk, G., Krol, W., & Krystal, J. (2003). Medication compliance feedback and monitoring in a clinical trial: predictors and outcomes. *Value Health, 6,* 566-573.

Cramer, J.A. (2004). A systematic review of adherence with medication for diabetes. *Diabetes Care, 27*(5), 1218-1224.

Dalal, J.J., Padmanabhan, T.N.C., Jain, P., Patil, S., Vasnawala, H., & Gulati, A. (2012). Lipitension: interplay between dyslipidemia and hypertension. *Indian Journal of Endocrinology and Metabolism, 16*(2), 240-245.

Das, S.K., Sanyal, K., & Basu, A. (2005). Study of urban community survey in India: growing trend of high prevalence of hypertension in a developing country. *International Journal of Medical Sciences, 2*(2), 70-78. doi: 10.7150/ijms.2.70

Davis, K., Schoenbaum, S.C., Collins, K.S., Tenney, K., Hughes, D.L., & Audet, A.M. (2002). *Room for improvement: Patients report on the quality of their health care.* New York: Commonwealth Fund. Retrieved June 1, 2013 from www.cmwf.org

Delamater, A.M. (2006). Improving patient adherence. *Clinical Diabetes, 24*(2)*,* 71-77. doi: 10.2337/diaclin.24.2.71

Denhaerynck, K., Manhaeve, D., Dobbels, Garzoni, D., Nolte, C., & DeGeest, S. (2007). Prevalence and consequences of nonadherence to hemolialysis regimens. *American Journal of Critical Care, 16*(3), 222-35.

Dennehy, C.E., Kishi, D.T., & Louie, C. (1996). Drug-related illness in emergency department patients. *American Journal of Health-System Pharmacy, 53*(12), 1422-26.

Deo, M.G. (2013). Doctor population ratio for India- the reality. *Indian Journal of Medical Research, 137*(4), 632-35.

Department of Health. (1992). *The Health of the Nation: A Summary of the Government's Proposals*. London: HMSO.

Derose, S.F., Green, K., Marrett, E., Tunceli, K., Cheetham, T.C., Chiu, V.Y., et al. (2013). Automated outreach to increase primary adherence to cholesterol-

lowering medications. *Journal of American Medical College Internal Medicine, 173*(1), 38-43. doi: 10.1001/2013.jamainternmed.717

Desroches, S., Lapointe, A., Rattè, S., Gravel, K., Lègarè, F., & Turcotte, S. (2013). Interventions to enhance adherence to dietary advice for preventing and managing chronic diseases in adults. *Cochrane Database Systematic Review, 2.* doi: 10.1002/14651858.CD008722

Deveugele, M., Derese, A., van den Brink-Muinen, A., Bensing, J., & De Maeseneer, J. (2002). Consultation length in general practice: cross sectional study in six European countries. *British Medical Journal, 325*, 472. doi: 10.1136/bmj.325.7362.472

DiBlasi, Z., Harkness, E., Ernst, E., Georgiou, A., & Kleinjen, J. (2001). Influence of context effects on health outcomes: a systematic review. *Lancet, 357*(9258), 757-762.

DiMatteo, M.R., & DiNicola, D.D. (1982). *Achieving Patient Compliance*. New York: Pergamon.

DiMatteo, M.R. (1994). Enhancing patient adherence to medical recommendations. *Journal of American Medical Association, 27*(1), 79-83.

DiMatteo, M.R. (1998). The role of the physician in the emerging health care environment. *Western Journal of Medicine, 168*(5), 328-333.

DiMatteo, M.R., & Lepper, H.S. (1998). Promoting adherence to courses of treatment: mutual collaboration in the physician-patient relationship (pp.75-86). In L.D. Jackson, & B.K. Duffy (Eds.), *Health Communication Research: A Guide to Developments and Directions.* Westport, CT: Greenwood.

DiMatteo, M.R., Giordani, P.J., Lepper, H.S., & Croghan, T.W. (2002). Patient adherence and medical treatment outcomes: a meta-analysis. *Medical Care, 4*(9), 794-811.

DiMatteo, M.R. (2004). Evidence-based strategies to foster adherence and improve patient outcomes. *Journal of the American Academy of Physician Assistants, 17*(11), 18-21.

DiMatteo, M.R. (2004b). Variations in patients' adherence to medical recommendations: a quantitative review of 50 years of research. *Medical Care, 42*(3), 200-209.

Dimatteo, M.R., & Martin, L.R. (2010). Health recommendations and change. *Health Psychology* (pp. 205). New Delhi: Dorling Kindersley (India).

Doll, S., Paccaud, F., Bovet, P., Burnier, M., & Wietlisbach, V. (2002). Body mass index, abdominal adiposity and blood pressure: consistency of their association across developing and developed countries. *International Journal of Obesity Related Metabolic Disorders, 26*(1), 48-57.

Donovan, J.L. (1995). Patient decision making: the missing element in compliance research. *International Journal of Technology Assessment in Healthcare, 11*(3), 443-455.

Dragomir, A., Cote, R., Roy, L., Blais, L., Lalonde, L., Berard, A., et al. (2010). Impact of adherence to antihypertensive agents on clinical outcomes and hospitalization costs. *Medical Care, 48*(5), 418-425. doi: 10.1097/MLR.0b013e3181d567bd

Duffy, F. D., Gordon, G. H., Whelan, G., Cole-Kelly, K., Frankel, R., Buffone, N., et al. (2004). Assessing competence in communication and interpersonal skills: The Kalamazoo II report. *Academic Medicine, 79*, 495–507.

Dunbar-Jacob, J., & Schlenk, E. (2001). Patient adherence to treatment regimen. In A. Baum, T.A. Revenson, & J. E. Singer (Eds.), *Handbook of Health Psychology.* Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Egan, B.M., Zhao, Y., & Axon, R.N. (2010). US trends in prevalence, awareness, treatment, and control of hypertension, 1988–2008. *The Journal of the American Medical Association, 303*(20), 2043–2050.

Eisen, S.A., Miller, D.K., Woodward, R.S., Spitznagel, E., & Przybeck, T.R. (1990). The effect of prescribed daily dose frequency on patient medication compliance. *Archives of Internal Medicine, 150*(9), 1881-1884.

Ellenbecker, C.H., Frazier, S.C., & Verney, S. (2004). Nurses' observations and experiences of problems and adverse effects of medication management in home care. *Geriatric Nursing, 25*(3), 164-170.

Emanuel, E.J., & Emanuel, L.L. (1992). Four models of the physician–patient relationship. *Journal of American Medical Association, 267*(16), 2221–26. doi: 10.1001/jama.1992.03480160079038.

Fallowfield, L. J., Hall, A., Maguire, G. P., & Baum, M. (1990). Psychological outcomes of different treatment policies in women with early breast cancer outside a clinical trial. *BMJ Clinical Research Education*, *301*(6752), 575-580.

Farmer, K.C. (1999). Methods for measuring and monitoring medication regimen adherence in clinical trials and clinical practice. *Clinical Therapeutics, 21,* 1074-90.

Feig, D.I., Kang, D.H., & Johnson, R.J. (2008). Uric acid and cardiovascular risk. *New England Journal of Medicine, 359,* 1811-21.

Feinstein, A.R. (1990). On white-coat effects and the electronic monitoring of compliance. *Archives of Internal Medicine, 150*(7), 1377-8.

Feldman, R., Bacher, M., Campbell, N., Drover, A., Chockalingam, A. (1998). Adherence to pharmacologic management of hypertension. *Canadian Journal of Public Health, 89*(5)*,* 116-118.

Ferlie, E.B., & Shortell, S.M. (2001). Improving the quality of health care in the United Kingdom and the United States: a framework for change. *The Milibank Quarterly, 79*(2), 281-315.

Fields, A.M., Freiberg, C.S., Fickenscher, A., & Shelly, K.H. (2008). Patients and jargon: are we speaking the same language? *Journal of Clinical Anesthesia, 20*(5), 343-346. doi: 10.1016/j.jclinane.2008.02.006

Flocke, S. A., Miller, W. L., & Crabtree, B. F. (2002). Relationships between physician practice style, patient satisfaction, and attributes of primary care. *The Journal of Family Practice*, *51*(10) 835-840.

Ford, S., Fallowfield, L., & Lewis, S. (1996). Doctor-patient interactions in oncology. *Social Science & Medicine, 42*(11), 1511-1519.

Freidson, E. (1988). *Profession of Medicine: A Study of the Sociology of Applied Knowledge.* Chicago, IL: University of Chicago Press.

Friedman, D.S., Hahn, S.R., Gelb, L., Tan, J., Shah, S.N., Kim, E.E., et al. (2008). Doctor-patient communication, health-related beliefs, and adherence in glaucoma: results from the glaucoma adherence and persistency study. *Opthalmology, 115*(8), 1320-1327. doi: 10.1016/j.ophtha.2007.11.023

Friedman, R.H., Kazis, L.E., Jette, A., Smith, M.B., Stollerman, J., Torgerson, J., et al. (1996). A telecommunications system for monitoring and counseling patients with hypertension: impact on medication adherence and blood pressure control. *American Journal of Hypertension, 9*(4 Pt 1), 285-292.

Fuentes, R., Ilmaniemi, N., Laurikainen, E., Tuomilehto, J., & Nissinen, A. (2000). Hypertension in developing economis: a review of population-based studies carried out from 1980 to 1998. *Journal of Hypertension, 18*(5), 521-529.

Gafaranga, J., & Britten, N. (2003). "Fire away": the opening sequence in general practice consultations. *Journal of Family Practice, 20*(3), 242-247. doi: 10.1093/fampra/cmg303

Gandhi, T.K. (2005). Fumbled handoffs: one dropped ball after another. *Annals of Internal Medicine, 142*(5), 352-358.

Ganiyu, A.B., Mabuza, L.H., Malete, N.H., Govender, I., & Ogunbanjo, G.A. (2013). Non-adherence to diet and exercise recommendations amongst patients with type 2 diabetes mellitus attending Extension II clinic in Botswana. *African Journal of Primary Health Care & Family Medicine, 5*(1). doi:10.4102/phcfm.v5i1.457

Gaziano, T., Reddy, K.S., Paccaud, F., Horton, S., & Chaturvedi, V. (2006). Cardiovascular disease. In D.T. Jamison et al. (Eds.), *Disease Control Priorities in Developing World* (pp. 645-662). Oxford: Oxford University Press.

Gladman, J. (1997). Pharmacists paid to improve drug compliance, persistency. *Payment Strategies Pharm Care*, Oct 4-8.

Golin, C.E., Dimatteo, M.R., & Gelberg, L. (1996).The role of patient participation in the doctor visit: implications for adherence to diabetes care. *Diabetes Care, 19,* 1153-64.

Golin, C.E., Thorpe, C., & DiMatteo, M.R. (2007). Accessing the patient's world: patient – physician communication about psychosocial issues. In J.A.L. Earp, E.A. French, and M.B. Gilkey *Patient Advocacy for Health Care Quality:*

Strategies for Achieving Patient-Centered Care. Sudbury, MA: Jones and Bartlett Publishers.

Govender, V., & Penn-Kekana, L. (2007). Gender biases and discrimination: a review of health care interpersonal interactions. Background paper prepared for the Women and Gender Equity Knowledge Network of the WHO Commission on Social Determinants of Health. Retrieved August 20, 2013 from http://www.who.int/social_determinants/resources/gender_biases_and_discrimination_wgkn_2007.pdf

Govender, V., & Penn-Kekana, L. (2008). Gender biases and discrimination: a review of health care interpersonal interactions. *Global Public Health, Supp 1,* 90-103. doi: 10.1080/17441690801892208

Graves, J.W. (2000). Management of difficult-to-control hypertension. *Mayo Clinic Proceedings, 75*(3), 278-284.

Gray, S.L., Mahoney, J.E., & Blough, D.K. (1999). Adverse drug events in elderly patients receiving home health services following hospital discharge. *The Annals of Pharmacotherapy, 33*(11), 1147-1153.

Greenfield, S., Kaplan, S.H., Ware, J.E., Jr, Yano, E.M., & Frank, H.J. (1985). Patients' participation in medical care: effects on blood sugar control and quality of life in diabetes. *Journal of General Internal Medicine, 3*(5), 448-457.

Groopman, J. (2007). *How doctors think.* New York: Houghton Mifflin Company.

Guadagnino, C., & Branch, William, Jr. (2006). Physician-patient communication. *Physician's News Digest.* Retrieved January 13, 2013 from www.physiciannews.com/cover/706.html

Guo, H., He, H., & Jiang, J. (2001). Study on the compliance of antihypertensive drugs in patients with hypertension. *Chinese Journal of Epidemiology, 22*(6), 418-420.

Gupta, R. (2004). Trends in hypertension epidemiology in India. *Journal of Human Hypertension, 18*(2), 73-78.

Gupta, R. (2005). Burden of coronary heart disease in India. *Indian Heart Journal, 57*(6), 632-8.

Gupta, R., & Gupta, V.P. (2009). Hypertension epidemiology in India: lessons from Jaipur heart. *Current Science, 97*(3), 349-355.

Ha, J.F., Anat, D.S., & Longnecker, N. (2010). Doctor-patient communication: a review. *The Ochsner Journal, 10,* 38-48.

Haas, J. S., Cook, E. F., Puopolo, A. L., Burstin, H. R., Cleary, P. D., & Brennan, T. A. (2000). Is the professional satisfaction of general internists associated with patient satisfaction? *Journal of General Internal Medicine*, *15*(2) 122-128.

Hadlow, J., & Pitts, M. (1991). The understanding of common health terms by doctors, nurses and patients. *Social Science & Medicine, 32*(2), 193-196.

Hall, J.A., & Roter, D.L. (1988). Medical communication and gender: a summary of research. *Journal of Gender Specific Medicine, 1*(2), 39-42.

Hall, J. A., Horgan, T. G., Stein, T. S., & Roter, D. L. (2002). Liking in the physician-patient relationship. *Patient Education & Counseling*, *48*(1) 69-77.

Halperin, R.O., Sesso, H.D., Ma, J., Buring, J.E., Stampfer, M.J., & Gaziano, J.M. (2006). Dyslipidemia and the risk of incident hypertension in men. *Hypertension, 47*(1), 45-50. doi: 10.1161/01.HYP.0000196306.42418.0e

Hampson, S.E., McKay, G.H., & Glasgow, R.E. (1996). Patient-physician interactions in diabetes management: consistencies and variation in the structure and content of two consultations. *Patient Education & Counseling, 29*(1)*,* 49-58.

Harding, S., Maynard, M., Cruickshank, J.K., & Gray, L. (2006). Anthropometry and blood pressure differences in black Caribbean, African, South Asian and white adolescents: the MRC DASH study. *Journal of Hypertension, 24*(8), 1507-14.

Hausman, A. (2001). Taking your medicine: Relational steps to improving patient compliance. *Health Marketing Quarterly, 19*(2) 49-71.

Haynes, R.B., Sackett, D.L., Gibson, E.S., Taylor, D.W., Hackett, B.C., Roberts, R.S., et al., (1976). Improvement of medication compliance in uncontrolled hypertension. *Lancet, 1*(7972)*,* 1265-1268.

Haynes, R.B., & Sackett, D.L. (1979). *Compliance in Healthcare.* Baltimore and London: The John Hopkins University Press.

Haynes, R.B., Taylor, D.W., Sackett, D.L., Gibson, E.S., Bernholz, C.D., & Mukherjee, J. (1980). Can simple clinical measures detect noncompliance. *Hypertension, 2*, 757-764.

Haynes, R.B., McKibbon, K..A., & Kanani, R. (1996). Systematic review of randomized trials of interventions to assist patients to follow prescriptions for medications. *Lancet, 348*(9024)*,* 383-386 [Erratum in *Lancet 349*(9059)*,* 1180].

Haynes, R.B. (2001). Interventions for helping patients to follow prescriptions for medications. *Cochrane Database of Systematic Reviews,* 1.

Haynes, R.B., McDonald, H., Garg, A.X., & Montague, P. (2002). Interventions for helping patients to follow prescriptions for medications. *Cochrane Database Systematic Review, 2,* CD000011.

Haynes, R.B., McDonald, H.P., & Garg, A.X. (2002). Helping patients follow prescribed treatment: clinical application. *Journal of the American Medical Association, 288*, 2880-2883.

Haynes, R.B., Ackloo, E., Sahota, N., McDonald, H.P., & Yao, X. (2008). Interventions for enhancing medication adherence. Cochrane Database of Systematic Reviews, Issue 2. doi: 10.1002/14651858.CD000011.pub3

He, F.J., & MacGregor, G.A. (2009). A comprehensive review on salt and health and current experience of worldwide salt reduction programmes. *Journal of Human Hypertension, 23*(6), 363-384. doi: 10.1038/jhh.2008.144

He, J., Klag, M.J., Whelton, P.K., Chen, J., Mo, J., Qian, M., et al. (1991). Migration, blood pressure pattern, and hypertension: the Yi Migrant Study. *American Journal of Epidemiology, 134*(10), 1085-1101.

Helman, C.G. (1984). *Culture, Health and Illness.* Oxford: Butterworth- Heinemann.

Heritage, J., & Maynard, D. (Eds.). (2006). *Doing Medicine: Structure and Process in Primary Care Encounters*. Cambridge: Cambridge University Press.

Heritage, J., & Robinson, J.D. (2006). The structure of patients' presenting concerns: physicians' opening questions. *Health Communication, 19*(2), 89-102.

Herndon, J., & Pollick, K. (2002). Continuing concerns, new challenges, and next steps in physician-patient communication. *Journal of Bone & Joint Surgery, 84A*(2), 309-315.

Ho, P.M., Spertus, J.A., Masoudi, F.A., Reid, K.J., Peterson, E.D., Maqid, D.J., et al. (2006). Impact of medication therapy discontinuation on mortality after myocardial infarction. *Archives of Internal Medicine, 166*(17), 1842-7.

Hodgson, T.A., & Cai, L. (2001). Medical care expenditures for hypertension, its complications, and its comorbidities. *Medical Care, 39*(6), 599-615.

Horne, R., & Weinman, J. (1999). Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. *Journal of Psychosomatic Research, 47*(6), 555-567.

Hutchison, L.C., Jones, S.K., West, D.S., & Wei, J.Y. (2006). Assessment of medication management by community-living elderly persons with two standardized assessment tools: a cross-sectional study. *The American Journal of Geriatric Pharmacotherapy, 4*(2), 144-153.

Institute of Medicine. (2003). *Who Will Keep the Public Healthy?* Washington, D.C.: The National Academies Press.

International Consortium for Blood Pressure Genome-Wide Association Studies. (2011). Genetic variants in novel pathways influence blood pressure and cardiovascular disease risk. *Nature, 478*(7367), 103-109. doi: 10.1038/nature10405

Irvine, J., Baker, B., Smith, J., Jandciu, S., Paquette, M., Cairns, J., et al. (1999). Poor adherence to placebo or amiodarone therapy predicts mortality: results from the CAMIAT study. *Psychosomatic Medicine, 61*(4), 566-575.

Ishikawa, H., Roter, D.L., Yamazaki, Y., & Takayama, T. (2005). Physician-elderly patient-companion communication and roles of companions in Japanese geriatric encounters. *Social Science & Medicine, 60*(10), 2307-20.

Ishikawa, H., Takayama, T., Yamazaki, Y., Seki, Y., & Katsumata, N. (2002). Physician-patient communication and patient satisfaction in Japanese cancer consultations. *Social Science & Medicine, 55*(2), 301-311.

Iversen, M.D. (2010). Managing hip and knee osteoarthritis with exercise: what is the best prescription? *Therapeutic Advances in Musculoskeletal Disease, 2*(5), 279-290.

Jackevicius, C.A., Mamdani, M., & Tu, J.V. (2002). Adherence with statin therapy in elderly patients with and without acute coronary syndromes. *Journal of the American Medical Association, 2888*(4), 462-467.

Jackson, J.L., Chamberlin, J., Kroenke, K. (2001). Predictors of patient satisfaction. *Social Science & Medicine, 52*(4), 609-620.

Jeffery, R..W., Pirie, P.L., Elmer, P.J., Bjornson-Benson, W.M., Mullenbach, V.A., et al. (1984). Low-sodium, high-potassium diet: feasibility and acceptability in a normotensive population. *American Journal of Public Health, 74*(5), 492-494.

Jin, J., Sklar, G.E., Oh Sen, V.M., & Li, S.C. (2008). Factors affecting therapeutic compliance: a review from the patient's perspective. *Therapeutics & Clinical Risk Management, 4*(1), 269-286.

Johnson, R.J., Segal., M.S., Sautin, Y., Nakagawa, T., Feig, D.I., Kang, D.H., et al. (2007). Potential role of sugar (fructose) in the epidemic of hypertension, obesity and the metabolic syndrome, diabetes, kidney disease, and cardiovascular disease. *The American Journal of Clinical Nutrition, 86*(4), 899-906.

Jolles, E.P., Clarke, A.M., & Braam, B. (2010). Getting the message across: opportunities and obstacles in effective communication in hypertension care. *Journal of Hypertension, 30*(8), 1500-10.
   doi: 10.1097/HJH.0b013e32835476e1

Jolles, E.P., Padwal, R.S., Clark, A.M., & Braam, B. (2013). A qualitative study of patient perspectives about hypertension. *ISRN Hypertension, 2013,* Article ID 671691. doi: 10.5402/2013/67191

Kane, S., Huo, D., Aikens, J., & Hanauer, S. (2003). Medication nonadherence and the outcomes of patients with quiescent ulcerative colitis. *The American Journal of Medicine, 114*(1), 39-43.

Kanfer, F.H., & Goldstein, A.P. (1986). *Helping People Change: A Textbook of Methods.* New York: Pergamon Press.

Katz., M.G., Jacobson, T.A., Veledar, E., & Kripalani, S. (2007). Patient literacy and question-asking behavior during the medical encounter: a mixed-method analysis. *Journal of General Internal Medicine, 22*(6), 782-786. doi: 10.1007/s11606-007-0184-6

Kazmi, R., Amjad, S., & Khan, D. (2008). Occupational Stress and its effect on job performance: a case study of medical house officer of district Abbottabad. *Journal of Ayub Medical College Abbottabad, 20*(3), 135-139.

Kearney, P.M., Whelton, M., Reynolds, K., Whelton., & He, J. (2004). Worldwide prevalence of hypertension: a systematic review. *Journal of Hypertension, 22*(1), 11-19.

Kearney, P.M., Whelton, M., Reynolds, K., Muntner, P., Whelton., & He, J. (2005). Global burden of hypertension: analysis of worldwide data. *Lancet, 365*(9455), 217-23.

Khan, A.R., Al Abdul Lateef, Z.N., Al Aithan, M.A., Bu-Khamseen, M.A., Al Ibrahim, I., Khan, S.A. (2012). Factors contributing to non-compliance among diabetics attending primary health centers in the Al Hasa district of Saudi Arabia. *Journal of Family & Community Medicine, 19*(1), 26–32. doi: 10.4103/2230-8229.94008

Kim, M.T., Hill, M.N., Bone, L.R., & Levine, D.M. (2000). Development and testing of the Hill-Bone Compliance to High Blood Pressure Therapy Scale. *Progress in Cardiovascular Nursing, 15*(3), 90-96.

Knutson, K.L., Van Cauter, E., Rathouz, P.J., Yan, L.L., Hulley, S.B., Liu, K., et al. (2009). Association between sleep and blood pressure in midlife: the CARDIA sleep study. *Archives of Internal Medicine, 169*(11), 1055-1061.

Kottke, T.E., Stroebel, R.J., & Hoffman, R.S. (2003). JNC 7 – it's more than high blood pressure. *Journal of American Medical Association, 289,* 2573-2575.

Kripalani, S., Jacobson, T.A., Mugulla, I.C., Cawthon, C.R., Niesner, K.J., & Vaccarino, V. (2010). Health literacy and the quality of physician-patient communication during hospitalization. *Journal of Hospital Medicine, 5*(5), 269-275. doi: 10.1002/jhm.667

Kripalani, S., Yao, X., & Haynes, R.B. (2007). Interventions to enhance medication adherence in chronic medical conditions: a systematic review. *Archives of Internal Medicine, 167*(6), 540-549.

Krishna, G.G. (1990). Effect of potassium intake on blood pressure. *Journal of the American Society of Nephrology, 1*(1), 43-52.

Kubota, Y., Yoshitaka, Y., Susumu, S., Takada, K., Sakuma, M., Morimoto, T., et al. (2011). Assessment of pharmacy students' communication competence using the Roter Interaction Analysis System during objective structured clinical examinations. *American Journal of Pharmaceutical Education, 75*(3), 43.

Kuhn, G. J. (2002). Diagnostic errors. *Academic Emergency Medicine, 9*(7), 740-750.

Laaksonen, D.E., Niskanen, L., Nyyssonen, K., Lakka, T.A., Laukkanen, J.A., & Salonen, J.T. (2008). Dyslipidemia as a predictor of hypertension in middle-

aged men. *European Heart Journal, 29(20),* 2561-2568. doi: 10.1093/eurheartj/ehn061

Lahdenpera, T.S., & Kyngas, H.A. (2000). Compliance and its evaluation in patients with hypertension. *Journal of Clinical Nursing, 9(6),* 826-833.

Laidlaw, T.S., MacLeod, H., Kaufman, D.M., Langille, D.B., & Sargeant, J. (2002). Implementing a communication skills programme in medical school: needs assessment and programme change. *Medical Education, 36*(2), 115-24.

Larson, E.B., & Yao, X. (2005). Clinical empathy as emotional labor in the patient-physician relationship. *Journal of American Medical Association, 293*(9), 1100-1106.

Lau, H.S., Beunning, K.S., Postma-Lim, E., Klein-Beernink, L., deBoer, A., & Porsius, A.J. (1996). Noncompliance in elderly people: evaluation of risk factors by longitudinal data analysis. *Pharmacy World & Science, 18*(2), 63-68.

Lee, J.K., Grace, K.A., & Taylor, A.J. (2006). Effect of a pharmacy care program on medication adherence and persistence blood pressure, low-density lipoprotein cholesterol: a randomized controlled trial. *Journal of American Medical Association, 296*(21), 2563-71.

Lehmann, L.S., Brancati, F.L., Chen, M.C., Roter, D., & Dobs, A.S. (1997). The effect of bedside case presentations on patients' perceptions of their medical care. *New England Journal of Medicine, 336*(16), 1150-1155.

Lerner, E.B., Jehle, D.V., Janicke, D.M., & Moscati, R.M. (2000). Medical communication: do our patients understand? *The American Journal of Emergency Medicine, 18*(7), 764-766.

Lewin, S.A., Skea, Z.C., Entwistle, V., Zwarenstein, M., & Dick, J. (2001). Interventions for providers to promote a patient-centered approach in clinical consultations. *Cochrane Database of Systematic Reviews, 4,* CD003267.

Lewis, C.C., Pantell, R., Sharp, L. (1999). Increasing patient knowledge, satisfaction, and involvement: randomized trial of a communication intervention. *Pediatrics, 88*(2), 351-358.

Liebl, A., Neiss, A., Spannheimer, A., Reitberger, U., Wieseler, B., Stammer, H., et al. (2002). Complications, co-morbidity, and blood glucose control in type 2 diabetes mellitus patients in Germany - results from the CODE-2 study. *Experimental & Clinical Endocrinology & Diabetes, 110*(1)*,* 10-16.

Lim, S., Vos, T., Flaxman, A.D., Goodarz, D., Shibuya, K., Healther, A.R., et al. (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study. *The Lancet, 380*(9859), 2224-2260. doi: 10.1016/S0140-6736(12)61766-8

Lipkin, M. (1996). Physician–patient interaction in reproductive counseling. *Obstetrics & Gynecology, 88*, 31S–40S.

Little, P., Everitt, H., Williamson, I., Warner, G., Moore, M., Gould, C., et al. (2001). Observational study of effect of patient centeredness and positive approach on outcomes of general practice consultations. *British Medical Journal, 323*(7318), 908-911.

Lupton, D. (1994). *Medicine as Culture.* London: Sage.

Lye, H.S., Kuan, C.Y., Ewe, J.A., Fung, W.Y., & Liong, M.T. (2009). The improvement of hypertension by probiotics: effects on cholesterol, diabetes,

renin, and phytoestrogens. *International Journal of Molecular Sciences, 10*(9), 3755-75. doi: 10.3390/ijms10093755

Makoul, G. (2001). Essential elements of communication in medical encounters: the Kalamazoo consensus statement. *Academic Medicine: journal of the Association of American Medical Colleges, 76*(4), 390–393.

Makoul, G., Krupat, E., & Chang, C. (2007). Measuring patient views on physician communication skills: Development and testing of the Communication Assessment Tool. *Patient Education & Counseling, 67*(3), 333-342. doi:10.1016/j.pec.2007.05.005

Malhotra, S., Karan, R.S., Pandhi, P., & Jain, S. (2001). Drug related medical emergencies in the elderly: role of adverse drug reactions and non-compliance. *Postgraduate Medical Journal, 77*(913), 703-707.

Mant, J., & McManus, R.J. (2006). Does it matter whether patients take their antihypertensive medication as prescribed? The complex relationship between adherence and blood pressure control. *Journal of Human Hypertension, 20*(8), 551-553.

Marmot, M.G., & Poulter, N.R. (1992). Primary prevention of stroke. *Lancet, 339*(8789), 344-347.

MarquezContreras, E., Vegazo Garcia, O., Claros, N.M., Gilguillen, V., de la Figuera von Wichman, M., Casado Martinez, J.J., et al. (2005). Efficay of telephone and mail intervention in patient compliance with antihypertensive drugs in hypertension: ETECUM-HTA study. *Blood Pressure, 14*(3)*,* 151-158.

MarquezContreras, E., Vegazo Garcia, O., Claros, N.M., Gilguillen, V., de la Figuera von Wichman, M., Casado Martinez, J.J., et al. (2006). Compliance Group of the Spanish Society of Hypertension (SEE). Efficacy of a home blood pressure

monitoring programme on therapeutic compliance in hypertension: the EAPACUM-HTA study. *Journal of Hypertension, 24*(1), 169- 175.

McCombs, J.S., Nichol, M.B., Newman, C.M., & Sclar, D.A. (1994). The costs of interrupting antihypertensive drug therapy in a Medicaid population. *Medical Care, 32*(3), 214-226.

McDonald, H.P., Garg, A.X., & Haynes, R.B. (2002). Interventions to enhance patient adherence to medication prescriptions. *Journal of American Medical Association, 288*(22), 2868-2879. doi: 10.1001/jama.288.22.2868

Mead, N., & Bower, P. (2000). Patient-centeredness: a conceptual framework and review of the empirical literature. *Social Science & Medicine, 51*(7), 1087-1110.

Medical Council of India. (2007). Vision 2015. Delhi: Medical Council of India. Retrieved June 6, 2013 from

http://www.mciindia.org/tools/announcement/MCI_booklet.pdf

Mensink. R.P., & Katan, M.B. (1992). Effect of dietary fatty acids on serum lipids and lipoproteins: a meta-analysis of 27 trials. *Arteriosclerosis and Thrombosis: a Journal of Vascular Biology, 12*(8), 911-919.

Miller, E.R. 3rd, Erlinger, T.P., Young, D.R., Jehn, M., Charleston, J., Rhodes, D., et al. (2002). Results of Diet, Exercise, and Weight Loss Intervention Trial (DEW-IT). *Hypertension, 40*(5), 612-618.

Miller, P.M., Anton, R.F., Egan, B.M., Basile, J., & Nguyen, S.A (2005). Excessive alcohol consumption and hypertension: clinical implications of current research. *Journal of Clinical Hypertension (Greenwich), 7*(6), 346-351.

Mishler, E.A. (1984). *The Discourse of Medicine: Dialectics of Medical Interviews*. Norwood: Ablex.

Misra, A., & Khurana, L. (2008). Obesity and the metabolic syndrome in developing countries. *Journal of Clinical Endocrinology and Metabolism, 93*(11 Suppl 1), S9-S30. doi: 10.1210/jc.2008-1595

Morisky, D.E., & Green L.W. (1986). Concurrent and predictive validity of a self-reported measure of medication adherence. *Medical Care, 24*(1), 67-74.

Morrison , A., & Wertheimer, A.I. (2004). Compilation of quantitative overviews of studies of adherence. *Drug Information Journal, 38*(2), 197-210.

Murray, C., & Lopez, A. (1996). *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries and Risk Factors in 1990*. Cambridge, MA: Harvard University Press.

Naik, A.D., Kallen, M.A., Walder, A., & Street, R.L.Jr. (2008). Improving hypertension control in diabetes mellitus: the effects of collaborative and proactive health communication. *Circulation, 117*(11), 1361-18. doi: 10.1161/CIRCULATIONAHA.107.724005

Narayan, K.M.V., Ali, M.K., & Koplan, J.P. (2010). Global non-communicable diseases – where worlds meet. *New England Journal of Medicine, 363,* 1196-1198. doi: 10.1056/NEJMp1002024

Nasseh, K., Frazee, S.G., Visaria, J., Vlahiotis, A., & Tian, Y. (2012). Cost of medication nonadherence associated with diabetes, hypertension and Dyslipidemia. *The American Journal of Pharmacy Benefits, 4*(2), e41-e47.

Nugent, C.A., Carnahan, J.E., Sheehan, E.T., & Myers, C. (1984). Salt restriction in hypertensive patients. Comparison of advice, education, and group management. *Archives of Internal Medicine, 144*(7), 1415-1417.Wein

Ogedegbea, G., Mancuso, C.A., Allegrante, J.P., & Charlson, M.E. (2003). Development and evaluation of a medication adherence self-efficacy scale in

hypertensive African-American patients. *Journal of Clinical Epidemiology, 56*(6), 520-529.

Ong, L.M., de Haes, J.C., Hoos, A.M., & Lammes, F.B. (1995). Doctor-patient communication: a review of the literature. *Social Science & Medicine, 40*(7), 903-918.

Osterberg, L., & Blaschke, T. (2005). Adherence to medication. *New England Journal of Medicine, 353,* 487-497. doi: 10.1056/NEJMra050100

Padmavati, S. (2002). Prevention of heart disease in India in the 21st century: need for concerted effort. *Indian Heart Journal, 54*(1), 99-102.

Palanisamy, S., & Sumathy, A. (2009). Intervention to improve patient adherence with Antihypertensive Medications at a tertiary care teaching hospital. *International Journal of PharmaTech Research, 1*(2), 369-374.

Park, D.C., Hertzog, C., Leventhal, H., Morrell, R.W., Leventhal, E., Birchmore, D., et al. (1999). Medication adherence in rheumatoid arthritis patients: older is wiser. *Journal of American Geriatrics Society, 47*(2), 172-183.

Parrott, R. (2004) Emphasizing "communication" in health communication. *Journal of Communication, 54*(4), 751-787. doi: 10.1111/j.1460-2466.2004.tb02653.x

Peck, B.M. (2011). Age-related differences in doctor-patient interaction and patient satisfaction. *Current Gerontology and Geriatrics Research, 2011,* Article ID 137492. doi: 10.1155/2011/137492

Perreault, S., Dragomir, A., Blais, L., Berard, A., Lalonde, L., White, M., et al. (2009). Impact of better adherence to statin agents in the primary prevention of coronary artery disease. *European Journal of Clinical Pharmacology, 65*(10), 1013-24. doi: 10.1007/s00228-009-0673-0

Peterson, M.C., Holbrook, J.H., Von Hales, D., Smith, N.L., & Staker, L.V. (1992). Contributions of the history, physical examination, and laboratory investigation in making medical diagnoses. *Western Journal of Medicine, 156*(2), 163-165.

Philips, D. (1996). Medical professional dominance and client dissatisfactions. A study of doctor-patient interaction and reported dissatisfaction with medical care among female patients at four hospitals in Trinidad and Tobago. *Social Science & Medicine, 42*(10)*,* 1419-1425.

Piatrauskene, I. (1991). Hypertension: economic aspects. *Sovetskoe Zdravookhranenie, 4*, 22-25.

Platt, F.W., & Gordon, G.H. (2004). *Field Guide to the Difficult Patient Interview* (2nd Ed.). Philadelphia: Lippincott Williams & Wilkins.

Platt, F.W., & Keating, K, N. (2007). Differences in physician and patient perceptions of uncomplicated UTI symptom severity: understanding the communication gap. *International Journal of Clinical Practice, 61*(2), 303-308.

Pollock, K., & Grime, J. (2002). Patients' perceptions of entitlement to time in general practice consultations for depression: qualitative study. *BMJ Clinical Research Education, 325*(7366), 687.

Poon, E.G., Haas, J.S., Louise Puopolo, A., Gandhi, T.K., Burdick, E., Bates, D.W., et al. (2004). Communication factors in the follow-up of abnormal mammograms. *Journal of General Internal Medicine, 19*(4), 316-323.

Poulter, N.R., Khaw, K.T., Hopwood, B.E., Mugambi, M., Peart, W.S., Rose, G., et al., (1990). The Kenyan Luo migration study: observations on the initiation of a rise in blood pressure. *British Medical Journal(Clinical Research Education), 300*(6730), 967-972.

Pound, P., Britten, N., Morgan, M., Yardley, L., Pope, C., Daker-White, G., et al. (2005). Resisting medicines: a synthesis of qualitative studies of medicine taking. *Social Science and Medicine, 61*(1), 133-155.

Pullar, T., Kumar, S., Tindall, H., & Feely, M. (1989). Time to stop counting the tablets? *Clinical Pharmacology & Therapeutics, 46*(2), 163-168.

Rao, C.R., Kamath, V.G., Shetty, A., & Kamath, A. (2012). High blood pressure prevalence and significant correlates: a quantitative analysis from coastal Karnataka, India. *ISRN Preventive Medicine, 2013*, Article ID 574973. doi:10.5402/2013/574973

Ratzan, S.C., Sterans, N., Payne, J.G., Amato, P., & Madoff, M. (1994). Education for the health communication professional: a collaborative curricular partnership. *American Behavioral Scientist, 38*(2), 361-380.

Reddy, K.S. (2003). Prevention and Control of Non-Communicable Diseases. Retrieved September 26, 2010 from www.icrier.org/pdf/wp104.pdf

Reddy, K.S., Shah, B., Varghese, C., & Ramadoss, A. (2005). Responding to the threat of chronic diseases in India. *Lancet, 366*(9498), 1746-51.

Richman, J. (1987). *Medicine and Health.* London & New York: Longman.

Rizzo, J.A., Abbott, T.A. 3rd., Pashko, S. (1996). Labour productivity effects of prescribed medicines for chronically ill workers. *Health Economics, 5*, 249-265.

Roberts, C.K., & Barnard, R.J. (2005). Effects of exercise and diet on chronic disease. *Journal of Applied Physiology, 98*(1), 3-30.

Roberts, C.S., Cox, C.E., Reintgen, D.S., Baile, W.F., & Gilbertini, M. (1994). Influence of physician communication on newly diagnosed breast cancer patients' psychological adjustment and decision-making. *Cancer, 74*(Suppl 1), 336-341.

Rogers, E.M. (1996). The field of health communication today: an up-to-date report. *Journal of Health Communication, 1*(1), 15-23.

Roter, D., & Larson, S. (2002). The Roter Interaction Analysis System (RIAS): utility and flexibility for analysis of medical interactions. *Patient Education & Counseling, 46*(4), 243-251.

Roter, D., Rosenbaum, J., de Negri, B., Renaud, D., Diprete-Brown, L., & Hernandez, O. (1998). The effects of continuing medical education programme in interpersonal communication skills on doctor practice and patient satisfaction in Trinidad and Tobago. *Medical Education, 32*(2), 189.

Roter, D.L., Hall, J.A. & Katz, N.R. (1988). Patient-physician communication: a descriptive summary of the literature. *Patient Education & Counseling, 12*(2), 99-119.

Roter, D.L., Stewart, M., Putnam, S.M., Lipkin, M.J., Stiles, W., & Inui, T.S. (1997). Communication patterns of primary care physicians. *Journal of American Medical College Association, 277*(4), 350-356.

Rubin,R.R. (2005). Adherence to pharmacologic therapy in patients with Type 2 diabetes mellitus. *American Journal of Medicine, 118*(Suppl 5A), 27S-34S.

Rudd, P., Byyny, R.L., Zachary, V., Loverde M.E., Mitchell, W.D., Titus, C., et al. (1988). Pill count measures of compliance in a drug trial: variability and suitability. *American Journal of Hypertension, 1*(3 pt1), 309-312.

Rudd, P., Houston, M.N., Kaufman, J., Kraemer, H., Bandura, A., Greenwald, G., et al. (2004). Nurse management for hypertension: a systems approach. *American Journal of Hypertension, 17*(10), 921-927.

Rybacki, J.J. (2002). Improving cardiovascular health in postmenopausal women by addressing medication adherence issues. *Journal of the American Pharmaceutical Association, 42,* 63-71.

Sabaté, E. (2003). Adherence to long-term therapies: evidence for action. Geneva: World Health Organization. Retrieved December 21, 2010 from http:// whqlibdoc.who.int/publications/2003/9241545992

Sackett, D.L., Haynes, R.B., Gibson, E.S., Hackett, B.C., Taylor, D.W., Roberts, R.S., et al. (1975). Randomized clinical trial of strategies for improving medication compliance in primary hypertension. *Lancet, 1*(7918), 1205-1207.

Safeer, R.S., & Keenan, J. (2005). Health literacy: the gap between physicians and patients. *American Family Physician, 72*(3), 463-8.

Safran, D. G., P. Neuman., Schoen, C., Kitchman, S.M., Wilson, I.B., Cooper, B., et al. (2005). Prescription drug coverage and seniors: findings from a 2003 National Survey of Seniors: where do things stand on the eve of implementing the new Medicare Part D benefit? *Health Affairs, 2005.* doi: 10.1377/hlthaff.w5.152

Safran, D. G., Taira, D. A., Rogers, W. H., Kosinski, M., Ware, J. E., & Tarlov, A. R. (1998). Linking primary care performance to outcomes of care. *The Journal of Family Practice*, *47*(3) 213-220.

Salzman, C. (1995). Medication compliance in the elderly. *Journal of Clinical Psychiatry, 56*(Suppl 1), 18-23.

Samora, J., Saunders, L., & Larson, R.F. (1961). Medical vocabulary knowledge among hospital patients. *Journal of Health and Human Behavior, 2*(2), 83-89.

Saunders. (2011). *Dorland's Illustrated Medical Dictionary.* (32nd ed.). New Delhi: Elseiver.

Sawaya, A.L., Sesso, R., Florêncio, T.M., Fernandes, M.T., & Martins, P.A. (2005). Association between chronic under-nutrition and hypertension. *Maternal & Child Nutrition, 1*(13), 155-163.

Schattner, A., Rudin, D., & Jellin, N. (2004). Good physicians from the perspective of their patients. *BMC Health Services Research, 4*, 26. doi: 10.1186/1472-6963-4-26

Schiavo, R. (2007). *Health Communication: From Theory to Practice*. SanFrancisco: JosseyBass, John Wiley & Sons.

Schneider, D.E., & Tucker, R.K. (1992). Measuring communicative satisfaction in doctor–patient relations: the Doctor-Patient Communication Inventory. *Health Communication, 4*(1), 19-28. doi: 10.1207/s15327027hc0401_2

Schofield, T. (2004). Introduction. In E. MacDonald (Ed.), *Difficult Conversations in Medicine.* Oxford: Oxford University Press.

Schroeder, K., Fahey, T., Hollinghurst, S., & Peters, T.J. (2005). Nurse-led adherence support in hypertension: a randomized controlled trial. *Family Practice, 22*(2), 144-151.

Schroeder, K., Fahey, T., & Ebrahim, S. (2004). How can we improve adherence to blood pressure-lowering medication in ambulatory care? Systematic review of randomized controlled trials. *Archives of Internal Medicine, 164*(7), 722-732.

Scotto, C.J., Waechter, D., & Rosneck, J. (2011). Factors affecting program completion in phase II cardiac rehabilitation. *Canadian Journal of Cardiovascular Nursing, 21*(2), 15-20.

Shapiro, S.M., Lancee, W.J., & Richards-Bentley, C.M. (2009). Evaluation of communication skills program for first year medical students at the University of Toronto. *BMC Medical Education, 9*(11), doi: 10.1186/1472-6920-9-11

Simpson, M., Buckman, R., Stewart, M., Maguire, P., Lipkin, M., Novack, D., et al. (1991). Doctor-patient communication: the Toronto consensus statement. *British Medical Journal, 303,* 1385-1387. doi: 10.1136/bmj.303.6814.1385

Singh, H., Arora, H.S., Vij, M.S., Rao, R., Khan, M.M., & Peterson, L.A. (2007).Communication outcomes of critical imaging results in a computerized notification system. *Journal of the American Medical Informatics Association, 14*(4), 459-66.

Smith, D.L. (1989). Compliance Packaging: a education tool. *American Pharmacy, NS29*(2), 42-53.

Smith, R.C., & Hoppe, R.B. (1991). The patient's story: integrating the patient-and-physician-centered approaches to interviewing. *Annals of Internal Medicine, 115*(6), 470-7.

Soumerai, S.B., Avorn, J., Ross-Degnan, D., & Gortmaker, S. (1987). Payment restriction for prescription drugs under Medicaid: effects on therapy, cost, and equity. *New England Journal of Medicine, 317*(9), 550-556.

Spiker, B. (1991). Methods of assessing and improving adherence in clinical trials. In J.A. Cramer & B.Spiker (Eds.), *Patient Compliance in Medical practice and Clinical Trials* (pp. 37-56). New York: Raven Press.

Staessen, J.A., Gasowski,., Wang, J,G., Thijs, L., Den Hond, E., Boissel, J.P., et al. (2000). Risks of untreated and treated isolated systolic hypertension in the elderly: meta-analysis of outcome trials. *Lancet, 355*(9207), 865-72. [Erratum in *Lancet, 357*(9257), 724].

Stewart, M., Brown, J. B., Donner, A., McWhinney, I. R., Oates, J., Weston, W. W., et al. (2000). The impact of patient-centered care on outcomes. *The Journal of Family Practice*, *49*(9), 796- 804.

Stewart, M.A. (1995). Effective physician-patient communication and health outcomes: a review. *Canadian Medical Association Journal, 152*(9), 1423-33.

Stivers, T. (2002). Presenting the problem in pediatric encounters: "symptoms only" versus "candidate diagnosis" presentations. *Health Communication, 14*(3), 299-338.

Street, R.L. (1991). Information giving in medical consultations: the influence of patients' communicative style and personal characteristics. *Social Science & Medicine, 32,* 541-548.

Suchman, A.L., Roter, D., Green, M., & Lipkin, M. Jr. (1993). Physician satisfaction with primary care office visits: collaborative study group of the American Academy on Physician and Patient. *Medical Care, 31*(12), 1083-1092.

Sugai, D.Y., Deptula, P.L., Parsa, A.A., & DonParsa, F. (2013). The importance of communication in the management of postoperative pain. *Hawaii Journal of Medicine & Public Health, 72*(6), 180-184.

Sullivan, S., Kreling, D.H., & Hazlet, T.K. (1990). Noncompliance with medication regimens and subsequent hospitalizations: a literature analysis and cost hospitalization estimate. *Journal of Research in Pharmaceutical Economics, 2*(2)*,* 19-33. doi: 10.1300/j063v02n02_03

Sun, Z., Zheng, L., Detrano, R., Zhang, X., Xu, C., Li, J., et al. (2010). Risk of progression to hypertension in rural Chinese women population with prehypertension and normal blood pressure. *American Journal of Hypertension, 23*(6), 627-632. doi: 10.1038/ajh.2010.41

Sutcliffe, K.M., Lewton, E., & Rosenthal, M.M. (2004). Communication failures: an insidious contributor to medical mishaps. *Academic Medicine: journal of the Association of American Medical Colleges, 79*(2), 186-194.

Svensson, S., Kjellgren, K.I., Ahlner, J., & Saljo, D. (2000). Reasons for adherence with anti-hypertensive medication. *International Journal of Cardiology, 76*(2-3)*, 157-163.

Swaminathan, G. (2007). Doctor-patient communication: patient perception. *Indian Journal of Psychiatry, 49*(3), 150-153.

Tapsell, L.C., Gillen, L.J., Patch, C.S., Batterham, M., Owen, A., Baré, M., et al. (2004). Including walnuts in a low-fat/modified-fat diet improves HDl cholesterol-to-total cholesterol ratios in patients with type 2 diabetes. *Diabetes Care, 27*(12), 2777-2783.

Tarnow-Mordi, W.O., Hau, C., Warden, A., & Shearer, A.J. (2000). Hospital mortality in relation to staff workload: a 4-year study in an adult intensive-care unit. *Lancet, 356*(9225), 185-189.

Textor, S.C., Schwartz, G.L., Frye, R.L. (2003). The new hypertension guidelines from JNC 7: is the devil in the details? *Mayo Clinic Proceedings, 78,* 1078-1081.

Thom, D.H., & Stanford Trust Study Physicians. (2001). Physician behaviors that predict patient trust. *The Journal of Family Practice, 50*(4), 323-328.

Thompson, C.L., & Pledger, L.M. (1993). Doctor-patient communication: is patient knowledge of medical terminology improving? *Health Communication, 5*(2), 89-97.

Thompson, D.W., & Furlan, A.J. (1996). Clinical epidemiology of stroke. *Neurologic Clinics, 14,* 309-315.

Thorson, A., & Johansson, E. (2004). Equality or equity in health care access: a qualitative study of doctors' explanations to a longer doctor's delay among female TB patients in Vietnam. *Health Policy, 68*(1), 37-46.

Tildesey, H.D., Mair, K., Sharpe, J., & Piaseczny, M. (1996). Diabetes teaching – outcome analysis. *Patient Education & Counseling, 29*(1), 59-65.

Tongue, J.R., Epps, H.R., & Forese, L.L. (2005). Communication skills for patient-centered care. *Journal of Bone & Joint Surgery, 87A*(3), 652-658.

Travaline, M.J., Ruchinskas, R., & D'Alonzo, G.E. (2005). Patient-physician communication: why and how. *The Journal of the American Osteopathic Association, 105* (1), 13-18.

Tsiantou, V., Pantzou, P., Pavi, E., Koulierakis, G., & Kyripoulos, J. (2010). Factors affecting adherence to anti-hypertensive medication in Greece: results from a qualitative study. *Patient Preference & Adherence, 4,* 335- 343.

U.S. Department of Health and Human Services. National Center for Chronic Disease and Health Promotion. (1996). Physical activity and health: a report of the Surgeon General Executive summary. Retrieved July 21, 2013 from www.cdc.gov/nccdphp/sgr/pdf/execsumm.pdf

van der Sande, M.A., Milligan, P.J., Nyan, O.A., Rowley, J.T., Banya, W.A., Ceesay, S.M., et al. (2000). Blood pressure patterns and cardiovascular risk factors in

rural and urban Gambian communities. *Journal of Human Hypertension, 14*(8), 489-496.

Van Wijk, B,L., Klungel, O.H., Heerdink, E.R., & deBoer, A. (2005). Effectiveness of interventions by community pharmacists to improve patient adherence to chronic medications: a systematic review. *The Annals of Pharmacotherapy, 39*(2), 319-328.

Vermeire, E., Hearnshaw, H., Van Royen, P., & Denekens, J. (2001). Patient adherence to treatment: three decades of research. A comprehensive review. *Journal of Clinical Pharmacy & Therapeutics, 26*(5), 331-342.

Vik, S.A., Maxwell, C.J., & Hogan, D.B. (2004). Measurement, correlated, and health outcomes of medication adherence among seniors. *The Annals of Pharmacotherapy, 38*(2), 303-312.

Vlasnik, J.J., Aliotta, S.L., & DeLor, B. (2005). Medication adherence: factors influencing compliance with prescribed medication plans. *The Case Manager, 16*(2), 47-51.

Wachira, J., Middlestadt, S., Reece, M., Peng, C.J., & Braitstein, P. (2013). Psychometric assessment of a physician-patient communication behaviors scale: the perspective of adult HIV patients in Kenya. *AIDS Research and Treatment, 2013,* Article ID 706191. doi: 10.1155/2013/706191

Waeber, B., Leonetti, G., Kolloch, R., & McInnes, G.T. (1999). Compliance with aspirin or placebo in the Hypertension Optimal Treatment (HOT) study. *Journal of Hypertension, 17*(7), 1041-1045.

Wanko, N.S., Brazier, C.W., Young-Rogers, D., Dunbar, V.G., Boyd, B., George, C.D., et al. (2004). Exercise preferences and barriers in urban African

Americans with type 2 diabetes. *Diabetes Education, 30*(3), 502-513. doi:10.1177/014572170403000322

Weinberger, M.H., Cohen, S.J., Miller, J.Z., Luft, F.C., Grim, C.E., & Fineberg, N.S. (1988). Dietary sodium restriction as adjunctive treatment of hypertension. *Journal of the American Medical Association, 259*(17), 2561–2565.

Wetzels, G.E.C., Nelemans, P., Schouten, J.S., & Prins, M.H. (2004). Facts and fiction of poor compliance as a cause of inadequate blood pressure control: a systematic review. *Journal of Hypertension, 22*(10), 1849-55.

White, T.J., Arakelian, A., & Rho, J.P. (1999). Counting the costs of drug-related adverse events. *PharmacoEconomics, 15*(5), 445-458.

Willems, S., DeMaesschakck, S., Deveugele, M., Derese, A., & De Maeseneer, J. (2005). Socio-economic status of the patient and doctor-patient communication: does it make a difference? *Patient Education and Counseling, 56*(2), 139-146.

Wilson, A., & Childs, S. (2002). The relationship between consultation length, process and outcomes in general practice: a systematic review. *The British Journal of General Practice, 52*(485), 1012-1020.

Wilson, I.B., Schoen, C., P, Neuman., Strollo, M.K., Rogers, W.H., Chang, H., et al. (2007). Physician–Patient Communication about Prescription Medication Nonadherence: A 50-State Study of America's Seniors. *Journal of General Internal Medicine, 22*(1), 6-12.

Wong, Y.S., & Lee, A. (2006). Communication skills and doctor-patient relationship. *Medical Bulletin, 11*(3), 7-9.

World Health Organization. (1993). Doctor-Patient Interaction and Communication. Retrieved January 15, 2013 from

whqlibdoc.who.int/hq/1993/WHO_MNH_PSF_93.11.pdf

World Health Organization Report. (2002). *Integrated chronic disease prevention and control.* Retrieved December 10, 2012 from

http://www.who.int/chp/about/integrated_cd/en/

World Health Organization. (2003). *Adherence to long term therapies: Evidence for action.* Retrieved Novemver 11, 2010 from

http://apps.who.int/medicinedocs/en/d/Js4883e/

World Health Organization. (2005). *Global Report: Preventing chronic diseases: A vital investment*. Retrieved September 12, 2012 from

http://www.who.int/chp/chronic_disease_report/en/

World Health Organization and World Economic Forum. (2011a). *From Burden to "Best Buys": Reducing the Economic Impact of Non-Communicable Diseases in Low- and Middle-Income Countries,* World Health Organization and World Economic Forum. Retrieved January 10, 2013 from

http://www.who.int/nmh/publications/best_buys_summary

World Health Organization. (2011b). *The Global Economic Burden of Non-communicable Diseases.* World Economic Forum and the Harvard School of Public Health. Retrieved January 15, 2012 from

www.weforum.org/EconomicsOfNCD

World Health Organization. (2013a). 10 facts on noncommunicable diseases. Retrieved December 11, 2012 from

http://www.who.int/features/factfiles/noncommunicable_diseases/en/

World Health Organization. (2013b). A Global Brief on Hypertension: Silent killer, global public health crisis. Retrieved August 15, 2013 from

http://www.who.int/cardiovascular_diseases/publications/global_brief_hyperte
nsion/en/

Wroe, A.L. (2002). Intentional and unintentional non-adherence: a study of decision making. *Journal of Behavioral Medicine, 25*(4), 355-372.

Yavagal, S.T., Amarkhed, B., Halkati, P.C., Patted, S.V., Porwal, S.C., Ambar, S., et al. (2013). Prehypertension –a hidden risk of Indian subcontinent. *Journal of Indian Medical Association, 111*(2), 118-20.

Zandbelt, L.C., Smets, E.M., Oort, F.J., Godfried, M.H., & de Haes, H.C. (2006). Patient participation in the medical specialist encounter: Does physicians' patient-centered communication matter? *Patient Education & Counseling, 65*(3)*,* 396-406.

Zolneirek, H., Kelly, B., & DiMatteo, M. R. (2009). Physician communication and patient adherence to treatment: a meta-analysis. *Medical Care, 47*(8), 826-834.

APPENDICES

HEALTH COMMUNICATION CHECKLIST
(For Patients)

Instructions: The checklist contains twelve items for which the responses have to be given in Please tick (√) the item pertaining to the issue that has been covered.

Name of Patient:

Age: Gender:

Name of Doctor:

Name of Hospital:

Did the doctor explain to you on the following aspects?

Sl.No.	Aspects	Response
1.	The present state of your health	
2.	Probable duration of your present state	
3.	Behaviour to be adopted for recovery	
4.	Medication (Timings, Dosage, Side effects)	
5.	Diet to be taken	
6.	Exercise	
7.	Other restrictions/precautions	
8.	What to do in case of emergency?	
9.	Alarming signals	
10.	The benefits of taking the medication	
11.	The benefits of following a particular diet in controlling the problem	
12.	The benefits of following the exercise routine and the way it helps in controlling the problem	

<u>ସ୍ୱାସ୍ଥ୍ୟ ସଂପ୍ରେଷରଣ ଯାଞ୍ଚସୂଚୀ</u>

ଏହି ଯାଞ୍ଚସୂଚୀରେ ସମୁଦାୟ ବାରଗୋଟି ବିଷୟରେ ଉତ୍ତର ଦେବାକୁ ପଡ଼ିବ ।

ରୋଗୀର ନାମ.. ଲିଙ୍ଗ...................

ଚିକିତ୍ସକଙ୍କ ନାମ...

ଚିକିତ୍ସାଳୟର ନାମ ....

ଡାକ୍ତର ଆପଣଙ୍କୁ ନିମ୍ନଲିଖିତ ବିଷୟରେ ଅବଗତ କରାଇଥିଲେ କି ?

କ୍ରମିକ ସଂଖ୍ୟା	ପ୍ରଶ୍ନ	ଉତ୍ତର
୧.	ଆପଣଙ୍କ ବର୍ତ୍ତମାନ ସ୍ୱାସ୍ଥ୍ୟ ଅବସ୍ଥା	
୨.	ଏ ରୋଗର ହାରାହାରି ଅବଧି	
୩.	କଣ କଲେ ରୋଗ ଆରୋଗ୍ୟ ହୋଇପାରିବ ?	
୪.	ଔଷଧ ସମୟ ମାପ, ପାର୍ଶ୍ୱପ୍ରତିକ୍ରିୟା	
୫.	ଖାଦ୍ୟ ଓ ପଥ୍ୟ	
୬.	ଶାରୀରିକ ବ୍ୟାୟାମ	
୭.	ଅନ୍ୟାନ୍ୟ ସାବଧାନତା	
୮.	ଜରୁରୀକାଳୀନ ଅବସ୍ଥାରେ କଣ କରିବେ	
୯.	ସତର୍କ ସଂକେତ	
୧୦.	ଔଷଧ ବ୍ୟବହାରର ଲାଭ	
୧୧.	ନିର୍ଦ୍ଦିଷ୍ଟ ଖାଦ୍ୟ ଖାଇବାର ଉପକାର	
୧୨.	ନିୟମିତ ବ୍ୟାୟାମର ଉପକାରିତା ଓ ଏହାର ସମସ୍ୟା ନିରାକରଣରେ ମାର୍ଗ ଦର୍ଶନ ।	

स्वास्थ्य संसूचना जाँच-सूची

[मरीज़ों के लिए]

निर्देश: इस जाँच-सूची में १२ स्थितियाँ के बारें में बताया गया हैं, जिनकी लिखित प्रतिक्रिया दी जायें. कृपया विशय से संबंधित उस स्थिति पर √ चिन्ह लगायें जिसकी जाँच की जा चुकी है.

क्या डॉक्टर ने आपसे निम्नलिखित अवस्थाओं पर बातचीत की है?

क्रमांक	अवस्थाएं	प्रतिक्रिया
1.	आपके स्वस्था की वर्तमान स्थिति	
2.	आपके वर्तमान स्थिति की संभावित अवधि	
3.	स्वास्थ लाभ के लिए अपनायी जाने वाली गतिविधि	
4.	औषधि -प्रयोग (समय, मात्रा/ खुराक, दुष्प्रभाव/साइड-एफेक्ट)	
5.	नियमित आहार	
6.	व्यायाम	
7.	अन्य प्रतिबंध तथा सावधानियाँ	
8.	आपात-कालीन स्थिति में क्या किया जाए?	
9.	सतर्क संकेत	
10.	औषधि-प्रयोग से होने वाले लाभ	
11.	स्वास्थ संबंधी समस्या को नियंत्रित करने हेतु किसी विशेष आहार-सूची के पालन से होने-वाले लाभ	
12.	किसी विशेष नित्य व्यायाम के पालन से हुए लाभ तथा स्वास्थ्य संबंधी समस्या को नियंत्रित करने में उसकी सहयोगिता	

ఆరోగ్య సంబంధిత సంవాదం చెక్లిస్ట్

(రోగుల కొరకు)

సూచనలు: ఈ చెక్లిస్ట్ 12 అంశాలను కల్గిఉన్నది. మీ సమాధానాలను (√) గుర్తు ద్వారా తెలియజేయండి.

రోగి పేరు:

వయస్సు:   జెండర్:

వైద్యుని పేరు:

వైద్యశాల పేరు:

క్రింద చెప్పిన వాటి గురించి మీకు వైద్యుడు వివరించారా?

వరుస సంఖ్య	విషయము	స్పందన
1.	మీ ఆరోగ్య ప్రస్తుత పరిస్తితి	
2.	ప్రస్తుతం మీరు ఉన్న స్తితిలో ఎంతకాలం ఉన్నారు	
3.	కోలుకోవడానికి అనుసరించ వలసిన పద్దతి	
4.	మందులు(సమయం, డోసు, దుష్ప్రభావాలు)	
5.	తీసుకోవలసిన ఆహారం	
6.	వ్యాయామం	
7.	ఇతర జాగ్రత్తలు	
8.	అత్యవసర పరిస్తితులలో ఏంచెస్తారు?	
9.	ప్రమాద సంకేతాలు	
10.	మందులు తీసుకోవడం వలన లాభాలు	
11.	ఆహారం విషయంలో జాగ్రత్తల వలన లాభాలు	
12.	సమస్య అధిగమించడం లో వ్యాయామాల వలన కలిగే లాభాలు	

HEALTH COMMUNICATION CHECKLIST
(For Doctors)

Instructions: The checklist contains 12 items for which the responses have to be given in Please tick (√) the item pertaining to the issue that has been covered.

Name of Patient:

Age: Gender:

Name of Doctor:

Name of Hospital:

Did you communicate with the patient on the following aspects?

Sl.No.	Aspects	Response
1.	The present state of the patient's health	
2.	Probable duration of the patient's present state	
3.	Behaviour to be adopted for recovery	
4.	Medication (Timings, Dosage, Side effects)	
5.	Diet to be taken	
6.	Exercise	
7.	Other restrictions/precautions	
8.	What to do in case of emergency?	
9.	Alarming signals	
10.	The benefits of taking the medication	
11.	The benefits of following a particular diet in controlling the problem	
12.	The benefits of following the exercise routine and the way it helps in controlling the problem	

University of Hyderabad
Centre for Health Psychology
HYPERTENSION COMPLIANCE SCALE

Name of the Patient: Patient ID:

Age: Gender:

Educational Qualification:

Occupation:

Name of the Hospital/ Clinic:

Instructions: The following scale aims to measure the extent to which you follow your treatment regimen in the management **of HYPERTENSION (High Blood Pressure/HBP/HTN).** Kindly read each question carefully and put a tick mark (√) in the appropriate column. Each question has five options to choose from. Each option is related to the frequency of your behaviour over a period of seven days (one week). Depending upon how often you do/ do not do something referred to the question you must choose your response.

None of the time (NT) = Not a single day in a week
Some of the time (ST) = one to two days in a week
Most of the time (MT) = three to four days in a week
All the time   (AT) = almost every day
NA/DK= not applicable/ do not know

Example: How often do you forget to carry your purse?
In case you forget your purse about one to two times in a week on an average, you need to choose 'Some of the time'. In case you always carry a credit/ debit card, then you need to choose 'Not applicable/ Don't know' option.

S.no	Item	NT	ST	MT	AT	NA/DK
1.	How often do you forget to take your medicine for high blood pressure **(HBP)?**					
2.	How often do you decide not to take your medicine?					
3.	How often do you eat salty food?					
4.	How often do you eat fast food?					
5.	How often do you add extra salt to your food?					
6.	How often do you get the next appointment before you leave the clinic?					
7.	How often do you run out of HBP medicine?					
8.	How often do you miss taking your medicine because you feel better?					
9.	How often do you miss taking your medicine because you feel sick?					
10.	How often do you take someone else's HBP medicine?					
11.	How often you just don't bother about taking your HBP medicine?					
12.	How often do you check blood pressure level?					
13.	How often do you do the prescribed exercises e.g. morning walk?					
14.	How often do you substitute your exercise with household chores/ running errands?					
15.	How often do you cut short the duration of your exercise?					

Thank you.

ହାଇଦ୍ରାବାଦ ବିଶ୍ୱବିଦ୍ୟାଳୟ
ସ୍ୱାସ୍ଥ୍ୟ ମନୋବିଜ୍ଞାନ କେନ୍ଦ୍ର
ଉଚ୍ଚ ରକ୍ତଚାପ ରୋଗୀଙ୍କର ଅଙ୍ଗୀକାର ସ୍କେଲ

ରୋଗୀର ନାମ :   ରୋଗୀର ପରିଚୟ:

ବୟସ :-   ଲିଙ୍ଗ :

ଶିକ୍ଷାଗତ ଯୋଗ୍ୟତା:-

ଚିକିତ୍ସାଳୟର ନାମ :-

ନିର୍ଦ୍ଦେଶାବଳୀ :- ନିମ୍ନଲିଖିତ ସୂଚକାଙ୍କର ଲକ୍ଷ୍ୟ ଆପଣ କେତେଦୂର ଉଚ୍ଚ ରକ୍ତଚାପ(BP/HTN) ପ୍ରକ୍ରିୟାର ନିର୍ବାରିତ ଚିକିତ୍ସା ଅବଲମ୍ବନ କରୁଛନ୍ତି । ଦୟାକରି ସତର୍କତାର ସହିତ ପ୍ରତିଟି ପ୍ରଶ୍ନକୁ ପଢ଼ନ୍ତୁ ଏବଂ ପାର୍ଶ୍ୱରେ ଥିବା ଉପଯୁକ୍ତ ସ୍ଥାନରେ ଠିକ୍ (√)ଚିହ୍ନ ଦିଅନ୍ତୁ । ପ୍ରତ୍ୟେକ ପ୍ରଶ୍ନର ୫ଗୋଟି ଉତ୍ତର ନିଷ୍କର୍ଷ ରହିଛି ଯାହା ଭିତରୁ ଆପଣଙ୍କୁ ବାଛିବାକୁ ହେବ । ପ୍ରତ୍ୟେକ ଉତ୍ତର ନିଷ୍କର୍ଷ ଆପଣଙ୍କ ସାତଦିନ (ଗୋଟିଏ ସପ୍ତାହ) ସମୟସୀମାର ନିୟମିତ ବ୍ୟବହାର ଉପରେ ସମ୍ପର୍କିତ ।

କେବେ ନୁହେଁ   –   କେବେବି ନୁହେଁ (ସପ୍ତାହରେ)
ବେଳେବେଳେ   –   ସପ୍ତାହର ଦିନେ ଦୁଇଦିନ
ଅଧିକାଂଶ ସମୟ   –   ସପ୍ତାହରେ ତିନିରୁ ଚାରିଦିନ
ପ୍ରତିଦିନ   –   ପ୍ରତିଦିନ ସପ୍ତାହରେ
ପ୍ରଯୁଜ୍ୟ ନୁହେଁ   –   ଜାଣିନାହିଁ

ଉଦାହରଣ :-ଆପଣ କେତେଥର ଆପଣଙ୍କର ମୂଣା ନେବାକୁ ଭୁଲିଯାଆନ୍ତି ।

ଯଦି ଆପଣ ନିଜର ମୂଣା ନେବାପାଇଁ ସପ୍ତାହରେ ଥରେ କିୟା ଦୁଇଥର ଭୁଲିଯାଆନ୍ତି ତାହାହେଲେ "ବେଳେବେଳେ" ଦର୍ଶାଇବେ ।
ଆପଣ ଯଦି କ୍ରେଡିଟ୍ କାର୍ଡ / ଡେବିଟ୍ କାର୍ଡ ନେବାପାଇଁ ନିଷ୍କର୍ଷ ନେଉଛନ୍ତି, ତାହାହେଲେ "ପ୍ରଯୁଜ୍ୟ ନୁହେଁ" ଦର୍ଶାଇବେ ।

କ୍ର.ନ°.	ତାଲିକାଭୁକ୍ତ	କେବେନୁହେଁ	ବେଳେବେଳେ	ଅଧିକାଂଶ ସମୟରେ	ପ୍ରତିଦିନ	ପ୍ରଯୁଜ୍ୟ ନୁହେଁ/ ଜାଣିନାହିଁ
୧.	ଉଚ୍ଚ ରକ୍ତଚାପର ଔଷଧ ସେବନ କରିବାପାଇଁ ଆପଣ କେତେଥର ଭୁଲି ଯାଆନ୍ତି ?					
୨.	ଆପଣ କେତେଥର ଆପଣଙ୍କ ଔଷଧ ସେବନ ନକରିବାପାଇଁ ନିର୍ଣ୍ଣୟ କରିଛନ୍ତି ?					
୩.	ଆପଣ କେତେଥର ଲୁଣି ଖାଦ୍ୟ ସେବନ କରନ୍ତି ?					
୪.	ଆପଣ କେତେଥର ଅଧିକ ତେଲଯୁକ୍ତ ଖାଦ୍ୟ ସେବନ କରନ୍ତି ?					
୫.	ଆପଣ କେତେଥର ଆବଶ୍ୟକତାଠାରୁ ଅଧିକ ଲୁଣି ଖାଦ୍ୟ ସେବନ କରନ୍ତି ?					
୬.	ଆପଣ କେତେବାର ଚିକିତ୍ସାଳୟ ଛାଡିବା ପୂର୍ବରୁ ସାକ୍ଷାତ ପାଇଁ ପୂର୍ବ ନିର୍ବାରିତ ବନ୍ଦୋବସ୍ତ କରିଥାନ୍ତି ?					
୭.	ଆପଣ କେତେଥର ଖାଉଥିବା ଉଚ୍ଚ ରକ୍ତଚାପ ଔଷଧର ଅଭାବ ହୋଇଥାଏ ?					
୮.	ଆପଣ କେତେଥର ସୁସ୍ଥ ଅନୁଭବ କରୁଥିବାରୁ ଔଷଧ ସେବନ କରିନାହାଁନ୍ତି ?					
୯.	ଆପଣ କେତେଥର ଶରୀର ଅସୁସ୍ଥ ଥିବା ହେତୁ ଔଷଧ ସେବନ କରିନାହାଁନ୍ତି ?					
୧୦.	ଆପଣ କେତେଥର ଅନ୍ୟବ୍ୟକ୍ତି ଖାଉଥିବା ଉଚ୍ଚ ରକ୍ତଚାପ ଔଷଧ ସେବନ କରିଛନ୍ତି ?					
୧୧.	ଆପଣ କେତେଥର ଖାମଖିଆଲି ଭାବରେ ଉଚ୍ଚ ରକ୍ତଚାପ ଔଷଧ ସେବନ କରିନାହାଁନ୍ତି ?					
୧୨.	ଆପଣ କେତେଥର ଉଚ୍ଚ ରକ୍ତଚାପ ଅନୁପାତକୁ ଯାଞ୍ଚ କରନ୍ତି ?					
୧୩.	ଆପଣ କେତେଥର ପରାମର୍ଶ ଅନୁଯାୟୀ ବ୍ୟାୟାମ କରନ୍ତି । (ଉଦାହରଣ: ପ୍ରାତଃ ଭ୍ରମଣ)					
୧୪.	ଆପଣ କେତେଥର ଘରୋଇ କାର୍ଯ୍ୟକୁ ବ୍ୟାୟାମ ଭାବରେ ଗ୍ରହଣ କରନ୍ତି ।					
୧୫.	ଆପଣ କେତେଥର ଆପଣଙ୍କର ବ୍ୟାୟାମର ସମୟ ସୀମାକୁ ହ୍ରାସ କରନ୍ତି ।					

ଧନ୍ୟବାଦ୍ !

కేంద్రియ విశ్వవిద్యాలయం

మనోవిజ్ఞాన శాస్త్రం
రక్తపోటు సమ్మతి

రోగి పేరు : .... వయస్సు : ....

విద్య అర్హతలు : .... వృత్తి : ....

ఆసుపత్రి పేరు : .... రోగి గుర్తింపు కార్డు : ....

లింగం / పురుషు / స్త్రీ : ....

సూచనలు : ఈ క్రింది ఇచ్చిన సూచనలను పాటించండి. ఈ క్రింది ఇచ్చిన సూచనలు హెచ్.బి.పి. ట్రీట్మెంట్ కోలవడం గురించి సూచించడం జరుగుతుంది. దిగువ ఇచ్చిన సూచనలను జాగ్రతగ చదవి మార్క్ చేయండి ( ) ఇచ్చిన స్థలములో ప్రతి ప్రశ్న 5 ఎంపికలో కలిగి ఉంటుంది. ప్రతి ప్రశ్న ని యొక్క ప్రవర్తన వారం రోజుల్లో ఎలా ఉంటుందో తెలుపుతుంది.

ఉదహరణ : నీవు ఎలా తరుచుగా నీ యొక్క పర్స్ తీసుకోకుండా ఎలా మరిచపోతావు ? ఒక వేళ పర్సు తీసుకోపోవజం మరిచి పోయావు ఒక సాం, లేదా రెండు సార్లు వారంలో అప్పుడు నీవు ఇంకో సమయాన్ని ఎంచుకోవాలి. ఒక వేళా ఎప్పుడు క్రెడిట్ , డెబిట్ కార్డు తీసుక వస్తే అప్పుడు ఇలా రాయాలి సంబందం లేదు / నాకు తెలియదు.

NT = వారంలో ఒక రోజు కుడా లేదు.

ST = వారంలో 2, లేదా మూడు రోజులు

MT = వారంలో 3, నుండి 4 రోజులు

AT = వారంలో ప్రతి రోజు

NA/ DK = సంబందం లేదు / నాకు తెలియదు.

క్రమ సంఖ్య	వస్తువు	NT	ST	MT	AT	NA/ DK
1)	ఎంత తరుచుగా మీరు హెచ్.బి.పి. కోసం మందులు తీసుకోవడానికి మరిచిపోతారు ?					
2)	ఎంత తరుచుగా మీరు మందులు తీసుకోవడానికి నిరాకరిస్తారు.					
3)	ఎంత తరుచుగా ఉప్ప ఆహరం తీసుకుంటారు ?					
4)	ఎంత తరుచగా ఫాస్ట్ఫుడ్ తీసుకుంటారు ?					
5)	ఎంత తరుచుగా మీ ఆహరంలో అదనపు ఉప్ప తీసుకుంటున్నారు?					
6)	ఎంత తరుచుగా మీరు తరువాత అపాయంట్మెంట్ దోరుకుతుంది. (ఒకసారి తీసుకున్నప్పుడు తర్వత ఎన్ని రోజులు పడుతుంది. మరల క్లీనిక్ వెళ్లడానికి)?					
7)	ఎంత తరుచుగా మీ హెచ్. బి. పి. ఔషదం అయిపోతుంది.					
8)	ఆరోగ్యం మంచిగ అవడం వలన ఎంత తరుచుగా ఔషదం తీసుకోవడం తప్పిస్తున్నారు ?					
9)	మీరు జబ్బు పడినట్లు బావించినప్పుడు ఎంత తరుచుగా మందులు తీసుకోవడం తప్పిస్తున్నారు?					
10)	ఎంత తరుచుగా మీరు మదాకరి ఎ.బి.పి. మందులు తీసుకుంటారు ?					
11)	ఎంత తరుచుగా మీకు కేవలం మీ హెచ్.బి.పి. మందులు తీసుకోడం గురించి ఇబ్బంది లేదు?					
12)	ఎంత తరుచుగా మీరు బి.పి. స్థాని చెక్ చేయించుకుంటున్నారు?					
13)	ఎంత తరుచుగా మీరు సూచించిన వ్యాయామాలు చేస్తున్నారు ఉదయాన్నె ?					
14)	ఎంత తరుచుగా మీరు మీ ఇంటి పనులకు మీ వ్యాయమంకు ప్రత్యేమ్నంగా ఉందా ?					
15)	ఎంత తరుచుగా మీ యొక్క వ్యయమం సమం తగ్గిస్తారు ?					

Doctor's Disease Prognosis Rating Scale (DoDPRS)

(For Doctors)

Instructions: The rating scale requires information to be filled regarding the prognosis of the patients based on the Blood Pressure (BP) reading of the patient. The BP reading will be taken twice during the course of study, once at the time of recruitment (Date 1) and second at the end of six weeks (Date 2). On the basis of the BP readings on both the dates, please rate the prognosis of the patient on a 3-point scale. If the patient's BP level has risen up, then the prognosis is marked as 1, if it has remained the same over the six weeks, it is rated as 2 and if the BP level has improved, the prognosis is marked as 3.

Name of the patient:

Name of the doctor:

Hospital:

	Date 1	Date 2
Blood Pressure Reading		

Good Prognosis	Status Quo	Bad Prognosis
3	2	1

Doctor-Patient Communication Quality Scores: Similarity Index

Let x_i be the score of a patient for i^{th} item and is assigned 1 if the patient's response is 'yes', otherwise its 0. In other words, the score of the patient is 1, if he/she has checked the item on the Health Communication Checklist (HCC) and its 0, if the item has not been checked. Similarly, let y_i be the score of the doctor for the ith item for the same patient. It is assigned as '1' if the doctor has checked that particular item for the same patient and is assigned '0' if the doctor has not checked the item on the HCC.

Let 'd' be the number of items (d = 12). Then the product $x_i\, y_i$ will be equal to 1 if and only if, the patient and doctor both have checked that particular item on HCC. The value of this product indicated the Total Agreement (TA) between the doctor's and the patient's response. So the TA between the patient and the doctor was arrived at by the following expression,

$$TA = \sum_{i=1}^{d} x_i y_i$$

The next step was to find out the magnitude of the patient's and doctor's response with respect to a particular item on the HCC. The magnitude of the patient's response (M_P) was represented by $\sqrt{\sum x_i^2}$. Thus,

$$M_P = \sqrt{\sum X_I^2}$$

Similarly, the magnitude of the doctor's response (M_D) was indicated by $\sqrt{\sum y_i^2}$. Thus,

$$M_D = \sqrt{\sum y_I{}^2}$$

Based on the above expressions, regarding the TA and the magnitude of the patient's and the doctor's response, the value of SI was arrived at with the following expression,

$$SI = \frac{\sum_{i=1}^{d} x_i y_i}{\sqrt{\sum_{i=1}^{d} x_i{}^2 \sum_{i=1}^{d} y_i{}^2}}$$

The value of this SI ranged between 0 and 1. If the value of SI was closer to 1, it indicated a better agreement between the doctor and the patient.

Prof. Meena Hariharan

Centre for Health Psychology
University of Hyderabad
Prof. C. R. Rao Road, Gachibowli
Hyderabad- 500 046

To

Dear Sir/ Madam

Ms. Sunayana Swain is pursuing PhD from the Centre for Health Psychology, on the topic *"Health Communication between Doctors and Patients: Impact on Patient Adherence and Disease Prognosis"*, under my supervision. With regard to the PhD programme, she has to collect data for her pilot study and main research study. The study requires to interview patients [with hypertension] and cardiologists of your institution. The study will span over a period of one year [including pilot study and the main study]. The data collected will be kept confidential and will be used purely for research purposes. I request you to grant permission to Ms. Sunayana Swain to collect data from your institution.

I may add that Ms. Sunayana is a Health Psychologist and during the process of her research in your institution, if required you may use her services for providing therapeutic intervention to patients.

Thanking you.

Yours sincerely

Meena Hariharan

University of Hyderabad
Centre for Health Psychology

Health Communication between Doctors and Patients: Impact on Patient Adherence and Disease Prognosis

Informed Consent Form (for Doctors)

I, Sunayana Swain, Research Scholar (PhD), Centre for Health Psychology, University of Hyderabad, am conducting research on Health Communication between doctors and patients and its impact on patient adherence and disease prognosis in cardiac patients. The study is going to spread over a period of two months.

Why are you approached to be a Participant in the study?

Since you are a qualified General Physician/Cardiologist and treating patients having Primary Hypertension (HTN), I seek your willingness to participate in the research as a volunteer. Please read the details relating to the study carefully. In case you have any questions please feel free to get all your queries answered by the person who has given you this form. After understanding the whole study if you are convinced to participate in the study, you may sign the consent form.

Purpose of the Study:

The purpose of the study is to study the impact of health communication between doctors and patients on treatment adherence on the part of patients and prognosis of the disease.

What do you have to do to participate in the study?

In case you give your consent to participate in the study as a voluntary subject, you will be asked to answer a checklist wherein you have to mark against the topics/issues which was discussed between you and every individual patient. You will also have to rate the patient's prognosis on the basis of the information provided in the medical examination record that would be available with the researcher. The rating would be done twice in the course of the study, once at the initial point of the research i.e. at the time of recruitment and second at the time of termination point i.e. at the end of six weeks.

Do you have to change the medical advice/ treatment?
No. You need not. You should continue your regular treatment plan.

Will you be paid for participation in the study?

No. Your participation in the study will be voluntary and no payments will be made for enrolling yourself in the study.

Can you leave the study in the middle?

Yes. It is your prerogative to drop out of the study any time you wish without explaining any reason.

Additional activities as a participant:

Your permission is required:

1. To allow the Investigator in your consultation chamber to observe and record (on paper) the Health Communication Checklist.

2. To access the medical records of your patients to record the readings of Blood Pressure.

3. To collect data for the study by interviewing your patients for studying the health communication between you and your patient.

In case you have any further queries regarding the study you may contact the researcher Ms. Sunayana Swain through phone (Mobile no:------------------) or through email   ……..@gmail.com

If you are satisfied with the information you may please sign the consent form.

Health Communication between Doctors and Patients: Impact on Patient Adherence and Disease Prognosis

This is to state that I have read the information sheet carefully and understood the details of the study. I have been given ample time by the researcher to clarify my doubts and understand the procedure of the study and my role and extent of participation. I give my consent to participate in the research study titled "**Health Communication between Doctors and Patients: Impact on Patient Adherence and Disease Prognosis"** conducted by Ms. Sunayana Swain, Centre for Health Psychology, University of Hyderabad, Hyderabad 500046.

1. I give my consent for the Investigator to be present in the consultation chamber to observe the interaction with the patient.

2. I give my consent to answer the checklist provided by the researcher.

3. I give my consent for rating the prognosis of the disease of the patient on the basis of medical examination record as provided by the researcher.

4. I give my consent to allow the Investigator to access the medical records of the patients.

5. I also give my consent for the Investigator to interview the patients.

Name of the Subject:

Address:

Signature of the Subject

Phone no:
Email id:

University of Hyderabad
Centre for Health Psychology
**Health Communication between Doctors& Patients: Impact on Patient Adherence &
Disease Prognosis**

Informed Consent Form (For Patients)

I, Sunayana Swain, Research Scholar (PhD), Centre for Health Psychology, University of
Hyderabad, am conducting research on Health Communication between doctors and patients
and its impact on patient adherence and disease prognosis. The study is going to spread over a
period of two months.

Why are you approached to be a Participant in the study?
Since you have been diagnosed as having Primary Hypertension (HTN), I seek your
willingness to participate in the research as a volunteer. Please read the details relating to the
study carefully. In case you have any questions please feel free to get all your queries
answered by the person who has given you this form. After understanding the whole study if
you are convinced to participate in the study, you may sign the consent form.

Purpose of the Study:
The purpose of the study is to find out the influence of the clarity in doctor-patient
communication on patients' sticking to the medical advice and on the care/control of
Hypertension.

Role of the Participants:

In case you give your consent to participate in the study, you will be administered a checklist
pertaining to various topics that were covered during your consultation with the doctor.

1. **Measuring and Recording of Blood Pressure**
   After you give your consent to participate in the study, your medical records will be
   accessed by the Investigator to record your readings of Blood Pressure as measured by the
   medical professional of the hospital. This will be done twice i.e. once immediately after
   you give your consent to participate in the study and then after a gap of six weeks.

2. **Do you have to stop any of your prescribed medicines?**
   No. You **need not stop** any medicines you have been taking for your Blood Pressure.
   You can continue with your prescription.

3. **Will you be paid for participation in the study?**
   No. Your participation in the study will be voluntary and no payments will be made
   for enrolling yourself in the study.

4. Can you leave the study in the middle?

Yes. It is your prerogative to drop out of the study any time you wish without explaining or giving any reason.

5. In what way the study will benefit you?

The study may not have any direct benefits. However, on the basis of the outcome of the study, efforts can be made to improve the communication between the doctors and patients (if there are any gaps), which would lead to better treatment in terms of following the treatment regimen and improved outcome.

In case you have any further queries regarding the study you may contact the researcher Ms. Sunayana Swain through phone (Mobile no: +91 --------------) or through email----------@gmail.com

If you are satisfied with the information you may please sign the consent form.

University of Hyderabad
Centre for Health Psychology
Health Communication between Doctors and Patients: Impact on Patient Adherence
and Disease Prognosis

This is to state that I have read the information sheet carefully and understood the details of the study. I have been given ample time by the researcher to clarify my doubts and understand the procedure of the study and my role and extent of participation. I give my consent to participate in the research study tiltled "**Health Communication between Doctors and Patients: Impact on Patient Adherence and Disease Prognosis"** conducted by Ms. Sunayana Swain, Centre for Health Psychology, University of Hyderabad, Hyderabad 500046.

1. I give my consent for the Investigator to be present in the doctor's chamber during my consultation with the doctor.
2. I give my consent for recording of my Blood Pressure as measured by the doctor.
3. I am also willing to answer to the checklist and the also the questions relating to my medication taking behaviour, and lifestyle pattern relating to diet, exercise, and monitoring my health check-ups.

Name of the Subject:

Signature of the Subject

Address:

Phone no:
Email id:

ହାଇଦ୍ରାବାଦ୍ ବିଶ୍ୱବିଦ୍ୟାଲୟ

ସ୍ୱାସ୍ଥ୍ୟ ମନୋବିଜ୍ଞାନ କେନ୍ଦ୍ର

"ଚିକିସ୍ତକ ଓ ରୋଗୀ ମଧ୍ୟରେ ସ୍ୱାସ୍ଥ୍ୟ ସଂପ୍ରେଷଣ ରୋଗୀଙ୍କ ଅନୁପାଳନ : ରୋଗୀଙ୍କର ଅନୁପାଳନ ଓ ରୋଗ ନିଦାନ ଉପରେ ଏହାର ପ୍ରଭାବ ।"

ସହମତି ପତ୍ର (ରୋଗୀ ନିମିତ୍ତ)

ମୁଁ ସୁନୟନା ସ୍ୱାଇଁ, ଶୋଧାର୍ଥୀ, ସ୍ୱାସ୍ଥ୍ୟ ମନୋବିଜ୍ଞାନ କେନ୍ଦ୍ର, ହାଇଦ୍ରାବାଦ୍ ବିଶ୍ୱବିଦ୍ୟାଲୟ "ଚିକିସ୍ତକ ଓ ରୋଗୀ ମଧ୍ୟରେ ସ୍ୱାସ୍ଥ୍ୟ ସଂପ୍ରେଷଣ ରୋଗୀଙ୍କ ଅନୁପାଳନ ଓ ରୋଗୀ ନିଦାନ ଉପରେ ଏହାର ପ୍ରଭାବ" ବିଷୟରେ ଏକ ଗବେଷଣା କରୁଛି ।

କାହିଁକି ଏହି ଅଧ୍ୟୟନରେ ଆପଣଙ୍କୁ ଅନ୍ତର୍ଭୁକ୍ତ କରାଯାଇଅଛି

ଯେହେତୁ ଆପଣଙ୍କୁ "ଉଚ୍ଚରକ୍ତ ଚାପ ରୋଗ" ଥିବାର ନିର୍ଣ୍ଣୟ କରାଯାଇଛି । ତେଣୁ ଏହି ଅଧ୍ୟୟନରେ ଆପଣ ଯୋଗଦାନ ନିମନ୍ତେ ମୁଁ ଆପଣଙ୍କର ସହମତି ପାଇଁ ଅନୁରୋଧ କରୁଛି । ଦୟାପୂର୍ବକ ଏହା ଅଧ୍ୟୟନ କରନ୍ତୁ ଓ ବିଷଦ୍ ଭାବରେ ବୁଝିବା ପାଇଁ ଚେଷ୍ଟା କରନ୍ତୁ । ଏଥ ସମ୍ବନ୍ଧୀୟ ଯେ କୌଣସି ସନ୍ଦେହ ମୋଚନ ପାଇଁ ପ୍ରଶ୍ନ ପଚାରି ପାରନ୍ତି । ସମସ୍ତ ବିଷୟ ଭଲଭାବରେ ବୁଝିବା ପରେ ଆପଣ ଏହି ଅଧ୍ୟୟନରେ ଯୋଗଦାନ ପାଇଁ ସହମତି ପତ୍ରରେ ଦସ୍ତଖତ କରି ପାରନ୍ତି ।

ଅଧ୍ୟୟନର ଉଦ୍ଦେଶ୍ୟ :

ଏହି ଅଧ୍ୟୟନର ମୂଳ ଉଦ୍ଦେଶ୍ୟ ହେଉଛି ଚିକିସ୍ତକ ଓ ରୋଗୀ ସଂପ୍ରେଷଣ ଓ ରୋଗ ସମ୍ବନ୍ଧୀୟ ଉପଯୁକ୍ତ ଉପଦେଶ ରୋଗୀ ପାଳନ କଲେ କଣ ଉପକାର ମିଳିଥାଏ ।

ଆପଣଙ୍କର ଭୂମିକା :

ଆପଣ ଯଦି ସହମତି ପ୍ରଦାନ କରୁଛନ୍ତି ତେବେ ଆପଣଙ୍କ ଚିକିସ୍ତା ସମୟରେ "ଯାଞ୍ଚପତ୍ର" ପ୍ରଦାନ କରାଯିବ ।

୧. "ରକ୍ତଚାପ ମାପ" କରିବା ପାଇଁ ଚିକିତ୍ସକଙ୍କୁ ସହମତି ପ୍ରଦାନ କରୁଅଛି ।

୨. ଆପଣ ବ୍ୟବହାର କରୁଥିବା ଔଷଧ ବନ୍ଦ କରିବାକୁ ହେବ ?

   –ନା, ଆପଣ ଖାଉଥିବା ସମସ୍ତ ଔଷଧ ବନ୍ଦ କରିବା ଆବଶ୍ୟକ ନାହିଁ ।

୩. ଆପଣ ଏହି ଅଧ୍ୟୟନ ଯୋଗଦାନ କଲେ କୌଣସି ପ୍ରାପ୍ୟ ଦିଆଯିବ କି ?

   – ନା , କୌଣସି ପ୍ରକାର ପ୍ରାପ୍ୟ ଦିଆହେବ ନାହିଁ । ଆପଣଙ୍କର ଯୋଗଦାନ ସମ୍ପୂର୍ଣ୍ଣ ସ୍ୱେଚ୍ଛାକୃତ ।

୪. ଆପଣ କଣ ଅଧ୍ୟୟନ ମଧ୍ୟ ଛାଡ଼ି ଦେଇ ପାରିବେ ?

   – ଯେ କୌଣସି ସମୟରେ ଅଧ୍ୟୟନ ଛାଡ଼ିବା ଆପଣଙ୍କର ନିଜସ୍ୱ କ୍ଷମତା ।

୫. ଏହି ଅଧ୍ୟୟନ କିଉଳି ଆପଣଙ୍କର ଉପକାର କରିବ ?

   – ଏହା ପ୍ରତ୍ୟକ୍ଷ ଭାବରେ ଲାଭଦାୟକ ନ ହୋଇପାରେ କିନ୍ତୁ ଏହା ଚିକିତ୍ସକ ଓ ରୋଗୀ ମଧ୍ୟରେ ସଂପ୍ରେଷଣରେ କୌଣସି ଅଭାବ ରହୁଥିଲେ ତାହା ଦୂର କରିପାରିବ, ତା ଦ୍ୱାରା ଚିକିତ୍ସାରେ ଉନ୍ନତି ପରିଲକ୍ଷିତ ହେବ ।

   ଯଦି ଆପଣଙ୍କର କୌଣସି ପ୍ରଶ୍ନ ଥାଏ ତେବେ ଆପଣ ସୁନୟନା ସ୍ୱାଇଁଙ୍କୁ ମୋବାଇଲ ନଂ............................) ସମ୍ପର୍କ କରିପାରିବେ ।

   ଯଦି ଆପଣ ସନ୍ତୁଷ୍ଟ ତେବେ ସହମତି ପତ୍ରରେ ଦସ୍ତଖତ କରିପାରନ୍ତି ।

"ଚିକିତ୍ସକ ଓ ରୋଗୀ ମଧ୍ୟରେ ସ୍ୱାସ୍ଥ୍ୟ ସଂପ୍ରେଷଣ ରୋଗୀଙ୍କ ଅନୁପାଳନ ଓ ରୋଗ ନିଦାନ ଉପରେ ପ୍ରଭାବ –"

ମୁଁ ଏତଦ୍ଦ୍ୱାରା ପ୍ରକାଶ କରୁଛି ଯେ ମୁଁ ସମସ୍ତ ବିବରଣୀ ପଢ଼ିଅଛି ଓ ପୁଙ୍ଖାନୁପୁଙ୍ଖ ଭାବରେ ବୁଝିଅଛି । ଏଥ ପାଇଁ ଶୋଧାର୍ଥୀ ମୋତେ ଯଥେଷ୍ଟ ସମୟ ପ୍ରଦାନ କରିଅଛନ୍ତି । ସୁନୟନା ସ୍ୱାଇଁ, ଶୋଧାର୍ଥୀ, ସ୍ୱାସ୍ଥ୍ୟ ମନୋବିଜ୍ଞାନ କେନ୍ଦ୍ର ହାଇଦ୍ରାବାଦ୍ ବିଶ୍ୱବିଦ୍ୟାଳୟରେ ଗବେଷଣା କରୁଥିବା ଅଧ୍ୟୟନ ପାଇଁ ମୋର ସହମତି ପ୍ରଦାନ କରୁଛି ଯେଉଁ ଅଧ୍ୟୟନର ନାମ "ଚିକିତ୍ସକ ଓ ରୋଗୀ ମଧ୍ୟରେ ସଂପ୍ରେଷଣ : ରୋଗୀ ଅନୁପାଳନ ଓ ରୋଗ ନିଦାନ ଉପରେ ପ୍ରଭାବ" ।

୧. ଶୋଧାର୍ଥୀଙ୍କୁ ସହମତି ପ୍ରଦାନ କରୁଛି ଯେ ସେ ଚିକିତ୍ସକ ପରାମର୍ଶ ସମୟରେ ସେ ଉପସ୍ଥିତ ରହିପାରିବେ ।

୨. ମୋର ରକ୍ତ ଚାପ ମାପିବା ପାଇଁ ସହମତି ପ୍ରଦାନ କରୁଛି ।

୩. ମୋର ଜୀବନଶୈଳୀ, ଖାଉଥିବା ଔଷଧ, ଖାଦ୍ୟାଭ୍ୟାସ, ବ୍ୟାୟାମ ଇତ୍ୟାଦି ପ୍ରଶ୍ନ ଯାଞ୍ଚ ସୂଚୀ ଅନୁସାରେ ମୁଁ ଉତ୍ତର ଦେବାପାଇଁ ସହମତି ପ୍ରଦାନ କରୁଛି ।

ନାମ.. ସ୍ୱାକ୍ଷର

ଠିକଣା: ....

....

....

ଫୋନ୍ ନଂ: ....

ଇମେଲ: ....

हैदराबाद विश्वविद्यालया

स्वास्थ्य मनोविज्ञान केन्द्र

चिकित्सक और मरीज़ के बीच स्वास्थ्य संप्रेषण: मरीज़ अनुपालन और रोग निदान पर प्रभाव

विषय सूचित सहमति पत्र (रोगी के लिए)

मैं, *सुनयना स्वैन, शोधार्थी (पि.एच.डी.) स्वास्थ्य मनोविज्ञान केन्द्र, हैदराबाद विश्वविद्यालया, चिकित्सक और मरीज़ों के बीच स्वास्थ्य संप्रेषण और अनुपालन और रोग निदान पर इसका प्रभाव पर,* एक शोध कर रही हूँ. यह अध्ययन लगभग दो महीने में पूर्ण होगा.

आपको क्यों अध्ययन में सम्मिलित होने के लिए कहा जा रहा है?

चूँकि आपको उच्च रक्त चाप का मरीज़ पाया गया है, मैं शोध में आपके स्वैच्छिक रूप में प्रतिभागिता की अनुमति चाहती हूँ. कृपया अध्ययन से संबंधित सामग्री को ध्यानपूर्वक पढ़ें. यदि कोई प्रश्न है तो, जिसने आपको यह

फॉर्म दिया है उससे सभी शंकाओं का उत्तर नि:संकोच पा सकते हैं. यदि आप अध्ययन में प्रतिभागिता के लिए सहमत हैं तो आप सहमति पत्र भर सटे हैं.

- **अध्ययन का उद्देश्य:**

इस अध्ययन का उद्देश्य, मरीज़ के चिकित्सकीय सलाह के अनुपालन और उच्च रक्त चाप का ध्यान रखने/ नियंत्रण रखने में चिकित्सक-मरीज़ संप्रेषण में स्पष्टता के प्रभाव को खोजना है.

आपकी सहमति देने के बाद आपसे उच्च रक्त चाप से सम्बंधित कुछ निश्चित शब्दों के अर्थ पूछे जाएँगे और आपके और आपके चिकित्सक के बीच संप्रेषण से संबंधित कुछ निश्चित प्रश्न पूछे जाएँगे. आपके उत्तरों की ऑडियो रिकॉर्डिंग की जाएगी और कागज पर दर्ज किया जाएगा.

1. **रक्त चाप का मापन और रिकॉर्डिंग:**

अध्ययन में सम्मिलित होने की सहमति देने के बाद आपका वह चिकित्सकिय रिकॉर्ड जिसमें आपका रक्त चाप, के माप हैं जो जाँचकर्ता के द्वारा देखा जाएगा. यह माप अस्पताल के चिकित्सकिया पेशवरों के द्वारा मापा गया होगा.

2. **क्या आप जिन दवाओं को ले रहे हैं उसमे से किसी को बन्द करनी होगी?**

नही. आपको रक्त चाप के लिए ली जाने वाली दवाओं के साथ ही किसी भी अन्य दावा को बन्द करने की ज़रूरत नही है. आप उन्हे जारी रख सकते है.

3. **क्या आपको अध्ययन में सम्मिलित होने के लिए भुगतान किया जाएगा?**

नही. आधाययन में आपकी प्रतिभागिता स्वैच्छिक होगी और अध्ययन में अपने आप को नामांकित करने के लिए आपको कोई भुगतान नही दिया जाएगा.

4. **क्या आप अध्ययन को बीच में ही छोड़ सकते हैं?**

हाँ. बिना कोई कारण बताए अध्ययन को बीच में ही छोड़ने की आपको सुविधा होगी.

5. **अध्ययन आपको किस रूप में लाभ पहुँचाएगा?**

इससे आपको प्रत्यक्ष फायेदा या लाभ हो ये जरूरी नही है, हालांकि अध्ययन के परिणामों के फलस्वरूप चिकित्सक और मरीज़ों के बीच (यदि कोई अन्तराल है तो) संप्रेषण में सुधार के लिए प्रयास किए जा सकते हैं, जो की अच्छे इलाज और बेहतर परिणामों की ओर ले जा सकता है.

यदि आपको अध्ययन सम्बंधी कोई और प्रश्न है तो आप शोधार्थी सुश्री सुनयना स्वेन को फोन (+91 ------------------) या ई-मेल (-----------------@gmail.com) पर समर्क कर सकते हैं यदि आप सूचनाओं से संतुष्ट हैं तो कृपया सहमति पत्र पर हस्ताक्षर कर सकते हैं.

<div align="center">

हैदराबाद विश्वविद्यालया

स्वास्थ्य मनोविज्ञान केन्द्र

"चिकित्सक और मरीज़ के बीच स्वास्थ्य संप्रेषण: मरीज़ अनुपालन और रोग निदान पर प्रभाव"

</div>

सूचना पत्र को मैने ध्यानपूर्वक पढ़ा है और अध्ययन के सभी पक्षों को समझ लिया है. शोधार्थी द्वारा मेरी शंकाओं को दूर करने के लिए पर्याप्त समय दिया गया हैं और मैने अध्ययन की प्रक्रिया, मेरी भूमिका और प्रतिभागिता की सीमा को साँझ लिया है.

"चिकित्सक और मरीज़ के बीच स्वास्थ्य संप्रेषण: हृदय रोगी में मरीज़ अनुपालन और रोग निदान पर प्रभाव- एक जैवमनोसामाजिक विश्लेषण" शीर्षकशोधअध्ययन में अपनी प्रतिभागिता की सहमति देदी है जो की सुश्री सुनयना स्वेन, स्वास्थ्य मनोविज्ञान केन्द्र, हैदराबाद विश्वविद्यालया, हैदराबाद-५०००४६, द्वारा किया जा रहा है.

1. मेरे चिकित्सक से परामर्श के दौरान चिकित्सक के दफ्तर में जाँचकर्ता के उपस्थित रहने के लिए सहमति देता /देती हूँ.
2. अपने रक्त चाप को मापने (चिकित्सक द्वारा) की सहमति देता/ देती हूँ और शोधार्थी द्वारा रिकार्ड करने के लिए सहमति देता /देती हूँ.
3. में जाँचकर्ता के सवालों (स्वास्थ्य से संबंधित) के जवाब देने की सहमति देता /देती हूँ.

विषय/ मरीज़ का नाम: विषय/मरीज़ का हस्ताक्षर

पता:

फोन नंबर:

ई-मेल:

HEALTH COMMUNICATION CHECKLIST

Item statistics of Health Communication Checklist (HCC)

S.No	Item	Scale Mean if Item deleted	Scale Variance if item is deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	The present state of the patient's health	22.28	5.716	.800	.717
2	Probable duration of the patient's present state	22.28	5.716	.800	.717
3	Behaviour to be adopted for recovery	22.26	5.911	.846	.725
4	Medication (Timings, Dosage, Side effects)	22.26	6.400	.129	.753
5	Diet to be taken	22.26	6.400	.129	.753
6	Exercise	22.30	6.255	.167	.752
7	Other restrictions/precautions	22.28	6.287	.187	.751
8	What to do in case of emergency?	22.26	5.911	.846	.725
9	Alarming signals	22.26	5.911	.846	.725
10	The benefits of taking the medication	22.26	5.911	.846	.725
11	The benefits of following a particular diet in controlling the problem	22.26	5.911	.846	.725
12	The benefits of following the exercise routine and the way it helps in controlling the problem	22.30	5.684	.674	.718

HYPERTENSION COMPLIANCE SCALE

Item statistics of Hypertension Compliance Scale

S.No	Item	Scale Mean if Item deleted	Scale Variance if item is deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	How often do you forget to take your medicine for high blood pressure (HBP)?	43.62	29.83	.279	.658
2	How often do you decide not to take your medicine?	43.52	28.70	.342	.649
3	How often do you eat salty food?	44.02	29.69	.224	.665
4	How often do you eat fast food?	43.50	30.46	.301	.658
5	How often do you add extra salt to your food?	43.48	29.60	.270	.659
6	How often do you get the next appointment before you leave the clinic?	45.18	26.72	.275	.667
7	How often do you run out of HBP medicine?	43.60	27.10	.488	.627
8	How often do you miss taking your medicine because you feel better?	43.42	28.86	.429	.642
9	How often do you miss taking your medicine because you feel sick?	43.44	28.90	.313	.653
10	How often do you take someone else's HBP medicine?	43.46	27.85	.300	.656
11	How often you just don't bother about taking your HBP medicine?	43.60	25.76	.545	.614
12	How often do you check blood pressure level?	44.62	30.44	.175	.671
13	How often do you do the prescribed exercises e.g. morning walk?	44.80	31.63	.124	.673
14	How often do you substitute your exercise with household chores/ running errands?	44.46	32.17	.055	.679
15	How often do you cut short the duration of your exercise?	44.40	31.55	.099	.677