

Minimising Reproductive Health Risk Behaviour in Adolescent Girls: Efficacy of an Integrated Psychosocial Intervention Model

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by

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DECLARATION

I, Aarti. N. Nagpal, hereby declare that this thesis entitled “*Minimising Reproductive Health Risk Behaviour in Adolescent Girls: Efficacy of an Integrated Psychosocial Intervention Model*”, submitted by me under the guidance and supervision of Dr. N.D.S. Naga Seema, Assistant Professor is a bonafied research work which is also free from plagiarism. I also declare that it has not been submitted previously, in part or in full, to this University or any other University or Institution for the award of any degree or diploma.

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CERTIFICATE

This is to certify that the thesis entitled, “*Minimising Reproductive Health Risk Behaviour in Adolescent Girls: Efficacy of an Integrated Psychosocial Intervention Model*”, submitted by Aarti. N. Nagpal, Research Fellow, ICSSR, bearing Registration No.: 15CPPH01 in partial fulfilment of the requirements for the award of Doctor of Philosophy in Psychology in the Centre for Health Psychology, School of Medical Sciences is a bonafide work carried out by her under my supervision and guidance.

This thesis is free from plagiarism and has not been submitted previously in part or in full, to this University or any other University or institution for the award of any degree or diploma.

Further, the student has the following publications before submission of the thesis for adjudication and has produced evidence for the same in the form of reprint in the relevant area of her research.

1. Nagpal, A. N., & Padhy, M. (2015). Dynamics of perception of illness along time among hypertensive patients: Influence on well-being. *Indian Journal of Health and Wellbeing*, 6(9).
2. Seema, N. N., Nagpal, A. N., & Shravanti, G. B. (2017). Impact of obesity on stress in women during first trimester. *Indian Journal of Health and Wellbeing*, 8(11), 1397-1400.
3. Nagpal, A. N., Rajendran, A., Hariharan, M., Seema, N. D. S., & Rao, C. R. (2017). Conceptualizing HIV/AIDS: Developmental Trend in School Children. *IOSR Journal of Nursing and Health Science*, 6(6), 74-81.

and has made presentations in the following seminars and conferences.

1. “Thematic Exploration of Reproductive Health behaviours of Indian Adolescent Girls” in 4th International Congress of Clinical and Health Psychology on Children and Adolescents held in Palma de Mallorca, Spain, Europe (November, 2018)
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3. “Sources of information on reproductive health among late adolescents” in International Seminar on Contemporary Trends in Health Psychology: Role of Psychologists, organized by S.V University, Tirupathi, Andhra Pradesh (September, 2017)

4. “Attitude of Adolescents towards Sex Education: Role of Education Level” in 52nd National and 22nd International Conference of Indian Academy of Applied Psychology, organized by University of Rajasthan, Jaipur (February 2017)
5. “Adolescents’ Attitude towards Sex Education: Role of Level of Education” in a National Seminar on Health Psychology: Contributions to Health and Well-Being, organized by Centre for Health Psychology, University of Hyderabad (August 2016)
6. Received Prof. Deepak Bhat award for best paper presentation from Indian Academy of applied Psychology (May 2016), during 51st National and 21st International Conference organized by University of Bangalore, Bangalore.
7. Participated in a national seminar on Healthy Ageing organised by S.V University, Tirupathi (March 2016)
8. “Understanding Women’s Health Issues in India: a Biopsychosocial Approach” in International conference on Psychosocial Perspective on Health and Well-being organised by Jamia Millia Islamia University, New Delhi
9. “Illness Perception and Well-being in Primary Hypertensive Patients: Role of Gender” in 2nd International & 4th Indian Psychological Science Congress organized by National Association of Psychological Science, Chandigarh (October, 2015)

Further, the student has passed the following courses towards fulfillment of coursework requirement for Ph.D.

Course Code	Name	Credits	Pass/Fail
1. HP 826	Theory Paper I*	4	Pass
2. HP 827	Book Review Paper II	4	Pass
3. HP 828	Review Paper III	4	Pass
4. HP 829	Empirical Paper IV	4	Pass

*Research Methodology and Advanced Statistics

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Head of the Centre

Dean of the School

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Aarti N. Nagpal

Abstract

Reproductive health risk behaviour, also known as health impairing behaviour, is perilous during adolescence because of its impending adverse effect and ramification in adulthood. As adolescence is a dynamic transitional phase, most adolescents, specifically adolescent girls, are vulnerable to high reproductive health-risk behaviour affecting their health and well-being. Though a plethora of research has been conducted on reproductive health of adolescent girls in India, two fundamental questions remained unsolved as to whether knowledge, attitude, and practice of reproductive health behaviour in late adolescent girls (16–19 years) played any role in their reproductive health-risk behaviour and psychological well-being, and to whether an intervention could be developed to enhance their knowledge on reproductive health. Therefore, using cross-sectional design, a survey is conducted involving 293 late adolescent girls to answer the first question and a pre-test post-test control group design is used involving 60 late adolescent girls to address the second question. Descriptive statistics, One-way ANOVA with post-hoc test, Chi-square test, Multiple regression analysis using stepwise method, Path analysis using structural equation modelling, and One-way ANCOVA have been computed. Results reveal that the late adolescent girls across three age groups significantly differ in their knowledge, attitude, and practice of reproductive health behaviour. Adolescent girls belonging to the age group of 18-19 years are observed to have higher reproductive health risk behaviour. Knowledge of reproductive health behaviour of the participants is observed to play a significant role in their psychological well-being. It is also observed that the relationship between knowledge and practice is mediated by attitude. Finally, this study has also found that the developed integrated psychosocial intervention model has significantly enhanced participants' knowledge on reproductive health behaviours. Limitations, future directions, and implications are discussed.

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Abbreviations

AIDS:	Acquired Immunodeficiency Syndrome
ARH:	Adolescent Reproductive Health
HIV:	Human Immunodeficiency Virus
RHB–AS:	Reproductive Health Behaviour-Attitude Scale
RHB–KT:	Reproductive Health Behaviour-Knowledge Test
RHB–PT:	Reproductive Health Behaviour-Practice Test
RTI:	Reproductive Tract Infection
STD:	Sexually Transmitted Diseases
STI:	Sexually Transmitted Infection
UNICEF:	United Nations International Children's Emergency Fund
WHO:	World Health Organisation

Chapter I

INTRODUCTION

Reproductive health risk behaviour, also known as health impairing behaviour, is perilous during adolescence because of its impending adverse effect and ramification in adulthood. Therefore, an increased interest in adolescent health more specifically on reproductive and sexual health has emerged in recent years. The reproductive health-risk behaviour gives rise to negative health outcomes and increases the magnitude of the potential loss of health and well-being. In contrast, health-enhancing behaviour focuses on health benefits in terms of positive health outcomes and an optimum level of well-being. During adolescence, fast physical growth, rapid hormonal change, and typical psychosocial development increase the chance of adolescents' engagement in reproductive health-risk behaviour. The outcomes of such reproductive health-risk behaviour are multi-faceted, starting from the lack of menstrual hygiene to sexual risk-taking. Though Indian society, where the world's largest adolescent population is found (approximately 243 million; UNICEF, 2012), views talks on reproductive health topics as taboos and discourages open discussions (WHO, 1997), studies have reported that adolescents in developing countries often engage in reproductive health-risk behaviour (Blum & Mmari, 2004).

As physical, social, cognitive, and emotional changes happen dynamically during adolescence (McClelland & Tolman, 2014), studies have reported that thoughts related to sexual behaviour are the central concern of the adolescents and such thoughts often occupy almost all their mind a good deal of the time (Kelly, 2001; Ponton, 2001). Globally, the early initiation of sexual activities and risk taking behaviours are raising in adolescents day-by-day due to cultural hybridisation. Most importantly, little is known about what factors influence the premarital sexual initiation among adolescents in developing countries. Research findings show that overall, around 2.5 million adolescents get infected with

sexually transmitted infection each year globally (Centres for Disease Control and Prevention, 2010; Forhan et al., 2009). One of the reasons cited was that the adolescents rarely use any contraceptives (Jones, Darroch, & Henshaw, 2002). Further, such negligence leads to unintended birth and sexually transmitted diseases (STD). Studies supported that adolescents having more than one sexual partner tend to be at odds with using any type of contraceptives (Luster & Small, 1994). Adolescent girls having partners older to them are likely to use contraceptives to a smaller extent; this further increases in the likelihood of STD (Manlove, Terry-Humen, & Ikramullah, 2006; DiClemente et al. 2002; Ryan et al. 2008) indicating a poor self-regulatory behaviour (Raffaelli & Crockett, 2003).

More specifically, the adolescent girls are more susceptible to reproductive health-risk behaviour (WHO, 1997). Due to menstruation, the daily routine activities of adolescent girls are restricted (Rana et al., 2015). Findings suggest that 19.2% of Indian girls with menstrual health problems have not preferred to discuss with a health professional, relative, or a peer (Sharma et al., 2008). Studies show that preparing girls prior to menarche results in more positive attitudes and further enhances better practices in respect of their menstrual health and hygiene (Jarrah & Kamel, 2012). It is also observed that the higher is the knowledge about menstruation, the more positive is adolescent girls' attitude (Marvan & Molina-Abolnik, 2012). The adolescent girls are largely contracted by the human immunodeficiency virus (HIV) due to the existing stereotyped roles performed by men and women in our society, societal norms, and their restricted access to information and inputs, all of these factors thwart the adolescent girls in taking decisions for maintaining healthy lives. Further, a number of recent research on knowledge of STD including HIV and contraception (Ivanova et al., 2019), reproductive health and responsible sexual behaviour (Vanusha & Parvathavarthini, 2018), and of prevention of HIV (Idele, Gillespie, & Porth, 2014) is considerably low in adolescent girls. Research also suggests for sexual and

reproductive health educational intervention study that is helpful for the adolescent girls for better health-seeking behaviours (Ivanova et al., 2019). Therefore, to gain information on sexual and reproductive health services stands as a fundamental right for the well-being of women and adolescent girls (WHO, 2019). Understanding the knowledge, attitude, and practice of reproductive health behaviour enables the adolescent girls to acquire and sustain health-enhancing behaviour for attaining optimum well-being during adolescence and later phase of life.

Problem statement

Reproductive health-risk behaviour across the lifespan is a global concern. In India, the problem of reproductive health behaviour has received considerable attention from researchers in the field of behavioural sciences, especially Psychology. Reproductive health behaviour is of great significance in the life of all reproductive age groups in general and adolescence per se. As adolescence is a dynamic transitional phase, most adolescents, specifically adolescent girls, are vulnerable to high reproductive health-risk behaviour affecting their health and well-being—physical, mental, social, and spiritual.

In India, though a plethora of studies has been conducted on reproductive health of adolescent girls, three fundamental questions remained unsolved as to whether knowledge, attitude, and practice of reproductive health behaviour in late adolescent girls (16–19 years) be measured; to whether these knowledge, attitude, and practice played any role in their psychological well-being; and to whether an intervention could be developed to enhance their knowledge on reproductive health behaviour. It is important that a mixed-method study be conducted to compare the late adolescent girls in terms of their knowledge, attitude, and practice of reproductive health behaviour and to develop an integrated psychosocial intervention model to enhance their knowledge of reproductive health behaviour.

Reproductive health and adolescence

Reproductive health is defined as “a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes” (The United Nations Population Information Network, 1994). It is majorly determined by the behaviours of an individual. The WHO (2017) demarcated that reproductive health implies “an individual’s ability to have a satisfying and safe sex life and that they have the capability to reproduce as well as the freedom to decide if, when, and how often to do so” (Blum & Mmari, 2005).

Adolescence is a developmental phase, extended for a period of 12 to 18 years of age. During this period many factors—physical, socio-cultural, psychosocial, and personality traits influence and change from childhood to later phases of life. Millions of adolescents are looking for answers to questions like: “Now that I am sexually mature, what do I do?” Much of the obstacles adolescents have are in terms of the ability to decide on how to perform sexual behaviour. For this, adolescents often come across inconsistent responses. Further, social media, peers, and other sources of information influence and portray sex in stimulating ways and encourage adolescents to exercise sexual behaviours before they are emotionally prepared (Ali & Scelfo, 2002). Several attempts have been made by most parents, mental health professionals, as well as religious groups on advocating adolescents not to engage in physical relationships too early and to wait until they gain emotional maturity (Rabasca, 1999). An appropriate approach is essential to explain the complex relationship between sex and love in adolescents. The upsurge of the biopsychosocial approach explains adolescent development as a process involving neural, hormonal, cognitive, social, personality, cultural, and sexual changes that impact and relate with one another (Herdt, 2004; Tolman, Striepe, & Harmon, 2003). The biopsychosocial approach views that sexual behaviour is dependent on hormonal, cognitive, personality,

culture, and emotional factors. For instance, sex hormones trigger physical changes, at the same time influences mood and behavioural changes, such as perceiving peers as romantically attractive further seeks an intimate relationship, which advances them to become sexually active (Schwab et al. 2001).

Reproductive health-risk behaviour: Knowledge, attitude, and practice

Reproductive health-risk behaviour may be described as any activity that has an adverse effect on an individual's reproductive system and in turn decreases the well-being. Reproductive health-risk behaviours are labelled as '*risk*' for the adolescents when they are either encouraged or engaged with undesirable behaviours that might bring a negative health outcome in the form of promiscuous sexual behaviour and having an unwanted pregnancy (Kirby, 2001). In this context, the reproductive health of adolescent girls is to be given high importance as they are the prospective mothers and the future generation is contingent on their health and well-being. To enhance the reproductive health of adolescent girls, their attitude, practice, and knowledge are to be addressed as a preventive measure against the potential risk.

Knowledge of reproductive health refers to an individual's understanding and awareness of reproductive health system and behaviours that are acquired through direct experience, informal sources, or formal sources. Informal sources primarily include family, peer group, social media, magazines, and movies. Formal sources include obtaining information about reproductive health from teachers and experts (e.g. doctors and health care professionals) in a formal setting, like educational institutes, hospitals, or health clinics. As knowledge of reproductive health is acquired, it is to be construed with reference to the social and cultural context in which it develops. In the present study, knowledge of reproductive health includes four important areas, such as knowledge of reproductive system and functions, ailments related to the reproductive system, causes of disorders

connected to the reproductive system, and prevention and treatment of reproductive health problems.

Attitude, having three major components—cognitive (belief), affective (feeling), and conative (action)—is a complex psychological construct and influences an individual's thought and action. Attitude towards reproductive health refers to the predisposition of the individual involving a positive and negative evaluation of reproductive health behaviour. The intensity of attitude varies. An intensely developed attitude is primarily affective in nature (Ajzen, 1989). Attitude is viewed as an idea that precedes the behaviour and directs an individual's choices and decisions for action. Therefore, it is imperative to study the attitudes of the adolescent girls towards reproductive health as the same decides their appropriate reproductive health behaviour.

The practice of reproductive health behaviour refers to the act of engaging in a particular reproductive health behaviour for an extended period of time for maintaining and mastering the behaviour. The practice is contingent on learning and experience. It also depends on the individual's frequency of engaging in reproductive health behaviour and the nature of appropriate feedback. There is the individual difference in terms of practice—some individuals gain mastery faster than others. Due to the influence of biopsychosocial factors, adolescents are more susceptible to engage in wrong reproductive health behaviour having impending risks to their health and well-being. In the present study, the practice of reproductive health behaviour is assessed in five dimensions, such as premarital sexual relationship, stigma related to HIV, promiscuous sexual behaviour, menstrual health and hygiene, and safe sex.

Theoretical framework

Globally, an enormous amount of evidence on the prevalence of adolescent's reproductive health problems has been reported. Lack of knowledge on and negative attitude

towards reproductive health contribute to poor practice, high risks, and low psychological well-being among adolescent girls. Since the primary focus is on the reproductive health risk behaviour of late adolescent girls, the present study has been carried out under the framework of Developmental Psychology and Health Psychology. Three theories, such as health-belief model (Rosenstock, 1974), socio-cognitive theory (Bandura, 2004), and socio-ecological theory (Bronfenbrenner, 1977) constitute the basis of this study.

Health belief model and reproductive health

The effect of health promotion more specifically health-education program rely on rationalising the most suitable theory and training strategies. To address reproductive health-risk behaviour, the health belief model is useful. The model explains health actions through the interaction of different beliefs. Health belief model has made considerable progress in explaining the factors determining an individual's health-related behaviours and directions to encourage positive behaviour changes.

Reproductive health professionals views theory-based research to throw light on inconsistent findings on poor contraceptive use and guide the development of more robust study designs (Katatsk, 1977; Herold, 1983). To test these factors, the health belief model (Rosenstock, 1974) is one such well-tested social cognitive framework. The model promotes that an individual must have an inclination to participate in intervention programmes pertaining to health and believe that keeping oneself healthy indicates positive health outcomes. The model counts on cognitive factors that orient the individuals towards goal-directed behaviours. It is a viable model for conducting interventions to minimise public health problems (Katatsk, 1977; Rosenstock, 1974).

The concepts of health belief model applied to reproductive health behaviours focuses on behaviour change. It recommends that for individuals displaying risky behaviours, perceived or supposed susceptibility is essential before committing to

modifying these risky behaviours to occur. Individuals who perceive that they are not at-risk, the profits or blockades to a particular behaviour are found to be inappropriate. Towards prevention of risks, such as unintended pregnancy and sequelae, contraceptive behaviours, the health belief model is appropriate. Also, prevention from HIV has been explicated by the health belief model (Becker, 1974).

The primary constructs of health belief model are helpful for effective intervention programs, e.g. adolescent's knowledge, consistent contraceptive use, and perceptions have been improved in an intervention study (Eisen, Zellman, & McAlister, 1985). Likewise, the intervention program basing on health belief model is developed for reproductive health behaviour focussing on self-efficacy (Stanton et al., 1996) and optimism (Meier, 2003). This model and theory of reasoned action are two such theories which can determine attitudes of people towards costs and benefits, behaviour, and subjective norm. Based on these theoretical perspectives, the present study can facilitate an integrated psychosocial intervention model for enhancing the knowledge of reproductive health behaviours in adolescent girls.

Socio-cognitive theory and reproductive health

In social cognitive theory, Bandura (1977) explained human behaviour as a reciprocal relationship with regard to environmental factors, personal factors and behaviour. It explains in the form of learning processes—observation and modelling. Through observation, an individual learns desirable and undesirable behaviours, also reproduces the learned behaviour in order to maximise benefits. Further, views about one's own self-efficacy further influences a tendency to reproduce an observed behaviour.

During adolescence, it is noted in a study that the exposure of sensual behaviours in the social media leads to early sexual initiation (Brown et al., 2006). The social cognitive theory is used to monitor behaviour change interventions. Studies were conducted on

secondary prevention programs such as condom use promotion in STD health centres (Sharma & Romas, 2008). Under social cognitive factors, Raj (1996) identified positive perceptions towards safe sex and consistent use of condoms in college students. Social cognitive theory and multiple cognitive-behavioural theories have been used in interventions for promoting safer sex behaviours in African-American adolescents (Kaneekar & Sharma, 2009).

Social-ecological model and reproductive health risk behaviours

The ecological systems theory explains that we experience different environments throughout our lifespan which in turn influence our behaviour in varying degrees. Socioecological model is rooted in ecological theory propounded by the American psychologist, Urie Bronfenbrenner in 1970. This model takes into account the blend of individual-level and environmental-level interventions to achieve substantial changes in health behaviours. It addresses the intricacies and interdependence between biological, psychological, socio-cultural, environmental, economic, political, and organizational determinants of behaviour (Stokols, 1996).

In order to minimise risk and improve health, individuals are suggested to initiate and maintain a proper lifestyle. In this process, behaviour of an individual is determined by several factors at distinct levels (Elder et al., 2006). According to Sallis and Owen (2001), there are different levels of classifications. In the first level, knowledge, beliefs, skills, and attitudes are the individual characteristics that determine behaviour. In the second level, interpersonal relationship processes give way to social identity such as a friend, family, and as a partner. The third level comprises the organizational level, which contains rules, policies, formal and informal structures. The community is the fourth level, which exists in the form of customs and traditions, ethics and community links. The fifth level is the societal level which holds the policies on health at the national level and in the cultural settings.

According to Bronfenbrenner (1979), the effects of the environment are explained in three levels—microsystem, mesosystem, and exosystem. In microsystem, the interaction between family members and the values and norms of work are explained. In mesosystem, school, work settings, and physical family is included. Finally, the larger system comprises economics, culture, and politics under exosystem. The factors influencing behaviour are explained as layers, in which each layer determines to reach to the subsequent levels; change of a behaviour is also influenced at each layer (Robinson, 2008). In the model, age, gender, knowledge, attitude, and personal characteristics are counted at the individual level. This further leads to the probability of conducting a desirable or undesirable behaviour. The causes of behaviour change are based on the skills, abilities, attitude, and awareness of the individual (Young et al., 2006). This shows that the model focusses on various stages of effects that increase opportunities to improve health behaviours.

Reproductive health behaviour and psychological well-being

The exposure to reproductive health-risk behaviour not only influences an adolescent girl's health but also affects her psychological well-being. Psychological well-being considers a broader spectrum of constructs (Seligman, 2011). According to Ryff and Singer (1998), “there are six constructs of psychological well-being, such as autonomy, environmental mastery, personal growth, positive relation with others, purpose in life, and self-acceptance”. Adolescents who exhibit strength in each of these domains are likely to be in a state of psychological wellbeing, whereas adolescents who lack in these areas will be in a state of psychological ill-being. The research reported that psychological well-being was found to have a positive influence on adolescents. Significant relationship with adult members can minimise the effects of risky sexual behaviours and drug abuse (Hamre & Pianta, 2001). Adolescents display healthful behaviours, higher academic achievement, job

accomplishment, strong marital bonding, and rate their health status positively (Kern & Friedman, 2008).

Rationale of the study

Adolescent reproductive health behaviour in the context of knowledge, attitude, and practice have been examined across the globe. However, literature has suggested that the knowledge of the reproductive health of adolescents is still low in developing as well as developed countries. Similarly, many myths and misconceptions about reproductive health arise in adolescents in Indian society. Further, the studies have shown adolescents' frequent engagement in risky reproductive health behaviour. Examining the knowledge, attitude, and practice of reproductive health behaviour of adolescents is still in its infancy when it comes to the pool of literature review. The most prominent concern missing in the review of literature is about the studies focusing on the development of measures to examine the attitude, knowledge, and practice of reproductive health behaviour of Indian adolescent girls. Little is known about the relationship between the reproductive health behaviour and psychological well-being of the adolescent girls. Moreover, a paucity of experimental research on enhancing the knowledge, attitude, and practice of reproductive health behaviour of adolescent girls was noted. Therefore, it is imperative to emphasise on the need for developing standardised measures to assess the knowledge, attitude, and practice of reproductive health behaviour of Indian adolescent girls on the basis of socio-cultural context. Not only measures but also a need is felt to enhance the knowledge of reproductive health behaviour through developing an integrated psychosocial intervention model for minimising the reproductive health risks among Indian adolescent girls.

Purpose statement

The purpose of the study is to measure and examine the knowledge, attitude, and practice of reproductive health behaviour in late-adolescent girls (16–19 years) and assess

their reproductive health-risks. The study also aims at exploring the role of knowledge, attitude, and practice of late adolescent girls' reproductive health behaviour in determining their psychological well-being, and designing and testing the efficacy of an integrated psychosocial intervention model in enhancing their knowledge of reproductive health behaviour. A mixed-method approach is used to address four specific research questions— (1) What is the level of knowledge, attitude, and practice of reproductive health behaviours in adolescent girls? (2) What is the role of knowledge, attitude, and practice of reproductive health behaviours in determining their psychological well-being? (3) Can an integrated psychosocial intervention model be designed to increase the knowledge of reproductive health behaviour of adolescent girls? (4) What is the efficacy of the developed integrated psychosocial intervention model in increasing their knowledge of reproductive health behaviour? This study is grounded on a quantitative approach using cross-sectional design involving survey method to answer the first and second questions because comparisons can be made across the age groups of adolescent girls. The third question is approached by data triangulation because the investigator aims to develop an integrated psychosocial intervention model. The fourth question is answered using experimental design because the investigator aims to test the efficacy of the developed model in enhancing the knowledge of reproductive health.

The thesis is written as per the guidelines of the APA Publication Manual (6th ed.). The thesis contains five chapters. *Chapter II* comprises the review of recent literature, research questions, objectives, and hypotheses. *Chapter III* outlines the method of study. *Chapter IV* consists of results containing statistical analyses, tables, and figures. *Chapter V* comprises discussion, limitations and future directions, implications, and conclusion followed by two independent sections—References and Appendixes.

Chapter II

REVIEW OF LITERATURE

In this chapter, an exhaustive literature review in the form of descriptions and critical analysis of the relevant empirical and theoretical studies is presented. The focal point of the review gives an overview of reproductive health behaviour of adolescent girls. It also presents plausible solutions in the form of interventions used in different settings. The review enlists evidence-based literature in terms of knowledge, attitude, and practice of reproductive health behaviour, specifically in the context of Indian society. The research findings presented in this chapter largely confines to the publications related to reproductive health in the last ten years.

The scenario of reproductive health

Reproductive health issues at large cause great risk to adolescents, especially girls and women. One in every six people is an adolescent, contributing about 1.2 billion worldwide. Exclusively, India accounts for 21% of adolescent population (Ministry of Health & Family Welfare, Government of India, 2014). The current health status of adolescents influences their health as adults in future. Early pregnancy and incidence of STD (HIV/AIDS) and RTI's are some of the most common issues faced by them. In India, most of the insight on adolescent health comes from national surveys by government agencies. Since the phase of adolescence has been found as vulnerable by the WHO, the Government of India took a step to launch a programme for adolescents that focuses on their sexual health. Under the same ministry (2014), the *Rashtriya Kishor Swasthya Karyakram* is an initiative that is started in 2014 with an aim to promote informed and responsible decisions of adolescents concerning their health and well-being.

Adolescents shows diverse range of problematic behaviours regarding their reproductive health. According to the National Family and Health Survey- 4, knowledge of

HIV and AIDS increased significantly more for women than men, who had attended school. The fact that using condoms and having a single sexual partner reduces the risk to contract HIV, increased from 26% among women to 71% from NHFS-3 to NHFS-4 respectively. As per the NHFS-3 data on adolescents, 2.7% of boys and 8% of girls are sexually active before the age of 15 years, leading to early pregnancy. The knowledge of contraception among adolescent girls (15-19 years) is as high as 94%, but actual practice showed a very small number (Sivagurunathan, Umadevi, Rama, & Gopalakrishnan, 2015). Indian adolescent girls below the age of 20 years, contribute as high as 17% to the fertility rate with 14% of them owing to unplanned pregnancies (Adolescent Health Division, 2014).

The Lancet Commission on Adolescent Health and Wellbeing identified three types of adolescent health countries—multi-burden countries, excess injury countries, and non-communicable disease countries. In this background, adolescents comprise more than 250 million hailing from countries categorised under multiple health burdens during the year 2016. These adolescents come across health disorders like communicable diseases, non-communicable diseases, reproductive health-related, high rates of injury, violence, and mental disorders (Azzopardi et al., 2019; Weiss & Ferrand, 2019). WHO (2016) revealed that though data are scarce, pregnancy and childbirth complications are estimated to be the foremost reasons for death among adolescents (15-19 years) across the world.

Knowledge of reproductive health behaviour

The prevailing knowledge of reproductive health behaviour is limited among adolescents. Both girls and boys below the age of 19 years have faulty concepts and beliefs that shape their existing myths. In India, only 19% of girls and 35% of boys accurately know about HIV/AIDS. Due to lack of knowledge, they are at a greater risk of contracting infections, engaging in unprotected and unethical sexual activities (Sivagurunathan, Umadevi, Rama, & Gopalakrishnan, 2015). It is alarming to notice that while a large number

of adolescents debut their sexual behaviour at a very young age, the awareness levels remain low. A study in Kerala was done on early adolescents and emerging adults to understand their knowledge, attitude, and practices of reproductive and sexual health. It reported a significant difference between the age groups of 10–14, 15–19, and 20–24 years, in terms of menstrual hygiene practices. The participants felt a need to involve their parents and the community in bringing about a change in their behaviour. Although the study showed a low level of knowledge, with an increase in it, the attitude and practices get better (Nair, Leena, Thankachi, George, & Russell, 2013).

In other developing countries too, the situation is equivalent to that of India. In Sri Lanka, a survey undertaken to examine the knowledge of school-going adolescents showed that less than 1% of participants had satisfactory knowledge of sexual health. Only a small percentage were comfortable discussing sexual health matters with their parents (Rajapaksa-Hewageegana, Piercy, Salway, & Samarage, 2015). Although parents are the first social contact for a child, the communication level with them is often limited when it comes to reproductive health. Most adolescents and even parents hesitate to discuss issues related to it. This creates a deficit of factual knowledge and paves way for myths and unreliable information.

A study on medical graduates in Karachi showed lower than expected knowledge of reproductive and sexual health paired with negative attitudes (Khanam, Perveen, & Mirza, 2011). In another study on Pakistani college going students, most of the adolescents had adequate knowledge about menstrual cycle, but had limited knowledge about contraceptives, STD's and pregnancy (Shahid, Nasim, Memon, & Mustafa, 2012). Similarly, a survey on the youth of China reported scanty knowledge of reproductive and sexual health, even though 22.4% of the participants agreed to have had a sexual experience. More than half of sexually active participants did not use contraceptives, often leading to

unwanted pregnancies (Zheng, Chen, Han, Chen, Lin, & Qiu, 2010). Another cross-sectional study on adolescents aged 15 to 20 years, showed poor reproductive health knowledge with 44% having a history of abortion (Lim et al., 2015)

A recent study aimed to measure knowledge of contraceptive methods among medical students in Malaysia reported a high level of knowledge prevailing among both male and female students. The study focussed on encouraging early reproductive health education to be maintained in institutions (Latt et al., 2019). Whereas, on the contrary, another study done on Malaysian students showed low knowledge of reproduction, pregnancy, and contraceptive uses. In this study, religion was found to be a significant correlate of attitude for pre-marital sex (Wong, 2012). Purdy (2006) further added that this results in misperception and conflict that hamper adolescents from making vital life choices. Several risk factors include lack of information, religion, policy, culture, erroneous knowledge and limited access to information and services of adolescent reproductive health (Ford, Shaluhiah & Suryoputro, 2007; Leerlooijer et al., 2014; Utomo & McDonald, 2009).

Similarly, studies done in Africa are alarming in nature. An in-depth analysis of four sub-Saharan African countries revealed that more than 60% of the adolescents were not aware of ways to prevent pregnancy (Durojaye, 2019). On the other hand, African-American teens living in the US had limited knowledge of HIV and were little aware of the right use of condom. Statistically, knowledge was seen a significant contributor to sexual health and behaviour. The study implicated the need for health-promoting behaviour through techniques that would change knowledge and attitude (Swenson et al., 2010). While comparing to the western countries, the statistics give a better picture in the United States. A study done on people aged 18-44 years showed a high level of knowledge of sexual and reproductive health. However, risks related to abortion were not well known to women (Kavanaugh, Bessett, Littman, & Norris, 2013).

Recent studies done in Indian states still show average or low knowledge levels. A study was done to assess reproductive health awareness in government schools of Maharashtra. The results revealed that 80% of girls were not aware of secondary sexual characteristics. Less than 30% of participants were aware of contraceptives and a very small number knew about RTI's and HIV (Shankar, Dudeja, Gadekar, & Mukherji, 2017). The state of Haryana in India faces the lowest male-female ratio with a high rate of female foeticide and infanticide. Keeping this in view, a study was done in Rohtak city by Mittal & Goel (2010) on 788 adolescent girls belonging to 15-19 years. It aimed to assess the knowledge of matters associated to reproductive health. Majority of the participants were observed to possess adequate knowledge of menstruation and modes of STD transmission. A small number were aware of protected sex and condom use. Stigma was attached to masturbation and the practice was considered wrong and abnormal. The study concluded by exploring the communication between the adolescent and parents, peers and information-seeking behaviour through mass media. It regarded different forms of health communication as an effective tool for knowledge enhancement in educational settings. Nixon (2014) studied the impact of social media and the same has given new forms of exploitation, predation, bullying in terms of sexual behaviours. A need to provide defending measures have not been established.

A natural physiological process that every girl goes through is menstruation, which usually starts at the age of 10-13 years. A strong link between menstruation and culture and religion have been projected through several studies. A meta-analytical study done by Chandra-Mouli & Patel (2017) reviewed 81 articles from 25 developing countries suggested that most adolescents are never prepared or well-informed during menarche. Embarrassment often leads to misconceptions and unhygienic practices. Recent studies identified that across the globe, knowledge of menstrual health is very low among adolescent girls. This lack of

knowledge and understanding stigmatizes the cultural perception of menstruation as unclean and forbidden (Chandramouli & Patel, 2017; Hennegan, Shannon, Rubli, Schwab, & Melendez-Torres, 2019). In the state of Meghalaya, adolescent girls did not know the meaning of menstruation but were aware of the symptoms. Age was seen as a significant determining factor of knowledge level (Nagar & Aimol, 2010). In a study in Mumbai, adolescents' lack of knowledge compelled them to follow poor practices of menstrual hygiene (Thakur et al., 2014; Sharma, Singh, Tempe, & Sharma, 2018).

The scenario in the developed countries is not comparably better than that of the developing nations. Many adolescents and adults of the developed countries are also affected by STD's. A systematic review was done in European countries to find out the knowledge levels of adolescents, revealing a high knowledge for HIV/AIDS, but low knowledge for other STD's such as HPV. However, the presence of knowledge does not necessarily reflect in behaviour and practice (Samkange-Zeeb, Spallek, & Zeeb, 2011).

Attitude towards reproductive health behaviour

Considering the perceptions and beliefs held by adolescents, we can mostly observe a negative or poor attitude towards reproductive health behaviour. Conversations related to sexual matters is continually considered to be a banned subject in most of the developing countries including India (Nath, 2009). Studies acknowledge that both parents and teachers are uncomfortable in discussing sexual aspects with adolescents, although the teachers understand that proper information on STD's and HIV should be imparted (Nair et al., 2012; Toor, 2016). Interestingly, a study done in Haryana reported that more than 90% adolescents were in favour of sex education and their attitudes reflected comfort to receive education from professionals (doctors and teachers) and less likely from parents. Similar to this, in several other Indian states, the attitude of adolescents towards reproductive health education has been positive (Kumar et al., 2017; Jaideep, 2012). However, a study in Karnataka

depicted a low attitude of adolescents towards receiving sexual health education (Dorle, Hiremath, Mannapur, & Ghattargi, 2010). In another study, it was seen that adolescents believed sex education could change their sexual behaviours and eradicate the stigma related to menstruation and HIV (Mueller, Gavin, & Kulkarni, 2008). Regarding menstruation, while girls become aware at a later stage about the natural biological process, a majority of urban and rural Indian girls perceive menstruation to be a disease which needs medical treatment (Dube & Sharma, 2012).

In India, often the health care professionals are also not well equipped with information that needs to be given to adolescents. The societal norms act as a major barrier in disseminating information formally. Incorrect information leads to misconceptions and unhealthy attitudes (Ismail et al., 2015). The health-care needs have not been properly understood by the Indian society at large (Kalkute et al., 2015). Indian traditions and cultural aspects have created a collective psyche of conservative attitudes towards reproductive health (Dwyer & Thornhill, 2010). The attitude surfaces a low understanding of reproductive health that was reflected in the banning of the sex education curriculum in six states where HIV prevalence was the highest (Benzaken, Palep, & Gill, 2011). Due to the stigma, policymaking on adolescent reproductive health has been affected by religious and social constraints (Khubchandani, Clark, & Kumar, 2014). Risky behaviours paired with scanty knowledge of reproductive health leads to mortality and morbidity in adolescents (Chothe et al., 2014; Tripathi & Sekher, 2013). No sex education or abstinence-only sex education is the most preferred choices of religious groups in India as they believe that it leads to promiscuous sexual behaviour and pre-marital sex (Stanger-Hall & Hall, 2011). A study done in Pune on adolescents who were never exposed to reproductive health concepts are expected to engage in sexual activities at an early age (Sahay, Nirmalkar, Sane, Verma, Reddy, & Mehendale, 2013). Adolescents do want to engage in protective behaviours such

as using condoms, nevertheless, the social stigma creates a barrier to use reproductive health services (Creel & Perry, 2003). In some instances, professional health care providers and teachers find it embarrassing to discuss sexuality and are often not clear about the needs of adolescents (Acharya, Van Teijlingen, & Simkhada, 2009).

A study done on adolescents in Nepal suggested that most of the adolescents are uncomfortable talking about matters related to sexuality and health with parents (Regmi, Van Teijlingen, Simkhada, & Acharya, 2010). It is also understood that young people do not find it feasible to access sexual health services as they believe that they would be judged by the health professionals and staff. A study was done on adolescents between the ages of 15-19 years with several focus group discussions. It revealed that socio-cultural factors, negative attitude of parents, privacy were integral factors that restricted them from accessing the services of reproductive health (Kennedy et al., 2013; Remes et al., 2010). Another study on young people's perception of sexual health services showed that boys preferred women to avail health facilities and themselves felt uncomfortable to be a part of it (Godia, Olenja, Hofman, & Van Den Broek, 2014).

Parents serve as major models for learning about behaviours and studies indicate that most parents find it needful to discuss with their teenagers about sexual matters. However, their belief about how to communicate and the young age of their children acts as a major barrier to their communication (Wilson, Dalberth, Koo, & Gard, 2010). A study done to find out the attitude of healthcare providers towards contraception in Nigeria revealed that the participants thought that providing contraceptives could promote sexual promiscuity and both married and unmarried adolescents should refrain from taking services (Ahanonu, 2014). Adolescents also report the attitude of public clinic healthcare providers to be negative which does not motivate them to avail services (Agampodi, Agampodi, & Piyaseeli, 2008).

Practice of reproductive health behaviour

Most of the behaviour that adolescents engage in, finds its way to their healthy development in adulthood. Many health risk behaviours that occur during adolescence, affect the well-being later in life (Jackson, Henderson, Frank, & Haw, 2012). Reproductive or sexual health risk behaviour includes early occurrence of physical relationship, multiple partners, unsafe physical relationship without using contraceptive, and having symptoms of STD's (Magnani et al., 2002). These behaviours are majorly influenced by the social and cultural setup that the individual belongs (Akwara, Madise, & Hinde, 2003). Norms prevailing in the peer group also plays a crucial role in determining an adolescent's sexual behaviour. High-risk involvement is seen more among adolescents approving peers (Potard, Courtois, & Rusch, 2008).

Usually, people who engage in one risky behaviour are susceptible to follow several behaviours that impose a risk to health (Kipping, Campbell, MacArthur, Gunnell, & Hickman, 2012). A strong link is seen between substance use, drug abuse and engaging in sexual relationships with multiple partners, more prominent in adolescent girls (Jackson, Sweeting, & Haw, 2012). Since sexual experimentation is high in adolescence, the physiological changes that occur during this phase create a risk of contracting HIV, other STD's, and unintended pregnancies (Dixon-Mueller, 2008). A few nations have shown a decreased rate of risk behaviours of adolescents, therefore reducing their risk to contract HIV and other infections (Ghys & Garnett, 2010).

A study on adolescents who have been sexually active between the ages of 14 to 19 years, revealed that their perception of sexual risk contraction was associated with their gender, high level of knowledge, and experience of symptoms of STD's (Sychareun, Thomsen, Chaleunvong, & Faxelid, 2013). Basing on the health belief model, studies suggest a correlation between risky sexual behaviour and perception of contracting HIV

(Anderson et al., 2007; Tenkorang et al., 2008; Tenkorang et al., 2009). Among adolescent girls, the rate of abortion increases during their late adolescence. In this phase, they also experience a high risk of STI's (Hale & Viner, 2012).

Communication plays a vital role in shaping behaviour that are protective in nature. A study on mother-daughter communication of sexual risk had a negative relationship with episodes of unprotected sexual intercourse, indicating that with an increase in communication, there is a significant decrease in engagement in health risk behaviour. Communication directly mediated self-efficacy and use of a condom (Hutchinson, Jemmott III, Jemmott, Braverman, & Fong, 2003). Another study on adolescent girls showed that sexual health risk was significantly predicted by the early onset of menarche (Belsky et al., 2010). History of first sexual intercourse before the age of 15 was correlated with sexual risk behaviour in adolescent girls (Langille, Asbridge, Flowerdew, & Allen, 2010).

The concept of menstruation being unclean is widely accepted in Indian society. A study done in Nagpur reported that half of the participants use an old cloth to collect the blood while only a small number of them cleaned their genitals. Several restrictions are followed that are determined by economic status and geographical location (Thakre et al., 2011). Contaminations owing to poor cleanliness practice during menses are commonly stated in number of studies. A study was done on adolescents between the ages of 11 to 20, along with their mothers in the city of Ranchi. The results reflected the cultural practices and social restrictions related to menstruation. Resistance towards positive change was reported and strategies that would enhance the menstrual hygiene of young girls was focussed upon (Kumar & Srivastava, 2011). There is a direct effect of knowledge with menstrual practices followed by adolescent girls. A cross-sectional survey done in Nigeria showed that more than half of the participants had high knowledge. Majority of girls used

sanitary napkins and this was linked to their school education and occupation of the mothers (Oche, Umar, Gana, & Ango, 2012).

The significance of using soft and clean sanitary products for adolescent girls, to maintain hygiene for long-run reproductive health benefits has been suggested by several studies. The knowledge is determined by shaping safe practices and improving menstrual hygiene, lessens the burden of contracting RTI's (Dasgupta & Sarkar, 2008; Mudey, Kesharwani, Mudey, & Goyal, 2010). A cross-sectional study was carried out to examine the menstrual practices of adolescent girls of Pakistan. The study projected several unhygienic practices such as non-bathing during periods, fear of bleeding, usage of cloths not properly washed and dried in sunlight etc., along with misconceptions that needed immediate attention (Ade & Patil, 2013). The ones who did not go to school were shown to have some unhygienic menstrual behaviours (Ali & Rizvi, 2010). However, in a contradictory study on Nigerian adolescents, most of them increased the frequency of bathing during menstruation (UM, Yusuf, & Musa, 2010).

A cross-sectional study was done in West Bengal to determine the factors of menstrual cleanliness of adolescent girls. It showed that literacy of mothers, knowledge of menstruation before attaining menarche, availability of proper sanitation facility at home, and exposure to health-promoting advertisements were significant indicators of menstrual health. Further, optimum health is crucial in the prevention of cervical cancer and RTI's in women (Sudeshna & Aparajita, 2012). Other Indian studies also suggest that school-going girls are not aware of the correct source behind menstrual bleeding and often use cloth material (Juyal, Kandpal, Semwal, & Negi, 2012; Kamaljit, Arora, Singh, & Neki, 2012), and some are not aware of the fact that menstruation is related to pregnancy (Shanbhag et al., 2012). Another study showed that the girls using cloth often developed genital infections and their hygiene was unsatisfactory (Mudey, Kesharwani, Mudey, & Goyal,

2010). Majority of adolescents using cloth also reuse them several times after washing it (Khanna, Goyal, & Bhawsar, 2005; Quazi, Gaidhane, & Singh, 2006). In Manipal, a comparative study between urban and rural adolescents showed that majority of rural participants using cloth and other materials dry their absorbents inside the house for reuse (Kamath, Ghosh, Lena, & Chandrasekaran, 2013). Adolescents frequently wash their vagina which promotes their menstrual health, and this behaviour significantly correlated with the presence of water supply and a separate toilet at home (Yasmin, Manna, Mallik, Ahmed, & Paria, 2013). A community-based cross-sectional study conducted in Nagpur compared urban and rural school-going adolescents for their menstrual hygiene and reported a significant difference between the two socioeconomic backgrounds. Menstrual practices were better in urban girls with fewer health problems (Thakre, Thakre, Ughade, & Thakre, 2012; Patle & Kubde, 2014; Paria, Bhattacharyya, & Das, 2014; Kuhlmann, Henry, & Wall, 2017).

A study on adolescents between the ages of 15–19 years in Thiruvananthapuram revealed that majority of them suffered from various symptoms related to menstruation such as dysmenorrhoea and abnormal vaginal discharge. However, they did not seek any treatment for these conditions which could have a long term effect on their reproductive health like impaired fertility (Nair et al., 2012). Another cross-sectional study in Varanasi conducted on 650 adolescent girls using a self-reported measure of RTI was observed to be more in adolescents who did not maintain menstrual hygiene (Kansal, Singh, & Kumar, 2016).

Interventions for enhancing reproductive health behaviour

Interventions that aim to bring about a behavioural change in adolescents by targeting the aspects of knowledge, attitude and practice have abundantly been studied. Some interventions have solely targeted the knowledge aspect, some the beliefs and

misconceptions, while others have aimed to change the existing practices. Most of the interventions designed are school-based due to the ease of learning process while also keeping it formal. Studies show that peer education in public spaces and youth centres have been ineffective in facilitating sexual and reproductive health education (Chandra-Mouli, Lane, & Wong, 2015). Promoting access to reproductive health services have been effective with adolescent-friendly approaches that are based on community acceptance as well (Denno et al., 2015).

A school and community-based study with methods including lectures, discussions, and demonstrations using pamphlets, booklets, posters, projectors, and boards etc., showed improved knowledge and increased awareness in girls about reproductive health. Informative interventions have a positive effect that correlates with health habits (Kotwa, Khan, & Kaul, 2014). Similarly in Bangladesh and Himachal Pradesh, booklets that were used as an intervention and were developed with the inputs of teachers and parents significantly improved the knowledge of the participants (Haseen et al., 2004; Dube & Sharma, 2012). Malleshappa and Krishna (2011) carried out an interventional study on 656 adolescent girls of a school in Andhra Pradesh. The reproductive health education led to a significant increase in knowledge regarding menstrual health, ovulation and fertilization, pregnancy and contraception, transmission and prevention of STD's. A study done on both girls and boys studying in 11th and 12th standards in Kerala and having poor knowledge about reproductive health matters were given an educational intervention. The post-intervention scores increased significantly for knowledge regarding STD's, HIV, and pre-marital sexual behaviour in both the groups (Nair et al., 2012)

Haberland and Rogow (2015) reviewed the effectiveness of sexuality education. The results concluded emphasising on several comprehensive sexual risk reduction programs that were proven to be effective. Majority of interventions that focus on abstinence-only

have also shown to reduce sexual risk behaviour in the target population, in terms of STD's and unintended pregnancies. A strong relationship between gender, power and its effect on reproductive and sexual health is also observed (Haberland, 2010). Thus, by empowering girls and women and enabling gender sensitivity can help in promoting reproductive health of adolescent girls in more positive ways. Programs that ignored the role of gender failed to show a behaviour change in terms of pregnancy and STD's. A 50-hour program designed for testing on adolescent boys and girls attending school, aimed to improve the reproductive health in rural South Africa. The curriculum was based on gender and empowerment, which resulted in 3% of the reduction in the incidence of herpes simplex virus 2 (Jewkes et al., 2008). A semantic review study analysed thirty interventional programs and concluded that positive youth development curriculum as the most effective for promoting reproductive health of adolescents (Gavin, Catalano, David-Ferdon, Gloppen, & Markham, 2010).

Educational institutions and schools act as facilitating agents in educating adolescents about reproductive health before they engage in intimate relationships and engage in risky behaviours. Schools can positively help to build healthy practices that can be followed in adulthood. This significantly enhances the quality of life of the individuals (Centers for Disease Control and Prevention, 2013). Schools are also the major source for young people to learn societal norms and develop self-concept related to sexuality and romantic relationships (Center for School, Health, and Education, 2011). Studies show that comprehensive sexual health education in schools result in the delay of sex initiation in adolescents (Kirby, Laris, & Rolleri, 2007). A study proposed to explore the role of family communication as a key component of comprehensive sex education and its effect on delay in sexual initiation in young adolescents studying in 6th and 7th standard. The intervention was subjected to family homework assignment which aimed to increase the communication between the family members on sexual issues. The adolescents who completed the task

significantly predicted a delay in sex and also additionally addressed the barriers in family communication (Grossman, Frye, Charmaraman, & Erkut, 2013).

Based on a review of studies done in the US, it was found that effective reduction of risk behaviours resulted from group-based interventions, and reduced adolescent pregnancy and contraction of STD's (Chin et al., 2012; Breuner et al., 2016). Many interventional studies have targeted on bringing about a behaviour change in terms of menstrual hygiene practised by adolescent girls. A recent study aimed to increase the knowledge of menstruation through the educational curriculum of reproductive biology. The post-intervention scores showed a reduction in wrong answers in the experimental group (Campero, Suárez-López, & Cruz-Jiménez, 2019). Similarly, another study assessed the reproductive health issues and intervened to increase help-seeking behaviour among 300 urban school adolescents aged 11-14 years. As compared to the percentage of adolescents seeking help to improve their sexual health before the intervention, a significant increase was observed in their behaviour as followed up for one year (Joshi et al., 2006).

Other Indian studies have focussed on using a combination of strategies like peer group support and conventional techniques to improve the knowledge of reproductive health in adolescents (Parwej, Kumar, Walia, & Aggarwal, 2005). A cross-sectional study was carried out recently in Andhra Pradesh to test the effectiveness of a community-based intervention for enhancing the reproductive health of adolescent girls. 250 girls between the ages of 11-16 years were given the intervention, the results of which showed a noteworthy rise in their knowledge of risk behaviours in terms of premarital sex, and unsafe sex (Aruna Devi, Mavatkar, & Usha Rani, 2019). The association between formal sex education and sexual health behaviour was studied on a sample of 4691 adolescents and early adults aged 15-24 years. Different kinds of sex education were given across institutes. The results revealed that either type of intervention yielded a relationship with delay in first sexual

activity in both girls and boys when compared to participants who did not receive any form of intervention. Interestingly, the association between the two variables was significantly mediated by the age of the participant (Lindberg & Maddow-Zimet, 2012). Using quasi-experimental design, studies suggested that the Community Friendly Health Clinic program significantly enhanced the adolescents' reproductive health attitudes, and skills in rural area (Susanto, Rahmawati, & Wantiyah, 2016). However, the knowledge of the participants of both rural and urban areas was enhanced.

The perceptions and needs of adolescents should also be taken into account for understanding the kind of intervention that would be effective in bringing about the desired change. A non-experimental survey group study was done on 259 adolescent girls and boys who had in the past attended school-based interventions. The results indicated that adolescents preferred being taught by professional health workers, parents and peers. The preference was also determined by gender and type of school (Turnbull, Van Schaik, & Van Wersch, 2010). Recently a quantitative study was conducted in Bali to evaluate an intervention on reproductive health by using traditional art to enhance the knowledge and attitude of adolescents. The non-equivalent quasi-experimental control group design was applied to measure the knowledge and attitude of pre-marital sex. The results indicated a significant increase in both the variables, with a decreased intention to engage in a pre-marital sexual relationship in the participants of the experimental group in comparison with a high intention in the participants of the control group (Widarini, Tetradewi, & Emilia, 2019). A cross-sectional interventional survey was conducted to measure the knowledge, practice and attitude of reproductive health and family planning on 452 suburban and rural adolescent population. The integrated intervention included a media campaign in the form of radio shows and theatre acts, and home visits to teach family planning. The post-test results showed a significant encouraging attitude to family planning and an intensification

in their knowledge of contraceptive use (Pires, Siemens, & Mupueleque, 2019). A workshop launched in Los Angeles targeting the reproductive health of the youth was tested for its efficacy on the attendees. The findings suggested better knowledge of reproductive health, birth control and family planning, attitude and self-efficacy after the intervention was delivered (Taylor, Shade, Lowry, & Ahrens, 2019).

Summary

In summary, it has been revealed from this review that even though the education curriculum includes information on the concept of reproductive health, many myths and misconceptions arise in adolescents world-wide. Further, the studies have shown adolescents' frequent engagement in risky reproductive health behaviour. The studies reviewed here seem to suggest a pertinent role of sociocultural factors in influencing the reproductive health behaviour of adolescent girls. Miniscule evidence is traced about the existence of suitable culture-sensitive measures to assess the knowledge, attitude, and practice of the reproductive health behaviour of the Indian adolescent girls. Research is also sparse in the area of linking reproductive health behaviour with psychological well-being of the adolescent girls. Though interventions for the knowledge, attitude, and practice of the reproductive health behaviour have been designed and tested across the globe, such interventions are limited to using instructional method without an integrative approach involving professionals from medical science and psychology.

Research questions

There are four specific research questions.

- (1) What is the level of knowledge, attitude, and practice of reproductive health behaviour in adolescent girls?
- (2) What is the role of knowledge, attitude, and practice of reproductive health behaviour in determining their psychological well-being?

(3) Can an integrated psychosocial intervention model be developed to increase the knowledge of adolescent girls' reproductive health behaviour?

(4) What is the efficacy of the developed integrated psychosocial intervention model in increasing their knowledge of reproductive health behaviour?

Objectives

The main objectives of the study are

(1) To measure and examine the knowledge, attitude, and practice of reproductive health behaviour in late adolescent girls (16–19 years) and assess their reproductive health-risks;

(2) To explore the role of knowledge, attitude, and practice of late adolescent girls reproductive health behaviour in determining their psychological well-being;

(3) To design and test the efficacy of an integrated psychosocial intervention model in enhancing their knowledge of reproductive health behaviour.

Hypotheses

It is hypothesised that

(1) The late adolescent girls across three age groups will differ in their knowledge, attitude, and practice of reproductive health behaviour

(2) There will be a positive impact of knowledge, attitude, and practice of adolescent girls' reproductive health behaviours on their psychological well-being

(3) The integrated psychosocial intervention model will increase the knowledge of adolescent girls' reproductive health behaviour.

Chapter III

METHOD

This chapter contains five major headings. First, the plan of the study and research designs are explained. Second, the pilot study is described. Third, sampling is mentioned along with the inclusion and exclusion criteria, sample size, and characteristics of the participants. Fourth, the measures used in the present study are described with their scoring procedure and psychometric properties. Fifth, the procedures of the study are explained.

Plan and Design

The study was planned to be carried out under three phases. In Phase I, the knowledge, attitude, and practice of adolescent girls' reproductive health behaviour were measured and examined using cross-sectional design. For this, a set of specific measures was developed and standardized (see *Appendix I*). In Phase II, an integrated psychosocial intervention model was designed using data triangulation method (see *Appendix II*). In Phase III, the efficacy of this model was tested by using experimental design.

In Phase I, a cross-sectional design was adopted ($N = 293$). The independent variable was Age of the girls belonging to late adolescence and had three levels—Age Group I (16+ years, $n_1 = 94$), Age Group II (17+ years, $n_2 = 101$), and Age Group III (18+ years, $n_3 = 98$). The primary dependent variables were knowledge, attitude, and practice of adolescent girls' reproductive health behaviour. In addition to this, psychological well-being was also measured.

In Phase III, a pre-test post-test control group design ($n = 64$) was followed to test the efficacy of the developed intervention model in bringing a positive change in reproductive health behaviour primarily on knowledge scores. The participants were randomly assigned into two groups—experimental and control. Each of these groups consisted of 32 participants. The treatment, i.e. the integrated psychosocial intervention was

administered on the experimental group. The dependent variable was knowledge of adolescent girls' reproductive health behaviour.

Pilot study

An external pilot study independent of the main study was conducted. Involving a small sample ($n = 75$), the pilot study aimed to validate the feasibility of the study by assessing the suitability of the method of data collection, the instruments used for the study, and identifying inclusion criteria of the participants. The relevance of the consent form, enrolment rates, length of time to receive written consent and assent, well-understood measure, and time needed for administering the measures was determined. The pilot study predicted an appropriate sample size for the main study to improve the important aspects of the method of study. The participants' non-verbal behaviour also gave important information and signal about any embarrassment or discomfort experienced concerning the content or wording of items in the developed measures. The observation of the pilot study was taken into consideration.

Participants

The study involved adolescent girls belonging to late adolescence who were selected from the student pool of various schools and colleges in the twin-city of Hyderabad and Secunderabad of Telangana State. The adolescent girls belonging to the age group of 16 to 19 years who attained menarche and were pursuing an education in high school or an intermediate level were included in the study. Any case, having known psychological disorders or any kind of chronic illnesses, were excluded from the study.

In Phase I, the initial sample consisted of 400 adolescent girls belonging to the age of 16-19 years. The sample was selected through purposive sampling. Out of 400, 26 participants did not consent to participate. The remaining 374 participants were assessed.

The final sample of Phase I consisted of 293 participants after removing 81 cases on the basis of missing data.

In Phase III, a separate sample of participants ($n = 64$) was selected by using simple random sampling method from a student pool of 80. These participants were recruited by the investigator from a girls' residential school for the feasibility of the administration of the intervention. These 64 participants were randomly assigned into experimental group and control group equally. All the 64 participants were from Class XI for maintaining intra-sample homogeneity. As there was a dropout of two participants from the control group, two participants from the experimental group were randomly deleted after imparting intervention at the time of data analysis.

Measures

Four measures—Reproductive Health Behaviour–Knowledge Test (RHB-KT), Reproductive Health Behaviour–Attitude Scale (RHB-AS), Reproductive Health Behaviour–Practice Test (RHB-PT) and Psychological Wellbeing Scale—were used. In addition to these, a Case History Form was used.

Reproductive Health Behaviour–Knowledge Test (RHB-KT)

The RHB-KT is a tailor-made test for Indian adolescent girls to measure the level of their knowledge on reproductive health behaviour. This RHB-KT is a 30-item test, having four dimensions, such as reproductive system and functions, disorders related to the reproductive system, causes of disorders related to the reproductive system, and prevention and treatment. There were four multiple choices for each item. Out of which, one was correct, two were incorrect, and the fourth was 'Do not know'. Each correct answer was assigned a score '1', whereas the other three options including 'Do not know' were assigned a score of '0'. Thus, the range of the total knowledge score was between 0–30. The higher the score, the higher was the level of knowledge. Scores were also calculated for each

dimension. The reliability of the scale using KR-20 (Kuder & Richardson, 1937) was found to be adequate (.70). The content validity of the test was established (see *Appendix I*).

Reproductive Health Behaviour–Attitude Scale (RHB-AS)

The RHB-AS is a tailor-made scale developed for the Indian adolescent girls to measure their attitude encompassing belief, feeling, and action towards reproductive health behaviour (see *Appendix I*). There were 15 items, each was measured using a 4-point Likert scale (1 = Strongly Disagree, 4 = Strongly Agree). The scale consisted of 5 positive items and 10 negative items to minimise respondent errors. The negative items were scored in a reverse way. The total attitude scores varied between 15 to 60. Higher the score, positive was the attitude. The reliability coefficient was 0.56. The content validity was established (see *Appendix I*).

Reproductive Health Behaviour–Practice Test (RHB-PT)

The RHB-PT test is a tailor-made projective test developed for Indian adolescent girls to measure their reproductive health-risk behaviour in five dimensions, such as premarital sexual relationship, stigma related to HIV, promiscuous sexual behaviour, menstrual hygiene, and safe sex (see *Appendix I*). This projective test consisted of five situation-completion vignettes. Each vignette had a partial description of a situation with a blank. The respondent was to fill the blank with a detailed description of her course of action. To score, each item was assigned a score of '1' when there was a risk involved and a score of '0' when there was no risk on the basis of predetermined criteria. The total practice score varied between 0–5. As RHB-PT was a projective test and coding was required to classify the responses under 'risk' or 'no risk', inter-rater reliability (Cohen's Kappa) was established and found to be high (ranging between .70 to .85). The content validity was established.

Ryff's Psychological Well-being Scale

The scale (Ryff, 1995) measures psychological well-being in six areas, such as “autonomy, environmental mastery, personal growth, positive relation with others, purpose in life, and self-acceptance”. This scale consisted of 42 items involving a 6-point Likert scale (Strongly Agree = 6, Strongly Disagree = 1). The reliability of the scale is adequate (Cronbach's alpha = 0.72). The validity has also been established. (see *Appendix III*).

Case History Form

A Case History Form was developed to collect essential information pertaining to demographic variables and other significant variables of interest. The demographic data included name, age, class, and name of the educational institution. Other significant variables of interest included attainment of menarche, any consultation with psychiatrist, and information about the presence of any chronic illness (see *Appendix III*).

Procedure

The Institutional Ethics Committee of the University of Hyderabad accorded the approval to conduct the study (see *Appendix IV*). In Phase I, the authorities of the Government and Private schools and colleges of twin-city of Hyderabad and Secunderabad of Telangana State were approached to seek permission to interact with their students as participants in the study. After obtaining permission from the authorities, the girl students were initially contacted and the purpose of the study was communicated. Those girls who provided Informed Assent (below 18-year of age) and Informed Consent (18-year of age and above) were included in the study (see *Appendix V*). The Case History Form and all the measures were administered on the selected sample through group assessment. The duration of the assessment varied between 60 minutes to 90 minutes. During the assessment, doubts of the participants were clarified. After the assessment, a debriefing was done.

In Phase II, an extensive review was done to collate studies on the adolescents' reproductive health. Small groups of 15 adolescent girls and 10 parents were chosen and In-depth interview sessions were carried out. Multiple sessions of in-depth interview were also completed with professionals from the field of Medical Sciences (Two Gynaecologists) and Psychology (Two Psychologists). In addition to these, the textbooks of Science (Biology) up to Class X and the findings of Phase I were referred. Following the data triangulation method, an integrated psychosocial intervention model was developed for improving the knowledge of adolescent girls' reproductive health behaviour (see *Appendix II*).

In Phase III, the effect of the developed intervention model was tested using experimental method. The pre-test post-test control group design was adopted. To make the intervention feasible, the Principal of a Girl's Residential School was contacted for permitting the investigator to conduct the intervention study. After obtaining the permission, 64 students were selected by means of a simple random sampling method from the pool of 80 students of Class XI. The informed consent and informed assent were collected from each of these 64 participants. Further, these 64 participants were coded and randomly assigned equally into the experimental group and control group. The baseline assessment of knowledge of reproductive health of the participants of both the experimental group and control group was done prior to exposure to the treatment (intervention). Each of the participants was explained about the intervention. The experimental session started when each participant understood what she had to do. Intervention for improving the knowledge on reproductive health behaviour was given in four sessions—sessions by the investigator, medical expert (gynaecologist), and psychologist followed by the last session, i.e. referring pamphlet. Each of the first three sessions continued for 45–60 minutes followed by distribution of pamphlets and an interactive session with each participant of the experimental group to enhance their knowledge. After the exposure of the experimental

group to treatment, a debriefing was done individually with each participant of the experimental group. During this period, the participants of the control group were engaged in their routine activities. Then, the post-test knowledge scores were obtained from the participants of the experimental group. At the same time, the knowledge of the participants of the control group was also measured. Considering the ethics, the written brochure was distributed to the participants of the control group for the acquisition of knowledge on reproductive health behaviour.

Chapter IV

RESULTS

This chapter comprises results and their analyses. The obtained quantitative data were entered into the IBM SPSS Statistics 23, and the process of data cleaning was run. Considering each objective and hypothesis, appropriate statistical tests were chosen. The main statistical analyses include Descriptive Statistics, One-way ANOVA, Chi-square, Multiple Regression Analysis, Path Analysis using Structural Equation Modelling, and One-way ANCOVA. Assumptions of each statistical test were tested. An alpha level of .05 was used for all statistical tests. Cohen's criteria (Cohen, 1988) for cut off of effect size was used wherever required. The results and the analyses are presented objective-wise, under three major headings—(1) knowledge, attitude, and practice of reproductive health behaviour; (2) role of knowledge, attitude, and practice on psychological well-being; and (3) designing and testing the efficacy of an integrated psychosocial intervention model. Under each objective, the type of data, the name of the statistical test, and testing of assumptions are mentioned in the first paragraph, followed by the analysis. The results are presented in tables and figures.

Knowledge, attitude, and practice of reproductive health behaviour

The *first* main objective of the study was to measure and examine the knowledge, attitude, and practice of reproductive health behaviour in adolescent girls. The objective was further divided into four sub-objectives and the results are written accordingly.

The *first sub-objective* was to find out the variations of scores of knowledge, attitude, and practice of reproductive health behaviour in adolescent girls across three age groups. The scores generated for knowledge and practice were ratio data, whereas the scores of attitude were interval data. As the data were ratio and interval, descriptive statistics (*M*, *SD*) and One-way Between-Subjects ANOVA (One-way ANOVA) was run for each dependant variable—knowledge, attitude, and practice. When the results of One-way ANOVA were

significant, post-hoc test (Tukey's HSD) was run for multiple comparisons. Before running the One-way ANOVA, its major assumptions like normal distribution and homogeneity of variance were tested.

The descriptive statistics (M and SD) and the results of One-way ANOVA on knowledge scores and its four dimensions are presented in Table 1. From the table, it is observed that there was a statistically significant difference in knowledge scores for the three age groups of adolescent girls, $F(2,290) = 8.74, p < .001$. The effect size, calculated using partial eta squared, was .06 (medium) suggesting about, 6% of the variance of knowledge scores was due to the differences in the age of the participants. *Figure 1* displays the mean scores of knowledge of reproductive health and its three dimensions. As the result of One-way ANOVA was significant, post-hoc comparisons using the Tukey's HSD test was run for multiple comparisons between the age groups and the results are presented in Table 2. From Table 2, it is observed that the knowledge scores of adolescent girls belonging to Group III ($M = 20.38, SD = 3.99$) were significantly higher than that of the girls belonging to Group I ($M = 18.55, SD = 4.47$, Tukey's HSD = 1.82, $p < .05$) and Group II ($M = 17.87, SD = 4.58$, Tukey's HSD = 2.50, $p < .05$). Nevertheless, the girls belonging to Group I and Group II did not differ significantly from each other.

There are four dimensions of knowledge—reproductive system and functions, disorders related to reproductive system, causes of disorders related to reproductive system, and prevention and treatment. One-way ANOVA was run for each dimension scores and the results are presented in Table 1. It is observed that there was a statistically significant difference in reproductive system and functions scores for the three age groups of adolescent girls, $F(2,290) = 7.28, p = .001$. The effect size, calculated using partial eta squared was .04,

Table 1

M, SD, and One-way Analyses of Variance for the Effect of Age Groups on Knowledge, Attitude, and Practice of Reproductive Health Behaviour

Variables	Group I		Group II		Group III		<i>F</i> (2,290)	<i>p</i>	η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Knowledge	18.55	4.47	17.87	4.58	20.38	3.99	8.74	<0.001	0.06
RSF	6.84	1.60	6.40	1.98	7.34	1.57	7.28	0.001	0.05
DRS	4.43	1.70	4.19	1.64	4.80	1.61	3.42	0.034	0.02
CDRS	4.48	1.58	4.48	1.73	5.21	1.40	7.11	0.001	0.05
PT	2.81	1.24	2.81	1.46	3.03	1.06	0.98	0.375	-
Attitude	42.33	4.54	41.84	5.07	43.93	4.72	5.13	0.006	0.03
Practice	1.71	0.96	1.74	1.12	2.09	1.11	3.74	0.025	0.03

Note. RSF: Reproductive systems and functions, DRS: Disorders related to reproductive system, CDRS: Causes of disorders related to reproductive system, PT: Prevention and treatment.
N = 293

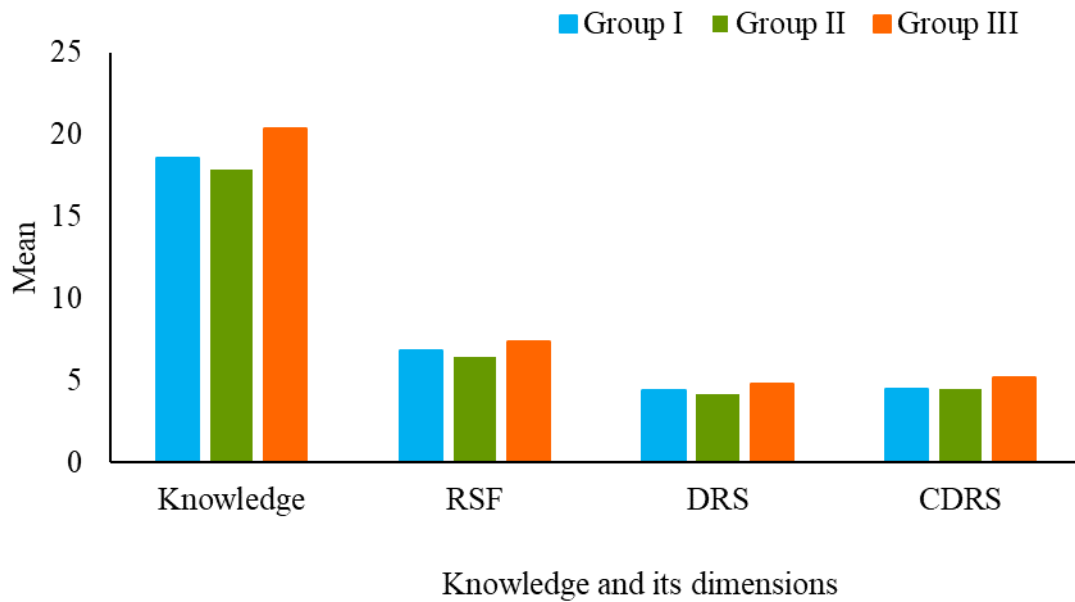


Figure 1. Mean scores of knowledge of reproductive health and its three dimensions—reproductive systems and functions (RSF), disorders related to reproductive system (DRS), and causes of disorders related to reproductive system (CDRS) of three groups of adolescent girls.

Table 2

Multiple comparisons using Tukey's HSD post-hoc test

Variables	Group I ~ Group II	Group I ~ Group III	Group II ~ Group III
Knowledge	0.68	1.82*	2.51*
RSF	0.44	0.50	0.95**
DRS	0.24	0.37	0.61*
CDRS	0.01	0.74**	0.74**
Attitude	0.49	1.60	2.09**
Practice	0.03	0.38*	0.35

Note. RSF: Reproductive systems and functions, DRS: Disorders related to reproductive system, CDRS: Causes of disorders related to reproductive system, PT: Prevention and treatment.
N = 293

suggesting about 4% of the variance of reproductive system and functions was due to the difference in the age of the participants. Tukey's HSD test revealed that girls belonging to Group III ($M = 7.34$, $SD = 1.57$) had significantly better level of knowledge of reproductive system and functions than Group II ($M = 6.40$, $SD = 1.98$, Tukey's HSD = 0.94, $p < .01$). No significant difference was observed between the means of Group I and Group II and between Group I and Group III as seen in Table 2.

The results of One-way ANOVA done on disorders related to reproductive system scores showed a statistically significant difference between the age groups, $F(2,290) = 3.41$, $p = .03$. The effect size, calculated using partial eta squared was .02 (low) suggesting about 2% of variance of disorders related to reproductive system was due to the difference in the age of the participants. As observed in Table 2, Group III ($M = 4.8$, $SD = 1.61$) significantly differed from Group II ($M = 4.19$, $SD = 1.64$, Tukey's HSD = 0.61, $p < .05$), with Group III participants displaying the highest mean value among the three groups.

As seen in Table 1, statistically significant difference was observed among the three groups with respect to causes of disorders related to reproductive system $F(2,290) = 7.11$, $p = .001$. The partial eta squared was .05 (medium effect size) suggesting about 5% of causes of disorders related to reproductive system was due to the difference in the age of the participants. The results of the post-hoc test in Table 2 suggests that participants belonging to Group III ($M = 5.21$, $SD = 1.40$) scored significantly higher than participants belonging to Group I ($M = 4.48$, $SD = 1.58$, Tukey's HSD = 0.73, $p < .01$) and Group II ($M = 4.48$, $SD = 1.73$, Tukey's HSD = 0.74, $p < .01$).

The results of One-way ANOVA done on knowledge of prevention and treatment were not statistically significant; hence the post-hoc test (Tukey's HSD) was not run.

The descriptive statistics (M and SD) and the results of One-way ANOVA on attitude towards reproductive health behaviour scores are presented in Table 1. The One-way

ANOVA revealed a statistically significant difference among the three age groups of adolescent girls in respect of their attitude towards reproductive health behaviour scores, $F(2,290) = 5.19, p = .006$. The effect size, calculated using partial eta squared was .03 (low) indicating about 3% of the variance of attitude was due to the differences in the age of the participants. *Figure 2* represents mean scores of attitude towards reproductive health behaviour of three groups of adolescent girls. As the results of One-way ANOVA were significant, the Tukey's HSD test was run for multiple comparisons between the groups. The results from Table 2 suggest that participants belonging to Group III ($M = 43.93, SD = 4.72$), scored significantly higher than participants belonging to Group II ($M = 41.84, SD = 5.07$, Tukey's HSD = 2.09, $p < .01$). However, no statistically significant mean difference was observed between Group I and Group II and between Group I and Group III.

The descriptive statistics (M and SD) and the results of One-way ANOVA on practice of reproductive health behaviour scores are presented in Table 1. The One-way ANOVA revealed a statistically significant difference among the three age groups of adolescent girls in respect of their practice of reproductive health behaviour $F(2,290) = 3.74, p = .025$. The effect size, calculated using partial eta squared was .02 (low) showing about 2% of the variance of the practice scores was due to the differences in the age of the participants. *Figure 3* indicates the mean scores of practice of reproductive health behaviour of three groups of adolescent girls. The Tukey's HSD test was run for multiple comparisons between the groups seen in Table 2 suggest that participants belonging to Group III ($M = 2.09, SD = 1.11$) scored significantly higher than participants belonging to Group I ($M = 1.71, SD = 0.96$, Tukey's HSD = 0.38, $p < .05$). However, no difference was observed between Group I and Group II and between Group II and Group III.

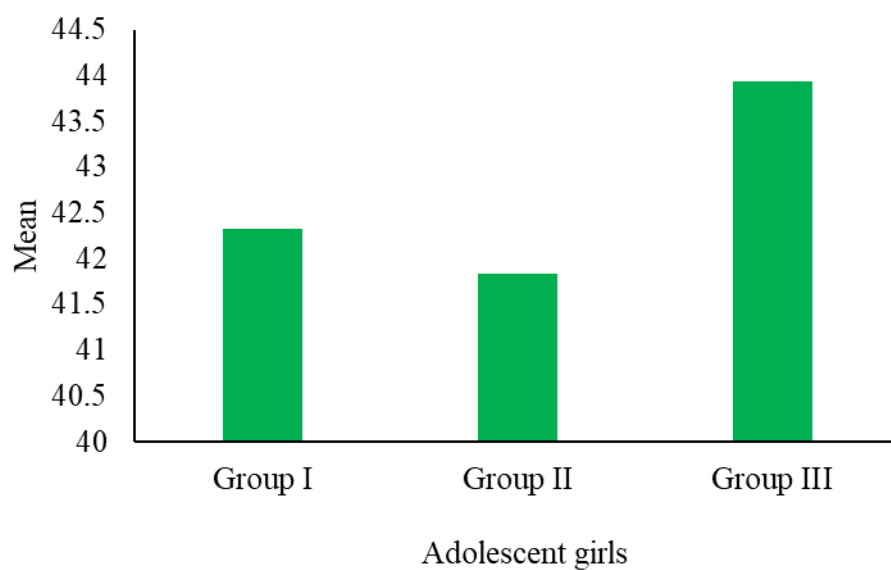


Figure 2. Mean scores of attitude towards reproductive health behaviour of three groups of adolescent girls.

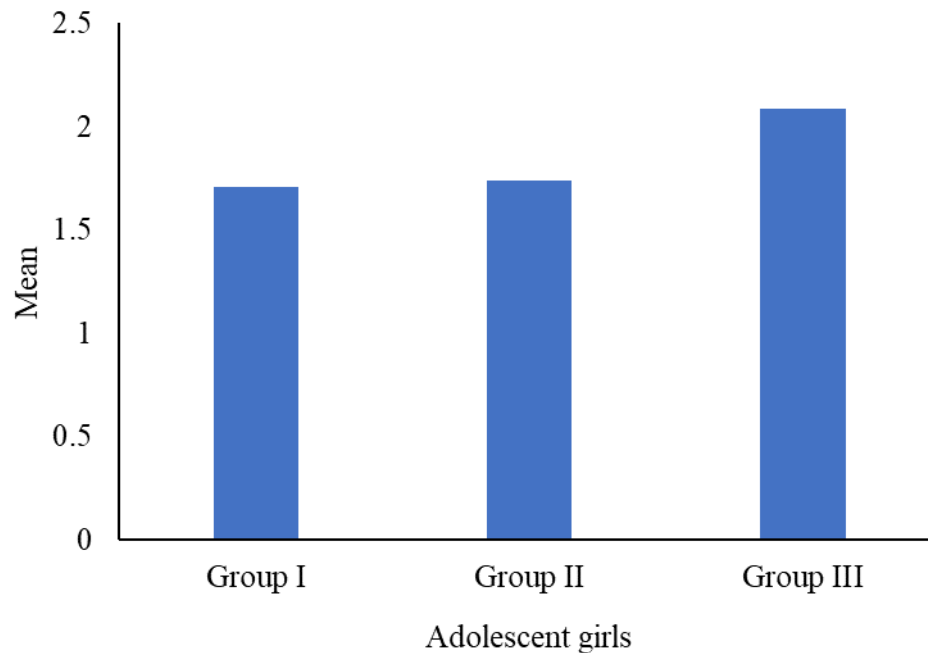


Figure 3. Mean scores of practice of reproductive health behaviour of three groups of adolescent girls

The *second sub-objective* was to examine the prevalence of reproductive health risk behaviour in adolescent girls. The reproductive health risk behaviour was measured from each item of the practice test and data thus generated were nominal. Therefore, Chi-square test of association was conducted to examine if there was a relationship between the age group and each of the five reproductive health risk behaviour that were measured through the practice test. The assumption of an expected frequency of at least 5 per cell was met. The results of Chi square analyses along with crosstab are presented in Table 3.

The results revealed that there was a significant association between age group and the reproductive health risk behaviour pertaining to pre-marital sexual relationship, $\chi^2(2) = 9.45$, $p = .009$. The participants of Group III appeared to have significantly higher risk (60.2%) in premarital sexual relationship in comparison to the participants of Group I (38.3%) and Group II (46.5%). *Figure 5* represents the percentage of adolescents girls of Age Group II ($N = 101$) having reproductive health risk behaviour in five dimensions—premarital sexual relationship, stigma related to HIV, promiscuous sexual behaviour, menstrual health and hygiene, and safe sex. Similarly, *Figure 6* shows the percentage of adolescent girls of Age Group III ($N = 98$) having reproductive health risk behaviour in five dimensions—premarital sexual relationship, stigma related to HIV, promiscuous sexual behaviour, menstrual health and hygiene, and safe sex. However, no significant association was observed between age and the reproductive health risk behaviour pertaining to stigma related to HIV [$\chi^2(2) = 0.97$, $p = .615$], promiscuous sexual behaviour [$\chi^2(2) = 4.89$, $p = .087$], menstrual health and hygiene [$\chi^2(2) = 1.62$, $p = .444$], and safe sex [$\chi^2(2) = 3.47$, $p = .176$]. Moreover, from Table 3, it is observed that the participants were at risk of premarital sexual relationship (48.5%), stigma related to HIV (27.6%), promiscuous sexual behaviour (51.2%), menstrual health and hygiene (20.1%), and safe sex (37.5%). It is observed that the rate of risk was comparatively higher in promiscuous sexual behaviour and premarital

Table 3

Prevalence of Reproductive Health Risk Behaviour in Adolescent Girls (N = 293)

Variable	Risk	<u>Age Group I</u>		<u>Age Group II</u>		<u>Age Group III</u>		<u>Total</u>		$\chi^2(2)$	<i>p</i>
		n	%	n	%	n	%	n	%		
PMSR	Risk	36	38.3	47	46.5	59	60.2	142	48.5	9.45	.009
	No risk	58	61.7	54	53.5	39	39.8	151	51.5		
SHIV	Risk	29	30.9	28	27.7	24	24.5	81	27.6	.97	.615
	No risk	65	69.1	73	72.3	74	75.5	212	72.4		
PSB	Risk	45	47.9	46	45.5	59	60.2	150	51.2	4.89	.087
	No risk	49	52.1	55	54.5	39	39.8	143	48.8		
MHH	Risk	23	24.5	18	17.8	18	18.4	59	20.1	1.62	.444
	No risk	71	75.5	83	82.2	80	81.6	234	79.9		
SS	Risk	29	30.9	38	37.6	43	43.9	110	37.5	3.47	.176
	No risk	65	69.1	63	62.4	55	65.1	183	62.5		

Note. PMSR: Premarital sexual relationship, SHIV: Stigma related to HIV, PSB: Promiscuous sexual behaviour, MHH: Menstrual health and hygiene, SS: Safe sex

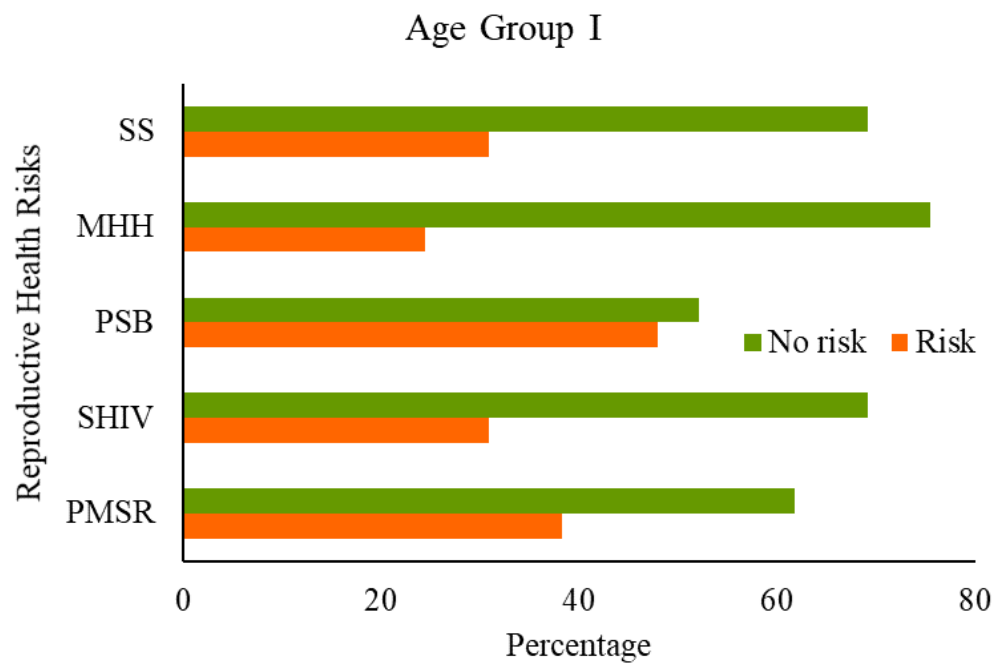


Figure 4. Percentage of adolescents girls of Age Group I (N = 94) having reproductive health risk behaviour in five dimensions—premarital sexual relationship (PMSR), stigma related to HIV (SHIV), promiscuous sexual behaviour (PSB), menstrual health and hygiene (MHH), safe sex (SS).

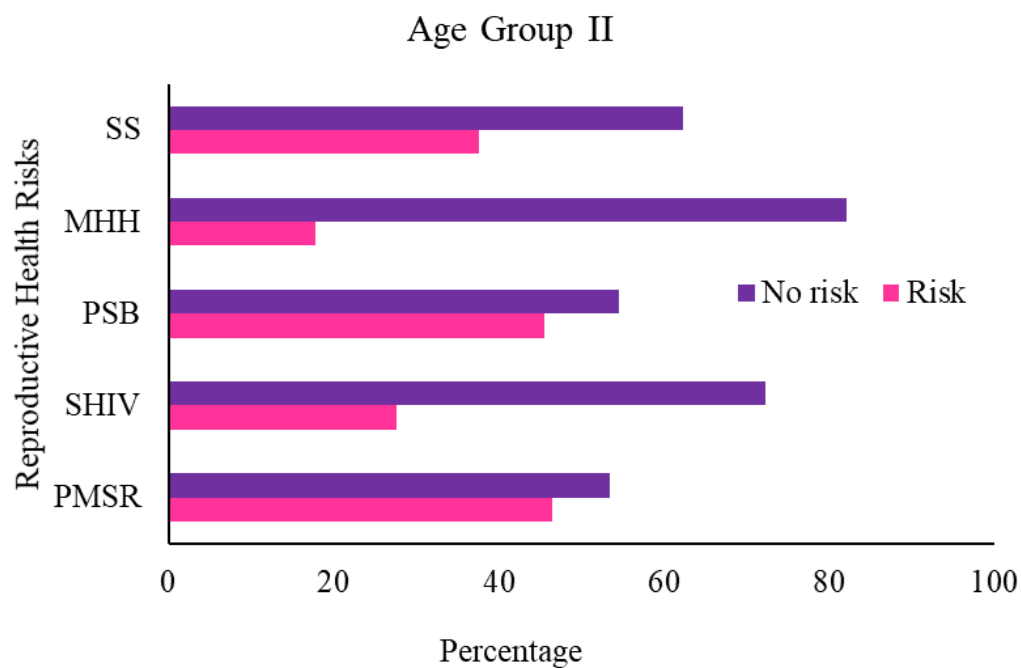


Figure 5. Percentage of adolescents girls of Age Group II ($N = 101$) having reproductive health risk behaviour in five dimensions—premarital sexual relationship (PMSR), stigma related to HIV (SHIV), promiscuous sexual behaviour (PSB), menstrual health and hygiene (MHH), safe sex (SS).

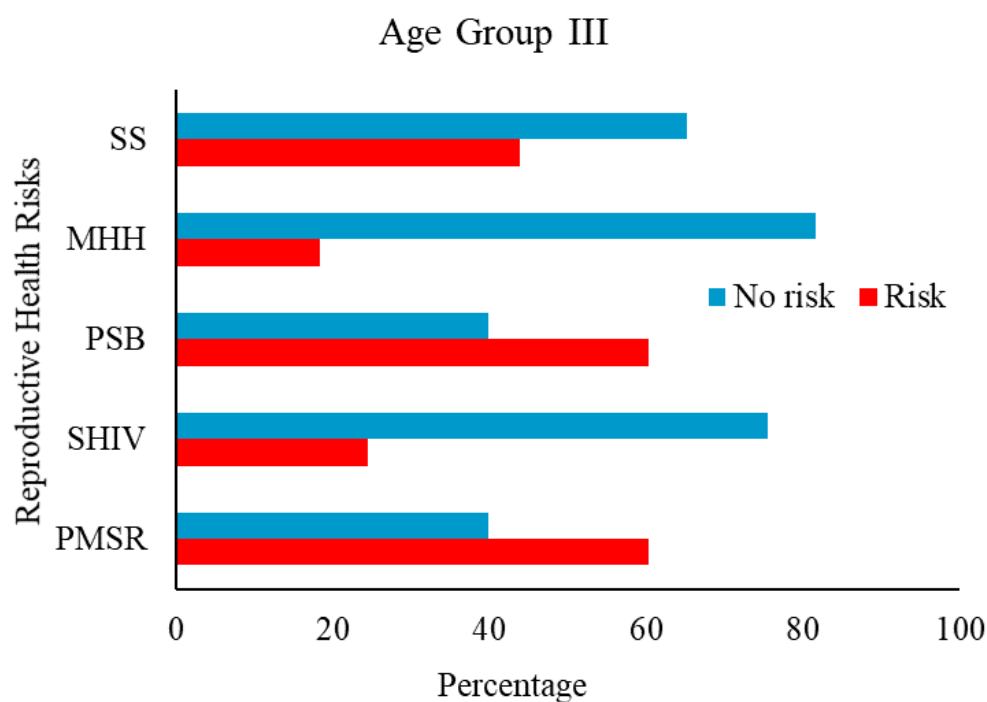


Figure 6. Percentage of adolescents girls of Age Group III (N = 98) having reproductive health risk behaviour in five dimensions—premarital sexual relationship (PMSR), stigma related to HIV (SHIV), promiscuous sexual behaviour (PSB), menstrual health and hygiene (MHH), safe sex (SS).

sexual relationship. *Figure 4* depicts the percentage of adolescent girls of Age Group I ($N = 94$) having reproductive health risk behaviour in five dimensions—premarital sexual relationship, stigma related to HIV, promiscuous sexual behaviour, menstrual health and hygiene, and safe sex.

The *third sub-objective* was to explore the relationship between knowledge, attitude and practice of reproductive health behaviour of adolescent girls across three age groups. As the obtained scores of knowledge and practice were ratio data and attitude scores were interval data, Pearson's r was calculated. Major assumptions were tested. Pearson's r values were calculated for the sample ($N = 293$) and presented in Table 4. As the results of One-way ANOVA revealed significant differences between the three age groups, Pearson's r values were calculated for each group separately and presented in Table 5 to Table 7.

The results in Table 4 ($N = 293$) showed that there was a significant positive relationship between knowledge and its dimensions—reproductive system and functions ($r = .76, p < 0.01$), disorders related to reproductive system ($r = .75, p < 0.01$), causes of disorders related to reproductive system ($r = .78, p < 0.01$), and prevention and treatment ($r = .48, p < 0.01$). There was a significant positive correlation between knowledge and attitude ($r = .27, p < 0.01$). Attitude was also found to be significantly positively correlated with the four dimensions of knowledge—reproductive system and functions ($r = .18, p < 0.01$), disorders related to reproductive system ($r = .13, p < 0.01$), causes of disorders related to reproductive system ($r = .23, p < 0.01$), and prevention and treatment ($r = .23, p < 0.01$). There was a positive correlation between practice and knowledge ($r = .12, p < 0.05$). Further, significant positive correlation was observed between practice and two dimensions of knowledge—reproductive system and functions ($r = .12, p < 0.05$), and causes of disorders related to

Table 4

Intercorrelations for Knowledge, Attitude, and Practice (N = 293)

Variables	Knowledge	RSF	DRS	CDRS	PT	Attitude	Practice
Knowledge	—	.76**	.75**	.78**	.48**	.27**	.12*
RSF		—	.39**	.49**	.15*	.18**	.12*
DRS			—	.47**	.20**	.13**	.07
CDRS				—	.17**	.23**	.16**
PT					—	.23**	-.03
Attitude						—	.09
Practice							—

Note. RSF: Reproductive systems and functions, DRS: Disorders related to reproductive system, CDRS: Causes of disorders related to reproductive system, PT: Prevention and treatment.

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

Table 5

Intercorrelations for Knowledge, Attitude, and Practice (Age Group I, N = 94)

Variables	Knowledge	RSF	DRS	CDRS	PT	Attitude	Practice
Knowledge	—	.76**	.78**	.80**	.52**	.15	.22*
RSF		—	.41**	.52**	.23*	.13	.07
DRS			—	.53*	.24**	.01	.24
CDRS				—	.19	.15	.19
PT					—	.18	.12
Attitude						—	.05
Practice							—

Note. RSF: Reproductive systems and functions, DRS: Disorders related to reproductive system, CDRS: Causes of disorders related to reproductive system, PT: Prevention and treatment.

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

Table 6

Intercorrelations for Knowledge, Attitude, and Practice (Age Group II, N = 101)

Variables	Knowledge	RSF	DRS	CDRS	PT	Attitude	Practice
Knowledge	—	.75**	.74**	.76**	.39**	.27**	.21*
RSF		—	.38**	.47**	.01	.11	.24*
DRS			—	.45**	.14	.07	.12
CDRS				—	.04	.28**	.20*
PT					—	.30**	-.04
Attitude						—	.05
Practice							—

Note. RSF: Reproductive systems and functions, DRS: Disorders related to reproductive system, CDRS: Causes of disorders related to reproductive system, PT: Prevention and treatment.

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

Table 7

Intercorrelations for Knowledge, Attitude, and Practice (Age Group III, N = 98)

Variables	Knowledge	RSF	DRS	CDRS	PT	Attitude	Practice
Knowledge	—	.73**	.73**	.75**	.56**	.27**	-.18
RSF		—	.31**	.41**	.26*	.23*	-.08*
DRS			—	.40**	.23*	.23*	-.21*
CDRS				—	.30**	.15	-.01
PT					—	.14	-.20
Attitude						—	0.08
Practice							—

Note. RSF: Reproductive systems and functions, DRS: Disorders related to reproductive system, CDRS: Causes of disorders related to reproductive system, PT: Prevention and treatment.

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

reproductive system ($r = .16, p < 0.01$). However, there was no significant correlation between attitude and practice ($r = .09, p > .05$).

In Table 5, results shows the correlation between knowledge and its dimensions of participants of Group I ($N = 94$). There was a significant positive relationship between knowledge and its dimensions—reproductive system and functions ($r = .76, p < 0.01$), disorders related to reproductive system ($r = .78, p < 0.01$), causes of disorders related to reproductive system ($r = .80, p < 0.01$), and prevention and treatment ($r = .52, p < 0.01$). There was a significant positive correlation between practice and knowledge ($r = .22, p < 0.05$). Whereas practice was not significantly correlated with any of the dimensions of the knowledge and attitude ($r = .15, p > 0.05$).

In Table 6, results shows the correlation between knowledge and its dimensions of participants of Group II ($N = 101$). There was a significant positive relationship between knowledge and its dimensions—reproductive system and functions ($r = .75, p < 0.01$), disorders related to reproductive system ($r = .74, p < 0.01$), causes of disorders related to reproductive system ($r = .76, p < 0.01$), and prevention and treatment ($r = .39, p < 0.01$). There was a significant positive correlation between knowledge and attitude ($r = .27, p < 0.01$). A significant correlation was observed between attitude and the two dimensions of knowledge—causes of disorders related to reproductive system ($r = .28, p < 0.01$), and prevention and treatment ($r = .30, p < 0.01$). However, attitude was not significantly correlated with the other two dimensions of knowledge—reproductive system and functions and disorders related to reproductive system. knowledge was also found to be significantly correlated with practice ($r = .21, p < 0.05$). Further, a significant positive correlations were observed between practice and knowledge dimensions—reproductive system and functions ($r = .24, p < 0.05$), and causes of disorders related to reproductive system ($r = .20, p < 0.05$).

In addition, practice was not significantly correlated with the other dimensions of knowledge—disorders related to reproductive system and prevention and treatment.

In Table 7, results shows the correlation between knowledge and its dimensions of participants of Group III ($N = 98$). As evident, knowledge was significantly positively correlated with its dimensions—reproductive system and functions ($r = .73, p < 0.01$), disorders related to reproductive system ($r = .73, p < 0.01$), causes of disorders related to reproductive system ($r = .75, p < 0.01$), and prevention and treatment ($r = .56, p < 0.01$). There was a significant positive correlation observed between knowledge and attitude ($r = .27, p < 0.01$). Further, attitude was significantly correlated with the knowledge dimensions—reproductive system and functions ($r = .23, p < 0.05$) and disorders related to reproductive system ($r = .23, p < 0.05$). However, practice was not significantly correlated with knowledge ($r = -.18, p > 0.05$). Nonetheless, significant negative correlations were found between the two dimensions of knowledge—reproductive system and functions ($r = -.08, p < 0.05$), and disorders related to reproductive system ($r = -.21, p < 0.05$).

The *fourth sub-objective* was to find out the impact of the four dimensions of knowledge on attitude and practice. As the knowledge and practice scores were ratio data and attitude scores were interval data, multiple linear regression analysis using stepwise method was computed ($N = 293$). For this analyses, the predictors were the four dimensions of knowledge scores and the criterion were attitude and practice scores. The major assumptions, such as normal distribution of sample, linear relationship between the dependent variables, and absence of multicollinearity were tested.

A multiple linear regression using stepwise method was performed between the adolescent girls' ($N = 293$) attitude towards reproductive health behaviour as the criterion and the four dimensions of knowledge as predictors—knowledge of reproductive system

Table 8

Summary of Multiple Regression Analysis (Stepwise) for Knowledge Dimensions Predicting Adolescent Girls' Attitude Towards Reproductive Health Behaviour (N = 293)

Step and predictor variable	C	R ²	ΔR ²	B	SE B	β	t
Step 1:	39.41	.05***	—				
CDRS				0.70	0.17	.23	4.05***
Step 2:	37.73	.09***	.04***				
CDRS				0.60	0.17	.20	3.39***
PT				0.74	0.22	.19	3.42***

Note. CDRS: Causes of disorders related to reproductive system, PT: Prevention and treatment.

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

and functions, disorders related to reproductive system, causes of disorders related to reproductive system, and prevention and treatment. Table 8 displays the results mentioning the number of steps, constant (C), R^2 , R^2 -change (ΔR^2), unstandardized regression coefficients (B), standard error of B , standardized regression coefficients (β), and t -value. The analysis showed that in the **first step**, the predictor knowledge of causes of disorders related to reproductive system, was entered into the stepwise model. As a significant predictor ($\beta = .23$, $t = 4.05$, $p < .001$), knowledge of causes of disorders related to reproductive system explained a statistically significant 5% proportion of the variance in attitude towards reproductive health behaviour, $R^2 = .05$, $F(1,291) = 16.43$, $p < .001$. As a result of the **second step**, the predictor knowledge of prevention and treatment was entered into the stepwise model already containing the predictor knowledge of causes of disorders related to reproductive system, giving rise to the final model containing only these two predictors. In this final step, when the predictor knowledge of prevention and treatment was added with the predictor knowledge of causes of disorders related to reproductive system, both explained significantly 4% more variance ($\Delta R^2 = .04$, F -change = 11.69, $p = .001$) in attitude towards reproductive health behaviour. In the final step, the model explained total 9% statistically significant proportion of the variance in attitude towards reproductive health behaviour, $R^2 = .09$, $F(2,290) = 14.36$, $p < .001$. Thus, finally the two significant predictors of attitude towards reproductive health behaviour were found to be knowledge of causes of disorders related to reproductive system ($\beta = .20$, $t = 3.49$, $p < .001$) and knowledge of prevention and treatment ($\beta = .19$, $t = 3.42$, $p < .001$).

Table 9 displays the results mentioning the number of steps and other parameters. The stepwise model displayed only one **step**, where the predictor was knowledge of causes of disorders related to reproductive system.

Table 9

Summary of Multiple Regression Analysis (Stepwise) for Knowledge Dimensions Predicting Adolescent Girls' Practice of Reproductive Health Behaviour (N = 293)

Step and predictor variable	<i>C</i>	<i>R</i> ²	ΔR^2	<i>B</i>	<i>SE B</i>	β	<i>t</i>
Step 1:	1.36	.02**	—				
CDRS				0.10	0.04	.15	2.61**

Note. CDRS: Causes of disorders related to reproductive system.

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

As a significant predictor ($\beta = .15$, $t = 2.61$, $p < .001$), knowledge of causes of disorders related to reproductive system explained a statistically significant 2% proportion of the variance in practice towards reproductive health behaviour, $R^2 = .02$, $F(1,291) = 6.81$, $p = .010$. Thus, knowledge of causes of disorders related to reproductive system ($\beta = .15$, $t = 2.61$, $p < .001$) was found to be the only significant predictor of practice towards reproductive health behaviour.

Role of knowledge, attitude, and practice on psychological well-being

The *second* main objective was to explore the role of knowledge, attitude, and practice of late adolescent girls in determining their psychological well-being. The objective was further divided into two sub-objectives and the results are written accordingly.

The *first sub-objective* was to find out the correlation between the scores of knowledge, attitude, and practice of reproductive health behaviour in adolescent girls and their psychological well-being. The scores generated for knowledge and practice were ratio data, whereas the scores of attitude and psychological well-being were interval data. As the data were ratio and interval, descriptive statistics (M , SD) and Pearson's product moment correlation coefficient (r) were computed. The results are presented in Table 10.

The results shown in Table 10 revealed that there was a significant positive relationship between total knowledge and psychological well-being ($r = .19$, $p < 0.01$). This indicated that when the knowledge score increased ($M = 169.28$, $SD = 18.42$), there was a significant increase in psychological well-being ($M = 18.93$, $SD = 4.47$) of the adolescent girls. Further, the total knowledge was significantly positively related with three dimensions of psychological well-being—positive relation with others ($r = .16$, $p < 0.01$), purpose in life ($r = .28$, $p < 0.01$), and self-acceptance ($r = .13$, $p < 0.01$). This shows that when there was an increase in knowledge of reproductive health, there was also an increase in the adolescent girls' positive relation with others, purpose in life, and self-acceptance. There

Table 10

Means, Standard Deviations, and Product Moment Correlation Coefficients for Adolescent Girls' Knowledge, Attitude, and Practice of Reproductive Health Behaviour, and Psychological Well-being (N = 293)

Variables	PWB	Auto	EM	PG	PRO	PL	SA	M ^b	SD ^b
Knowledge	.19**	-.05	-.02	.06	.16**	.28**	.13*	18.93	4.47
RSF	.11	-.09	-.04	.07	.11	.19**	.10	6.85	1.78
DRS	.12*	-.06	-.03	.01	.07	.25**	.11	4.47	1.66
CDRS	.13*	-.07	-.04	-.03	.20**	.27**	.08	4.72	1.61
PT	.18**	.12*	.07	.16**	.08	.05	.09	2.88	1.27
Attitude	.06	.03	-.01	-.07	.07	.14*	-.04	42.70	4.86
Practice	.02	-.09	.01	-.02	.07	.09	-.05	1.85	1.09
M ^a	169.28	36.56	37.46	39.61	39.94	29.47	28.68	—	—
SD ^a	18.42	4.26	4.30	4.44	4.91	5.20	4.99	—	—

Note. RSF: Reproductive systems and functions, DRS: Disorders related to reproductive system, CDRS: Causes of disorders related to reproductive system, PT: Prevention and treatment. PWB: Psychological well-being, Auto: Autonomy, EM: Environmental mastery, PG: Personal growth, PRO: Positive relation with others, PL: Purpose in life, SA: Self-acceptance.

^a Means and Standard Deviations for Psychological Well-being

^b Means and Standard Deviations for Knowledge, Attitude, and Practice

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

was a significant positive correlation observed between total psychological well-being and knowledge of prevention and treatment ($r = .18, p < 0.01$). In addition, prevention and treatment dimension was also found to be significantly correlated with two dimensions of psychological well-being—autonomy ($r = .12, p < 0.01$) and personal growth ($r = .16, p < 0.01$). Further, there was a significant positive correlation found between knowledge of causes of disorders related to reproductive system and two dimensions of psychological well-being—positive relation with others ($r = .20, p < 0.01$) and purpose in life ($r = .27, p < 0.01$). Attitude was also found to be significantly correlated with only one dimension of psychological well-being, i.e., purpose in life ($r = .14, p < 0.01$). This indicated that when attitude was positive ($M = 42.70, SD = 4.86$), there was an increased feeling of purpose in life ($M = 29.47, SD = 5.20$). There was, however, no significant correlation observed between total psychological well-being scores and attitude and practice scores.

The *second sub-objective* was to examine the role of knowledge, attitude, and practice of late adolescent girls in determining their psychological well-being. A multiple linear regression using stepwise method was performed between the adolescent girls' ($N = 293$) psychological well-being as the criterion and knowledge dimensions as predictors. Attitude and practice scores were not included as the predictors, since there was no significant correlation observed between them and psychological well-being.

Since, there was no significant correlation was observed between all the dimensions of knowledge and each of the dimensions of psychological well-being, multiple regression analysis was not run between the individual dimensions psychological wellbeing as the criterion and knowledge dimensions as predictors.

Table 11 shows the results of the analysis mentioning the number of steps and other parameters. The stepwise model gave rise to one-step solution, where the predictor

Table 11

Summary of Multiple Regression Analysis (Stepwise) for Knowledge Dimensions Predicting Adolescent Girls' Psychological Well-being (N = 293)

Step and predictor variable	<i>C</i>	R^2	ΔR^2	<i>B</i>	<i>SE B</i>	β	<i>t</i>
Step 1:	161.89	.03**	—				
PT				2.56	0.84	.18	3.06**

Note. PT: Prevention and treatment.

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

was knowledge of prevention and treatment. As a significant predictor ($\beta = .18$, $t = 3.06$, $p < .001$), knowledge of prevention and treatment explained a statistically significant 3% proportion of the variance in psychological well-being, $R^2 = .03$, $F(1,291) = 9.36$, $p = .002$. Hence, knowledge of prevention and treatment ($\beta = .18$, $t = 3.06$, $p < .001$) was observed to be the only significant predictor of psychological well-being.

Designing and testing the integrated psychosocial intervention model

The *third* main objective was to design and test the efficacy of an integrated psychosocial intervention model for increasing the knowledge of adolescent girls' reproductive health behaviour. The objective was further divided into two sub-objectives and the results are written accordingly.

The *first sub-objective* was to design an integrated psychosocial intervention model basing on the findings of the data. The detailed intervention model is mentioned in *Appendix II*. To find out the importance of knowledge for the integrated psychosocial intervention model, path analysis (simple mediation analysis) with structural equation modelling (SEM) using IBM SPSS Amos was run.

To explore a causal process between knowledge, attitude, and practice, a theoretical model was conceptualized as illustrated in Figure 7 and tested through SEM.

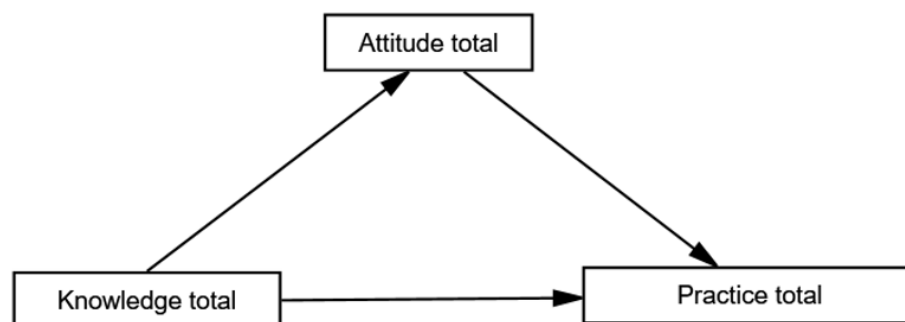


Figure 7. Theoretical model depicting causal process between knowledge, attitude, and practice.

The SEM gave rise to an initial model. The Figure 8 illustrates the model and Table 12 contains the regression weights. In this model, the standardized regression coefficient between knowledge and attitude of reproductive health behaviour was statistically significant ($\beta = .45, p < .001$), whereas the standardized regression coefficients between attitude and practice ($\beta = .09, p = .157$) and knowledge and practice ($\beta = .07, p = .249$) were not significant. This indicated that though there was a significant path between knowledge and attitude, no significant paths were traced between attitude and practice, and knowledge and practice of reproductive health behaviour. Therefore, the path between knowledge and practice of reproductive health behaviour was deleted from the model and the analysis was run again.

After deleting the path between knowledge and practice, the SEM gave a simple mediation model [$\chi^2(1) = 1.33, p = .249$; RMSEA = .03, CFI = .99, SRMR = .02]. The regression weights are mentioned in Table 13. It was observed in this final model that the relationship between knowledge and practice was mediated by attitude. As Figure 9 illustrates, the standardized regression coefficient between knowledge and attitude was statistically significant ($\beta = .45, p < .001$), as was the standardized regression coefficient between attitude and practice ($\beta = .13, p < .030$). The standardized indirect effect was calculated as $(.45)(.13) = .06$. This revealed that knowledge played a significant role in determining the attitude and the attitude significantly influenced the practice.

The *second sub-objective* was to test the efficacy of the developed integrated psychosocial intervention model in enhancing knowledge of adolescent girls' reproductive health behaviour. To measure the effect of the developed integrated psychosocial intervention model, One-way ANCOVA was preferred. Independent variable was the intervention—integrated psychosocial intervention model. There were five dependent variables—post-test knowledge scores and its four dimensions—reproductive system and

Table 12

Regression weights for Path Model 1 in Figure 8 (N= 293)

Parameter			<u>Regression Weights</u>				<u>Standardized Regression Weights</u>
			Estimate	S.E.	C.R.	<i>p</i>	Estimate
Attitude	<--	Knowledge	.599	.069	8.719	<.001	.455
Practice	<--	Attitude	.017	.012	1.416	.157	.092
Practice	<--	Knowledge	.018	.016	1.153	.249	.075



Figure 8. Standardized regression coefficients for the relationship between knowledge, attitude, and practice of Path Model 1.

Table 13

Regression weights for Path Model 1 in Figure 9 (N= 293)

Parameter		<u>Regression Weights</u>				<u>Standardized Regression Weights</u>
		Estimate	S.E.	C.R.	<i>p</i>	Estimate
Attitude	<-- Knowledge	.599	.069	8.719	<.001	.455
Practice	<-- Attitude	.023	.011	2.174	.030	.126

Note. $\chi^2(1) = 1.33$, $p = .249$; GFI = .99; NFI = .98; RMSEA = .03

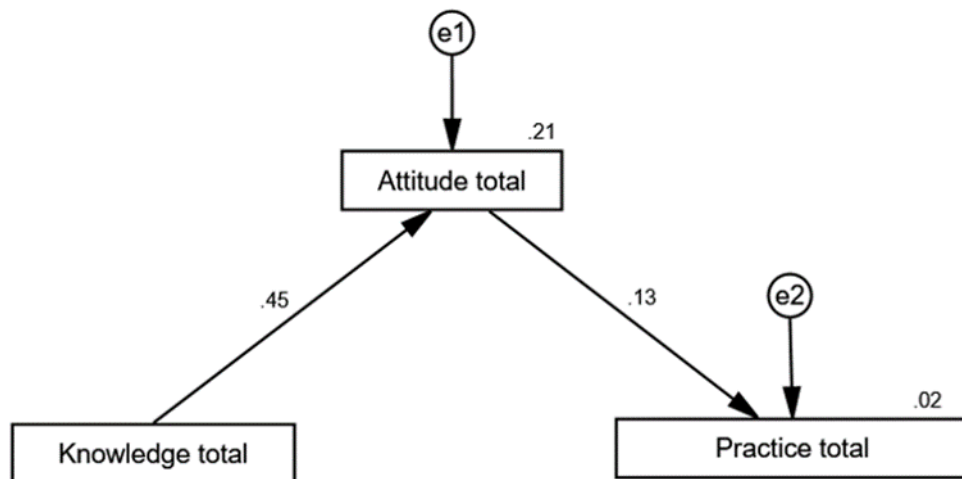


Figure 9. Standardized regression coefficients for the relationship between knowledge and practice as mediated by attitude in Path Model 2.

functions, disorders related to reproductive system, causes of disorders related to reproductive system, and prevention and treatment scores. The corresponding pre-test scores were treated as covariate. The major assumptions of One-way ANCOVA were tested. The results of the One-way ANCOVA are presented in Table 14.

There was a statistically significant effect of the integrated psychosocial intervention model on total knowledge scores of the experimental group, $F(1,57) = 108.88, p < .001$, with a large effect size (Partial $\eta^2 = .66$). The effect size suggested that about 66% of the variance in total knowledge scores could be explained by the effect of the intervention when controlling for the pre-test total knowledge scores. This indicated that the participants of experimental group scored significantly higher in knowledge ($M = 24.72, SD = 2.66$) after the intervention, compared to control group ($M = 20.28, SD = 2.06$). The results also suggest that there was a statistically significant effect of the covariate, i.e., pre-test knowledge scores, on the dependant variable post-test knowledge scores $F(1,57) = 68.43, p < .001$.

From Table 14, it is observed that there was a statistically significant effect of the intervention on the *first* dimension of knowledge, i.e., reproductive system and functions scores of the experimental group, $F(1,57) = 74.63, p < .001$, with a large effect size (Partial $\eta^2 = .57$). The effect size suggested that about 57% of the variance in knowledge of reproductive systems and functions scores could be explained by the effect of the intervention when controlling for the pre-test knowledge of reproductive systems and functions scores. This indicated that the participants of experimental group scored significantly higher in knowledge of reproductive system and functions scores ($M = 10.34, SD = 1.20$) after the intervention, compared to the control group ($M = 8.32, SD = 1.0$). Further, a statistically significant effect of the covariate, i.e., pre-test knowledge of reproductive system and functions scores, was found on the dependant variable post-test knowledge of reproductive system and functions scores $F(1,57) = 31.70, p < .001$.

Table 14

Pre-test Means, Adjusted Post-test Means, SD, and ANCOVA Results for Knowledge and Its Dimensions

	<u>Experimental Group ($n_1 = 30$)</u>				<u>Control Group ($n_2 = 30$)</u>						
	<u>Pre-test</u>		<u>Post-test</u>		<u>Pre-test</u>		<u>Post-test</u>				
Knowledge	M	SD	M	SD	M	SD	M	SD	$F(1,57)$	p	η^2
Total	18.90	2.88	24.72	2.66	19.97	2.33	20.28	2.06	108.88	<.001	.66
RSF	8.17	1.15	10.34	1.20	7.73	1.17	8.32	1.0	74.63	<.001	.57
DRS	4.87	1.28	5.93	0.76	5.03	0.89	5.14	0.87	17.51	<.001	.23
CDRS	3.87	1.17	5.43	0.92	4.93	0.83	4.60	0.87	20.01	<.001	.26
PT	2.00	0.59	2.99	0.71	2.27	0.52	2.24	0.48	35.38	<.001	.38

Note. RSF: Reproductive systems and functions, DRS: Disorders related to reproductive system, CDRS: Causes of disorders related to reproductive system, PT: Prevention and treatment

As evident from Table 14, it is observed that there was a statistically significant effect of the intervention on the *second* dimension of knowledge, i.e., knowledge of disorders related to reproductive system scores of the experimental group, $F(1,57) = 17.51$, $p < .001$, with a large effect size (Partial $\eta^2 = .23$). The effect size suggested that about 23% of the variance in knowledge of disorders related to reproductive system scores could be explained by the effect of the intervention when controlling for the pre-test knowledge of disorders related to reproductive system scores. This indicated that the participants of experimental group scored significantly higher in knowledge of disorders related to reproductive system scores ($M = 5.93$, $SD = 0.76$) after the intervention, compared to the control group ($M = 5.14$, $SD = 0.87$). Moreover, there was a statistically significant effect of the covariate, i.e., pre-test knowledge of disorders related to reproductive system scores, on the dependant variable post-test knowledge of disorders related to reproductive system scores $F(1,57) = 15.90$, $p < .001$.

From the table, it is observed that there was a statistically significant effect of the intervention on the *third* dimension of knowledge, i.e., knowledge of causes of disorders related to reproductive system scores of the experimental group, $F(1,57) = 20.01$, $p < .001$, with a large effect size (Partial $\eta^2 = .26$). The effect size suggested that about 26% of the variance in knowledge of causes of disorders related to reproductive system scores could be explained by the effect of the intervention when controlling for the pre-test knowledge of causes of disorders related to reproductive system scores. This indicated that the participants of experimental group scored significantly higher in knowledge of causes of disorders related to reproductive system scores ($M = 5.43$, $SD = 0.92$) after the intervention, compared to the control group ($M = 4.60$, $SD = 0.87$). Additionally, a statistically significant effect of the covariate, i.e., pre-test knowledge of causes of disorders related to reproductive system

scores, was observed on the dependant variable post-test knowledge of causes of disorders related to reproductive system scores $F(1,57) = 57.61, p < .001$.

Finally, it is also observed that there was a statistically significant effect of the intervention on the *fourth* dimension of knowledge, i.e., knowledge of prevention and treatment scores of the experimental group, $F(1,57) = 35.38, p < .001$, with a large effect size (Partial $\eta^2 = .38$). The effect size suggested that about 38% of the variance in knowledge of prevention and treatment scores could be explained by the effect of the intervention when controlling for the pre-test knowledge of prevention and treatment scores. This indicated that the participants of experimental group scored significantly higher in knowledge of prevention and treatment scores ($M = 2.99, SD = 0.71$) after the intervention, compared to the control group ($M = 2.24, SD = 0.48$). Nevertheless, there was a statistically significant effect of the covariate, pre-test knowledge of prevention and treatment scores, on the dependant variable post-test knowledge of prevention and treatment scores $F(1,57) = 37.76, p < .001$. *Figure 10* displays the adjusted post-test means for knowledge and its four dimensions—reproductive system and functions, disorders related to reproductive system, and causes of disorders related to reproductive system, and prevention and treatment of adolescent girls belonging to the Experimental Group and Control Group.

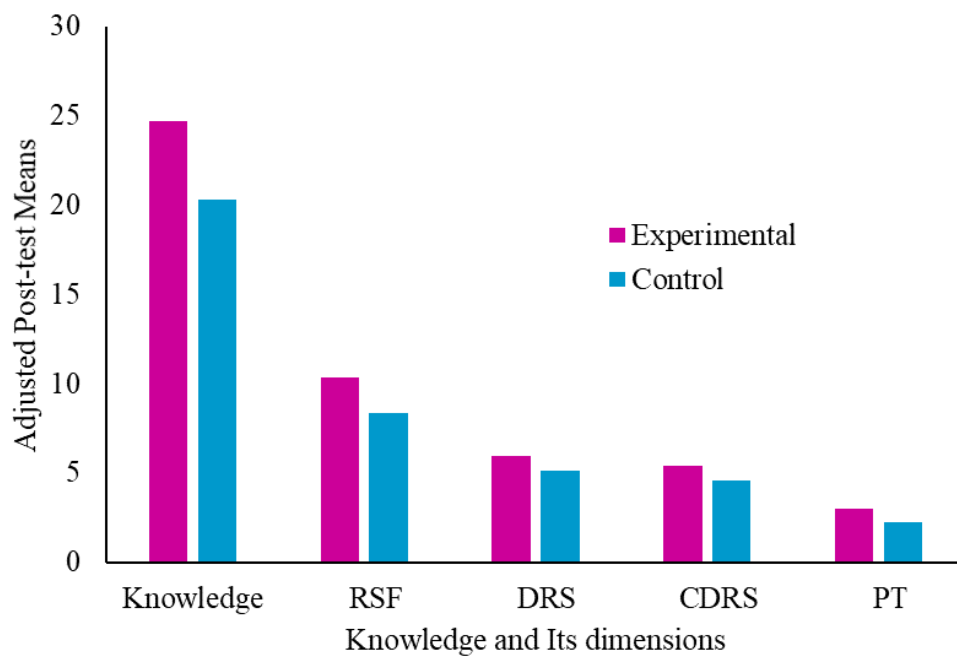


Figure 10. Adjusted post-test means for knowledge and its four dimensions—reproductive systems and functions (RSF), disorders related to reproductive system (DRS), and causes of disorders related to reproductive system (CDRS), and prevention and treatment (PT)—of adolescent girls belonging to the Experimental Group and Control Group.

Chapter V

DISCUSSION AND CONCLUSION

This chapter contains the general discussion after recapitulating the primary research questions, objectives, and hypotheses. The key findings and conclusion are included along with the major limitations, future directions, and implications.

The ***first main objective*** was to measure and examine the knowledge, attitude, and practice of reproductive health behaviour in late-adolescent girls. The first major objective was further divided into four sub-objectives in this study.

The ***first sub-objective*** was to find out the variations of scores of knowledge, attitude, and practice of reproductive health behaviour in late-adolescent girls across three age groups. The findings of the first sub-objective revealed that the knowledge of reproductive health significantly differed across the three age groups of adolescent girls. The adolescent girls belonging to the age group of 18-year and above had more knowledge of reproductive health than that of the girls belonging to the other lower age groups. Further, the results revealed that the adolescent girls belonging to 18-year and above had more knowledge on reproductive system and functions, disorders related to the reproductive system, and causes of disorders related to the reproductive system. It was also observed that the attitude towards reproductive health behaviour significantly differed across the three age groups of adolescent girls. Further, it is noticed that the adolescent girls belonging to the age group of 18-year and above exhibited a more positive attitude towards reproductive health behaviour. Similarly, adolescent girls across three age groups significantly varied in their practice of reproductive health behaviour, where the adolescent girls belonging to the age group of 18-year and above showed poor practices.

Hence, the first hypothesis stated that the late adolescent girls across three age groups will differ in their knowledge, attitude, and practice of reproductive health behaviour is accepted.

Research findings suggest that higher age has been a significant indicator of a higher level of knowledge, positive attitude, and better practice of reproductive health behaviour. Interestingly, the findings of the first sub-objective are consistent with the literature suggesting that under graduation students had a better knowledge of reproductive health and rights as compared to high school students (Adinew, Worku & Mengesha, 2013). In another study, an increase in age showed an increase in knowledge and awareness of reproductive and sexual health in adolescents (Gupta, Bhatnagar, & Bahugana, 2015). Adolescents between the ages of 15-20 years more specifically aged 18 and above had better knowledge, understanding and attitude of Sexually Transmitted Infections and HIV (Anwar, Sulaiman, Ahmadi, & Khan, 2010). However, none of the studies explored on adolescent girls as a special section across age groups in examining knowledge, attitude, and practice of reproductive health behaviour.

To date, research in India has not explored differences in knowledge, attitude, and practice of reproductive health behaviour among late-adolescent girls showing a developmental trend across the age groups. The present study is a significant contribution to the area in terms of the development of indigenous measures and examining the knowledge, attitude, and practice of reproductive health behaviour of Indian adolescent girls. As adolescent girls grow in terms of their age, their knowledge, attitude, and the practice of reproductive health behaviour become firm.

The *second sub-objective* was to examine the prevalence of reproductive health risk behaviour in adolescent girls. A significant association was found between age group and one dimension of practice of reproductive health behaviour, i.e., the pre-marital sexual

relationship. Another important finding was that the adolescent girls belonging to the age group of 18-year and above were in the risk category with respect to premarital sexual relationship compared to the participants of the other two lower age groups. It is noteworthy that the late-adolescent girls were observed to be at risk of premarital sexual relationship, stigma related to HIV, promiscuous sexual behaviour, menstrual health and hygiene, and safe sex. The most striking finding is that the rate of risk was comparatively higher in promiscuous sexual behaviour and premarital sexual relationship, showing the influence of socio-cultural hybridisation.

What is surprising is that in Indian society, adolescent girls are most likely to involve in risky practices of reproductive health behaviour. This poses a serious concern. This finding is consistent with that of Gupta (2000) who has observed that older age as a significant risk factor towards sexual initiation in women. Another study has also indicated that sexual experiences confirm the trend towards early sexual initiation among female adolescents by the age of 18 (Meekers & Calves, 1999). Further, it has been observed that leaving from school early and staying away from home are significant factors in premarital sexual initiation among adolescents (Laguna, 2001).

Studies on adolescents have revealed that the older the age, the higher is the likelihood of having multiple sexual partners (Ben-Zur et al., 2000). It is observed that adolescents often engage with multiple sexual partners leading to HIV risk. However, their attitudes towards HIV/STD give way to poor health-seeking behaviour which is a potential threat for reproductive health risk behaviour.

However, an inverse relationship is observed between the knowledge and involvement in high-risk behaviour, indicating safe sexual practices (Sharma, 2019). In addition to this, menstruation, which is considered as an unclean state in Indian society, gives rise to behavioural restrictions in terms of food, daily bath, and use of cloth absorbent

during menses leading to increased risk of reproductive tract infections (Dasgupta, 2008; Nair, Grover & Kannan, 2007). These practices can be attributed to societal attitudes, gender disparities, and a sense of autonomy in women (Jejeebhoy, Koenig & Elias, 2003). However, in contrary, menstrual hygiene is adequately practised by the majority of adolescent girls (Nair et al., 2012).

Nevertheless, the present findings on adolescent girls' reproductive health risk behaviour have been corroborated with the existing body of literature. Therefore, the study uniquely contributes in terms of the percentage of risks involved in practice dimensions, such as premarital sexual relationship, stigma related to HIV, promiscuous sexual behaviour, menstrual health and hygiene, and safe sex across the whole sample of adolescent girls as well as three age groups.

Emphasising the role of women in society, the present study has specifically selected the late-adolescent girls as a homogenous sample. Hence, the findings suggest that reproductive health risks are on the rise in adolescent girls. Unhealthy reproductive health practices, such as promiscuous sexual behaviour and premarital sexual relationship are the risky trends observed in the adolescent girls, signifying a requirement to address the knowledge of reproductive health risk behaviour as an intervention in minimising the risks.

The *third sub-objective* was to explore the relationship between knowledge, attitude and practice of reproductive health behaviour of adolescent girls across three age groups. As knowledge of reproductive health behaviour increased in adolescent girls, their attitude was found to be positive. Further, what is curious about this result is that the adolescent girls' practice and knowledge of reproductive health behaviour were positively correlated showing that their knowledge of the reproductive system and functions, and causes of disorders related to the reproductive system increased with poor practices. The findings showed that adolescent girls belonging to the lowest age group engaged in good

reproductive health practices which further increased their knowledge of reproductive health.

Thus, the increased knowledge of reproductive health yields a positive attitude, and poor practices towards reproductive health behaviour in adolescent girls. The findings of the current study support the previous research. It is observed that an increase in the knowledge of sexual health is associated with a positive attitude towards sexual health in nursing students (Sung, Huang, & Lin, 2015). However, in contrast, the negative attitude is observed to be correlated with higher knowledge, further indicating that sexually active students have poor protective behaviour (Obarisiagbon, Ofili, Isara, & Ighedosa, 2019). Moreover, the findings add to the literature that age and standard of education are interrelated with knowledge and attitude (Finlay et al., 2019).

Understanding the relationship between knowledge, attitude, and practice of reproductive health behaviour has recently gained importance. Nevertheless, in India few studies have been conducted on adolescent girls across ages. Therefore, this study is a unique contribution in terms of establishing the relationship between the knowledge, attitude, and practice of reproductive health behaviour of adolescent girls across three age groups. Thus, the results of the present study suggest that an increase in knowledge of reproductive health facilitates the formation of positive attitude and the manifestation of better reproductive health practices among adolescent girls.

The *fourth sub-objective* was to find out the impact of the four dimensions of knowledge on attitude and practice of reproductive health behaviour of the adolescent girls. Out of the four dimensions of knowledge, the knowledge of causes of disorders related to the reproductive system and knowledge of prevention and treatment were found to be the significant predictors of attitude towards reproductive health behaviour. The late-adolescent girls with higher scores on two dimensions of knowledge—the knowledge of causes of

disorders related to the reproductive system and knowledge of prevention and treatment—were expected to have a more positive attitude, after controlling for the other dimensions of knowledge in the model. Likewise, the knowledge of the causes of disorders related to the reproductive system was found to be the only significant predictor of practice towards reproductive health behaviour. The adolescent girls with higher scores on the knowledge of causes of disorders related to the reproductive system were expected to have better practice, after controlling for the other dimensions of knowledge in the model.

Research findings suggest that adolescents' reproductive knowledge, attitudes, and beliefs affect their practice of reproductive health behaviour, like contraceptive use and pregnancy during adolescence (Rocca, Harper, & Raine-Bennett, 2013; Gloppen, David-Ferdon, & Bates, 2010; Ryan, Franzetta, & Manlove 2007; Shneyderman & Schwartz, 2013). Research also establishes that adolescents' reproductive knowledge, attitudes, and beliefs that are associated with sexual and contraceptive behaviour during adolescence continue to be related with their reproductive outcomes into young adulthood (Garfield et al., 2016).

The present study establishes that knowledge of reproductive health behaviour during the adolescence phase of the girls plays a significant role in determining the positive attitude towards reproductive health and better practice of reproductive health behaviour. This finding is clinically relevant to develop a suitable intervention for enhancing knowledge in adolescent girls.

The ***second main objective*** was to explore the role of knowledge, attitude, and practice of late adolescent girls in determining their psychological well-being. Moreover, the second objective was further divided into two sub-objectives.

In this, the *first sub-objective* was to find out the correlation between the scores of knowledge, attitude, and practice of reproductive health behaviour in adolescent girls and

their psychological well-being. A significant positive relationship was found between the overall knowledge of reproductive health behaviour and psychological well-being. This showed that when the knowledge score increased, there was a significant enhancement of adolescent girls' psychological well-being. Further, it was observed that the knowledge was positively related to three dimensions of psychological well-being—positive relation with others, purpose in life, and self-acceptance. Further, a significant positive correlation was observed between the attitude towards reproductive health behaviour and only one dimension of psychological well-being, i.e., purpose in life. This indicated that when the attitude was positive there was an increased feeling of purpose in life. However, it is surprising that the attitude and practice of reproductive health behaviour were not correlated with the psychological well-being of adolescent girls.

The *second sub-objective* was to examine the role of knowledge, attitude, and practice of late adolescent girls in determining their psychological well-being. As the results did not reveal a significant correlation between attitude, practice, and psychological well-being, a multiple linear regression using stepwise method was performed between the adolescent girls' four knowledge dimensions as predictors and psychological well-being as the criterion. It is a matter of importance that the knowledge of prevention and treatment was observed to be the only significant predictor of the psychological well-being of late-adolescent girls. The adolescent girls with higher scores on the knowledge of prevention and treatment were expected to have higher psychological well-being, after controlling for the other dimensions of knowledge in the model.

Hence, the second hypothesis stated that there will be a positive impact of knowledge, attitude, and practice of adolescent girls' reproductive health behaviour on their psychological well-being is partially accepted.

Though well-being during adolescence has its own idiosyncrasy (Casas, 2010), the relationship between reproductive health behaviour and psychological well-being have received little empirical attention. The present study has explored this relationship and found the significance of the knowledge of reproductive health behaviour in determining the psychological well-being of the late-adolescent girls.

The ***third main objective*** was to design and test the efficacy of an integrated psychosocial intervention model for increasing the knowledge of adolescent girls' reproductive health behaviour. Nevertheless, this objective was also further divided into two sub-objectives.

The *first sub-objective* of the present investigation was to develop an integrated psychosocial intervention model to increase the knowledge of adolescent girls' reproductive health behaviour. To find out the importance of knowledge of reproductive health behaviour for psychosocial intervention model, a simple mediation analysis with structural equation modelling was run. The model showed that the relationship between knowledge and practice was mediated by attitude. This revealed that knowledge played a significant role in determining the attitude and the attitude significantly influenced the practice. In addition to this, from the review of literature and analysis of in-depth interview data, it was understood that bringing change in knowledge base within a short span was easier, whereas bringing change in attitude and practice that were more complex might take a relatively long time. Thus, using data triangulation method, the findings have emphasised on designing and developing an integrated psychosocial intervention model encouraging knowledge of reproductive health and involvement of professionals in promoting healthy reproductive health behaviour during adolescence.

The primary aim of the integrated psychosocial intervention model was to enhance the knowledge of reproductive health in its four dimensions—reproductive system and function, disorders related to the reproductive system, causes of disorders related to the reproductive system, and prevention and treatment. During the intervention, the investigator, medical expert, and psychologist were to interact with the adolescent girls and address relevant issues and concerns related to their reproductive health behaviour. A pamphlet containing all the essential information related to the women reproductive health was one of the important components of the developed model.

The *second sub-objective* was to test the efficacy of the developed integrated psychosocial intervention model to enhance the knowledge of reproductive health behaviour of the adolescent girls. Using a pre-test post-test experimental design, the findings revealed a statistically significant effect of the integrated psychosocial intervention model on total knowledge scores as well as its four dimensions scores of the experimental group. This indicated that the participants of the experimental group scored significantly higher in knowledge and its four dimensions after the administration of the developed integrated psychosocial intervention model, compared to the control group.

Thus, the third hypothesis stated that the integrated psychosocial intervention model will increase the knowledge of adolescent girls' reproductive health behaviour is accepted.

Reproductive health risks can be minimised by increasing the knowledge of adolescents girls. Existing literature has reported a number of studies in this context. As the knowledge of reproductive and sexual health issues among adolescent girls is dismal, a need for awareness is suggested (Shankar, Dudeja, Gadekar, & Mukherji, 2017). For this, intervention is given in the form of lecture, PowerPoint and discussion, generated positive outcomes on middle and high school students of 12-19 years of age, as there is an increase in the level of knowledge and attitude about reproductive health (Amiruddin et al., 2019).

Kemigisha et al. (2019) have successfully demonstrated the effect of comprehensive sexuality education in early adolescents of Uganda towards shaping positive attitudes. Similarly, Calabrese (2019) has found that a mixed media teaching curriculum is effective to increase the sexual and reproductive health knowledge of adolescents.

Moreover, school-based interventions for both adolescent girls and boys have been proved to increase the knowledge of reproductive and sexual health in the state of Kerala (Nair et al., 2012). This particularly included features related to STI, HIV/AIDS, pregnancy and perceptions about premarital sex. Another study in Karnataka concerning the knowledge of girls regarding pregnancy and its signs and contraception has also shown desirable changes after an educational intervention program (Rao, Lena, Nair, Kamath, & Kamath, 2008). Malleshappa and Krishna (2011) have noted a significant increase in overall knowledge of rural adolescent girls about the menstrual cycle, ovulation, fertilization and pregnancy, and knowledge regarding contraception transmission and prevention of STDs after a reproductive health education intervention programme. Reproductive health promotion through health education through parents along with formal sources have been linked with lowered sexual risk among vulnerable adolescent girls (Ancheta, Hynes, & Shrier, 2005).

Previous studies have made attempts to suggest interventions to address the knowledge of the adolescent girls' reproductive health. However, a few studies have taken up the intervention programs and tested the efficacy in the Indian scenario. The present study has designed a culturally appropriate integrated psychosocial intervention model and tested its efficacy. The intervention has been observed to be effective.

Limitations and future directions

First, the study comprises a homogeneous sample focussing solely on adolescent girls. This limits our understanding of knowledge, attitude, and practice of reproductive

health behaviour and psychological well-being of only adolescent girls. The future studies should focus on gender differences and the other potential age groups that are also central, such as early adolescence, middle adolescence, emerging adulthood, and young adulthood.

Second, in the method of study, the complexity of the topic has resulted in developing vignettes—a type of projective technique for assessing the practice of reproductive health behaviour. The initial validation process is followed for the newly developed measures: RHB-KT, RHB-AS, and RHB-PT. Hence, a follow-up study is needed to establish adequate psychometric properties and norms of these measures. In addition to this, a qualitative research method may be adopted to study the practice of reproductive health behaviour in adolescents for bringing more clarity in the process and consequences, rather than the quantity.

Third, as a cross-sectional study, the data are collected only at a single point of time. This primarily limits the ability to comprehend how knowledge, attitude, practice, and psychological well-being could change and may emerge and evolve over time across the age groups of adolescent girls.

Fourth, the study has not explored the effectiveness of integrated psychosocial intervention model by evaluating the change in attitude and practice as well as the psychological well-being of adolescent girls. Further follow-up research including a longitudinal study is recommended.

Implications

This study paves several important paths for implications for professionals—psychologists, social workers, educationists, medical practitioners, and researchers. This study is remarkable in that the participants are closely connected in terms of gender, age and education; more specifically they are from the same phase of life span development, i.e. late adolescence.

The findings of this study help psychologist, other professionals, and researchers to understand the importance of knowledge, attitude, and practice of reproductive health behaviour in late-adolescent girls and their reproductive health-risks. The measurement of psychological well-being in this study is a strong point and distinct from other research related to reproductive health behaviour of adolescent girls. This study has also discovered how the relationship between knowledge and practice of reproductive health behaviour is mediated by attitude. The discovery of the importance of knowledge of reproductive health during late adolescence is one of the significant contributions of this study.

This study has primary implications for practising psychologists in both assessment and intervention. The study has developed three new research instruments to measure knowledge, attitude, and practice of reproductive health behaviour of adolescent girls in the Indian cultural context. Assessing practice of reproductive health behaviour is complex. This study has developed a simple method to assess the practice of reproductive health behaviour using a set of vignettes—a projective technique. The unique contribution of this assessment technique is two-fold. It helps to know the score of practice of reproductive health behaviour as well as identifying reproductive health risk of the adolescent girls.

To date, no psychosocial intervention has been developed that specifically targets the enhancement of knowledge of reproductive health behaviour of Indian adolescent girls. The present study has designed an integrated psychosocial intervention using data triangulation method and tested its efficacy through experimental design.

Conclusion

This study offers important insight into the reproductive health behaviour in late-adolescent girls as reproductive health risk behaviour is perilous during adolescence because of its impending adverse effect and ramification in adulthood. In this study, the purpose is to assess the knowledge, attitude, and practice of reproductive health behaviour and

psychological well-being in late-adolescent girls and to develop an integrated psychosocial intervention model to enhance their knowledge on reproductive health. The results suggest that the late adolescent girls across three age groups significantly differ in their knowledge, attitude, and practice of reproductive health behaviour. Furthermore, adolescent girls belonging to the age group of 18-19 years are observed to have higher reproductive health risk behaviour. Knowledge of reproductive health behaviour of the participants is found to play a significant role in their psychological well-being. It is also observed that the relationship between knowledge and practice is mediated by attitude. Finally, this study has also found that the developed integrated psychosocial intervention model has significantly enhanced adolescent girls' knowledge of reproductive health behaviour. While much is yet to be learned about the reproductive health behaviour of the adolescents, the findings of the present study offer important implications to psychologists, researchers, and other professionals. It is, however, imperative that future research pursue this sensitive topic by addressing the outlined limitations.

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Appendix I

Steps of Development of Measures

The world's largest adolescent population is found (approximately 243 million; UNICEF, 2012) in India, where talks on reproductive health topics are viewed as taboos. The contemporary Indian society even discourages discussions on such a topic (WHO, 1997). Despite this, research findings have suggested that adolescents in developing countries often engage in reproductive health-risk behaviour (Blum & Mmari, 2004). Reproductive health-risk behaviour, also known as health impairing behaviour, is perilous during adolescence because of its impending adverse effect and ramification in adulthood. The reproductive health-risk behaviour gives rise to negative health outcomes and increases the magnitude of the potential loss of health and well-being.

Identifying a need for developing the measures

During the review, it is observed that there is a dearth of culture-free measures to assess the knowledge, attitude, and practice of reproductive health behaviour. The existing measures are culture-specific and having a higher connotation. We have never come across such standardised measures to assess the knowledge, attitude, and practice of reproductive health behaviour of the adolescent girls in India socio-cultural context. It is also observed that assessing practice of reproductive health behaviour is complex. Therefore, independent measures have been developed and initially validated to assess knowledge, attitude, and practice of reproductive health behaviour of adolescent girls in the Indian socio-cultural context.

The major steps of construction of the three independent measures, such as (1) Reproductive Health Behaviour–Knowledge Test, (2) Reproductive Health Behaviour–Attitude Scale, and (3) Reproductive Health Behaviour–Practice Test are briefly mentioned.

(1) Reproductive Health Behaviour–Knowledge Test (RHB-KT)

Knowledge of reproductive health refers to an individual's understanding and awareness of reproductive health system and behaviour that are acquired through direct experience, informal sources, or formal sources. Informal sources primarily include family, peer group, social media,

magazines, and movies. Formal sources include obtaining information about reproductive health from teachers and experts (e.g. doctors and health care professionals) in a formal setting, like educational institutes, hospitals, or health clinics. As knowledge of reproductive health is acquired, it is to be construed with reference to the social and cultural context in which it develops.

Step 1: Item writing

After identifying a need, the research studies on the knowledge of adolescent's reproductive health behaviour were reviewed. For this purpose, several research instruments were referred. A measure developed by WHO was also used in pilot research on a sample of 200 adolescents (both girls and boys) to assess the applicability. It was observed that most of the concepts were not well-understood by the participants and the scoring was also appeared to be ambiguous. In addition to the review, the textbooks of Science (Biology) of 8th to 10th Standard published by the CBSE, ICSE, and NCERT curriculum were also referred. As these are the standard curriculum and taught in the classroom, the materials were considered as culture-appropriate to design a test. Thus, based on the review, four important dimensions of knowledge of reproductive health were identified. The four dimensions include knowledge of the reproductive system and functions, disorders related to the reproductive system, causes of disorders related to the reproductive system, and prevention and treatment of reproductive health problems are identified. Initially, 60 items were written, 15 from each dimension. The items were primarily related to the epistemology of the reproductive systems, disorders such as reproductive tract infections, sexually transmitted diseases, HIV/AIDS, the causes that lead to disorders mainly focusing on health risk behaviour, and the ways to prevent them through health-enhancing behaviour. Subsequently, these items were reduced to 32 items after categorization and initial evaluation.

Step 2: Nature of the item and naming

Considering the nature of knowledge, it was decided to develop a knowledge test having multiple-choice items. There were four multiple choices for each item. Out of which, one was

correct, two were incorrect, and the fourth was 'Do not know'. As there were right and wrong answers, the measure was named as Reproductive Health Behaviour–Knowledge Test (RHB-KT).

Step 3: Establishing content validity

For establishing content validity, the 32 items were rated by six experts from the field of Psychology. These experts were requested to indicate against each item whether the item was 'essential', 'not essential', or 'essential but need modification' in order to measure the knowledge of reproductive health of adolescent girls. Lawshe's content validity ratio was calculated for each item and two items were deleted. Basing on the feedback of the experts, seven items were also modified partially to increase their relevance. Finally, 30 items were retained in the test. There were 12 items under the reproductive system and functions, seven items under disorders related to the reproductive system, seven items under causes of disorders related to the reproductive system, and four items under prevention and treatment.

Step 4: Establishing reliability

The 30-item RHB-KT was administered on a sample of 220 adolescent girls (16-19 years) from different educational institutions of the twin-city of Hyderabad and Secunderabad to examine the consistency of its results. As the test had dichotomous items (i.e. answers that were right or wrong), Kuder-Richardson Formula 20, or KR-20, was used to find the reliability of the test. Thus, the reliability coefficient was found to be .70, suggesting adequate reliability of RHB-KT and no further deletion of the item.

Step 5: Scoring

There are four multiple choices for each item. Out of which, one is correct, two are incorrect, and the fourth is 'Do not know'. Each correct answer is assigned a score '1', whereas the other three options including 'Do not know' are assigned a score of '0'. Thus, the range of the total knowledge score varied between 0–30. The higher the score, the higher is the level of knowledge. Scores are also calculated for each dimension. To find out the overall knowledge scores, the dimension scores are to be added.

Step 6: Administration

The RHB-KT is designed to be administered either in a group and individually. The time taken for the administration may vary between 10-15 minutes. This is a culture-specific test and meant for the Indian adolescent girls having education up to Class X and above.

(2) Reproductive Health Behaviour–Attitude Scale (RHB-AS)

Attitude, having three major components—cognitive (belief), affective (feeling), and conative (action)—is a complex psychological construct and influences an individual's thought and action. Attitude towards reproductive health refers to the predisposition of the individual involving a positive and negative evaluation of reproductive health behaviour. The intensity of attitude varies. An intensely developed attitude is primarily affective in nature (Ajzen, 1989). Attitude is viewed as an idea that precedes the behaviour and directs an individual's choices and decisions for action. Therefore, it is imperative to study the attitude of the adolescent girls towards reproductive health as the same decides their appropriate reproductive health behaviour.

Step 1: Item writing

After identifying a need, the research on adolescent's attitude towards reproductive health behaviour was reviewed. The existing attitude scales on reproductive health behaviour administered on different populations were also reviewed. Two experts from the field of Psychology were consulted. Ten adolescent girls were also interviewed, the investigator designed the attitude scale. Initially, 60 items were written representing all the three major components of attitude.

Step 2: Nature of the item and naming

Considering the nature of attitude, it was decided to develop an attitude scale using a 4-point Likert scale ranging between 'Strongly agree' to 'Strongly disagree'. The middle option of 'Neither agree nor disagree' was not kept in the scale considering ambivalence. As there were no right and wrong answers, the measure was named as Reproductive Health Behaviour–Attitude Scale (RHB-AS).

Step 3: Establishing content validity

For establishing content validity, the 60 items were rated by six experts from the field of Psychology. These experts were requested to indicate against each item whether the item was ‘essential’, ‘not essential’, or ‘essential but need modification’ in order to measure the attitude of adolescent girls towards reproductive health behaviour. Lawshe’s content validity ratio was calculated for each item and half of the items were deleted. Basing on the feedback of the experts, eight items were also modified partially to increase their relevance. Finally, 30 items were retained in the RHB-AS.

Step 4: Establishing reliability

The 30-item RHB-AS was administered on a sample of 220 adolescent girls (16-19 years) from different educational institutions of the twin-city of Hyderabad and Secunderabad to examine the consistency of its results. As RHB-AS used a 4-point Likert scale, internal consistency, Cronbach’s alpha was used to find the reliability of the test. Thus, the reliability coefficient, Cronbach’s alpha was found to be .56, suggesting moderate reliability of RHB-AS. At the time of establishing reliability, again half of the items were deleted. Thus, 15 items were finally retained in the RHB-AS.

Step 5: Scoring

Each of the items of RHB-AS is measured using a 4-point Likert scale (4 = Strongly Agree, 1 = Strongly Disagree). The scale consists of 5 positive items and 10 negative items to minimise respondent errors. The negative items are scored in a reverse way. The total attitude scores vary between 15 to 60. Higher the score, positive is the attitude.

Step 6: Administration

The RHB-AS is designed to be administered either in a group and individually. The time taken for the administration may vary between 5-10 minutes. This is a culture-specific measure and meant for the Indian adolescent girls.

(3) Reproductive Health Behaviour–Practice Test (RHB-PT)

The practice of reproductive health behaviour refers to the act of engaging in a particular reproductive health behaviour for an extended period of time for maintaining and mastering the behaviour. The practice is contingent on learning and experience. It also depends on the individual's frequency of engaging in reproductive health behaviour and the nature of appropriate feedback. There is the individual difference in terms of practice—some individuals gain mastery faster than others. Due to the influence of biopsychosocial factors, adolescents are more susceptible to engage in wrong reproductive health behaviour having impending risks to their health and well-being.

Step 1: Item writing

Assessing practice of reproductive health behaviour is complex. After identifying a need, the existing research instruments used to measure practice and behaviour of adolescents' reproductive health were reviewed. The existing attitude scales on reproductive health behaviour administered on different populations were also reviewed. Several checklists and qualitative studies were referred to understand the emerging practices that prevailed among adolescents, especially girls. Ten adolescent girls were also interviewed. Basing of these data, five major dimensions of reproductive health risk behaviour of adolescent girls were identified, such as premarital sexual relationship, stigma related to HIV, promiscuous sexual behaviour, menstrual health and hygiene, and safe sex. Considering the complexity of the nature of practice, a simple method was followed to assess the practice of reproductive health behaviour using a set of seven vignettes.

Step 2: Nature of the item and naming

Considering the complex nature of practice of reproductive health risk behaviour, it was decided to develop a set of seven vignettes—a projective technique to elicit the responses from the participants. This projective test consisted of seven situation-completion vignettes. Each vignette had a partial description of a situation with a blank. The respondent was to fill the blank

with a detailed description of her course of action. As there were criteria to decide the right practice (no risk) and wrong practice (risk), the measure was named as Reproductive Health Behaviour–Practice Test (RHB-PT).

Step 3: Establishing content validity

For establishing content validity, the seven vignettes were judged by six experts from the field of Psychology. These experts were requested to indicate against each vignette whether the vignette was ‘essential’, ‘not essential’, or ‘essential but need modification’ in order to measure the practice of reproductive health risk behaviour of adolescent girls. Considering the feedback of the experts, two vignettes were deleted. Finally, five vignettes were retained in the RHB-PT.

Step 4: Establishing reliability

The RHB-PT was administered on a sample of 220 adolescent girls (16-19 years) from different educational institutions of the twin-city of Hyderabad and Secunderabad to examine the consistency of its results. As it was a projective technique, inter-rate reliability was calculated. For this, 15 response sheets of the participants are randomly chosen and were made two sets. These two sets of 15 response sheets were given to two experts to score the response of each vignette independently as per the pre-determined criteria to classify the response under two category—risk or no risk. Cohen’s Kappa value was calculated for each vignette representing each dimension of the practice. All the five independent dimensions of practice showed high inter-rater reliability—pre-marital sexual relationship (.70), stigma attached to HIV (.70), promiscuous sexual behaviour (.73), menstrual health and hygiene (.70), and safe sex (.85).

Step 5: Scoring

To score, each item is assigned a score of ‘1’ when there is a risk involved and a score of ‘0’ when there is no risk on the basis of predetermined criteria. The overall practice scores vary between 0–5. Lower the score, lower is the risk and better is the practice. Using the score, the participants may also be classified under two categories—risk and no risk.

Step 6: Administration

The RHB-AS is designed to be administered either in a group and individually. The time taken for the administration may vary between 15-20 minutes. This is a culture-specific measure and meant for the Indian adolescent girls.

All these three measures in their final forms are as follows.

RHB-KT

Instructions: There are 30 questions given below, each having four options, to test your knowledge of reproductive health. You have to choose the right answer from the given options by putting a tick mark (✓) against the box (☐) provided in the left side of each option. If you do not know the answer, put a tick mark in the box against option “d. Do not know”. Every question, however, may have other right answers that are not given in the options. Read each question carefully and choose only one of the options. **You are not allowed to change your answer.** You may take your own time; but try to finish it as soon as possible.

1. Secondary physical characteristics in human being begins to develop during

- ☐ a. Childhood
- ☐ b. Adolescence
- ☐ c. Adulthood
- ☐ d. Do not know

2. The union of human egg and sperm is known as

- ☐ a. Ovulation
- ☐ b. Menstruation
- ☐ c. Fertilization
- ☐ d. Do not know

3. Gestation is related to which system of the body?

- ☐ a. Respiratory system
- ☐ b. Reproductive system
- ☐ c. Immune system
- ☐ d. Do not know

4. Oestrogen is present in

- ☐ a. Only boys
- ☐ b. Only girls
- ☐ c. Both boys and girls
- ☐ d. Do not know

5. The female ovaries normally release an egg in every

- ☐ a. 60 days
- ☐ b. 28 days
- ☐ c. 15 days
- ☐ d. Do not know

6. The formation of spermatozoa takes place in

- ☐ a. Testes
- ☐ b. Prostatic ducts
- ☐ c. Penis
- ☐ d. Do not know

7. Androgen is present in

- ☐ a. Only girls
- ☐ b. Only boys
- ☐ c. Both girls and boys
- ☐ d. Do not know

8. Average pregnancy in women lasts for about

- ☐ a. Four trimesters
- ☐ b. Three trimesters
- ☐ c. Two trimesters
- ☐ d. Do not know

9. Reproductive tract infection occurs

- ☐ a. Only in men
- ☐ b. Only in women
- ☐ c. Both men and women
- ☐ d. Do not know

10. STD is

- ☐ a. Sexually transferrable disease
- ☐ b. Sexual tract disease
- ☐ c. Sexually transmitted disease
- ☐ d. Do not know

11. The primary female sex hormone is

- ☐ a. Oestrogen
- ☐ b. Testosterone
- ☐ c. Oxytocin
- ☐ d. Do not know

12. Human fertilization normally takes place in

- ☐ a. Ovaries
- ☐ b. Fallopian tube
- ☐ c. Uterus
- ☐ d. Do not know

13. What is AIDS?

- ☐ a. Acquired immune deficiency symptom
- ☐ b. Acquired immunity deficit syndrome
- ☐ c. Acquired immune deficiency syndrome
- ☐ d. Do not know

14. Menarche refers to

- ☐ a. First occurrence of menstruation
- ☐ b. Last occurrence of menstruation
- ☐ c. The monthly period of menstruation
- ☐ d. Do not know

15. Which of the following disease does not spread due to sexual contact?

- ☐ a. Syphilis
- ☐ b. Gonorrhoea
- ☐ c. Blood cancer
- ☐ d. Do not know

16. Which of the following diseases is not related to human reproductive system?

- ☐ a. Pharyngitis
- ☐ b. Cervical cancer
- ☐ c. Chlamydia
- ☐ d. Do not know

17. STDs cannot be caused by

- ☐ a. Bacteria
- ☐ b. Virus
- ☐ c. Insects
- ☐ d. Do not know

18. Contraception is a method used to prevent

- ☐ a. Blood pressure
- ☐ b. Pregnancy
- ☐ c. Gastric ulcers
- ☐ d. Do not know

19. HPV means

- ☐ a. Human protective virus
- ☐ b. Human pepperonvirus
- ☐ c. Human papillomavirus
- ☐ d. Do not know

20. Which of the following is not used as a contraceptive technique?

- ☐ a. Antibiotics
- ☐ b. Intrauterine device
- ☐ c. Condom
- ☐ d. Do not know

21. HIV is known as

- ☐ a. Human immunity virus
- ☐ b. Human immunodeficiency virus
- ☐ c. Human immunization virus
- ☐ d. Do not know

22. Which of the following does not spread HIV?

- ☐ a. Sexual contact
- ☐ b. Sharing used syringes/needles
- ☐ c. Hugging & kissing
- ☐ d. Do not know

23. An untreated HIV positive woman can infect the foetus during/through

- ☐ a. Breastfeeding
- ☐ b. Touching
- ☐ c. Bathing
- ☐ d. Do not know

24. Spermarche occurs in

- ☐ a. Only girls
- ☐ b. Only boys
- ☐ c. Both girls and boys
- ☐ d. Do not know

25. In women, HPV can lead to

- ☐ a. Cervical cancer
- ☐ b. Prostate cancer
- ☐ c. Breast cancer
- ☐ d. Do not know

26. Urinary tract infection in women is caused due to

- ☐ a. Sedentary lifestyle
- ☐ b. Poor menstrual hygiene
- ☐ c. Unhealthy eating habits
- ☐ d. Do not know

27. AIDS is a

- ☐ a. Communicable disease
- ☐ b. Curable disease
- ☐ c. Non-communicable disease
- ☐ d. Do not know

28. Pregnancy can be prevented by

- ☐ a. Contraceptive pills
- ☐ b. Antibiotics
- ☐ c. Genital hygiene
- ☐ d. Do not know

29. Which of the following viruses can lead to AIDS?

- ☐ a. HPV
- ☐ b. HIV
- ☐ c. HCMV
- ☐ d. Do not know

30. HIV through sexual contact can be prevented by

- ☐ a. Vaccination
- ☐ b. Using condom
- ☐ c. Medicines
- ☐ d. Do not know

RHB-AS

Instructions: There are 15 statements below, each having four options, such as Strongly agree (**SA**), Agree (**A**), Disagree (**D**), and Strongly disagree (**SD**). Read each statement carefully and put a tick mark (✓) against each item with the appropriate option that applies to you best. There is no right or wrong answer. Please read each statement carefully and answer genuinely without any hesitation.

Statement	SA	A	D	SD
1. I prefer to consult a doctor for issues related to my reproductive organs	☐	☐	☐	☐
2. I believe that sexually transmitted diseases cannot be treated	☐	☐	☐	☐
3. Only girls or women should know about menstruation	☐	☐	☐	☐
4. I feel that persons suffering from HIV/AIDS should stay away from others	☐	☐	☐	☐
5. I believe that only women get infected by HIV/AIDS	☐	☐	☐	☐
6. I like to gain information on reproductive health in the presence of others	☐	☐	☐	☐
7. Sexually transmitted diseases affects persons having bad luck	☐	☐	☐	☐
8. People with multiple sexual partners only suffer from sexually transmitted diseases	☐	☐	☐	☐
9. I believe that sexually transmitted diseases are treatable	☐	☐	☐	☐
10. I am comfortable talking only to boys or men on matters related to my reproductive health	☐	☐	☐	☐
11. I believe that HIV/AIDS can be managed	☐	☐	☐	☐
12. Men are more susceptible to sexually transmitted diseases in comparison to women	☐	☐	☐	☐
13. I would not feel shy to discuss about contraception with my partner	☐	☐	☐	☐
14. I hesitate to discuss matters related to my reproductive health	☐	☐	☐	☐
15. I prefer to gain information on reproductive health through formal education	☐	☐	☐	☐

RHB-PT

Instructions: This section consists of five different situations. Each situation gives a description of a person who likes to follow certain health practices. The situations are incomplete. After reading each situation, please take a moment to imagine what the person might do. Elaborate and complete the situation in the space provided. There is no right or wrong way to complete the situation.

Situation 1. Your neighbour Sheela, an 18-year-old girl, is in love with a 20-year-old boy. She is very attracted to him and wants to develop a physical relationship. However, her parents have selected a groom for her and are planning to get her married soon.

In this case, Sheela _____

Situation 2. Your cousin Rekha, a 20-year-old girl studies in a college. Recently her classmate got diagnosed as HIV positive. Most of her classmates hesitate to talk to him and refuse to share food or water with him.

In this case, Rekha _____

Situation 3. Your friend Roopa, a 19-year-old girl, is a very social person. She has three boyfriends. Roopa secretly engages in sex with all her partners.

Roopa _____

Situation 4. Your friend's younger sister Sneha is 16-year-old and studying in high school. Her first menstrual period was at the age of 13, three years ago. Her menstrual cycle is often irregular. She experiences pain, excessive bleeding and abnormal discharge during her periods. Always during her periods, she stays at home. She hesitates to discuss about her menstrual problem to her mother. She often takes medicines suggested by her friends for controlling her pain.

In this case, Sneha _____

Situation 5. Your sister Sudha is now 20-year-old and in love with a 22-year-old boy. During their relationship of six months, they had many events of physical intimacy. One day, the boy insisted on using a condom during sexual intercourse, whereas Sudha was reluctant.

Therefore, Sudha _____

Appendix II

Development of Integrated Psychosocial Intervention Model

One of the main objectives of the present study was to design and test the efficacy of an integrated psychosocial intervention model for increasing the knowledge of adolescent girls' reproductive health behaviour following the data triangulation method. Triangulation is a technique to collect data by several sources to find out a phenomena for a clearer and in-depth understanding. The intervention model aimed to enhance the knowledge of reproductive health behaviour since the change in attitude and behaviour modification involving more complex processes would take a relatively long time. The intervention model was designed to be used in an educational setting to improve the knowledge of adolescent girls about reproductive health behaviours. The integrated psychosocial intervention model was designed using the data triangulation method under the following phases.

Phase 1: Review of literature

In this phase, an extensive review was done to collate studies related to the reproductive health of adolescents. The interventions designed and used in similar settings and with the same population were reviewed. During the review, it was observed that in the majority of the studies knowledge was imparted by one or two sources. The method of such intervention was also limited to a specific dimension of knowledge. There was also a dearth of experimental studies on intervention for enhancing the knowledge of reproductive health behaviour of Indian adolescent girls. Therefore, it was decided to design and test an integrated psychosocial intervention model using a multi-dimensional approach by integrating different means to deliver the intervention. In addition to these, the textbooks of Science (Biology) up to Class X were also reviewed to identify the contents.

Phase 2: In-depth interview

In-depth interview sessions were conducted with a small group of 15 adolescent girls and 10 parents. Multiple in-depth interview sessions were also conducted with 10 teachers and professionals from the field of Medical Sciences (Two gynaecologists) and Psychology (Two psychologists). The aim of this phase was to identify the gaps in the knowledge of the adolescent girls keeping in view the age group of the adolescents and the cultural sensitivities.

Phase 3: Outcome of the study

The present study developed a measure to assess the knowledge of reproductive health behaviour in adolescent girls. The measure gave rise to four dimensions, such as reproductive system and functions, disorders related to the reproductive system, causes of disorders related to the reproductive system, and prevention and treatment.

To find out the importance of knowledge of reproductive health behaviour for psychosocial intervention model, a simple mediation analysis with structural equation modelling was run. The model showed that the relationship between knowledge and practice was mediated by attitude. This revealed that knowledge played a significant role in determining the attitude and the attitude significantly influenced the practice.

Thus, using data triangulation method, it was understood that bringing change in knowledge base within a short span was easier, whereas bringing change in attitude and practice that were more complex might take a relatively long time. The findings also emphasised on designing and developing an integrated psychosocial intervention model encouraging knowledge of reproductive health and involvement of a group of professionals in promoting healthy reproductive health behaviour during adolescence.

Phase 4: Contents and protocol of the integrated psychosocial intervention model

The integrated psychosocial intervention model was developed in consultation with the adolescent girls, parents, teachers, and professionals. The contents of the integrated psychosocial intervention model included anatomy and physiology of female and male reproductive system, physical and psychological changes during and after puberty, menstrual cycle, pregnancy, prenatal and antenatal care, various methods of contraception, and STDs including HIV/AIDS. Culture sensitive terms were used lucidly. Audio-visual aids such as powerpoint presentation using LCD projector, short videos, charts and pamphlets were used.

The integrated psychosocial intervention model was developed for the Indian adolescent girls of Class X and above. The model involved four sessions, each session lasting for 45 minutes to one hour. Each session was followed by an interactive session. The model was administered on the adolescent girls in the presence of their teachers. This was one of the prime requirement of the model as teachers could facilitate the process of acquiring knowledge subsequently and help to translate the learning into practice.

In *Session I*, the investigator oriented the participants about the relevance of knowledge of reproductive health behaviour during adolescence and later phases of life. She also identified the deficit areas with reference to the baseline knowledge of the participants about reproductive health behaviour.

In *Session II*, a gynaecologist explained the anatomy and physiology of the female and male reproductive system. She discussed the major issues related to the reproductive system and how to adopt preventive steps. As adolescents were prone to a number of myths and misconceptions about reproductive health behaviour, gynaecologist addressed all of them. She gave individual attention to each participant. The clear understanding of each participant was ascertained through individual interaction.

In *Session III*, a psychologist explained how adolescents' knowledge had an impact on attitude and how the attitude affected the practice of reproductive health behaviour. She explained how to form positive attitude and how to learn healthy reproductive behaviour. She discussed reproductive health risk behaviour and how to prevent risks. She also explained the dynamics of health communication to seek professional help in need. She gave individual attention to each participant. The clear understanding of each participant was ascertained through individual interaction.

In *Session IV*, a pamphlet with printed material and infographics was given to each participant for referring it for a relatively long period of time for better retention. The pamphlet contained all the essential information related to the women reproductive health. In this session, the participants were asked to read pamphlet carefully and clarify their doubts from the two professionals—gynaecologist and psychologist. Finally, debriefing session was done with the participants.

REPRODUCTIVE HEALTH BEHAVIOURS KNOWLEDGE

What is Reproductive Health?

Reproductive Health is defined as a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes

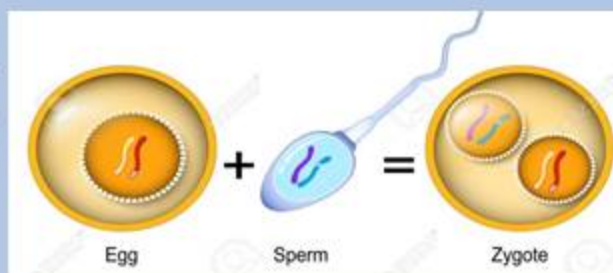


Sound reproductive health suggests that every birth is safe and wanted, every young individual is free from HIV and that all women and girls are treated equally, emphasizing on empowering them

What is Reproduction?

Reproduction is the biological process by which new individual organisms or 'offspring' are produced by the parents. Each individual organism exists as the result of reproduction

Sexual reproduction involves the fusion of female gamete (egg cell- ovum) and male gamete (spermatozoa), which forms a zygote that eventually becomes an embryo, developing into an offspring.

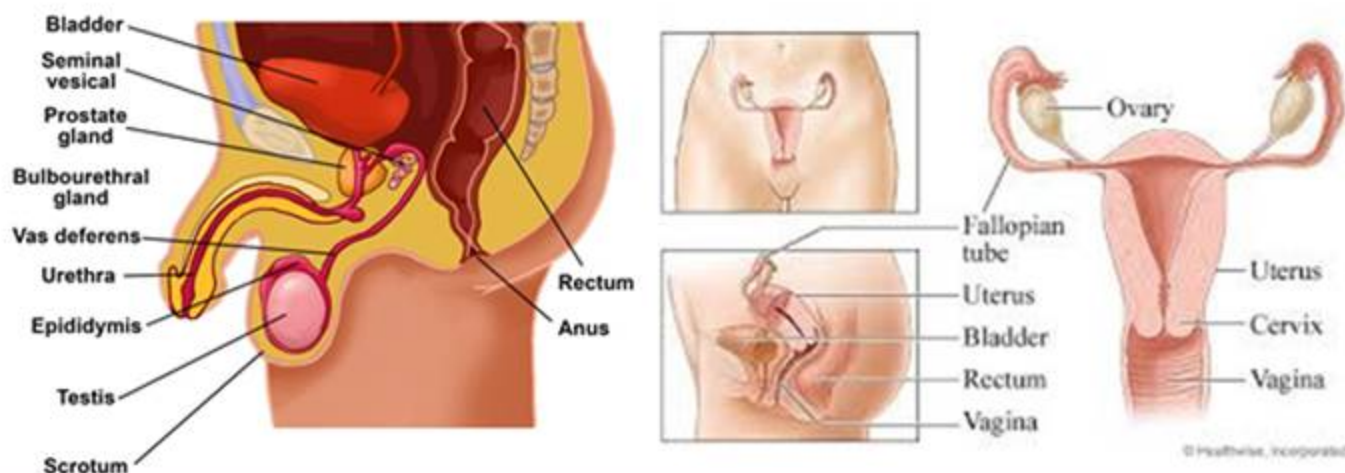


Human reproduction involves sexual intercourse between male and female reproductive system, resulting in the fertilization of the woman's ovum by the man's sperm.

Reproductive System

The reproductive system, also known as genital system is a system of sex organs in an organism, which functions for the purpose of sexual reproduction. A number of non-living substances such as fluids and hormones, also play an important role in the functioning of the reproductive system. In humans, the males and the females have different set of reproductive systems with specialised organs that foster the process of sexual reproduction.

Anatomy of Male and Female Reproductive System



Sex Hormones

Sex hormones controls the ability to engage in sexual behaviours in mammals.

Oestrogen & Progesterone: Typically regulate motivation to engage in sexual reproduction behaviour for females in mammalian species. In particular, oestrogens have been shown to correlate positively with increases in female sexual motivation, and progesterone has been associated with decreases in female sexual motivation.

Oxytocin & Vasopressin : The hormones oxytocin and vasopressin are implicated in regulating both male and female sexual motivation. Oxytocin is released at orgasm and is associated with both sexual pleasure and the formation of emotional bond. High levels of vasopressin can lead to decrease in sexual motivation for females. A link between vasopressin release and aggression has been observed in females, leading to hostility, whereas in males, vasopressin is involved in the arousal phase, which usually increases during erectile response.

Testosterone : Major contributing factor in sexual motivation in male, however it is present in females too, but is not sufficient to prompt sexual motivation in them

oestrogen
breasts grow,
pubic hair grows,
wide hips
develop



testosterone
body hair grows,
voice breaks,
muscle growth
increases



Menstruation

Menstruation (commonly known as period) is the monthly discharge of blood and mucosal lining from the inner lining of the uterus through vagina.

The onset of period or the first event of flow of menstrual blood is known as menarche.

A typical cycle lasts for 28 days with 4-7 days of bleeding

Menstruation stops occurring after menopause, which usually occurs between 45 and 55 years of age. Periods also stop during pregnancy and typically do not resume during the initial months of breastfeeding.

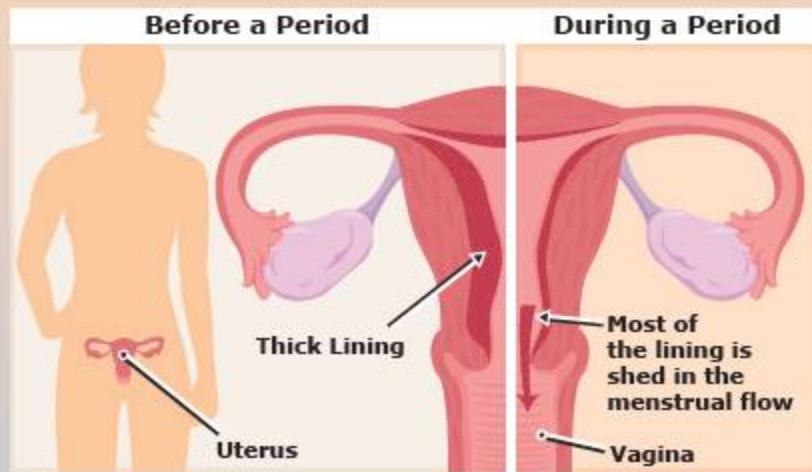
Majority of women experience common signs during menstruation, such as acne, breast tenderness, muscle cramps, bloating, irritability and mood changes. These symptoms are known as premenstrual syndrome.

Menstruation & Pregnancy

The changes in hormones in a female body leads to a menstrual cycle. The thickening of the uterus lining and growth of an egg (ovulation) which is required for getting pregnant occurs during a regular cycle.

The egg releases from an ovary on the 14th day of the cycle and once implanted, the thickened uterus lining provides nutrients to the embryo.

During the period of ovulation if the egg meets spermatozoa of a male human, it can lead to pregnancy through sexual intercourse. If pregnancy does not occur, the lining is released through menstruation.



Pregnancy

Also known as gestation

Occurs through sexual intercourse during which the sperm fertilizes the egg and travels down the fallopian tube and attaches inside the uterus

Usually takes 40 weeks from the time of last menstrual period to childbirth. Typically divided into three trimesters

Week 1 to 12 – first trimester includes conception

Week 13 to 28 – second trimester including movement of the foetus

Week 29 to 40 – third trimester



Disorders related to Reproductive System

Any infection caused to the reproductive organs of a human being, and disturbs the functioning of the reproductive system

These include reproductive tract infections, sexually transmitted diseases, certain cancers such as cervical, prostate, testicular and breast cancer

In females the RTI's affect the upper reproductive tract—Fallopian tube, ovary and uterus, and the lower reproductive tract—vagina, cervix and vulva. In males, it affects the penis, testicles, urethra and vas deferens.

Sexually Transmitted Diseases (STD's)

Any infection of disease that is caused through sexual contact and exchange of fluids, through bacteria, virus or parasite

Human Pappilomavirus infection: An infection that causes warts in various parts of the body, depending on the strain.

Genital herpes : A common sexually transmitted infection marked by genital pain and sores.

Chlamydia : sexually transmitted infection that may not cause symptoms.

Gonorrhea : A sexually transmitted bacterial infection that, if untreated, may cause infertility.

HIV/AIDS : HIV causes AIDS and interferes with the body's ability to fight infections.

Syphilis : Bacterial infection usually spread by sexual contact that starts as a painless sore.

Hepatitis : Hepatitis B virus causes this STD, transmitted through contact with infected semen, blood, and other bodily fluids.

Symptoms of STD's

In women:

pain or discomfort during sex or urination

sores, bumps, or rashes on or around the vagina, anus, buttocks, thighs, or mouth

unusual discharge or bleeding from the vagina

itchiness in or around the vagina



In men:

pain or discomfort during sex or urination

sores, bumps, or rashes on or around the penis, testicles, anus, buttocks, thighs, or mouth

unusual discharge or bleeding from the penis

painful or swollen testicles

Prevention of STD's

Sex using a condom is the safest way to prevent the spread of STDs. Condoms are known as barrier contraceptives, due to their presentation of a physical barrier to microbes.

Here are other steps you can take to reduce the risk of an STD:

Abstinence: Abstaining from any sexual act is the most effective way to avoid an STD.

Monogamy to one uninfected partner: A long-term, monogamous relationship with one person who is not infected can reduce the risk of contracting an STD.

Vaccinations: There are vaccinations that can protect an individual from eventually developing some types of cancer that are caused by HPV and hepatitis B.

Check for infections: Before sexual intercourse with a new partner, check that the partner and yourself have no STDs.

Avoid alcohol: People who have consumed too much alcohol are more likely to engage in risky behaviour. Avoid using recreational drugs, which may also affect judgment.

Engage in safe sex: Before engaging in any sexual act with a new partner, communicate that you would only consider safe sex.

Education: The population falling under reproductive age, especially adolescents and teenagers should be given appropriate sex education through health care professionals, health psychologists, teachers and doctors.

Dr. N.D.S. Naga Seema

Aarti N. Nagpal

Centre for Health Psychology, University of Hyderabad

Appendix III

Case History Form

ID No:

Name : _____

Age : _____

Class : _____

School/College : _____

Age of menarche : _____

Recent visit to a psychiatrist : Yes ☐ No ☐

Presence of any chronic illness : Yes ☐ No ☐

Ryff's Psychological Well-being Scale

Instructions: There are 42 statements below each having 6 options ranging from ‘Strongly disagree’ (SD) to ‘Strongly agree’ (SA). Please read each statement carefully and answer to what extent each statement is true in your case. In other words, how far each one is a description of yourself? Consider each statement honestly in the above way and put a tick mark (✓) in one of the appropriate boxes (□) against each item. There is no right or wrong answer. Therefore, please be attentive and answer genuinely without any hesitation.

[illegible]

[illegible]

Appendix IV



Institutional Ethics Committee University of Hyderabad

Justice TNC Rangarajan
Chairperson

Prof. Geeta K. Vemuganti
Member Secretary

Decision Letter of Institute Ethics Committee

IEC No.	UH/IEC/2018/35	Date of review	03-10-2018
Application No:			
Project Title:	Minimizing Reproductive Health Risk Behaviours in Adolescent Girls: Efficacy of an Integrated Psychosocial Intervention Model		
Principal Investigator/ Co-PI:	PI: Aarti N. Nagpal CI: Dr Nagaseema		
Participating Institutes if any	Telangana Social Welfare Residential School, Gowlidoddi, Hyderabad	Approval from Participating Institute	Yes
Documents received and reviewed	Protocol, ICF		
In case of renewal submission of update	----		
Decision of the IEC:	Approved after the conditions suggested at the IEC meeting were fulfilled on 15.04.2019 Duration: One year from date of approval		
Any other Comments Requirements for conditional Approval	----		
Members Present	Sri Justice Rangarajan, Prof. Geeta K. Vemuganti, Dr. C.T. Anitha, Dr. Insaf Ahmed, Smt. Vimala Sthanikam, Dr. Suvashesa Rana, Dr. Sunita Mishra		

Please note:

- Any amendments in the protocol must be informed to the Ethics committee and fresh approval taken.
- Any serious adverse event must be reported to the Ethics Committee within 48 hours in writing (mentioning the protocol No. or the study ID)
- Any advertisement placed in the newspapers, magazines must be submitted for approval.
- The results of the study should be presented in any of the academic forums of the hospital annually.
- If the conduct of the study is to be continued beyond the approved period, an application for the same must be forwarded to the Ethics Committee.
- It is hereby confirmed that neither you nor any of the members of the study team participated in the decision making/voting procedures.

Chairperson

(Justice Rangarajan)

Institutional Ethics Committee (IEC)
School of Medical Sciences
University of Hyderabad

Member Secretary

(Prof. Geeta K Vemuganti)

Member Secretary
Institutional Ethics Committee (IEC)
School of Medical Sciences
University of Hyderabad

Address : School of Medical Sciences, University of Hyderabad, C.R. Rao Road, Gachibowli, Hyderabad - 500 046

Tel (O) : +91-040-23135470 / 23013279

E-mail : iec_uoh@uohyd.ernet.in, deanmd@uohyd.ernet.in

Appendix V

ID No: _____

ASSENT FORM University of Hyderabad Centre for Health Psychology

Please read this assent form carefully. Ask as many questions as you like before you decide whether you want to participate in this research study. You are free to ask questions at any time before, during, or after your participation in this research.

Title of the Study: Minimizing Reproductive Health Risk Behaviors in Adolescent girls: Efficacy of an Integrated Psychosocial Intervention Model

Researchers: Ms. Aarti N Nagpal (PhD Research Scholar) & Dr. N.D.S Naga Seema (Assistant Professor)

Organization: Centre for Health Psychology, University of Hyderabad, Central University Campus PO, Hyderabad-500046, India. Telephone No. +91-40-23134790

Description of the study: The main purpose of this study is to assess the level of knowledge, attitude and practice of adolescent girls towards Reproductive health behaviors and determine their well-being. Reproductive Health is defined as a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes

In order to participate in this research study, it is necessary that you give your assent. By signing this assent statement, you are indicating that you understand the nature of the research study and you agree to participate in the research. When filling out questionnaires/scales or answering to the questions asked, you may come across a question or answer choice that you find unpleasant, upsetting, otherwise objectionable or highly personal in nature. For instance, a few of the questions may cause you to think about negative emotional states or your genuine personal life related to reproductive health. You may also feel that you have performed poorly, but there is no right or wrong answer except in Section II. You will be asked to provide confidential information about yourself. When your participation is complete, you will be given an opportunity to learn about this research, which may be useful to you in understanding yourself and others. You will have an opportunity to contribute to psychological science by participating in this research. There are no known or possible risks for you in this study.

Please consider the following points before signing this Informed Consent Form:

- 1. I understand that I am participating in this psychological research.*
- 2. I understand that my identity will not be linked with my data, and that all information I provide will remain confidential. Results of the study, including all collected data, may be published in investigators' thesis and in possible future journal articles and professional presentations, but my name or any identifiable references to me will not be included.*
- 3. I understand that I will be provided with an explanation of the research in which I participate. Any questions I may have about this study will be answered by Ms. Aarti N Nagpal, PhD Research Scholar, Centre for Health Psychology, University of Hyderabad, Central University Campus PO, Hyderabad-500046, India. Telephone No. +91-40-23134790, E-mail: aartinagpal0205@gmail.com.*
- 4. I understand that I will not be paid any financial compensation for my participation, nor will I incur any costs as a result of my participation in this research.*
- 5. I understand that the participation in research is voluntary. If I decide now or at any point to withdraw this consent or stop participating, I am free to do so at no penalty to myself.*

I understand the above information and assent to participate in this study voluntarily.

NAME: _____

NAME: Ms. Aarti N Nagpal

Signature of the participant

Date: __/__/____

Signature of the researcher

Date: __/__/____

ID No: _____

INFORMED CONSENT FORM
University of Hyderabad
Centre for Health Psychology

Please read this informed consent form carefully. Ask as many questions as you like before you decide whether you want to participate in this research study. You are free to ask questions at any time before, during, or after your participation in this research.

Title of the Study: Minimizing Reproductive Health Risk Behaviors in Adolescent girls: Efficacy of an Integrated Psychosocial Intervention Model

Researchers: Ms. Aarti N Nagpal (PhD Research Scholar) & Dr. N.D.S Naga Seema (Assistant Professor)

Organization: Centre for Health Psychology, University of Hyderabad, Central University Campus PO, Hyderabad-500046, India. Telephone No. +91-40-23134790

Description of the study: The main purpose of this study is to assess the level of knowledge, attitude and practice of adolescent girls towards Reproductive health behaviors and determine their well-being. Reproductive Health is defined as a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes

In order to participate in this research study, it is necessary that you give your consent. By signing this informed consent statement, you are indicating that you understand the nature of the research study and you agree to participate in the research. When filling out questionnaires/scales or answering to the questions asked, you may come across a question or answer choice that you find unpleasant, upsetting, otherwise objectionable or highly personal in nature. For instance, a few of the questions may cause you to think about negative emotional states or your genuine personal life related to reproductive health. You may also feel that you have performed poorly, but there is no right or wrong answer except in Section II. You will be asked to provide confidential information about yourself. When your participation is complete, you will be given an opportunity to learn about this research, which may be useful to you in understanding yourself and others. You will have an opportunity to contribute to psychological science by participating in this research. There are no known or possible risks for you in this study.

Please consider the following points before signing this Informed Consent Form:

1. I understand that I am participating in this psychological research.
2. I understand that my identity will not be linked with my data, and that all information I provide will remain confidential. Results of the study, including all collected data, may be published in investigators' thesis and in possible future journal articles and professional presentations, but my name or any identifiable references to me will not be included.
3. I understand that I will be provided with an explanation of the research in which I participate. Any questions I may have about this study will be answered by Ms. Aarti N Nagpal, PhD Research Scholar, Centre for Health Psychology, University of Hyderabad, Central University Campus PO, Hyderabad-500046, India. Telephone No. +91-40-23134790, E-mail: aartinagpal0205@gmail.com.
4. I understand that I will not be paid any financial compensation for my participation, nor will I incur any costs as a result of my participation in this research.
5. I understand that the participation in research is voluntary. If I decide now or at any point to withdraw this consent or stop participating, I am free to do so at no penalty to myself.

I understand the above information and consent to participate in this study voluntarily. I also declare that I am above 18 years of age.

NAME: _____

NAME: Ms. Aarti N Nagpal

Signature of the participant

Date: __/__/____

Signature of the researcher

Date: __/__/____

Minimising Reproductive Health Risk Behaviour in Adolescent Girls: Efficacy of an Integrated Psychosocial Intervention Model

by Aarti N Nagpal

Submission date: 19-Dec-2019 03:35PM (UTC+0530)

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Dynamics of perception of illness along time among hypertensive patients: Influence on well-being

Aarti N. Nagpal and Meera Padhy

Centre for Health Psychology, University of Hyderabad, Telangana

The study aimed to measure the impact of duration of hypertension on illness perception and well-being, and explore the relationship between illness perception and well-being. Basing on between-subjects survey design, the sample of 150 hypertensive patients was divided equally into three groups on the criterion of duration of hypertension less than one year, between one to five years, and more than five years. The Illness Perception Questionnaire-Revised and Warwick-Edinburgh Mental Well-being Scale were used. The results revealed that the illness perception and well-being of the participants having hypertension more than five years were significantly better than the participants belonging to other two groups. A significant positive correlation was found between illness perception and well-being of the participants. The implications and shortcomings of the study were discussed.

Keywords: hypertension, illness perception, well-being, between-subjects survey design

Hypertension or high blood pressure, sometimes called arterial hypertension, is a chronic medical condition in which the blood pressure in the arteries is elevated. Hypertension occurs when the cardiac output is too high, which puts pressure of the arterial walls as blood flow increases. This requires the heart to work harder than normal to circulate blood through the blood vessels. It accounts for the largest incidence of arterial disorders. Blood pressure is summarized by two measurements, systolic and diastolic, which depend on whether the heart muscle is contracting (systole) or relaxed between beats (diastole) and equate to a maximum and minimum pressure, respectively. The average adult blood pressure is considered to be less than 120/80 mm Hg. The top number (120) is the systolic pressure and measures the highest amount of pressure in the artery when the ventricles of the heart contract. The lower number is the diastolic pressure and measures the artery pressure when the ventricles relax. Medical parameters for diagnosing high blood pressure start with pre-hypertension at levels above 120/80. Stage 1 hypertension is recognized when the level reaches 140/90 and greater, it is also known as mild hypertension and is defined by systolic pressure consistently between 140 and 159 and diastolic between 90 and 99. Stage 2 or moderate hypertension involves a pressure consistently between 160 and 179 systolic and diastolic between 100 and 109; and stage 3 or severe hypertension means a systolic blood pressure consistently between 180 and 209 systolic and between 110 and 119 diastolic. The last stage, stage 4 is categorized with a high systolic pressure, greater than 210 and diastolic greater than 120.

Well being

World Health Organisation (2013) defined mental health as “a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community.” The positive dimension of mental health is

stressed in WHO's definition of health as contained in its constitution: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

Well-being is a general term for the condition of an individual or group, for example their social, economic, psychological, spiritual or medical state. High well-being means that in some sense the individual or group's experience is positive, while low well-being is associated with negative happenings..

Illness perception

Illness perceptions are the organized cognitive representations or beliefs that patients have about their illness. It is associated with treatment, adherence and functional recovery and they form the basis for deciding which strategies and behaviours patients will use to manage their illness. People may also have well developed illness perceptions even though they may not have been personally diagnosed with that illness. It may be formed due to previous experience with that illness, from seeing family or friends being diagnosed with similar illness or information received through social media.

Illness perceptions have been used to explain behaviour following heart attacks, responses to cancer screening, disability in chronic fatigue syndrome, how patients cope with cancer treatment, and a variety of illnesses such as diabetes, rheumatoid arthritis and hypertension.

Review of literature

A study conducted by Stewart et al. (1989) on functional status and well-being of patients with chronic conditions on a sample of 9,385 adults. The results showed that 2,706 patients out of the total sample were diagnosed with hypertension. On analysing the hypertension group, the results indicated that coefficients of well-being were significantly different in predicted health, relative to patients without any chronic conditions.

A study on responsiveness and calibration of the general well-being adjustment of 545 patients with hypertension was conducted. Patients with any one of 14 physical symptoms or problems,

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compared to those without symptoms, had lower General Well-being (GWB) scores. The study concluded that the GWB was responsive to clinically meaningful changes in symptoms and could provide a more complete evaluation of the effects of medical treatment (Revicki, Allen, Bungay, Williams, & Weinstein, 1994).

A cross-sectional study was done on patients' illness schemata and role of beliefs for the choice of treatment among 191 hypertensive Portuguese patients. The findings supported that illness perceptions and beliefs about medicines play a role in influencing patients' preferences of medicines for the treatment of hypertension (Weinman et al., 1998).

Role of illness perceptions and treatment beliefs indicated significant results in the study on patients' compliance in hypertension. Results revealed that older patients were more likely to be compliant than younger patients. Aspects of illness perception were found to be associated with compliance. Higher emotional response to illness was related to poorer compliance and patients who had lower consequence perceptions had higher compliance (Ross, Walker, & MacLeod, 2001).

A research was conducted to find out the psychological well-being and health care practices of patients with hypertension in Malaysia. The results indicated that most hypertensive showed the symptoms of depression, but were having moderately high social support. There was no significant relationship between psychological well-being and adherence to physical activity and weight management. However, the presence of depression was affecting the medication adherence and adherence to low salt diet (Sharoni, Naziron, Hamzah, & Mohamed, 2013).

The literature available focuses on illness perception and well being as two major variables that may play an important role in any chronic illness. Taking this into account, the present study explores the relationship between illness perception and well being of hypertensive patients in Indian culture.

Objectives of the study

- To find out the difference in illness perception among three groups of hypertensive patients based on their duration of illness.
- To find out the difference in well-being among three groups of hypertensive patients based on their duration of illness.
- To explore the relationship between illness perception and well-being of hypertensive patients.

Hypotheses of the study

- There would be a difference in illness perception among three groups of hypertensive patients based on their duration of illness.
- There would be a difference in well-being among three groups of hypertensive patients based on their duration of illness.
- There would be a relationship between illness perception and well being of hypertensive patients.

Method

Participants

The sample included 150 (75 males and 75 females) patients diagnosed with primary hypertension, between the age of 27 and 67 years ($M=48.74$ years, $SD=9.20$). The sample was collected from various clinics and hospitals of Hyderabad and Secunderabad. The

sample was divided into three groups of 50 participants (25 males and 25 females) each, which was categorized, based on the duration of illness, i.e., less than one year ($M=46.28$ years, $SD=10.61$), 1-5 years ($M=48.49$ years, $SD=9.29$) and more than 5 years ($M=51.30$ years, $SD=6.79$). The timeline of diagnosis was the inclusion criteria and the presence of any other comorbid condition such as diabetes; heart problem etc was the exclusion criteria.

Instruments

Hypertension screening checklist: This checklist was adapted from the hypertension history checklist developed by the American College of Physicians. It consisted of 25 questions out of which, 15 items were to find out the co-morbidity of diabetes, cholesterol, family history of heart problems, dietary pattern, health risk behaviours like alcohol consumption and smoking, symptoms experienced due to medical condition and self monitoring of blood pressure were included in the hypertension screening checklist. This checklist was mainly used to establish rapport with the participant and also to screen if the patient has any co-morbid medical conditions.

The Illness Perception Questionnaire- Revised: IPQ-R (Moss-Morris et al., 2002) was used to measure the Illness perception of the patient. The questionnaire contains 9 subscales viz, identity, timeline, consequences, personal control, treatment control items, illness coherence items, timeline cyclical, emotional representations and causes. The first part of the questionnaire measures the illness identity dimension with a list of 14 commonly occurring symptoms. The second part of the IPQ-R consisted of 38 statements accounting for seven domains. The responses for these 38 items and for the 18 causal items ranged from "strongly disagree", "disagree", "neither agree nor disagree", "agree" and "strongly agree". The scores were in Likert scale ranging from 1 to 5, where 1 was for strongly disagree, 2 for disagree, 3 for neither agree nor disagree, 4 for agree and 5 for strongly agree. Reverse scoring was done for 13 items out of the 38 items representing the seven domains. High scores indicated stronger beliefs in: serious consequences of the disease, a chronic long-term disease, illness and/or symptoms as cyclical in nature, the patients' own ability to control symptoms, and the effectiveness of treatment in controlling the illness. Higher scores on the illness coherence scale indicate a higher degree to which patients feel they have a coherent model of the illness, and higher scores on the emotional representations scale indicated emotional response to illness. The third part consists of questions about causal attributions, used the same five-point scale and consisted of 18 items. The total score of illness perception is obtained by adding up the scores for 38 items and separately for dimension wise. The reliability coefficients as reported by Scharloo et al (2009) ranged from 0.70 to 0.92, Consequences - 0.76, Timeline Cyclical- 0.70, Personal Control - 0.74, Treatment control - 0.78 Illness coherence - 0.75, Emotional representations - 0.92, indicating satisfactory internal consistency.

Well-being self assessment Scale: Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (Tennant et al., 2007) a 14-item self-report measure of mental well-being was used. It is scored on a Likert scale, ranging from 1 for none of the time to 5 for all of the time. The WEMWBS showed good reliability in terms of both internal consistency (Cronbach's alpha value higher than 0.80) and stability (test-retest reliability with a correlation of at least 0.80) at population level.

Procedure

The consent form used was specifically designed for this study. Permission for collecting data was taken from various hospitals and clinics of Hyderabad and Secunderabad. The participants were assured of the confidentiality of their responses and were informed about the honesty of their response choice. They were also informed that there was no "right" or "wrong" response as there would be individual differences in the way people feel and behave in different situations. Further doubts (if any) were clarified by the investigator. Participants were included only after obtaining a signed informed consent. The demographic details of the participants were noted along with the hypertension checklist. The participants were then given the Illness Perception questionnaire-R and the Well-being Self Assessment scale to complete. They were asked to read the instructions carefully and tick mark one of the response choice for each item.

Research design

A between-subjects design was used involving three independent groups of hypertensive patients diagnosed for less than one year, between one to five years and for more than five years. The dependent variables measured were illness perception and well-being.

Results

The Statistical Package for Social Sciences (SPSS) software (version 19.0) was used to compute one-way Analysis of Variance (ANOVA), Tukey's HSD, and Pearson's Product Moment Correlation (r) on obtained quantitative data on illness perception and well-being. The results obtained are discussed below.

Illness perception: The mean (M) and Standard Deviation (SD) scores for each dimension of the illness perception and the total score are illustrated in Table 1. The three groups differed significantly on the total score of illness perception, as indicated by one-way ANOVA, $F(2, 147) = 65.25, p < 0.01$. The pair wise comparisons using Tukey's HSD presented in Table 2 indicated that the group diagnosed for less than one year and between one and five years differed significantly ($MD = -10.64, SE = 2.40, p < 0.01$). The group diagnosed between one and five years differed significantly from the group that was diagnosed for more than five years ($MD = -16.60, SE = 2.40, p < 0.01$). The group diagnosed for less than one year also differed significantly from the group diagnosed for more than five years ($MD = -27.24, SE = 2.40, p < 0.01$). This indicates that the group diagnosed for more than five years has a significantly higher illness perception of hypertension ($M = 140.14, SD = 10.36$), than the group diagnosed between one and five years ($M = 123.54, SD = 11.42$) and less than one year ($M = 112.90, SD = 13.97$).

Timeline (Dimension 1): Significant difference was found between the three groups, $F(2, 147) = 27.58, p < 0.01$ as indicated by one-way ANOVA, presented in Table 1. The pair wise comparisons using Tukey's HSD presented in Table 2 indicated that the group diagnosed for less than one year and between one and five years differed significantly ($MD = -2.34, SE = 0.54, p < 0.01$). The group diagnosed between one and five years differed significantly from the group that was diagnosed for more than five years ($MD = -1.92, SE = 0.54, p < 0.01$). The group diagnosed for less than one year also differed significantly from the group diagnosed for more than five years ($MD = -4.20, SE = 0.54, p < 0.01$). This indicates that the group

diagnosed for more than five years has a significantly higher perception of the timeline of hypertension ($M = 21.02, SD = 2.42$), than the group diagnosed between one and five years ($M = 19.10, SD = 2.63$) and less than one year ($M = 16.76, SD = 3.45$).

Consequences (Dimension 2): Significant difference was found between the three groups, $F(2, 147) = 17.18, p < .01$ as indicated by one-way ANOVA, presented in Table 1. The pair wise comparisons using Tukey's HSD presented in Table 2 indicated that the group diagnosed for less than one year and between one and five years differed significantly ($MD = -1.62, SE = 0.58, p < 0.05$). The group diagnosed between one and five years differed significantly from the group that was diagnosed for more than five years ($MD = -1.88, SE = 0.58, p < 0.01$). The group diagnosed for less than one year also differed significantly from the group diagnosed for more than five years ($MD = -3.50, SE = 0.58, p < 0.01$). This indicates that the group diagnosed for more than five years has a significantly higher perception of the consequences of hypertension ($M = 19.54, SD = 2.48$), than the group diagnosed between one and five years ($M = 17.66, SD = 3.18$) and less than one year ($M = 16.04, SD = 3.08$).

Personal Control (Dimension 3): Significant difference was found between the three groups, $F(2, 147) = 10.93, p < .01$ as indicated by one-way ANOVA, presented in Table 1. The pair wise comparisons using Tukey's HSD presented in Table 2 indicated that the group diagnosed for less than one year and between one and five years differed significantly ($MD = -1.60, SE = 0.59, p < 0.05$). The group diagnosed between one and five years differed significantly from the group that was diagnosed for more than five years ($MD = -1.16, SE = 0.59, p < 0.05$). The group diagnosed for less than one year also differed significantly from the group diagnosed for more than five years ($MD = 2.76, SE = 0.59, p < 0.01$). This indicates that the group diagnosed for more than five years has a significantly higher perception of their personal control ($M = 21.50, SD = 2.38$), than the group diagnosed between one and five years ($M = 20.34, SD = 2.91$) and less than one year ($M = 18.74, SD = 3.48$).

Treatment Control (Dimension 4): Significant difference was found between the three groups, $F(2, 147) = 21.97, p < .01$ as indicated by one-way ANOVA, presented in Table 1. The pair wise comparisons using Tukey's HSD presented in Table 2 indicated that the group diagnosed for less than one year and between one and five years did not differ significantly. However, the group diagnosed between one and five years differed significantly from the group that was diagnosed for more than five years ($MD = -2.18, SE = 0.45, p < 0.01$). The group diagnosed for less than one year also differed significantly from the group diagnosed for more than five years ($MD = -2.88, SE = 0.45, p < 0.01$). This indicates that the group diagnosed for more than five years has a significantly higher perception of their treatment control ($M = 21.76, SD = 2.26$), than the group diagnosed between one and five years ($M = 19.58, SD = 2.38$) and less than one year ($M = 18.88, SD = 2.14$).

Illness coherence (Dimension 5): Significant difference was found between the three groups, $F(2, 147) = 62.98, p < .01$ as indicated by one-way ANOVA, presented in Table 1. The pair wise comparisons using Tukey's HSD presented in Table 2 indicated that the group diagnosed for less than one year and between one and five years did not differ significantly. The group diagnosed between one and five years differed significantly from the group that was diagnosed for more than five years ($MD = -3.62, SE = 0.42, p < 0.01$). The group diagnosed for less than one year also differed significantly from the group diagnosed for more than five years ($MD = -4.54, SE = 0.42, p$

< 0.01). This indicates that the group diagnosed for more than five years has a significantly higher perception of illness coherence ($M = 23.00$, $SD = 1.94$), than the group diagnosed between one and five years ($M = 19.38$, $SD = 2.28$) and less than one year ($M = 18.46$, $SD = 2.16$).

Timeline cyclical (Dimension 6): Significant difference was found between the three groups, $F(2, 147) = 52.61$, $p < .01$ as indicated by one-way ANOVA, presented in Table 1. The pair wise comparisons using Tukey's HSD presented in Table 2 indicated that the group diagnosed for less than one year and between one and five years differed significantly ($MD = -1.34$, $SE = 0.41$, $p < 0.01$). The group diagnosed between one and five years differed significantly from the group that was diagnosed for more than five years ($MD = -2.78$, $SE = 0.41$, $p < 0.01$). The group diagnosed for less than one year also differed significantly from the group diagnosed for more than five years ($MD = -4.12$, $SE = 0.41$, $p < 0.01$). This indicates that the group diagnosed for more than five years has a significantly higher perception of the timeline cyclical of hypertension ($M = 13.98$, $SD = 2.24$), than the group diagnosed between one and five years ($M = 11.20$, $SD = 1.65$) and less than one year ($M = 9.86$, $SD = 2.19$).

Emotional Representation (Dimension 7): Significant difference was found between the three groups, $F(2, 147) = 40.85$, $p < .01$ as indicated by one-way ANOVA, presented in Table 1. The pair wise comparisons using Tukey's HSD presented in Table 2 indicated that the group diagnosed for less than one year and between one and five years differed significantly ($MD = -1.92$, $SE = 0.55$, $p < 0.01$). The group diagnosed between one and five years differed significantly

from the group that was diagnosed for more than five years ($MD = -3.06$, $SE = 0.55$, $p < 0.01$). The group diagnosed for less than one year also differed significantly from the group diagnosed for more than five years ($MD = 4.98$, $SE = 0.55$, $p < 0.01$). This indicates that the group diagnosed for more than five years have significantly higher emotional representations ($M = 19.34$, $SD = 2.93$), than the group diagnosed between one and five years ($M = 16.28$, $SD = 2.54$) and less than one year ($M = 14.36$, $SD = 2.84$).

Well-being

The Mean (M) and Standard Deviation (SD) scores for well being are illustrated in Table 1. Significant difference was found between the three groups, $F(2, 147) = 128.60$, $p < .01$ as indicated by one-way ANOVA, presented in Table 1. The pair wise comparisons using Tukey's HSD presented in Table 2 indicated that the group diagnosed for less than one year and between one and five years differed significantly ($MD = -16.00$, $SE = 1.30$, $p < 0.01$). The group diagnosed between one and five years differed significantly from the group that was diagnosed for more than five years ($MD = -3.62$, $SE = 1.30$, $p < 0.05$). The group diagnosed for less than one year also differed significantly from the group diagnosed for more than five years ($MD = -19.62$, $SE = 1.30$, $p < 0.01$). This indicates that the group diagnosed for more than five years have a significantly higher well being ($M = 50.58$, $SD = 6.04$), than the group diagnosed between one and five years ($M = 46.96$, $SD = 5.40$) and less than one year ($M = 30.96$, $SD = 7.83$).

Table 1 Mean Scores and Standard Deviation Scores of Illness Perception and Well being and Summary of one-way ANOVA for the three groups of diagnosis

Dependent Variable	Less than 1 year (n=50)		1-5 years (n=50)		More than 5 years (n=50)		One-way ANOVA		F(2, 147)
	M	SD	M	SD	M	SD	Mean Square		
							Between	Error	
Illness Perception	112.90	13.97	123.54	11.42	140.14	10.36	9423.22	144.40	65.25**
Timeline	16.76	3.45	19.10	2.63	21.02	2.42	227.58	8.24	27.48**
Consequences	16.04	3.08	17.66	3.18	19.54	2.48	153.40	8.60	17.81**
Personal Control	18.74	3.48	20.34	2.91	21.50	2.38	96.02	8.78	10.93**
Treatment Control	18.88	2.144	19.58	2.38	21.76	2.26	112.80	5.13	21.97**
Illness Coherence	18.46	2.16	19.38	2.28	23.00	1.94	288.02	4.57	62.98**
Timeline Cyclical	9.86	2.19	11.20	1.65	13.98	2.24	220.82	4.19	52.61**
Emotional Representations	14.36	2.84	16.28	2.54	19.34	2.93	315.42	7.72	40.85**
Well Being	30.96	7.83	46.96	5.40	50.58	6.04	5450.40	42.38	128.60**

Note: ** $p < 0.01$.

Table 1: Means, SDs, for the Scores of Decisional Forgiveness and Emotional Forgiveness of Individualistic Forgivers (Hindus Muslims Christians) With Against Your group Condition

Dependent Variable	Multiple Group Comparisons		Mean Difference
Illness Perception	Less than 1 year	1 to 5 years	10.64**
		More than 5 years	27.24**
	1 to 5 years	More than 5 years	16.60**
Timeline	Less than 1 year	1 to 5 years	2.34**
		More than 5 years	4.26**
	1 to 5 years	More than 5 years	1.92**

Consequences	Less than 1 year	1 to 5 years	1.62*
		More than 5 years	3.50**
Personal Control	Less than 1 year	1 to 5 years	1.88**
		More than 5 years	1.60*
Treatment Control	Less than 1 year	1 to 5 years	2.76**
		More than 5 years	1.16*
Illness Coherence	Less than 1 year	1 to 5 years	0.70
		More than 5 years	2.88**
Timeline Cyclical	Less than 1 year	1 to 5 years	2.18**
		More than 5 years	0.92
Emotional Representations	Less than 1 year	1 to 5 years	4.54**
		More than 5 years	3.62**
Well Being	Less than 1 year	1 to 5 years	1.34**
		More than 5 years	4.12**
		1 to 5 years	2.78**
		More than 5 years	1.92**
		1 to 5 years	4.98**
		More than 5 years	3.06**
		1 to 5 years	16.00**
		More than 5 years	19.62**
		1 to 5 years	3.62*
		More than 5 years	

Note: * $p < 0.05$ and ** $p < 0.01$.

Illness perception and well-being

A Pearson's Product Moment Correlation (r) between illness perception and well-being and between the seven dimensions of illness perception and well-being indicated positive correlations. The results are presented in Table 3. It indicated that higher the illness perception, better the well being.

Table 3 Correlation (Pearson r) between Illness Perception and well-being and seven dimensions of illness perception and well being

Dependent Variables	R
Illness Perception	0.536**
Timeline	0.445**
Consequences	0.364**
Personal Control	0.309**
Treatment Control	0.282**
Illness Coherence	0.433**
Timeline Cyclical	0.469**
Emotional Representations	0.513**

Note: ** $p < 0.01$.

Discussion

This study was designed to find out the difference in illness perception and well-being among three groups of hypertensive patients based on their duration of illness, i.e., less than one year, between one and five years and more than five years, and to explore the relationship between the two dependent variables. The results obtained are discussed critically, keeping in view the objectives of the study.

It was hypothesized that there would be a difference in Illness Perception among three groups of hypertensive patients based on their duration of illness. The results indicated that there was a significant difference between the three groups on the total score of illness perception as well as on the seven dimensions of the variable.

When the three groups were compared, on all the dimensions, the group which was diagnosed for more than five years had a significantly higher mean score than the other two groups, suggesting that illness perception is better in patients who have been diagnosed for a period of more than five years.

It was also hypothesized that there would be a difference in well-being among three groups of hypertensive patients based on their duration of illness. The results indicated that there was a significant difference between the three groups on well-being, the group being diagnosed for more than five years, scoring significantly more on well-being than the group diagnosed for less than one year and between one to five years, thus supporting the second hypothesis.

The frequencies of causal items on illness perception were also calculated. Group differences were seen, suggesting individual differences as well as group differences in attributing a cause to their hypertension. Most agreed causal item was stress and worry and hereditary, which was majorly seen as a cause across all three groups, indicating that stress and genetic influence play a major role in developing hypertension, as observed from the responses given by the participants. Smoking and alcohol were seen as the least frequent cause for hypertension. Literature suggests that these factors play a role in hypertension, however it was not perceived as a major cause by the sample.

The correlation results obtained, show a significant positive correlation between the two variables, suggesting that better the illness perception, better would be the well-being and vice versa. There was also a significant positive correlation between the seven dimensions of illness perception timeline, consequences, personal control, treatment control, illness coherence, timeline cyclical, emotional representations and well-being. Thus, the last hypothesis is also accepted, and the null hypothesis is rejected.

The results of the present study are in accordance with the results obtained by Stewart et al. (1989), which reported significant relation between diagnosis of hypertension, functional health status

and well-being. Studies in the past have also shown the importance of illness perceptions and cognitions in hypertension which is again supported by the findings of this study. However, not many studies were done taking into account the duration of diagnosis, which was a major variable in the present study and the different groups have been significantly compared and discussed.

This study shows that illness perception affects well-being of the individuals. People who have higher level of illness perception are more likely to be high in well-being. The present findings are in accordance with the results of the study done by Timmers et al. (2008), which revealed that perception of more symptoms; more consequences and lower personal control were associated with lower well-being in patients undergoing dialysis and vice-versa.

Implications of the study

The findings of the study show that illness perception plays a key role in supporting well-being. Hence, while dealing with hypertensive patients, by improving their perception of illness through the means of psychoeducation and awareness of symptoms, treatment, and duration, the well-being of the patient can be improved. This would help in designing and providing appropriate psychosocial intervention modules for increasing the illness perception and improving the well-being of the patients.

Limitations of the study

The results of the study need to be carefully interpreted, keeping in mind the limitations of the study. The study focussed on three groups of hypertensive patients, divided on the basis of their duration of illness. A longitudinal study on the same sample, across years would be more effective in establishing the improvement of illness perception and well-being along with time. The sampling method

employed may also be the limitation of the study. Also, the differences in sample characteristics such as age, socio economic status, educational qualification, social support may be considered as factors for further analysis as there was a wide range. Finally, the method of data collection may be a limitation to the study. A quantitative approach was adopted for this study. A mixed method approach, involving clinical interview may have added to the findings of the study. These limitations provide directions for future research in this area.

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Impact of obesity on stress in women during first trimester

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Pregnancy is a complex psychophysiological process. The presence of obesity and stress increases the complexity in pregnant women. Therefore, the present study attempted to find out the level of perceived stress and examine the prenatal psychosocial risk in obese and non-obese women during their first trimester. Basing on a between-group survey design, 60 young pregnant women (30 obese & 30 non-obese) in their first trimester were selected. The Perceived Stress Scale and Prenatal Psychosocial Profile Scale were administered individually. The results revealed that the perception of stress of both obese and non-obese pregnant women was similar during first trimester. The findings showed that the obese pregnant women experienced significantly higher prenatal psychosocial risk compared to their non-obese participants. The condition of obesity was found to have large effect on the prenatal psychosocial risk. The implications and shortcoming were also discussed.

Keywords: trimester, perceived stress, prenatal psychosocial risk, obesity

Pregnancy is a complex psychophysiological process. It brings specific physical, psychological, and sociocultural experiences and issues to be taken care of by a woman. Some issues are typical to each trimester whereas others are constant throughout the period of pregnancy. Women often experience a certain degree of ambivalence toward being pregnant when it is first confirmed (Hassid, 1978). The idea of being pregnant and accepting it are influenced by the amount of stress in her life (Lederman, 1984). Majority of women start experiencing common physical symptoms nausea, vomiting, increase in urination, and fatigue during the first trimester (Hassid, 1978).

The complexity of pregnancy increases when the woman is obese. Obesity increases the risk of chronic illnesses, like type 2 diabetes, hypertension, and cancer. Specifically, maternal obesity and the comorbid conditions have a serious impact on the health of the mothers and the development process of her offspring.

Weight, fat mass, and obesity have been found to play a major role in female reproductive health. Obese women have a greater risk of infertility compared to non-obese women. It is observed that obese women fail to become pregnant in both natural and assisted conception cycles. The findings of a study suggest that maternal obesity has adverse effects during pre-implantation embryo stages and these effects may contribute to lasting morbidity in offspring (Sarfati, Young, & Christin, 2010). Another study suggests that obese pregnant women have exaggerated metabolic adaptation, endothelial dysfunction, and increased risk of adverse pregnancy outcomes (Jarvie & Catalano, 2010).

Obesity is a risk factor for many metabolic diseases for the mother, both during gestation and post-partum, and for the child in later life. Obesity along with pregnancy results in altered physiological states, significantly different from the state of the non-obese and non-reproductive adult female. Both obesity and

pregnancy are states of insulin resistance whereas maternal obesity is associated with foetal insulin resistance.

Maternal obesity is associated with increased morbidity and mortality for both mother and offspring. The mechanisms underlying the increased risk associated with maternal obesity are not well understood. In non-pregnant populations, many of the complications of obesity are thought to be mediated in part by inflammation and its sequelae. The evidence for inflammation as a key mediator of adverse pregnancy outcome is also presented, focusing on the role of inflammation in adipose tissue, systemic inflammation, the placenta, and vascular endothelium (Denison & Roberts, 2010).

A woman undergoes physical and psychological changes during pregnancy that are typical of this condition. Some women find certain aspects of their pregnancy very stressful. They respond to stress by feeling anxious, worried, or tensed. The frequency and intensity of the stress reaction depends on a woman's perception of the stressors and her ability to cope with the same.

Evidence suggests that stress can be a cause of obesity. This is shown by different observations including similarities between hypercortisolism and obesity, weight gain in depressed persons and changes in food intake as a result of stress and cortisol. Together, these observations suggest that stress induces weight gain. Cannon (1935) has stated that stress is the physical or emotional outcome of the body while it undergoes a critical state of being under pressures or tension. Selye (1936) was the first to describe stress as a nonspecific response of the body to any demand characterised by the secretion of glucocorticoid. Selye puts forth an argument stating that stress portrays a pivotal role in the progression of any disease.

According to the biopsychosocial model of stress, stress involves three components external component, internal component, and the interaction between the external and internal components. The external component involves the environmental events that precede the recognition of stress and can elicit a stress response. Most of the common stressors fall within the four broad categories personal, social (familial or societal), work, and environment. These stressful events have been linked to a variety of psychological and physical

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complaints. Stress is viewed as a relationship between individuals and their environment. Psychological stress refers to a relationship with the environment that the person appraises as significant for his or her well-being (Lazarus & Folkman, 1986).

The studies of the effects of antenatal stress and anxiety in humans have concentrated on obstetric outcome. Hansen et al. (2000) found that women who experienced severe life events in the first trimester of pregnancy had a 50% increase in the rate of congenital abnormalities in cranial neural crest derived organs. Greater risk was associated with the most severe and rare stress seen predominantly in obese women.

There is a significant association found between general distress in the earlier weeks of pregnancy and an increased risk of preterm delivery (Hedegaard et al., 1993). Huizink (2010) performed a study on 170 healthy women and their levels of maternal stress and anxiety. High amounts of stress and anxiety during the first trimester of pregnancy appeared to be associated with low psychomotor scores on the Bayley developmental test and poor adaptation to a new environment, and with more problematic behaviour when the infants were eight months of age.

A longitudinal study followed-up 70 mother infant pairs from the first trimester of pregnancy to the age of nine years. Observations of foetal behaviour at 36 weeks' gestational age (using ultrasound) and of neonatal behaviour showed that infants of high anxious women had more bodily activity than infants of low anxious women. During the first seven months after birth, the former infants exhibited the specific behavioural characteristics more frequently, like crying, irritability, irregularity of biological functions, gripes, and difficult temperament. At nine-year of age, these children (boys in particular) were further active. Moreover, they showed more attention deficits, had more problems with inhibition of difficult behaviour, and were more aggressive (Van den Bergh, 2011).

Considering the complexities of obesity and stress during pregnancy, the present study attempted to find out the level of perceived stress and examine the prenatal psychosocial risk in pregnant obese and non-obese young women during first trimester of pregnancy. It is imperative to study the stress level of pregnant obese women in order to understand not only their health, but also the prenatal, perinatal, and postnatal development of their children. Basing on the review, it was hypothesized that the obese pregnant women would perceive more stress and experience more prenatal psychosocial risk than non-obese pregnant women in their first trimester.

Method

Participants

The study included 60 pregnant women during their first trimester. Among them 30 women were obese and 30 were non-obese. These participants were selected from five hospitals located in Hyderabad city on the basis of purposive sampling. The age group of the participants was 20-33 years. The women crossing the period of first trimester and having co-morbid illness and psychiatric disorders were excluded from the study.

Instruments

Perceived Stress Scale (PSS): The PSS (Cohen et al., 1988) was used to measure the perceived stress in the participants. The PSS measures the degree to which the situations in one's life are appraised as

stressful during the past month. It is a 10-item scale involving a 5-point Likert scale (0 = never, 4 = very often). Cronbach's alpha of the scale was found to be ranging from 0.75 to 0.91 (Cohen et al., 1983; Cohen & Williamson, 1988; Cole, 1999; Glaser et al., 1999).

Prenatal Psychosocial Profile (PPP): The PPP (Curry, Campbell, & Christian, 1994) scale was used to measure participants' experience of stress, support from partner, support from others, and self-esteem during pregnancy. The PPP, a composite of the Rosenberg Self-Esteem Scale, the Support Behaviors Inventory, and a newly developed measure of stress, is a brief, comprehensive clinical assessment of psychosocial risk during pregnancy (Curry et al., 1994). It is a 4-point scale ranging from 1 (no stress) to 4 (severe stress) and the participant needs to indicate the extent to which each of the items is a current stressor. Convergent validity, internal consistency reliabilities (Cronbach's alpha = .70), and test-retest reliability have been reported (Curry et al., 1994).

Demographics: Demographic details includes age, height, weight, and BMI of the participant. The WHO's classification system was followed to classify BMI into three categories BMI < 18.5: underweight, BMI = 18.5-24.9: normal weight, BMI = 25.0-29.9: overweight, and BMI ≥ 30: obese.

Research design

The study adopted a between-group survey design. The sample consisted of two groups obese and non-obese pregnant women. The independent variable under study was obesity calculated in the form of body mass index (BMI) and the dependent variables were perceived stress and prenatal psychosocial risk.

Procedure

The official permissions were obtained from the heads of the gynaecology and obstetrician departments of the selected five hospitals where pregnant women were attending for regular check-ups. The investigator selected the participants based on the inclusion and exclusion criterion. Participants were clearly explained the purpose of the study and their contribution. After obtaining their informed consent, they were requested to go through the instructions of the measures carefully. After this, the measures were administered and the demographic details were collected. During the assessment, the investigator clarified their doubts. The duration of the assessment varied between 20 to 30 minutes. Finally, the participants were debriefed.

Results

The quantitative data were analysed by means of descriptive statistics, Independent t-test, and Cohen's d using SPSS 19.0. The results are presented in Table 1.

Table 1: Descriptive statistics, t-value, and effect size

Variable	Obese		Non-obese		t	Cohen's d
	M	SD	M	SD		
Perceived stress	20.17	4.63	20.17	4.91	0.38	-
Prenatal psychosocial risk	25.13	3.83	20.57	5.36	3.80**	.98

Note. **p < .01

From the table, it is observed that there was no significant difference found between obese and non-obese pregnant women in terms of their perceived stress, $t = .38$, $p > .05$. This indicated that the

perception of stress of both obese and non-obese participants during their first trimester was similar ($M = 20.17$) with minimum variability in measurement ($SD = 4.63$ & 4.91).

Nevertheless, there was a significant difference observed between obese and non-obese participants in terms of their prenatal psychosocial risk during their first trimester, $t = 3.80$, $p < .01$. This showed that the obese participants experienced significantly higher prenatal psychosocial risk ($M = 25.13$, $SD = 3.83$) compared to non-obese pregnant women ($M = 20.57$, $SD = 5.36$). The condition of obesity was found to have large effect (Cohen's $d = .98$) on the prenatal psychosocial risk.

Discussion

The present study discusses the stress and its associated risks among obese and non-obese pregnant women during first trimester. The study has been carried out to examine initially the level of perceived stress in pregnant obese and non-obese young women during first trimester. It has been hypothesized that the obese pregnant women would perceive more stress than non-obese pregnant women. But the results reveal that both the obese and non-obese pregnant women perceive stress equally during first trimester of pregnancy. Therefore, the hypothesis is rejected.

Perceived stress is primarily dependent on several factors like daily hassles, major events, alteration in coping resources, and above all, the appraisal of stress which is subjective and situation specific. Pregnancy is a life event experienced by large numbers of women, many of whom consider it to be stressful (Lobel, 1998; Dunkel-Schetter et al., 2001). Thus, irrespective of whether the woman is obese or non-obese, the perception of stress with respect to pregnancy is commonly observed. Since the situation of being pregnant is common amongst the two groups, irrespective of their BMI, both the groups perceived the same amount of stress during the first trimester of their pregnancy.

The study has also attempted to assess the prenatal psychosocial risk in pregnant obese and non-obese young women during first trimester of pregnancy. Supporting hypothesis, the results have shown that obese participants are found to experience significantly higher prenatal psychosocial risk compared to non-obese participants.

The results of this study are supported by other studies where psychosocial support during pregnancy is seen to play a very significant role in regulating or reducing stress. The role of social support in pregnancy has received much attention (Dunkel-Schetter et al., 2001). In obese women the need for social support is very high and providing the same would be further aiding in reduction or streamlining of the stress experience. Supportive relationships have believed to benefit pregnant women because supporters can provide information about prenatal care, assistance with daily tasks that are burdensome, as well as caring and understanding of the stressors being faced. Support provisions such as these may help women to perceive pregnancy as less stressful. Indeed, social support is significantly associated with psychological well-being in pregnancy (Dunkel-Schetter et al., 2001). Obese women are at increased risk of complications at the time of labour and delivery. The rate of successful delivery decreases progressively as maternal BMI increases.

Basing on the findings, a few management techniques are recommended to overcome stress during pregnancy. Preconception

assessment and counseling play a pivotal role. The counseling should include the provision of specific information concerning the maternal and fetal risks of obesity. The participants should be counseled about the possible complications and encouraged to undergo a weight-reduction program. At the initial prenatal visit, height and weight should be recorded for all women to allow calculation of BMI. While pre-conception advice and care are the ideal scenario for women with obesity, those women present for the first time during pregnancy should also be given an early opportunity to discuss potential risks and management options with a healthcare professional. It is further suggested to consult a health psychologist for a behavioural change programme in weight management. Here the aim would be to provide appropriate information sensitively that may empower the woman to actively engage with health professionals and the services available to her. Relevant information would include the increased risk of pre-eclampsia, gestational diabetes, and foetal macrosomia requiring an increased level of maternal and foetal monitoring.

Not only this, women should also be made aware of the importance of healthy eating habits and appropriate exercise during pregnancy in order to prevent excessive weight gain and gestational diabetes. Women should be given the opportunity to discuss how the complications outlined above can be minimised. They should also be aware of the possible technical difficulties with intravenous access, regional anaesthesia, and foetal surveillance in labour, and how these are likely to be addressed. Maternal obesity is associated with reduced breast feeding rates, both in terms of breast feeding initiation and duration. This is likely to be multi factorial in origin; women's perception of breast feeding; difficulty with correct positioning of the baby; and the possibility of an impaired prolactin response to suckling.

Usage of various coping skills need to be taught in order to overcome the stress, tension and worries related to pregnancy. All the necessary precautions have to be delivered before and while the trimesters are being completed. Not only the women but social support from husband, mother and siblings would be idle as it would be motivating to the women. Along with the women if one of the persons whom they perceive as their moral support accompanies them to the hospital, their levels of stress may be regulated and thoughts may be streamlined.

Most of the obese pregnant women are found to be aware about the complications that they are likely to face. They are also extra careful with respect to their pregnancy. Moreover, the psychological support and reduced levels of stress experience are found to be missing; thus giving a way to further research in the area and also a scope for psychological intervention to help regulate the stress.

Nevertheless, the small sample size may have impact on the statistical findings of the study. In addition to this, the study could have adopted qualitative research design to explore the insiders' perspective about the perceived and experienced stress during first trimester of pregnancy in women.

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Conceptualizing Hiv/Aids: Developmental Trend In School Children

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Abstract: Background: Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome (HIV/AIDS) is a cluster of various health conditions caused to a person infected with HIV. Although the prevalence rate and its incidence has been increasing over time, the knowledge regarding it is seen to be poor. Not only this, the society also holds lot of stigma towards HIV/AIDS as a result of misconceptions. More often, children and adolescents are seen to have little knowledge that increases over time with maturity and education, inversely decreasing their misconceptions.

Method: The present study aimed to understand the conceptualization of HIV/AIDS among Indian school children, using a qualitative approach. The study also attempted to identify a progressive change in the concept of HIV/AIDS from class 6 to class 12 students across India. Students belonging to the age group of 11 years to 18 years falling in the classes of 6th class to 12th class were chosen to fill an open ended question. Data from 784 participants were collected and analysed.

Results: Content analysis was done and sub-themes that emerged out of the responses were categorized under themes like nature of the disease AIDS, its symptoms, its causes, misconceptions regarding AIDS, and finally “do not know” category. Further, using frequency of responses, entropy (disorderliness) rate was calculated which helped in seeing a developmental trend. The results showed a gradual increase in the neutralized entropy from class 6 to class 8 and then sudden jump from class 9 to class 11. The entropy rates give a picture of the varied responses that students have when their class level increases from 6th to 11th. Furthermore, the misconceptions are seen to decrease progressively across the classes.

Keywords: HIV/AIDS, developmental trend, knowledge, misconceptions, entropy

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I. Introduction

The health of the nation should ideally be planned and effectively executed. It should have a focus to arrest and prevent the disease condition, protect for the next decade, and prepare the future population for a healthy lifestyle. This is an efficient way to encounter the impending prevalence projected for any disease conditions, lest the very purpose of the projections may be defeated. One of the fundamental initiatives in preparing a population for prevention of a disease conditions is by enhancing the awareness about the disease. Any awareness programmes would reap optimal outcome if planned to build upon the existing knowledge.

Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome (HIV/AIDS) is a cluster of various health conditions caused to a person infected with the human immunodeficiency virus (HIV). About 70 million people worldwide have been affected by the virus contributing to the death of 50% of the infected people. As per reports 36.7 million people were infected and living with the virus by the end of 2015 (UNAIDS). The projection on the prevalence of the disease in India for the year 2015 is between 0.26% - 0.32% (National AIDS Control Organisation, 2015).

It is very essential that the children in pre adolescence and adolescence groups have the awareness about the etiology and consequences of the disease as this is the most vulnerable group so far as reproductive behaviour and use of psychoactive drugs is concerned. The Government (masked for review) has been carrying out an intensive campaign to create right awareness about HIV/AIDS through media to prevent health risk behaviour and also to dissipate the misconceptions about it.

The key to effective prevention through awareness programmes is primarily to assess the level of knowledge of HIV/AIDS among children. Studies have been conducted to assess such knowledge. Surveys done

on school samples to measure the knowledge of AIDS found that the students were aware of only two modes of transmission of HIV—sexual intercourse and intravenous drug use. Students who were taught about HIV/AIDS had better knowledge than those who weren't taught (Anderson, Kann, Holtzman, Arday, Truman, & Kolbe, 1990). It was found 95.1% had knowledge that HIV is transmitted through unprotected sex and 75.8% had knowledge that HIV could be transmitted from mother to child. The major source of information about HIV/AIDS came from television which was 85% (Gupta, Anjum, Bharadwaj, Srivastav & Zaidi, 2013). 86% of the respondents know that unsafe sex causes HIV. There was inadequate knowledge too, 47% did not know that sharing razor with a HIV positive person would be contracting the virus (Bhattacharya, Cleland, & Holland, 2000). Majority of adolescents had moderate level of knowledge about AIDS but they lacked knowledge in sections of transmission and prevention of HIV/AIDS (Mahat & Scoloveno, 2006). 48% only knew about sexual transmission of HIV/AIDS, 14.9% of them knew condom use as a preventive measure. 9.5% of children only heard about HIV/AIDS in their school programmes (Lal, Nath, Badhan, & Ingle, 2008). There was a low and inconsistent knowledge about AIDS and there were misconceptions regarding symptoms, treatment, and preventive measures (Zhao, Li, Stanton, Mao, Wang, Zhong, & Zhang, 2009). After majority of students (70.70%) believed that condom is a best preventive against AIDS, the next majority believed safe blood transfusion (43.75%) and slightly less percentage of students (40.23%) believed the usage of disposable syringes as a preventive (Shinde, Trivedi, Shinde, & Mishra, 2017).

Studies specified that, the awareness of prevention of HIV was higher among females (94.6%) than males (89.9%), whereas the knowledge about treatment was higher in males (43%) than in females (38.8%) (Opt & Loffredo, 2004; Lawrence, 1993; Rao, Palani, Iyer, & Sathiyasekaran, 2011). Misconceptions go alongside knowledge. It was also found that misconceptions regarding the transmission of HIV was high in (masked for review) adolescents (Thanavanh, Rashid, Kasuya, & Sakamoto 2013, Tavoosi, Zaferani, Enzevaei, Tajik, & Ahmadinezhad, 2004; Mehra, Bhattar, Bhalla, & Rawat, 2014). Misconceptions can be addressed only through free and open discussion. However, the stigma attached to HIV/AIDS just because the etiology includes sexual promiscuity and substance abuse, stands a major inhibitor to open discussion between adults and children.

In view of the sensitivities involved, it is very important that the researcher chooses the suitable method in collecting any data related to HIV/AIDS. Self-report method (Mohammed, Tefera, & Ahmed, 2015, Cabezas, Fornasini, Dardenne, Borja, & Albert, 2013), mixed method approach where self-report questionnaires, in depth interviews and open ended questions have been used (Sahile, Mekuria, & Yared, 2015, Gupta, Anjum et al, 2013). Open ended questions are one of the tools that helps eliciting natural response that reflects the existing knowledge base.

The research questions for this study were formulated as—How do (masked for review) school children conceptualize HIV/AIDS? And Is there a conceptual expansion of HIV/AIDS across age? The objectives of the study were to understand the way children conceptualize HIV/AIDS and to track the changes in comprehending HIV/AIDS among children from 6th to 12th class.

II. Method

A combination of qualitative and quantitative approach has been taken for the present study.

Participants

Students belonging to the age group of 11 years to 18 years studying in 6th to 12th class constitute the last unit of sample. For this, three schools catering to socially marginalised children were identified. Out of these one was Social Welfare Residential school exclusively for girls run by the State Government, a co-educational high school managed by a private Cement industry in a remote village, catering to the children from tribal hamlets, and an exclusively boys school run by a Christian missionary for socioeconomically backward children, were included as the first unit of sample. All the students from 6th to 12th class studying in these schools constituted the last unit of sample.

Instrument

A ruled paper that called for basic information such as name, age, gender, class and school on one side and, an open ended question— “What do you understand by HIV/AIDS?” on the other side with six lines for the answers was the tool for the present study.

Procedure

Informed consent was obtained from the school management and assent was taken from the participants after explaining to them the purpose of the study and their right to abstain from participating in the study. The children gathered in their respective class rooms, where the slips of the open ended questions were distributed. They were instructed to write their response in the blank space provided beneath the question. It was

reiterated that each one may differ in their answers and that they would not be assigned any marks for their answers. After receiving the completed answer sheets from the students, they were de-briefed and thanked for their participation.

Data cleaning

A total of 812 children participated in the study. All the response sheets were labelled with a numerical that served as identification number. All the responses were read by the investigators. Those responses that were incomprehensible or incomplete were dropped. By this process a total of 75 response sheets were discarded and remaining 737 responses sheets are taken as final for data analysis.

III. Results

The results of the study are presented in three parts. Part I describes the content analysis. Part II examines the frequency of responses under different themes categorized to understand the concept of HIV/AIDS. Finally, part III examines the developmental trend in children's' conceptualization of HIV/AIDS.

1) Part I: Content Analysis

In part I, content analysis was used to find the broader output of the large sample as in this study. For this, all the responses of the 737 participants were read and re-read several times by two investigators. Both the investigators separately categorised the responses under different sub-themes. The next step required both the investigators to compare their response categorization for each respondent and check for agreement percentage. Both the investigators had complete agreement for the responses of 689 respondents (93.48%). For the remaining 48 (6.52%) agreement was arrived at after discussion on every response so as to arrive a 100% agreement. Thus, every response was placed under a sub-theme that formed a part of a broad theme. The responses under each theme were coded as ND – Nature of disease, SD – Symptoms of disease, CD – Causes of disease, MD – Misconceptions regarding the disease and DK – Do not know. These five themes are mutually exclusive. Table 1 consists of theme and sub-theme along with sample responses. Five major themes were evolved from the responses viz., nature, symptoms, causes, misconceptions and do not know.

Table1: Summary of themes, sub-themes and sample phrases

Theme and sub-themes	Sample phrases
Nature of the disease (ND)	
Dangerous	"HIV/AIDS is a harmful disease" "It is very dangerous to have AIDS"
Incurable	"There is no medicine for AIDS"
Communicable	"AIDS people have no treatment, they will die"
Fatal	"AIDS spreads from one to another" "Person having AIDS will die" "Death come to AIDS person"
Symptoms (SD)	
Weakness	"AIDS people faint and feel weak" "HIV affected persons look thin"
Collapse of immune system	"AIDS people immune system is weak" "People having AIDS have low immunity power"
Loss of appetite	"They do not feel hunger"
Loss of energy	"No work energy, cannot work with AIDS"
Loss of weight	"AIDS happen means we become very thin"
Causes (CD)	
Sexual promiscuity	"Copulation with many people do for AIDS"
Infected syringes	"Using one injection for many people"
Blood transfusion	"Blood from AIDS person spreads to others"
Spreads from parent to child	"Parents with AIDS, child also will get AIDS" "Pregnant mother give disease to the children"
Misconceptions (MD)	
Only affects female	"This disease affects only girls" "Bad girls will get AIDS if they do wrong things"
Spreads through hugging and kissing	"Hugging and kissing give AIDS"
AIDS affected feel upset and down	"People with AIDS feel upset and low"
Supporting the social stigma	"AIDS people must leave their family and go away" "HIV/AIDS people should be kept alone in room"
AIDS is a bad disease	"AIDS is a very bad disease" "Bad people get punishment with this disease"
AIDS people commit suicide	"If AIDS come persons do suicide" "People suffering will kill themselves"
Do not know (DK)	"Sorry I do not know what is this" (Includes "I don't know", "No idea" responses)

There was a possibility of more than one response from each student. Thus a total of 937 responses were classified under major themes and sub themes. It may be observed that from Table 1 three major themes emerged from the responses after excluding the 'misconceptions' and 'do not know' category. The sub themes under the major themes of Nature of the disease, causes of the disease, and Symptoms of the disease consisted of valid sub-themes connecting the major themes.

2) Part II: Frequency of responses for major themes

The class wise distribution of responses under different themes were examined. Table 2 shows class wise frequency and percentage for different themes including 'misconceptions' and 'do not know' responses.

Table 2 Summary of percentages of responses class wise

Class	Responses	Frequency and(Percentages) of responses				
		Theme 1 Nature of disease	Theme 2 Symptoms of disease	Theme 3 Causes of disease	Theme 4 Misconceptions	Theme 5 Do not know
6	151	41 (27.15)	14 (9.27)	12 (7.94)	21 (13.91)	63 (41.72)
7	169	66 (39.05)	21 (12.42)	10 (5.92)	23 (13.61)	49 (28.99)
8	180	51 (28.33)	13 (7.22)	44 (24.44)	28 (15.55)	44 (24.44)
9	233	87 (37.33)	36 (15.45)	66 (28.32)	14 (6.00)	30 12.87
10	77	37 (48.05)	6 (7.79)	18 (23.37)	13 (16.88)	3 (0.38)
11	59	30 (50.84)	1 (1.69)	21 (35.59)	4 (6.77)	3 (5.08)
12	68	33 (48.53)	4 (5.88)	24 (35.29)	5 (7.35)	2 (2.94)
Total	937					

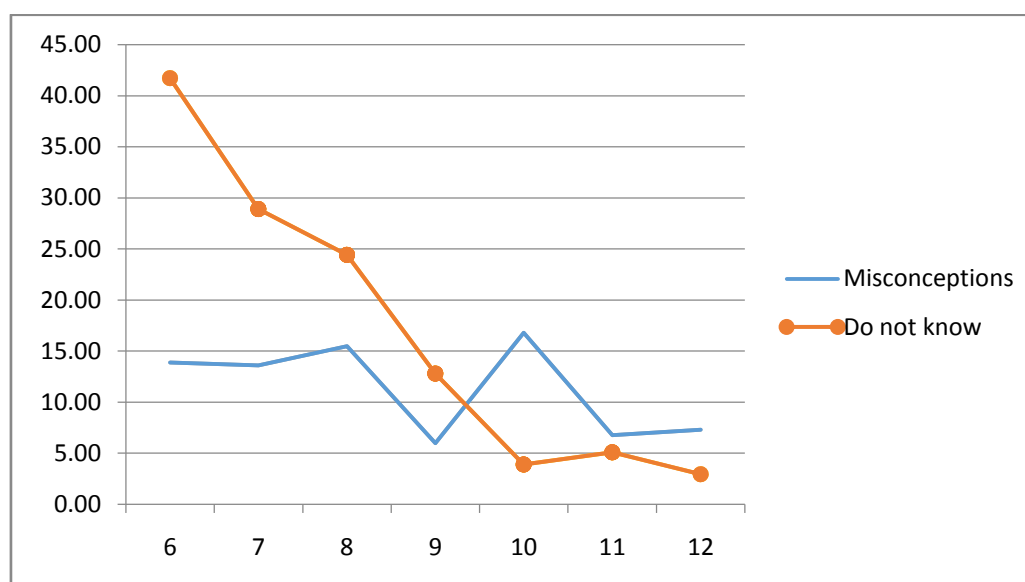


Figure 1 representing a line graph for the percentages of responses, for the themes of Misconceptions and Do not know

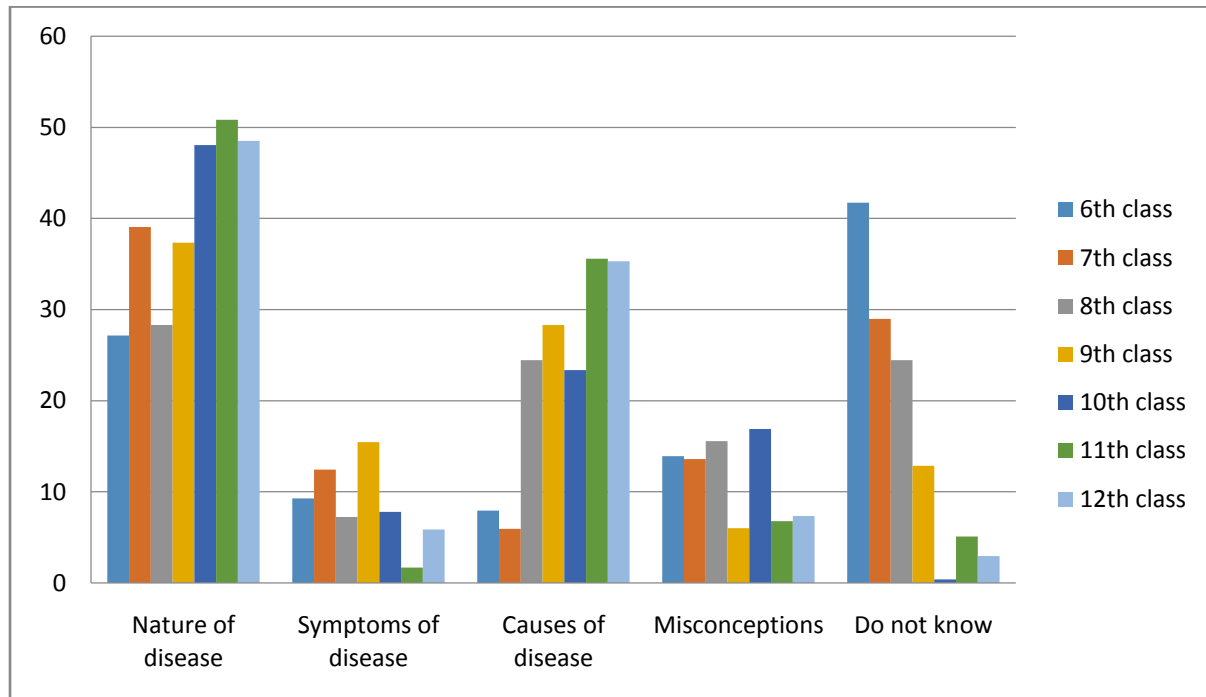


Figure 2 Comparison of thematic responses across class

It may be observed that from table 2 that (masked for review) children's knowledge about HIV/AIDS is dismally low. This is evident from the fact that just about 50.84% of the responses from children in 10th class revealed about the nature of the disease, which is the highest percentage of response under this theme. Similarly, the percentage of response under the symptoms of the HIV/AIDS touched the double digit in response of the 7th and 9th class students. The largest percentage of response indicating the knowledge about the causes of HIV/AIDS is found to be around 35% among 11th and 12th class students.

It may be observed from the line graph in figure 1, that the 'do not know' responses showed a progressive decline across classes. There is a sudden drop in this category of responses from 9th class to 10th class. Though there is a general declining trend in misconception, it is alarming to see a spurt of raise in it in 10th class which is surprising and demands in depth scrutiny. The figure 2 showing the bar graph indicates a general trend of low level of knowledge regarding the symptoms, followed by the cause.

3) Part III: Quantification of conceptual diversity through computation of Entropy

This part of the results presents the divergence in the conceptualisation of the disease among students from 6th class to 12th class. Divergence is calculated by computing the 'entropy' value. Entropy refers to 'disorderliness' in the context of Physical Sciences. It is explained in terms of lack of convergence in response indicating lack of definite patterns. In the present context entropy of responses of a class refers to the spread of responses of that class across themes. Entropy is calculated for each class by using the formula in the following steps.

$$\text{Probability } P = \frac{\text{No. of responses per theme}}{\text{Total number of responses in each class}}$$

The values of P were converted into logarithmic values for easy understanding and interpretation. Here 'I', stands for Information (on probability). The logarithmic value is multiplied by the P for a class in order to arrive at Entropy (E) value.

$$I = -\log(P)$$

The total sample is not equally distributed across classes. Since the Entropy value is the logarithmic product of number of responses in a class divided by the total responses, the value is impacted by the size of each class. Hence, there is a need to balance the factor of class size. This is possible by dividing the class size by the total sample. This is explained by the following formula where BF refers to Balancing Factor.

$$BF = \frac{\text{Sample size of the class}}{\text{Total sample size}}$$

The Divergence Index (DI) of conceptualisation of HIV/AIDS is arrived at by dividing the Entropy value (E) with the Balancing Factor (BF). The Divergence Index is also called Neutralised Entropy.

$$DI = \frac{E}{BF}$$

Table 3 presents the derived scores for classes 6-12

Table 3: Entropy and Divergence Index of conceptualizing HIV/AIDS in students across classes.

Class	Respondents	Responses	E	DI
6	131	67	0.28	1.58
7	146	97	0.08	0.40
8	158	108	0.41	1.91
9	148	189	0.45	2.24
10	64	61	0.37	4.26
11	43	19	0.33	5.66
12	47	20	0.28	4.39
Total	737	561	2.4	

Note. N=Total number of participants; E= Absolute entropy; DI =Divergence Index (Neutralized entropy).

Table 3 reveals the Absolute Entropy scores and Divergence Index or Neutralised Entropy values on conceptualization of HIV/AIDS from 6th class to 12th. It may be observed from the table that the classes 6th through 8th, number of responses were visibly much lower than the number of participants indicating that a large proportion of students resorted to 'do not know' response. This is reflected in figure 1 that indicates a steady decline in 'do not know' response with the progress of class from 9th class to 11th class. The Divergence Index has shown a steady progress (DI for 9th, 10th, 11th class are 2,24, 4,26 and 5.66) respectively. This can be easily perceived in figure 3.

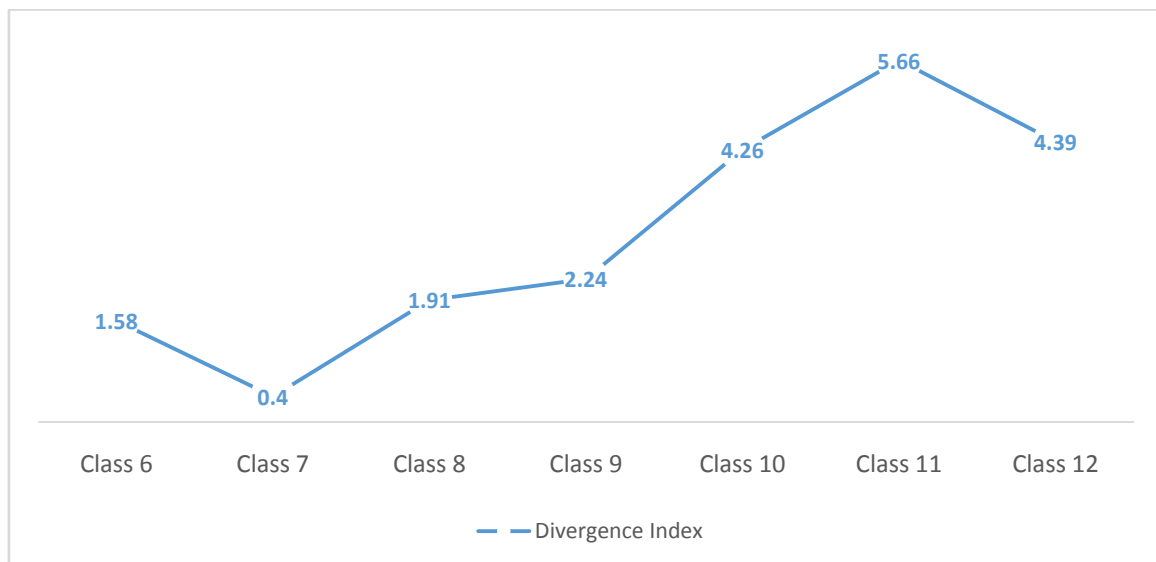


Figure 3 showing the developmental trend in the Divergence index across the classes

In a nut shell, the results revealed dismally inadequate knowledge about HIV/AIDS (masked for review) school children on causes and symptoms. Though inadequate knowledge, there is a progressive developmental trend in knowledge about HIV/AIDS. Further the children were found to hold a number of misconceptions about HIV/AIDS, which again showed a declining trend across classes, which showed a progressive declining trend.

IV. Discussion

The current study examined the conceptualization of HIV/AIDS among children studying in schools. It may be reiterated that unfortunately the disease continues to have a stigma carrying out open discussion on it similar to equally dangerous disease like cancer is not found to be as common. The purpose of using open-ended question was served, since the response belonged to themes ranging from nature of HIV/AIDS to misconceptions regarding it. Since the question was enquiring about HIV/AIDS, it elicited responses related to stigma which are categorised under misconceptions.

This reflects in low level of knowledge about nature, symptoms and causes of the disease and higher levels of misconceptions and admitting ignorance. There is also a possibility that the 'do not know' response reflecting ignorance could be one of the inhibiting factor than ignorance. The investigator's observation suggests such a possibility.

One of the investigators recorded in the observation sheet that there is a possibility that many children took shelter under 'do not know' response because of the stigma. This was evident from the responses observed by the investigator. For example, there were spontaneous soliloquy like 'oh my God' when they read the question.

The results indicated that a developmental trend but a deviation with a drop in 7th and 12th class. These two stages are characterised by the stages of early adolescence and peak adolescence.

Children in 6th class may feel the eagerness to exhibit their knowledge on any concept with not much inhibition or hesitation. However, the children in the 7th class are in their first threshold of early adolescence with a preoccupation of observation of changes in reproductive system in one's own body. A little information on HIV/AIDS coloured with social stigma successfully creates misconceptions as well as inhibitions that prevents them to clarify their ambiguity. Then the safe position is to express ignorance. The drop in Divergence index among 12th class students is also intriguing. An observation of table 2 reveals that there is a relatively low percentage of response on the theme of symptoms of HIV/AIDS. Their thought process seems to be in terms of the nature of the disease and the causes. Given their age and vulnerability, perhaps the communication reaching them is more in terms of the nature of the disease and the etiology, both with an aim to circulate abstinence from unsafe sexual practises and drug abuse. However, this inference needs to be substantiated with in depth interviews.

Though the data and statistics indicate presence of awareness about HIV/AIDS, there is more to it. Based on the investigators observation, two aspects have been found among the respondents during the interaction. Firstly, the stigma attached to the very word HIV/AIDS, where they felt that the mere utterance of HIV/AIDS is 'bad'. Studies justify that there is a negative attitude towards AIDS infection and it is associated with 'immoral behaviour' which results in fear and avoidance (Maman et al., 2009; Ti et al., 2012). Such an avoidance is oriented towards even denying even any knowledge regarding AIDS, thus protecting a 'good boy/good girl' picture. This could prove detrimental in implementing preventive public health goals. This would prove detrimental in reaching the preventive public health goals.

The present findings are also supported by several studies that were done in the past to find out the knowledge and awareness of children and adolescents. A qualitative study conducted with focus groups to elicit knowledge and attitudes of children about AIDS. Misconception was prevalent in lower grade students and they also a difficulty in stating the causation of the disease. Older grades students' response was characterised by complexity in response when compared to lower grades. (Hoppe, Wells, Wilsdon, Gillmore, & Morrison, 1994). Current study corroborates fittingly with the above study, since even in the current study misconception was high in lower grades students and Divergence index (variety of responses) showed a upward developmental trend.

In such a scenario, the role of an efficient tool can be played by education. Though 74% of adolescents wanted the introduction of HIV/AIDS in the curriculum (Verma, Nandan, & Shrotriya, 2016), in reality only 9.5% of children heard about HIV/AIDS in their school programmes (Lal, Nath, Badhan, & Ingle, 2008). However, after a few years 66.3% respondents had responded that HIV/AIDS was part of their curriculum (Trivedi, 2014). Though there is an improvement, it calls for more effort in this direction. Education in such a case can be used as a tool to address the stigmatizing attitudes and gaps in HIV/AIDS knowledge and awareness (Pramanik, Chartier, & Koopman, 2006).

V. Conclusion

It is to be appreciated that the children belonging to low socio economic background have comprehensively conceptualized HIV/AIDS, in terms of its nature, causes and symptoms, though the extent of knowledge is considered inadequate. The open survey helped in finding the range of responses that the children gave across different age groups. Developmental trend in terms of conceptualizing HIV/AIDS, the indication of social stigma associated with HIV/AIDS and the large misconception that hovers around it are the noteworthy implications of the study conducted. Discussing the issue objectively and openly is the need of the hour to fight stigma.

For better comparative study, the other socio economic strata should be included in the study.

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