Social Communication Model for Reproductive Health Awareness and Wellbeing amongst Adolescent Girls

Ph.D. Synopsis

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Abstract

With the shift of focus in healthcare from treatment and maintenance to prevention and promotion, the forthcoming age is referred as a digital age for health, with Health Communications becoming a boon for the Public Health sector. Health Communication has made significant contributions to promote health practices. With the onset of Covid19, evidence and benefits of Health Communication has become prominent. Healthcare and health promotion for behavior change are complex human endeavor. Where penetration of mobile technology has influenced the acceptance, adaptation, and accessibility of technology-based interventions. The designing the interventions where the primary focus is on creativity, engagement, and interactivity, the long-term implications of behavior change is still questioned. The Health Communication Models proposed by WHO, John Hopkins discusses strategies of promoting and marketing an intervention. Most of the communications are built around pill reminders, informative messages. Which leads to becoming dependent on technology, rather than self-reliant. This calls for a need of an approach where behavior modifications are made as conscious attempts of self-reliance and awareness. Over the centuries Social Communication has been used as a medium to transform and influence people towards behavior change. Historical Evidence of behavior transformation through Social Communication can be found in spiritual reformations, freedom movement, ad campaigns for family planning to campaigns like #metoo.

The current study is to build a Social Communication model with an underpinning of Participatory and Reflexive consciousness. The focus is to build a medium that would lead an individual through the various levels of Stages of change, using Nudge and Risk Perception. The proposed model is targeted for a group where the possible health implications are not immediate, but for a distant future. Hence Adolescence has been identified as the user group for the study.

Adolescence is a unique and critical phase in an individual's life that represents the transition between childhood and adulthood, characterized by physical and psychosocial changes. It is a life phase in which opportunities for health are significant as future patterns of adult health are established. The issues that affect adolescents have long-term health and social implications, which require explicit attention, specifically in the field of reproductive health and wellbeing. Hence, adolescence is an ideal time to educate individual about health, healthy habits, and lifestyle. A poor start in life can lead to poor health, nutrition, and inadequate learning, resulting in low adult earnings as well as social tensions.

The area of adolescent health and well being have gained prominence since 2015 after inclusion in the Global Strategy for Women's, Children's, and Adolescents' Health 2016, when it was realized the dynamism of the adolescent age group as a separate entity then women and children. The also emphasized the need to be included in the Sustainable Development Goals, Goal 3 that ensures healthy lives and promote well-being for all at all ages. In this Target 3.7 focuses of ensuring universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programs.

The objective of the study is to develop a Social Communication Model for Adolescent, to make them aware of the reproductive health and well-being. The wellness of the reproductive health is an ongoing process, where the complications and issues that a woman goes through is not constant and evolves at a different level for different individual. Where the main premise is overall well-being, there is a strong need to be self-reliant and vigilant towards one's health. And the awareness of this must be built at a conscious level.

The overall premise of the study has been done using mixed method, where the whole study has been divided into two phases. Phase1 focuses on understanding the knowledge, awareness, information seeking behavior and overall perspective towards reproductive health and well-being amongst adult females of all age groups. This has been done using concurrent mixed method where the qualitative and quantitative method has been conducted simultaneously. Phase2 focuses on building the social communication model where Action Based Research has been used.

Phase1 is further divided into 2 parts. Phase1-A comprises is a qualitative study in which semi-structured interviews were conducted with 30 female respondents. In the interview the females shared their journey towards their understanding of reproductive health from adolescents to adulthood. Part1-B constituted the quantitative data, which was collected using survey questionnaire to evaluate people's understanding of reproductive health and wellbeing. The respondents for both the study belong to the age group of 26-60 years residing in the 2 and 3 tier cities of India.

The overall findings from the interviews suggest that women in most cases had limited or no information regarding their reproductive health and wellbeing and could not differentiate between, reproductive and sexual health, and the effect of hormones in the body. The knowledge about their health and wellbeing developed at much later stages, mostly acquired from their personal experience, in an incomplete manner. Instances where they did not face any health issues, they remain unaware of it. The evidence of taboo in discussing issues related to reproductive health was significant, resulting in lack of conceptual understanding about it.

Phase2 focused on development of the social communication model using the method of co-creation and iteration. It comprised of 2 parts, i) A series of workshops using design thinking

process, conducted with 7 participants in the age group of 21-25, who represented the young adult, and ii) evaluating the model at various stages with experts in the fields. (Doctors, professionals working in adolescents, counselors, mothers). The outcome of phase two formulated the conceptual framework and for the model.

KEYWORDS: Female Adolescents, Reproductive Health and well-being, Social Communication Model, gamified experimental design

Chapter 1 – Introduction

Health is not a physical accomplishment but the manifestation of our awareness of whom we are and integrity in living out of that knowledge.
- Dr. Rand Olson, Children of Promise: The Ultimate Guide to Raising Healthy Kids

Over the centuries Social Communication has positively influenced, sustainable behavior changes at a population level in various aspects, through diverse means . Originally social communication was associated with bringing awareness through consciousness, where consciousness is meant by the inner life of an individual, including thoughts, attitudes, emotions(Earley, 2002) (Smith J. , 2020). Over the years, the face of social communication has evolved from religious awakening in 268 BCE to Hippocrates writing about health and environment in the 4th century BC, to its current form that is known as health communication. Which it is defined as a multidisciplinary field of study and practice that applies communication evidence, strategy, theory, and creativity to promote behaviors, policies, and practices that advance the health and well-being of people and populations, SHC, 2017 (Communication, 2016). According to WHO, in the age where governments are taking severe measures in response to the neoliberalist focus on citizens,' self-responsibility for health outcomes have intensified in areas of public health and healthcare (WHO W. H., 2010).

Several writers have recognized the importance of self-management and self-responsibility that continues to form part of health promotion strategies. They have contended the thought that represent individuals or social groups as ignorant, lacking self-control of having the capacity to take appropriate responsibility of their health. Going

forward there needs to be a balance between what needs to be communicated to what is being communicated.

The aim of the study is to develop a Social Communication model for Adolescent Reproductive Health and Well-Being. Where the objective is to make them self-reliant and self-responsible towards their reproductive health so that they can manage their wellbeing. To build an understanding of given context the content of the chapter is divided into 3 topics, understanding the changing phases of Health Communication, relevance of Social Communication in the current context and Adolescent. Where the first sections focus on the different aspects of current Health Communication practices, identifying the gaps and issues, second section focus on the need for social communication over Health Communication, followed by elaborating need of Adolescents as the chosen target audience emphasizing it's inclusion in the Sustainable Development Goals.

1.1 The Changing face of Health Communication

Health communication has played an important role in influencing population about their health choices. Public health experts have recognized the vitality of health communication in public health programs to address disease prevention, behavior change for quality of life. Over the years the face of Health Communication has evolved in forms of curating messages, promoting, and diversifying medium of outreach. From ad campaigns on Family planning in Print (Elliott, 1971) to Messages regarding health and hygiene on Broadcast media (Smith, 2011), to tech-enabled health communication interventions based on analytics, to use of social media (Bhattacharyya, 2016) all of them offers great opportunities in the field of health communication (Stellefson, 2020). This has expanded the acceptance, and adaptability of the health communication programs, targeting a high

outreach to a diverse and large population. With the evolution of tech-based interventions and the penetration of mobile technology, the 21st century is being recognized as the digital age for health communication (WHO, 2018). With the emergence of Web2.0., this has been consistently increasing and expanding with a range of digitized health promotion practices (Pandey, 2020) (Dunn, 2019). This includes AI enabled adaptive technology, Internet search engines and data mining based on social media for prevention or diagnoses of disease (Fogel, 2018)(Banerjee, 2020). The ability to adapt to the dynamic social context of its users, social media platforms, such as Twitter, Facebook, YouTube, and Instagram have been involved with sophisticated technology that has led to the success of social media (Bughin, 2010).

The information assimilated from these sources are derived from big data that is being processed and synthesized for behavior analysis (Buhi, 2013) (Korda, 2013), on the basis of which communication strategies are designed and developed. These communication strategies are further disseminated using moderated or unmoderated methods. Whether moderated or unmoderated, interventions designed with emphasis on visuals, voice modulation, built to fit certain context facilitate the ease in understanding (Joshi A. R., 2011) (Shoup, 2019).

1.2 Boon in the sector of Public Health

Most primary healthcare services are focused on treating illnesses than prevention of disease. Hence there is a constant burden on the healthcare providers. With Overcrowded hospital, limited available time for doctors and healthcare workers, patients face lack of information from reliable sources. In such a situation Health communication and promotion has been a boon in the public health sector, as it has been able to emphasize on prevention and promotion to safeguard treatment and maintenance (Srinivisan, 2010). It is possible to

reduce disease morbidity effectively if individuals engage reliably in prevention behaviors. Non-communicable Diseases (NCDs) account for 71% of annual global deaths. To overcome this, public health awareness campaigns has been recognized as a “Best Buy” (WHO W. H., Best buys’ WHO Report, 2017). According to which, it is essential to reach everyone in the cornerstone to achieve universal health coverage: “leave no one behind” (UN, 2021). This acknowledges the benefits of health communication for its cost-effectiveness, higher outreach, along with the ability to curate messages for specific group or individual. These care further be customized using time analytics as per location for higher outreach. The dynamic process of reviewing, engaging, iterating and outreach of health communications in real time had been able to maximize its impact.

Health Communication as a method to create public health awareness have been recognized in achieving significant milestones. This works at the level of a behavioral, organizational, and changes in policy making. Over the last 2 decades, health consumers have evolved from passive recipients to active health-seeking co-owners of their health and wellness decisions. Where there has been an increase in the health seeking behavior in their current context. People are becoming conscious of their right towards good health and well-being. They prefer to have choices and preferences in the kind of message they want to hear and opt for which Web 2.0 has acknowledged by allowing creation of content and generating of data. Hence it is characterized as ‘prosumers’ of online technologies, by the activists, as users both produce and consume digital content (Ritzer, 2012) (Lupton, 2014) (Korda, 2013).

1.3 Limitations of current Health Communication Strategies

- Implications of health promotion practices are constantly being questioned. Instances where people have recognized the benefits, they have been able to accept and adapt

technology. However, there are multiple factors that contribute and influence such behavior. Where some of these practices are voluntarily undertaken by individuals who are interested in improving their health and fitness, there are others who are employed by agencies to impose health interventions on a particular target group (Lupton, 2014) (Reddy, 2020).Where there are promising advances in technology innovation and acceptance, evidences of the efficacy of the interventions leading to consistent behavior change are limited. This highlights the need to for a fresh approach yielding new theories and interventions that work. It is also important to get a deeper understanding of the underlining complexities that hinders the effectiveness of an intervention.

- With the acceptance and advancement of digital technology, it has become critical to develop an understanding of the overall perspective, balancing both the negative and positive aspects. For example, the emergence of digital health practice and promotion have emphasized the importance of understanding the role of misinformation, misconception, which imposes the potential to distort, and undermine public perceptions towards public health issues. (Gold, 2019)
- In certain situations, there are shortcomings that might arise because of developing dependency. There have been evidences that support that rather than becoming self-reliant from features like alarms and pill-reminders, consumers have become over dependent on technology. The growing entry of commercial apps, self-tracking devices, smart objects and environments into digitized health promotion, opens up the use of digital data on individuals' health- and wellbeing-related behaviors (Lupton, 2014) (Renfree, 2016), this leads to further complexities.

- In situations where interventions are enabled through agencies, with every upgrade there is a requirement of retraining staff and upgrading the systems around it. Field data suggests that there is uneven distribution between Health Seekers and Healthcare providers, leading to Constant training and upgrading staff.
- Most Health Communications models work at a system level defining strategies for health promotional methods. There is fewer evidence of models based on Health Psychology models and frameworks, that work on behavior change mechanisms.

2.1 Current Health Communication Framework

Several agencies have formulated a health communication framework that clearly defines a systematic way of integrating and navigating health interventions. These frameworks are being used extensively to plan and strategies health promotion programs. In this section we would be discussing 3 such programs that work at different level. The most recognized framework is suggested by WHO in 2017 known as the strategic communications framework for effective communications, (WHO, WHO strategic communications framework for effective communications, 2017). The other popular frameworks are Field Guide to Designing a Health Communication Strategy by Johns Hopkins Bloomberg School of Public Health, (O'Sullivan, 2003) The Periodic Table of Healthcare Communications. (health, 2018)

2.2 The strategic communications framework for effective communications

WHO has recognized the need for an effective, integrated and coordinated communication, that can work as an integral component to carry out its goal to build a better, healthier future for people across the world. To accomplish this a structured and comprehensive framework, has been proposed that describes a strategic approach for effectively communicating information, advice, and guidance across a broad range of health

issues. The proposed approach has been presented as a framework of principles so that it could be applied in various communication functions, where the audiences for these are the health decision-makers and agents who use WHO communications products to make a range of health decisions. This framework comprises of

- ***Individuals*** – They are the health decision makers of their self and their families health. Program could include childcare guidance, practices of basic hygiene, norms and protocols for travel in countries where infectious diseases are circulating.
- ***Health care providers*** – They are the agents for decision making about screening, diagnostics, treatment, and recommendations for patients.
- ***Policymakers*** – They are the agencies at national and subnational levels. Their responsibility is to include investing in training health workers, building emergency operations centers, or funding vaccine programmers.
- ***Communities*** - They are the group or network of people who make decisions about shared space, activities, and services with health consequences. For example, clean-up of standing water in community squares, location of health facilities in proximity to residences, etc.
- ***International organizations and stakeholders*** - These are agencies who make decisions about funding and implementing health programs. This includes involving and assisting countries in health systems, funding programs to reduce chronic diseases, providing support for public health research.
- ***WHO staff*** - They work as the primary stakeholders to make decisions about programs, coordination, human and financial resources. (WHO, World Health Organisation, 2022)

Figure 1.

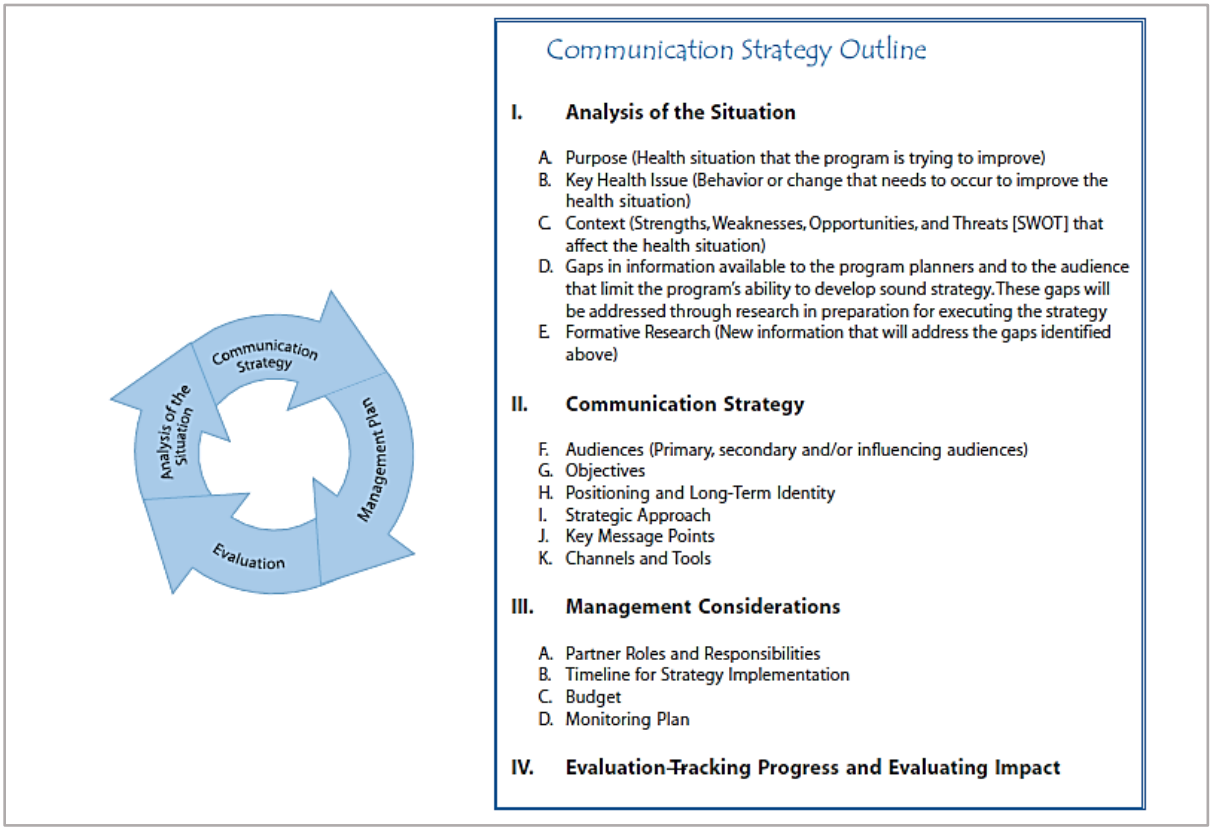
The strategic communications framework for effective communications

Source: https://www.who.int/about/communications

2.3 Field Guide to Designing a Health Communication Strategy

A Field Guide to Designing a Health Communication Strategy, by Johns Hopkins Bloomberg School of Public Health. (O'Sullivan, 2003) is a comprehensive 300 pages document that details out each stages of an intervention in a step wise process. This includes 1. Analysis of the situation, 2. Communication Strategy, 3. Management Consideration, Evaluation tracking Progress and Evaluating Impact. Each stage is further divided into steps, that include added resources like example, worksheet, tip, checklist, questions to ask yourself, important note, case study example of documentation.

Figure 2.
Field Guide to Designing a Health Communication Strategy



Source: O ga Sullivan, G. A., Yonkler, J. A., Morgan, W., & Merritt, A. P. (2003). A field guide to designing a health communication strategy: a resource for health communication professionals. In A field guide to designing a health communication strategy: a resource for health communication professionals (pp. 308-308).

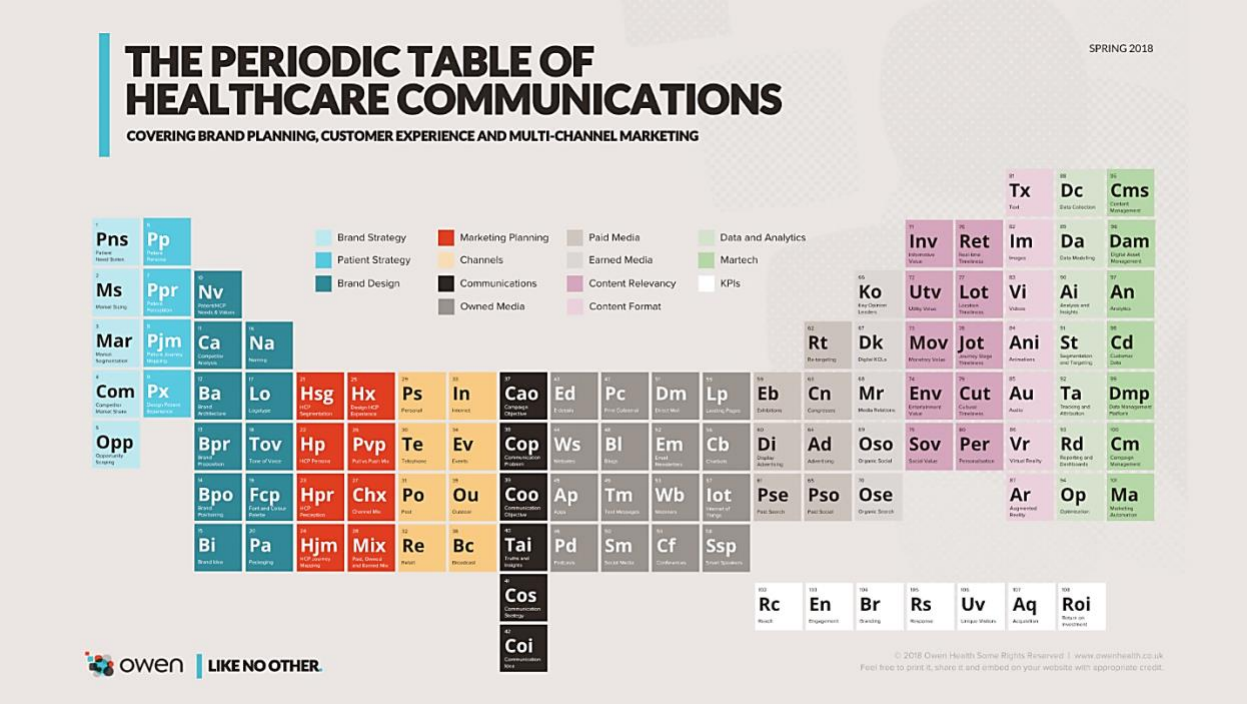
2.4 Commercially known and accepted frameworks like The Periodic Table of Healthcare

The Periodic Table of Healthcare Communications is a commercially known and popularly accepted framework on Brand Planning to integrate marketing activities. This definitive framework for building healthcare communication strategies and plans covers Brand Planning, Customer Experience and Multi-channel Marketing. (health, 2018). The framework covers three areas

- ***Brand planning and multi-channel marketing*** - In this the brand activity that caters to market, patient and competitors, are placed upfront and sets the scenario for the marketing planning. This informs the multi-channel communication campaigns.

- ***Customer experience in healthcare communications*** – This focuses on understanding the positioning the customer experience and health communication. This is done by first, understanding the journey map of Customer and Health Care Professional, then mapping the journey to facilitate designing a new journey map.
- ***Healthcare communication propositions*** – This focuses on keeping the brand proposition and communication proposition separate, so that they can be integrated in a way that does not influence of affect each other.

Figure 3.
Field Guide to Designing a Health Communication Strategy



Source:
https://www.pmlive.com/pmhub/healthcare_creative_and_design/owen_health/white_papers_and_resources/the_periodic_table_of_healthcare_marketing

3.1 Complexities and gaps in designing for health communication

All the three communication frameworks discussed above focuses on developing strategies and integrating programs. Where the WHO frameworks discusses from the

perspective of stakeholders, the John Hopkins details out implementation plan, and the Owen's Periodical table discusses works like a social marketing strategy focusing more on brand planning and marketing. Where all have significant role and contribution, none of them actually focus on communication design based on structuring content.

Designing of healthcare communication for multicultural diverse population is a complex endeavor. Where there are evident issues like geographical diversity, infrastructure, and technological limitations, language barriers effect the success of an intervention. Underline issues like cross cultural influences, behavioral, psychological and socio demographic influences make in challenging to design an effective health communication model. The following section focuses on some of these issues.

3.2 Socio cultural and demographic factors

The influence of socio-cultural factors is becoming evident in integrating health behavior is the socio demographic data. It works as a hidden influencer, that, is more powerful than it appears to be. However, in most cases behavioral scientist works more on psychological variables and less on socio demographical variables. A country that is rich in cultural and socio-economic diversity faces challenge to provide equal access to health delivery despite all the government initiatives. Further there are issues from non-accessibility to non-acceptance. In such situations technology becomes a useful tool to effectively evolve the social communication model for health behavior change. (Ashing-Giwa, 1999)

There is a non-uniformity in the socio-economic status of each part of the country. Along with the diversity of language, the Cultural context varies from region to region, what is acceptable to one group/community may not be acceptable to another. Gender divide is prevalent even in the context of what information is to be given to whom. Women faces

restriction to receive certain messages/information from certain stakeholders. (Joshi A. R., 2019). The socio-economic factors effect the level of exposure to new technology and availability of resources. These issues become a roadblock for localizing and scaling up of any program.

3.3 Infrastructure

Most Health communication programs that are enabled through government agencies that have difficulty in managing the ecosystem with multiple stakeholders. The government run programs are operated in the public hospitals, in these places setting up and running a program becomes a herculean task. Public Hospitals in most sections of are not equipped for upgraded technology facilities, where there are infrastructural issues like lack of computer and internet connections. There is also a lack of man-power resources, with very few people educated and trained to handle the system, keeping the Health workers overworked, as they become the only source for enrolling, registering, training, and troubleshooting. (Joshi A. R., 2014)

3.4 Technology

Lack of technological skills create a hindrance for field staff and health workers. Where there are certain tasks where technology can take a lead by providing support, facilitating and working hand in hand with supply side workers. In certain situation it becomes a roadblock as untrained health workers are not equipped to use advanced technology, leading to incorrect data entry.

Acceptance of technology for Behavior change mechanism also depends on various factor, where safe parenthood and wellbeing becomes a motivating factor to adapt to new technology, the reliability of the source of information becomes an important influencer.

Acceptance of features like pill reminders depends on individual preference. Where there is a possibility of under use of the feature after habit formation, there would be others who might become more dependent on technology. Support needs to be identified and provided in specific instances where it is needed. Wellbeing of dependents becomes a motivating factor for behavior change. The use of mobile technology becomes valuable in situations where information is needed on sensitive issues; like sex education, as it helps to maintain privacy, where the design of messages needs to be more discreet. (Joshi A. R., 2019)

3.5 Top-down approach

The discourse referring to 'behavioral interventions' still follows a top-down paternalistic approach i.e., imposing of thoughts rather the building consciousness for general health and wellbeing, where the emphasis is on preaching of advice then focus on behavior change. Where the emergence of technology, gives an option of choice autonomy, most health communication till date tend in impose content, then inform with consent. According to WHO, in the age where governments are taking severe measures in response to the neoliberalist focus on citizens' self-responsibility for their health outcomes have intensified in areas including healthcare and public health. (WHO W. H., A conceptual framework for action on the social determinants of health, 2010). However, till date most health promotions are not chosen by the people, but instead are identified for them by the agencies who priorities and direct it towards them. (Dennison, 2013)

There is a need to relook at the interventions and the way it has been designed to sensitize people towards their health behavior, in a way where individual take oneness of decision making through change is attitude and belief.

3.6 Psychological Dimensions Learning

People cannot imagine things out of the context; current programs are designed for the present context. We have not been able to communicate what could be the future health risk for them. (Renfree, 2016**).** Hence where there are evidence of psychological factor like motivation that becomes a strong determinant for relying on health communication, in interventions on maternal health, or risk perception for conditions like HIV/AIDs or Covid. There are very few evidences of efficacy towards health communication programs where for future health issues. Theories of Nudge, Motivation, Risk Perception have played an important role in the health communication design. More studies are needed in integrating them to develop a holistic model. Health Psychology emphasizes the relevance of multi-level framework or 'Onion Model' that takes into account biological determinants and social context for health-related experience. This highlights a strong effect that influence the mechanism for bringing about change. Measuring such influences in a multi diverse cross-cultural setting is a challenging endeavor. This makes evidence of such health psychological models for designing health communication

4 Covid-19: The game changer

Covid-19 has emerged as an infectious disease that can pose a serious threat to human health. The sudden approach and unexpected nature of Covid-19 has sensitized health consumers/ policy makers to the importance of preventive health ¬ communication. There is a surge in demand for digital based health messaging (Motta Zanin, 2020) (Pandey N. a., 2020). Although the true risk of the virus remained unknown at every phase, the media attention received by the pandemic along with social media discussion, have been able to

induce the perception of risk among people. (Dryhurst, 2020)The uncertainty of the situation made people conscious of their own actions, reconfirming that risk perception leads to urgency in behavior change (Cori, 2020). This led to the soaring of digital adoption for health communication medium with greater openness from health consumers to implement preventive health changes. (Golinelli, 2020) Due to the unexpected situation, constructive fear has worked in health behavior change (Maddux, 1983). The willingness to stay healthy and safe has become the driving force for behavior change. People have made efforts to be self-reliant making themselves self-aware to the best of their knowledge. (de Bruin, 2020)The lockdowns have forced people to acknowledge the use of technology in seeking information for health communication to a large extent, reconfirming the use and misuse of different modes of communication to spread communication more evident (Gerhold, 2020) (Wise, 2020). However, the permanence of the change in behavior remains a question as it was the effects of a situation that was prevailing; hence the behavior change was evident. Which with circulation of vaccination and the changing temperament of the virus, the efficacy towards the norms and protocols were going down. Hence although there have been strong evidences of technology acceptance, effectiveness of health communication because of perceived risk perception. There are no studies to suggest that the behavior change has been consistent and with long term effects (Scott, 2020) (Sust, 2020) (Kalhori, 2021).

5.1 The Need for Social Communication over Health Communication

In the current scenario there is a need for a social communication model in the sector of healthcare with an underpinning of psychological models and theories. Frameworks, that can integrate the core theories of behavior change mechanism is a systematic way to bring

about a sustainable behavior modificattion. The model that works on not only making people aware but inform them in a way that helps them rationalize their choices and making them self-reliant and work towards their well-being.

As humans we often treat our own bodies and psyches as objects to be manipulated. In doing so we miss the importance of inner lives and start relying on the "magic bullets" and behavioral quick fixes to solve psychological problems. While doing it we, ignore the ecological threats to health and well-being. In the crisis of current scenario, these vital qualities of life have been suppressed, and unconsciously lost through in the process of strategic and systematic approach. This calls for a need of a medium like social communication, where there is more emphasis on behavioral reforms based on self-transformation.(Earley, 2002)

5.2 Understanding Social Communication

Social Communication is referred as the communication that is targeted for the larger audience, it mostly deals in the social context, where the purpose is to bring about a positive change in behavior. It is a multidisciplinary field of study and practice that applies creative ways of communication to promote behaviors, policies, and practices that advance the health and well-being of people and populations, SHC, 2017. (Communication, 2016)

Over the years the face of Social Communication and evolved and changed. The initial evidence of Social Communications were prevalent for religious reforms in the form of Bhakti movement, where the spiritual masters would use songs and verses to spread spiritual values. (Gumperz, 1964)Most of the time they were not direct messages, but the dohas and verses by Kabir, or Lalon Fakir worked on bringing spiritual awakening amongst people. Evidence of Social communication on religious reforms are also found in the Edicts

of Ashoka. Later during the time of India independence, social communication has been used to bring about revolution. The medium of the communication varied from songs to wall arts to street plays, with several artists still being recognized by their work independence. Social Communication has played significant role in bringing revolutionary reforms. Gradually the mode of Social Communication started shifting in a more structured ways with campaigns like Family Planning, Awareness programs on HIV/AIDS with mascots like Bula Di (Parikh, 2006) (Mishra, 2008).With the emergence and inclusion social media campaigns like #metoo or breast cancer are becoming popular. (Leiss, 2018) This evidence highlights that any campaign that is designed in a way where the is a democracy in choice and preferences are made on the basis of their consciousness have greater impact and influence towards behavior change.

6 Significance of the Study

The acceptance and vitality of Health Communication is becoming evident in the healthcare domain. Government, non-government, and private companies working in the area of healthcare are developing mechanisms to build strategies. There is lot of focus is given on developing and building the content, making it engaging and interactive. Where there are claims of behaviors modifications and positive influences, as an outcome of the programs. The evidences are based on immediate implications of the system, like pregnancy, HIV/AIDS, diabetes or Covid19. There is no evidence of significant behavior change for long term implications. Or no studies that validates the transfer of knowledge in long term basis.

This calls for the need of a validated study for a communication medium that works on cognitive level to bring about sustainable positive health behavior change. The study needs to be conducted over a population where the future implications could be measured.

Study of adolescent sexual behavior has been a prime area of healthcare intervention since generations. Where a lot of emphasis is being given on menstruation practices, health, hygiene, and other sexual practices. Topics related with reproductive health and general wellbeing does not get much attention. Hence many women still face multiple reproductive health issues at a later age, that they remain unaware of. The education given during adolescence in most cases is not carried forward for future implications.

Adolescence is an ideal time period to educate individuals about health and healthy habits/lifestyles. Lifestyle changes made in adolescence are likely to stay with the person for a lifetime. Therefore, positive health behaviors inculcated in adolescence can reduce an individual's risk of developing chronic diseases in adulthood. Researches show precautions taken in adolescent may suppress the effect of disease risk after age 45. This means that health habits that are practiced as a teenager or college students may well determine which chronic diseases they develop in adulthood (Taylor, 2009)

7.1 Understanding the relevance of Adolescent for the study

Adolescence is a dynamic phase where opportunities for health are significant as future patterns of adult health are established in an individual's life, these represent the transition between childhood and adulthood. These transitions could be characterized by significant physical, psychological, psychosocial changes that bring both risks and opportunities related with their health and wellbeing. The habits and behavior patterns that are formed during this phase could influence the life prospects of young people, further

effecting the long-term health and social implications that require explicit attention. (Sawyer, 2012) (Liang, 2019)

Historically, societies expect childbearing to follow shortly after marriage. In the current and upcoming generation, norms are shifting towards delayed childbearing. These key changes, affect all societies by varying degrees, expanding the gap between puberty and marriage, futher between marriage and childbearing. Thus, assumptions about the adequacy and effectiveness of health-service delivery through pediatric or adult reproductive services are no longer appropriate in developing or developed countries. Adolescents, for many reasons, have urgent need for accessible, quality health care. (Bearinger, 2007)

The shape of adolescence is rapidly changing— the age of onset of puberty is decreasing and the age at which mature social roles are achieved is rising. New understandings of the diverse and dynamic effects on adolescent health include insights into the effects of puberty and brain development, together with social media. forthcoming generation of young people will take a different path through adolescence from previous generations and face new challenges to their health and wellbeing. How they negotiate these years will have a powerful effect on their future health and their countries' economic and social prospects. (Sawyer, 2012)

Adolescence and young adulthood coincide with major changes in health problems and determinants of health in later life. Evidence based research reveal that precautions taken during adolescent may suppress the effect of disease risk after age 45. This means that health habits people practice as a teenager or college students may well determine which chronic diseases they develop and what they ultimately die off in adulthood. (Shribman, 2007) (Viner, 2012) (Sawyer, 2012)

Today's Adolescent girls are more likely to marry later, delay their first sexual experience, and delay their first childbirth, compared with 25 years ago. Despite overall progress, there is unequal progress in Adolescent sexual and reproductive health issues. The issues related with Reproductive Health are also expanded, including general and mental well-being. Recognizing the need that adolescents and youth have the right to be informed. Further actively and meaningfully participate in all matters that affect their lives (Liang, 2019).

Sexual and reproductive health is a state of physical, emotional, mental, and social well-being in relation to all aspects of sexuality and reproduction, which is not merely the absence of disease, dysfunction, or infirmity. Therefore, a positive approach to sexuality and reproduction should be recognized as a part played by pleasurable sexual relationships,

trust, and communication in the promotion of self-esteem and overall well-being. (Engel, 2019)

7.2 Demographic and Education

The profile and distribution of adolescents across world regions have changed significantly where the number of adolescent girls increased by 13.7%, from 529 million in 1994 to 601 million in 2019. Sustained school enrollment for girls has influenced the age at first sex and first marriage, (United Nations, 2019)Globally, enrollments in education have increased significantly at all education levels. The gross enrollment ratio (GER) in secondary school increased from 56.1% to 76.4% between 1994 and 2016, and the GER in tertiary schools increased from 15.0% to 37% over the same period ((UIS)., August 21, 2019) Adolescents live in a world that has become increasingly urban and mobile. In 2019, 56% of the world's Adolescent population lived in urban areas, as compared to 44% in 1994 (Migration, 2018) (United Nations D. o., 2019) (SAPD, 2019)

New means of communication, knowledge sharing, and social media are transforming the lives of particularly adolescents. Youth of all age groups relate to social media, with approximately 71% with online presence are from the age group of 15 - 24 (Keeley, 2017) The growing development of simple smartphones with a few core platforms, like WhatsApp and Facebook, available at very low prices is increasing smartphone uptake even among the poorest countries in South Asia. Such technology penetration is profoundly shifting the ways that adolescents interact with their peers, family, and the world at large. Influencing how they learn, communicate, make decisions, form relationships, explore their sexuality, and manage their health (UNICEF, 2017) (Livingstone S, 2019). Online interventions are enabling adolescents to independently seek ASRH information on their own terms, as in the case of text lines, online counseling, chatbots, and informational Web sites.

Overall, the shifting demographic, health, and social changes since 1994 reflect extraordinarily positive trends in development amongst adolescents. Access to new digital means of communication is shrinking the world for young people, and information about new models and norms from other countries are changing the aspirations of young people everywhere. These trends, in general, have changed the scenario of ASRH since 1994. (Liang, 2019)

7.3 Health Data

Over 250 million adolescents are living in countries characterized by multiple health burdens in 2016. (Azzopardi, 2019) (Weiss H. A., 2019). Adolescents in these countries face a triple burden of health problems, ranging from communicable, reproductive health-related issue, nutritional diseases, high prevalence rates of injury, violence, noncommunicable diseases and mental disorders. Other nutritional health risks are becoming prominent, with an

increase of 120% is adolescents who are overweight or obese (Azzopardi, 2019). Overweight and obesity adversely affect many outcomes for lifelong health issues, including sexual and reproductive health. Excess weight and abdominal fat are risk factors for menstrual abnormalities (Douchi, 2002), ovulatory dysfunction, altered endometrial function (DeUgarte, 2010), miscarriage (Rittenberg, 2011), pregnancy and perinatal complications (Weiss J. L., 2004).

However, most parts of the world staunchly continue to refuse, acknowledge, and accept adolescent sexuality. In most situations, adolescent sexuality is discussed as a risk or problem to be avoided in the context of disease and pregnancy prevention. It is promoted as acceptable only in the context of childbearing within marriage. Although girls are seen as the embodiment of sex and sexuality when they reach puberty, abstinence on discussions on sex before marriage is commonly presented as the only allowable option for adolescents (Heilman, 2018) (Chandra-Mouli, 2017). Discussions around Sexual health, including positive and respectful approaches to sexuality, relationships and sexual pleasure, is minimized and ignored (UNESCO, 2019) Greater engagement of adolescents in their health can be positively associated with utilization of care and can enhance the effectiveness and sustainability of adolescent SRHR interventions (Sebastian, 2014)

The prevalence of reproductive cancers is generally low among adolescents, however, the contribution of ovarian and breast cancers among adolescent girls have increased between 1994 and 2017. Globally, the proportion of ovarian cancer increased from .08% in 1994 to .11% in 2017 (IHME., 2019)

7.4 Current state of Reproductive Health and Well Being

The data from 2016 shows that in the developing world, an estimated 38 million girls are sexually active, where sexually active is defined as having intercourse in a span of 3 months. In this only 15 million reported uses of a modern contraceptive, leaving 23 million at risk of unintended pregnancy (Darroch, 2016). The rate of contraceptives use is 51% amongst unmarried sexually active adolescent girls, which is higher than married or in union adolescent girls, the number of which is 20%, along with the unmet need for family planning, which is 41% and 23%, respectively. (Fund, 2019).

According to the latest United Nations Population Division estimates, globally the adolescent birth rate by country depicts that in almost all countries, early childbearing has become less common since the early 1990. It decreased by one-third, i.e 34.4% from 1990-1995 to 2015-2020, now standing at 42.5 births per 1,000 women aged 15-19 years. (United Nations, 2019)The global decrease was deeply affected by the 72.5% decline in Central and Southern Asia, from 95.3 to 26.2 births, which, in turn, was driven largely by India, where the adolescent birth rate decreased from 94.0 to 13.2 births per 1,000 women.

Pregnancy and childbirth complications are estimated to be the leading cause of death among 15- to 19-year-old girls worldwide (estimates, 2016). Adolescents aged 15-17 years have greater maternal health risks than women just a few years older (Blanc, 2013), reflecting multiple compounding vulnerabilities, both social and biological.

In comparison to older women, adolescents have a higher risk of pre-eclampsia, eclampsia, puerperal endometritis, and systemic infections (Ganchimeg T, 2014). They are more likely to experience preterm birth, stillbirths, low birth weight, and neonatal mortality (Althabe F, 2015). The point estimate for maternal mortality ratio among 15- to 19-year-olds is at 260 per 100,000 live births, higher than the estimate for those aged 20-24 years with190 per 100,000 live

births, but lower than for those aged 35 years and older, where the numbers are 710 - 2,800 per 100,000 live births. (Nove A, 2014).

Overall, there has been great progress at the global and regional levels, in the various health trajectories of adolescent health, especially adolescent sexual health and rights. There is a need to focus on the issues that are more related to reproductive health and well being that caters to the holistic understanding of the wellbeing of a women's body.

7.5 Recognition of Adolescents Healthcare for Sustainable Development Goals

In 2016, to fulfill the mission of "leaving no one behind," the special needs of adolescents were recognized in both the The Sustainable Development Goals (SDGs) and in the Global Strategy for Women's, Children's, and Adolescents' Health (UN, 2021) (Geneva, 2019)

Adolescents were virtually absent in the Global Strategy for Women and Children's Health before 2015. (Bundy, 2017) The updated Global Strategy includes adolescents as they are central to everything we want to achieve, to the overall success of the 2030 Agenda. Hence it is now being called Global Strategy for Women's, Children's, and Adolescents' Health" (UN, 2021). Giving an opportunity to address adolescent health in general and ASRHR that did not exist before.

It has now been recognized that a person's health at each stage of life affects health at other stages, it has cumulative effects for the next generation. A poor start in life can lead to poor health, nutrition, and inadequate learning, resulting in low adult earnings as well as social tensions. Hence, the health and well-being of adolescents are essential for achieving the SDGs. Particularly in areas where there is, poverty, lack in health security and education. Action is necessary across sectors and settings to support children and adolescents to survive, thrive and

transform. (WHO, Child and adolescent health: fact sheet on Sustainable Development Goals (SDGs): health targets, 2021)

The purpose of SDG 3 is to ensure healthy lives and promote well-being for all at all ages. It has several indicators of which Target 3.7 focuses of ensuring universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programs. Rationale behind this is to reduce adolescent fertility along with underlying multiple factors that are essential for improving sexual and reproductive health, social and economic well-being of adolescents. Significant literature suggests that women who become pregnant and give birth very early in their reproductive lives are subject to higher risks of complications or even death during pregnancy and birth. The children born to them are also more vulnerable. Therefore, preventing births very early in a woman's life is an important measure to improve maternal health and reduce infant mortality. The adolescent birth rate also provides indirect evidence on access to pertinent health services since young people, and in particular unmarried adolescent women, often experience difficulties in access to sexual and reproductive health services, making this important agenda to be looked at. (Platform, 2022)

8 Research Gap and Rationale of the Study

Gaps in current Heath Communication

- The Health Communication Models focus on immediate health implications. The efficacy of these interventions cannot be measured for long term health issues. Where these interventions have worked for conditions like Pregnancy, HIV/AIDS, Diabetes, Covid19.

There are no validated studies showing positive influence towards health where there are no direct or immediate implications.

- Current Health Communication Models are not based of Health Psychology theories and models. Hence there is a lack of psychological underpinning, which leads to lack of rationale regarding the benefits of certain health promotion practices.
- Most of the Health Promotion practices are initiated by government or agencies working in this area of healthcare. Most of them focusing on features like monitoring and reminding. There are lack of evidence on information seeking.
- The current Health Communication models work on strategies of implementation and promotion of the interventions. As it woks at a mass level, hence customization and localization becomes a challenge.

Gaps in Adolescents Reproductive health and well being

- In recent years, menstrual health has emerged as an important yet neglected entry point to discuss puberty, gender, reproductive health, and sexuality issues with young women. Globally, knowledge and understanding of reproductive health and well being are highly variable and often low among adolescent girls (Chandra-Mouli, 2017). Lack of understanding coincides with stigma around discussing women's health, alongwith and a cultural perception of menstruation as dirty and taboo (Chandra-Mouli, 2017). There is a need for comprehensive education on understanding women's body will help to enhance understanding of reproductive health and wellbeing, dispelling beliefs and practices, reducing stigma and giving girls greater freedom.

- In the past 25 years, program implementers, researchers, and policymakers have expanded the available public knowledge concerning adolescents needs, concerns, identifying ways to help them overcome barriers to their sexual and reproductive health and well-being and to support them in fulfilling their aspirations. However the focus is largely on physical health outcomes, predominantly using a risk-reduction approach. Mental and social well-being, including body image, self-esteem, and equal romantic and sexual relationships, which are intrinsic parts of sexual and reproductive health, receive far less attention and are often measured only in small-scale cross-sectional studies. (Liang, 2019)
- There is a lack of understanding in the current interplay of life events, including how over exposure to information augment or negate certain sexual and reproductive health risks and transitions to healthy adulthood.

Chapter 2 – Theoretical Framework of the Study

Games/Play has been explored as a medium for effective health communication since decades. Where game or play have the ability make a content engaging and interactive, it gives a liberty to incorporate different psychological theories and concepts to build a strategy for behavior change. Where the interactive medium makes it engaging, the various strategies used to build a gameplay evokes a learning experience that can be speculative in nature, giving you opportunity to envision a future. Hence this kind of medium can help to bring about information seeking and knowledge building ability amongst adolescents, to curate their own learning experience.

The proposed theoretical framework utilizes game as a medium to speculate future of health. The process goes through multiple layers, where first the user is made aware through consciousness building, further leading them through the five stages of Transtheoretical Model (Stages of Change) using elements of Nudge and Risk Perception. The explanation and purpose of each theory are as follows

1.1. Participatory/Reflective Consciousness

The past few years have seen the emergence of the topic social evolution of consciousness, where consciousness is referred as the inner life of the individual, including thoughts, attitudes, emotions, motivations, and spiritual experience. The Biological Evolution of consciousness has evolved millions of years ago, the recognition of social evolution came later which were formulated into model by several authors. The model used for the current study was developed in 1997. This model covers not only consciousness, but all aspects of society, including the evolution of technology (material realm) and social structure (social realm). It

further explains both scientific, humanitarian, and artistic advances as a species (Earley, 2002). A few authors have presented theories that explain the evolution of consciousness at particular transition points during social evolution (Berman, 1984) (Block, 1977) (Whyte, 2017). The more sophisticated model was expanded and popularized by Ken Wilber (Wilber, 2007).

The present model defines two complementary qualities of consciousness: participatory and reflexive. Where Participatory consciousness is the sense of aliveness and belonging to the world. In this mode, people relate to the world primarily through intuition, emotion, the body, and the immediate present. Reality is experienced as animate, organic, and spiritual. Reflexive consciousness gives us the ability to understand ourselves and the world through the mediation of images and ideas. It emphasizes on reflection of experience rather than simply experiencing the world; giving an opportunity to conceptualize and analyze. Reflexive consciousness allows for objective understanding. and enhances our ability to take control of our environment and plan (Earley, 2002). Over the years the trend has shifted from reflexive to participatory. Where with the loss of meaning, detached consciousness brings about an impairment of empathy. Where people tend to see everything in objective and machinelike terms (Tarnas, 1991). Over the course of history, these two complementary qualities of both reflexive and participatory have been opposed to each other. Where the emergent quality of reflexive consciousness, has been growing, and the ground quality of participatory consciousness, has been suppressed and devalued. The current world reflects a crisis in the form of increasing domination of emergent qualities and suppression of ground qualities. This imbalance between ground and emergent qualities applies to the social arrangements, economic system emphasizing material growth (emergent) at all costs, trampling over community and self-reliance (ground) (Daly, 2002).

As the modern era ends, the loss of the ground qualities is causing serious problems for society, individuals, and for the world. Our society has devalued participation and privileged understanding based on empirical data and logic, leading to deadness and detachment. Many people feel separate from nature, isolated from community, disconnected from emotional, creative, artistic and spiritual self. People are drifting towards money, security, power, and appearances. We apply quick fixes and Band-Aids to the great problems of our time, such as drug abuse, environmental degradation, poverty, and homelessness. With no larger vision of where we are going. Along with the loss of meaning, detached consciousness brings about an impairment of empathy. We tend to see everything in objective and machinelike terms (Tarnas, 1991).

To resolve the planetary crisis and move into a new era of social evolution, there is a need to reclaim the ground qualities and integrate them with the emergent qualities through consciousness. Changes in consciousness are important in themselves, as they affect our social arrangements. The consciousness realm is crucial to the process of social change because it is the realm in which it is easiest to promote change incrementally on a one-to-one basis. In the consciousness realm, it is possible for individual people to change their consciousness in healthy directions, and therefore, consciousness movements can build gradually. Earley's current model suggests that each stage of social evolution is defined by the relationship between participatory and reflexive consciousness. In participatory consciousness, activity tends to be spontaneous and flowing, stemming from feeling and impulse. In reflexive consciousness, activity tends to be organized, planned, and structured. Ideally, we want to have both these modes available to us. There is a need to integrate reflexive and participatory consciousness to understand reality. This is reflected in the table modes of knowing.

Figure 4:

Modes of Knowledge

Participatory	*Reflexive*
Intuitive	Factual
Artistic, religious	Scientific
Subjective	Objective
Emotional	Rational

Source: Earley, J. (2002). The social evolution of consciousness. Journal of Humanistic Psychology, 42(1), 107-132.

Understanding consciousness and it's different aspects that reflects the societal paradigms becomes relevant and evident in today's context of health communication, is . With the thorough involvement of AI, monitoring and supervising every action, people have started depending applications on AI to an extent that it is becoming like a cyborg. There is a tendency of overruling the existing practices and considering them as non-reliable and unscientific. This drift their mind from lack of understanding of simple and logical things, further getting influenced by the external popular culture and norms.

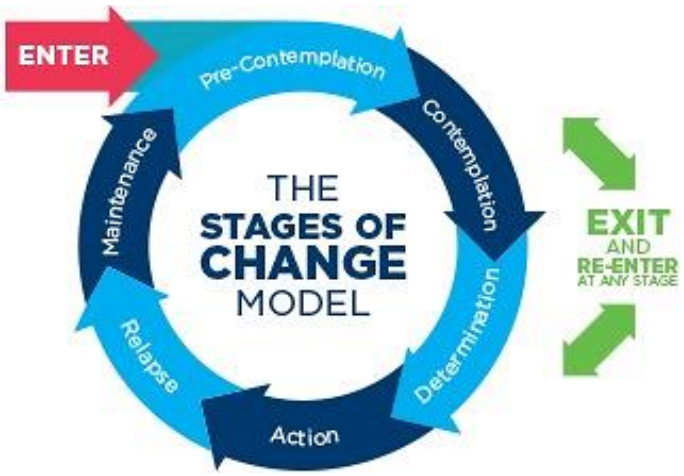
1.2. The Transtheoretical Model (Stages of Change)

The Transtheoretical Model – TTM (also called the Stages of Change Model), was developed by Prochaska and DiClemente in the late 1970s. It has evolved through studies done by comparing and examining the experiences of smokers who quit smoking. Where there were some who quit on their own, there were others who require further treatment. It was determined that people quit smoking if they were willing to do so. (Estacio, 2018) Basic research conducted to check the validity of the models suggest a rule of thumb for at-risk populations: 40% are in precontemplation, 40% in contemplation, and 20% in preparation. Applied research studies

suggest dramatic improvements in recruitment, retention, and progress using stage-matched interventions and proactive recruitment procedures. The most promising outcomes to date have been found with computer-based individualized and interactive interventions, specially computer-based programs with personalized counselors. One of the most striking results to date for stage-matched programs is the similarity between participants reactively recruited who reached us for help and those proactively recruited who we reached out to help. Transtheoretical Model (TTM) focuses on the decision-making of the individual and is a model of intentional change. It operates on the assumption that people do not change behaviors quickly and decisively. Rather, change in behavior, especially habitual behavior, occurs continuously through a cyclical process. Thus it is considered as a model; that can be applied in different behavioral theories and constructs where they may be most effective. The Transtheoretical Model provides suggested strategies for public health interventions to address people at various stages of the decision-making process. This can result in interventions that are tailored (i.e., a message or program component has been specifically created for a target population's level of knowledge and motivation) and effective. The TTM encourages an assessment of an individual's current stage of change and accounts for relapse in people's decision-making process.

Figure 5:

Stages of Change



Source 1Source: Health Psychology, 10th Edition

TTM suggests that individuals move through six stages of change: precontemplation, contemplation, preparation, action, maintenance, and termination. For each stage of change, different intervention strategies that are most effective at moving the person to the next stage subsequently leading them to model to maintenance, which is the ideal stage of behavior. (Prochaska J. O., 2015) The stages of change are defined in the table.

Table 1:

Stages of Change

	Stage	**Behavior Pattern**	**Assumed Tentative Duration**
1	Precontemplation	• No intention of action in foreseeable future. • Unaware that their behavior is problematic or produces negative consequences. • Underestimate the pros of changing behavior and place too much emphasis on the cons of changing behavior.	6 Months
2	Contemplation	• Intention to start a healthy behavior in the foreseeable future.. • Recognize that the behavior may be problematic • More thoughtful and practical consideration of pros and cons of changing the behavior , with equal	6 Months

		emphasis placed on both.	
3	Preparation (Determination)	• In this, people are ready to take action • Starting to take small steps toward the behavior change • Believe changing their behavior can lead to a healthier life.	30 days
4	Action	• People recently changed their behavior, and intend to keep moving forward with that behavior change • Exhibit this by modifying their problem behavior or acquiring new healthy behaviors.	6 Months
5	Maintenance	• In this stage, people have sustained their behavior change for a while (defined as more than 6 months) and intend to maintain the behavior change going forward. People in this stage work to prevent relapse to earlier stages.	More than 6 months
6	Termination	• people have no desire to return to their unhealthy behaviors and are sure they will not relapse. • Since this is rarely reached, as people tend to stay in the maintenance stage, this stage is often not considered in health promotion programs	Constant

To progress through the stages of change, people apply cognitive, affective, and evaluative processes. Ten processes of change have been identified where some processes are more relevant to a specific stage. These processes result in strategies that help people make and maintain change.

Table 2:

Progress through the stages of change

1	Consciousness Raising	Increasing awareness about the healthy behavior

2	Dramatic Relief	Emotional arousal about the health behavior, whether positive or negative arousal
3	Self-Reevaluation	Self reappraisal to realize the healthy behavior is part of who they want to be
4	Environmental Reevaluation	Social reappraisal to realize how their unhealthy behavior affects others
5	Social Liberation	Environmental opportunities that exist to show society is supportive of the healthy behavior.
6	Self-Liberation	Commitment to change behavior based on the belief that achievement of the healthy behavior is possible
7	Helping Relationships	Finding supportive relationships that encourage the desired change
8	Counter-Conditioning	Substituting healthy behaviors and thoughts for unhealthy behaviors and thoughts
9	Reinforcement Management	Rewarding the positive behavior and reducing the rewards that come from negative behavior
10	Stimulus Control	Re-engineering the environment to have reminders and cues that support and encourage the healthy behavior and remove those that encourage the unhealthy behavior

The model has certain limitations that include:

- Lack of social context in which change occurs, such as socio-economic status and income.
- Lines between the stages are arbitrary with no set criteria to determine an individual person's stage of change.
- The time duration for how much time is needed for each stage cannot be same for all, hence it cannot be defined as how long a person can remain in a stage
- The model assumes individual to make coherent and logical plans in their decision-making process, which is not feasible for every individual.

1.3. Nudge

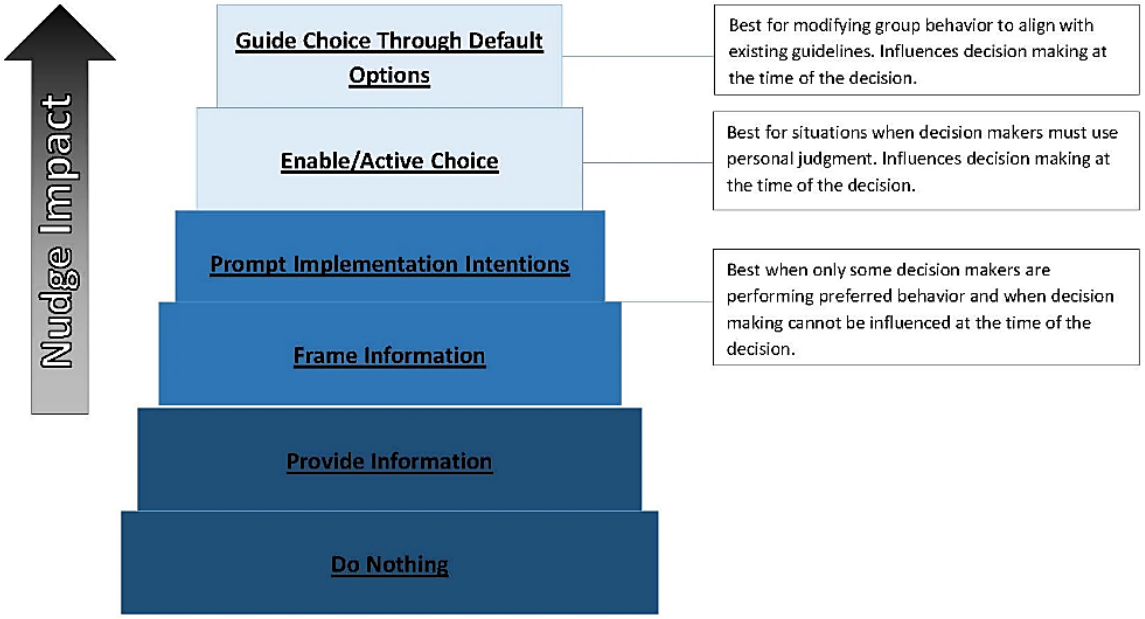
Nudges are subtle changes to choose architecture or the framing of information that can significantly influence behavior without restricting choice (Thaler, 2008). They are a set of

techniques developed by psychologists to promote “better” behavior through “soft” interventions rather than “hard” ones (mandates, bans, fines). In other words, people aren’t punished if they fail to follow them. The nudges are based on psychological and behavioral economic research into human behavior and cognition (Osman, n.d.).In health care settings, nudges can be used to improve patient outcomes and health care delivery (Patel, 2018). There is a significant opportunity to expand the use of nudges in health care settings through intentional design, rigorous experimentation, and systematic evaluation. (UniT, 2020) Significant research evidences validating these include using default options to increase generic prescribing and reduce opioid prescribing, using active choice to increase influenza vaccination, and using peer comparison feedback to increase statin prescribing and reduce unnecessary antibiotic prescribing. (Delgado, 2018) (Patel M. S., 2017) (Kim, 2018) (Meeker, 2016)

Nudges vary in their approach as well as in their effectiveness. The Figure depicts a nudge intervention ladder that can be used by health systems to help guide the development and implementation of nudges in clinical settings.

Figure 6

Ladder of Nudge Interventions with Best Practices Recommendations



Source: Harrison, J. D., & Patel, M. S. (2020). Designing nudges for success in health care. AMA Journal of Ethics, 22(9), 796-801.

Nudges towards the bottom of the ladder focus on delivering information. These approaches can be used to deliver infrequent messaging that can influence everyday decisions (Patel M. S., 2018). Nudges in the middle of the intervention ladder depend on framing existing information or on prompting goal-directed implementation intentions that specify when, where, or how goal-directed behavior will be enacted. (Robinson, 2019)

Nudges are more likely to be successful when they fit well into the workflow of key decision makers. As one moves up the ladder, nudges are delivered more directly at the time of decision making either by enabling active choice or setting the evidence-based option as the default selection. (Harrison, 2020)

The concept of nudge puts a label on efficacious influences that preserve freedom of choice without engaging the influences' deliberative capacities. Results show that choice architecture interventions promote behavior change with a small to medium effect size. The effectiveness of choice architecture interventions varies significantly as a function of technique and domain. Across behavioral domains, interventions that target the organization and structure of choice alternatives (decision structure) consistently outperform interventions that focus on the description of alternatives (decision information) or the reinforcement of behavioral intentions (decision assistance) (Mertens, 2022).

1.4. Risk Perception

Risk Perception is an individual's subjective assessment of the level of risk associated with a particular hazard (e.g., health threat). It varies according to factors such as past experiences, age, gender, and culture. For example, women tend to overestimate their risk of developing breast cancer. These exaggerated perceptions of risk, alsp known as perceived risk motivate people to seek genetic services, genetic testing, or prophylactic surgery. (APA, 2022). An individual's thought and feeling about risks face, is an important determinant of protective behavior. According to the psychometric model of risk, risk perceptions are characterized by two main dimensions: the degree to which a risk is dreaded and unknown Where dread risks are uncontrollable, catastrophic, involuntary, inequitable, fatal, new, global, and not easily reduced. Unknown risks are not understood by science, unobservable, new, and delayed in their effects (Katherine V. Kortenkamp, 2022)

The estimation of risk perception or people's judgment towards future outcomes may come about either through an analytical or experiential process. Where the analytical mode involves deliberatively and systematically taking into the various dimensions of the risk, such as the likelihood of events, utility of these events, and the number of individuals affected. The experiential mode involves an affective and intuitive reaction to the risk at stake. Where both modes are useful in some circumstances, they may also give rise to predictable departures from the objective magnitude of the risk (Hoorens, 2020).

In health decision-making, individuals are expected to navigate choices involving weighing risk for consequences with benefits of action. Behaviors contributing to disease initiation and progression are often pleasurable (e.g., smoking or overeating). Motivation to forgo such pleasurable behaviors, or engage in inconvenient preventive behaviors, is believed to be driven to some extent by beliefs about the probability that a health consequence will occur (Rogers, 1975). Correlational evidence supports an at-least-modest association between risk perceptions and health behaviors (Brewer, 2007) (Floyd, 2000)

Risk perception is also a highly personal process of decision making, based on an individual's frame of reference that developed over a lifetime, among many other factors. Substantial research have been conducted over the years to show evidence that when it comes to making decisions about health and safety, we don't always worry the most about the most pressing threats. (Slovic, 1987)

1.5. Overall understanding

A growing body of literature has probed how risk perceptions are formed. Risk perceptions are often targeted in health behavior change interventions, where an individual's

perceived susceptibility to a threat – are a key component of many health behavior change theories. Recent meta-analytic evidence suggests that interventions which are successful in engaging and change risk perceptions produce subsequent increases in health behaviors. Theory-guided health behavior change interventions and health communications often target risk perceptions toward the end of changing health behaviors (Noar, 2005). Meta-analysis of experimental evidence also supports the role of risk perceptions in health decision-making; when interventions have been successful to make health behavior change (Sheeran, 2014). Although risk perceptions can be optimistic (i.e., low) or pessimistic (i.e., high), they are empirically and conceptually distinct from general dispositional optimism, in part because they are domain-specific (Radcliffe, 2002). Indeed, evidence suggests that, in the general population, individuals can differentiate among specific threats when forming risk perceptions.

The above theories have been integrated to build the framework to develop game play mechanics.

Figure 7:

Theoretical Framework of Social Communication Model


Enter
Risk Perception
Precontemplation
Risk Perception
Contemplation
Hard Nudge
Determination
Soft Nudge
Action
Soft Nudge
Risk perception
Relapse
Hard Nudge
Maintenance
Soft Nudge
Participatory Consciousness
Artistic
Subjective
Emotional
Intuitive
Religious
Reflexive Consciousness
Factual
Scientific
Objective
Rational

Chapter 3 – Methodology

1. Research Question

- What are the best ways to communicate with Adolescents regarding their reproductive health and well-being?
- How to make adolescents aware of their reproductive health and well being for long term implications?
- Does the interaction of residential location and attitude towards reproductive health, affect the information seeking behavior?
- How to build a positively designed health information system, delivered longitudinally, leading to a steady behavioral change?

2. Research Objective

The study was conducted to develop a social communication model for the adolescent female to make them aware of their reproductive health and wellbeing. The objective of the study was to

- Investigate the current knowledge and awareness of women regarding their reproductive health and well being
- To understand the information seeking behavior of women regarding their reproductive health and wellbeing
- To investigate the level of retention of knowledge and information regarding the reproductive health and well-being received at an early age
- To study whether awareness of reproductive health is dependent on residential location or attitude towards accepting a positive change
- To understand the modes of communication prevalent for information seeking

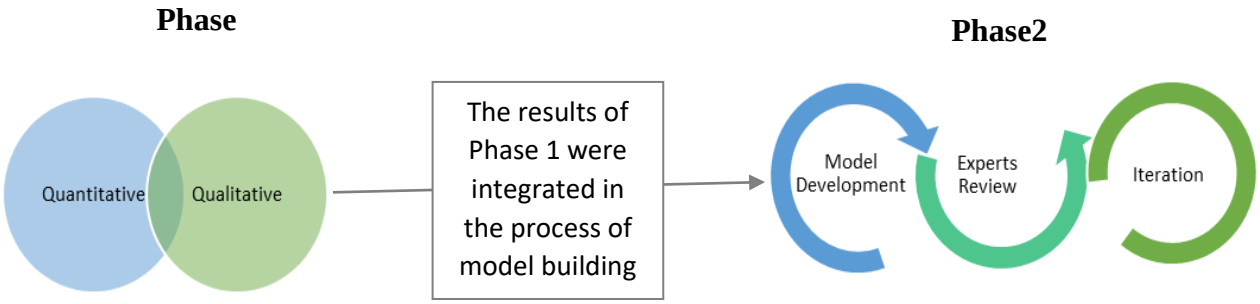
- To develop a social communication model intended to bring about behavioral change amongst adolescent girls towards their reproductive health and wellbeing
- To test the effectiveness of the social communication model amongst adolescent girls

3.1 Structure of the Research

To have an empirical understanding of the topic the study was divided into 2 phases. Where Phase 1 focused on understanding the topic Phase 2 focused on building the Social Communication model.

Figure 8:

Structure of the Research



3.2 Phase 1

For the convenience in understanding, **Phase 1** of the study was divided in 2 parts and referred as **Phase1-A** and **Phase1B**. **Phase1-A** is a Qualitative Study where 30 interviews were conducted with females in the age group of 25 – 65 years. The focus of the interviews were to get an understanding of their, current knowledge awareness regarding their reproductive health and wellbeing. In **Phase1-B** Quantitative data was collected using online survey questionnaire.

3.2.1 Data Collection

For the qualitative study, semi structured interviews were conducted with 10 participants residing in Mumbai. Based on their response survey questionnaire were developed with 22 questions. At the end of the questionnaire, option was given to respondents to opt for participation in the qualitative study. Remaining 20 participants for the qualitative study were respondents who had opted to be interviewed in the survey questionnaire. To maintain a diversity in population the respondents were selected based on age and location. The 20 interviews were conducted online because of the prevalent pandemic situation. Once the respondents for the qualitative interview were identified from the 136 respondents of the survey. Further data collection was continued to get significant quantitative data.

3.3 Phase 2

To build the Social Communication model, Action Research was adopted. In this practitioners and researchers cocreate knowledge, policy and practice through an iterative process of action and learning. This process often includes reappraisal of existing norms, values and assumptions, developing and understanding of how norms are shaped by power, raising an awareness of a social change (Pettit, 2010) (Koshy, 2011). There is reference of frequent combination of the quantitative and qualitative data in action research studies in healthcare.

Phase 2 has further been divided as Phase2-A and Phase2-B. Where in Phase2-A, series of workshop were conducted with 7 participants to develop the model. The participants were of the age group 20-24, representing the population of young adults. Selection of the participants were based on the age group, the knowledge in the field of

women's health, and their education in the field of design. In Phase2-B expert interview was conducted to evaluate the models by experts. The experts have experience in domains related with adolescent health and healthcare. The expert's review was taken once the series of workshop was over, feedback received by them were incorporated to enhance the model.

4.1 Phase 1 -A

Concurrent Mixed Methods research design was adopted for **Phase 1**. Where mixed method is defined as the type of research in which a researcher combines elements of both qualitative and quantitative research approaches for the purpose of depth of understanding and corroboration (Johnson et al., 2012). In Concurrent Mixed Method the researcher converges or merges quantitative and qualitative data to provide a comprehensive analysis of the research problem. In this design, the investigator collects both forms of data at the same time further integrating the information while interpretating the overall results. (Research Design-Creswell).

4.2 Objective

- To understand the perception and attitude towards reproductive health and well being
- To understand whether information seeking behavior is dependent on residential location or attitude towards accepting a positive change
- To understand the modes of communication used to seek information
- To understand the cross-cultural influences that impacted knowledge and information seeking for reproductive health and well-being

4.3 Method

Semi- structured interview was conducted with 30 female respondents in the age group of 26-60.

4.3.1 Sample

Purposive sampling was done with a diverse socio-demographic setting to get an understanding of cross-cultural influence. For this emphasis was laid on the location where the participant has spent their adolescent phase. The purpose of this was to understand the influence of various socio-demographic settings in the formative years of life, further compare it with their current social setting. The sample was spread across 1 and 2 tier cities covering the primary zones of India. The selection of the sample was also dependent on the attitude of the respondents towards the topic and the willingness to participate in the study.

Table 3:

Sample distribution of qualitative study

Age Group	Number of Participant
26 – 30	5
31 – 35	3
36 – 40	5
41 – 45	5
46 – 50	6
51 – 55	4
56 – 60	2
Total	30

4.3.2 Tool

10 in person interviews. 20 interviews on an online platform Jitsi. (Jitsi, 2022)

4.3.3 Procedure

30 females who had volunteered to participate and represented a diverse socio-demographics settings were interviewed for the study. Informed consent was obtained from all the respondents, and they were assured of confidentiality of their responses especially related to their personal experiences and challenges. Initial 10 interviews were conducted in person with a prior appointment. Remaining 20 interviews were conducted telephonically or using online platform Jitsi, an encrypted open-source platform that would maintain data privacy and confidentiality. The interviews were conducted in English, Hindi and Bengali, depending on the language preference given by the respondent. The 30 interviews consisted of a total of 970 minutes of audio recording. The average duration of the interview was approximately 33mins, where the duration varied upon the openness of the respondent from minimum 23mins to maximum 57 mins.

4.3.4 Structure of the interview

Semi-structured interview was designed using open-ended questions that would make them reflect on their self-journey towards understanding of the reproductive health and well-being. The interviews started with ice breaking basic questions about demographics, further direct questions on terms like Sexual Health, Reproductive Health and Hormones. These were followed by reflective questions about their experience through the various stages of life in connection with the evolution of their knowledge and understanding through experience. Further probing questions were asked to get a better understanding of the context.

Table 4:

Structure of the interview

Dimensions to explore	Aiming to Understand	Suggested start questions
Understanding of terminology	Awareness regarding reproductive and sexual health. Similarities and differences	1) What do you understand by the term healthy? 2) What do you understand by reproductive health? 3) What do you understand by sexual health? 4) 4. Is there any difference
Health Issues related to reproductive health	Awareness about their own well being	5) Did you have any health issues during your adolescence? Mainly during your periods. 6) What was your lifestyle when you were young? Did you do any sort of physical activity?
Socio-Cultural Norms and practices	Formation of ideas concepts and cultures	7) What all health-related things were told to you as Do's and Don't while you were growing up. (eg: Horse riding, picking up heavy things, etc) 8) normative cultural beliefs about reproductive health in your culture. what have been the cultural practices for better reproductive health in women
Sources of information	Information seeking behavior	1) Since when you started discussing about reproductive health or sexual practices? with whom, source etc as probes to the question. Age? 2) What/who were your source of information?
Influencers to develop formative learning	Information seeking behavior	Were/Are you aware of any reproductive health issues? Were you concerned about them?

* Interview questions added in the Appendix Section

4.4 Ethics followed in research

For the qualitative interviews, informed consent was taken from all the experts. Permission for recording the interviews was taken beforehand. The participants were also assured of confidentiality of their responses, they can choose not to respond to any questions, they have the permission to leave the study in which case their data will not be used for the study

5.1 Phase 1-B

The purpose of this phase was to understand women's awareness towards their own body, reproductive health, and wellbeing.

5.2 Objective

- To understand the current awareness level regarding reproductive health and wellbeing amongst women
- To understand whether they are aware of the terminologies related to reproductive health
- To validate their scientific and conceptual understanding
- To understand their sources of information seeking

5.3 Method

Online survey was conducted using Google form

5.3.1 Sample

The pilot study consisted of 136 participants. Where the question for participation in the qualitative study was included. Once sufficient data was gathered for the qualitative study, the quantitative study was continued excluding question for participating in the qualitative study. The sample of the main study consists of 500+ participants.

5.3.2 Tools

A questionnaire was developed with 22items given having 20 multiple choice questions and 2 short descriptive questions. Some of the responses had multiple correct

answers to confirm the conceptual understanding of the respondent regarding the topic. The questions were divided in following categories

- Awareness about reproductive health
- Issues related with reproductive health
- Conceptual Understanding about Reproductive Health
- Source and influence of information seeking

5.3.3 Procedure

Due to the pandemic the survey was conducted using online Google forms, language used was English. Hence the participants of the study were netizens who could access google form. To maintain a control of the participants, snowball technique was used. Where participants who were identified based on their age and location. Further they were asked to circulate the questions with 10 more respondents.

5.4 Ethics followed in research

To maintain confidentiality of the respondents their name and email address were not taken. Information related to gender, education, location, and location of their formative education was taken. The questionnaire gave an option of giving consent of publishing the results in the beginning of the survey. No data was collected for the respondents who did not give consent for the study

6.1 Phase 2-A

The second phase of the study focuses on the design and development of the social communication model using Action Research in an iterative method. This included series of workshops with participants representing the young adult age group, i.e 21-24.

6.2 Objective

- To develop a social communication model to make adolescents aware of their reproductive health and wellbeing.
- To develop the model using co-design and iterative technique
- To develop a conceptual framework of the model based on Theory of Planned Behavior and Stages of Change, Nudge, Risk Perception and Participatory/Reflexive Conciousness

6.3 Method

6.3.1 Sample

- Seven young adults between the age group of 20-24
- Education – Students of Design with previous experience on projects working on women's health

6.3.2 Tools

- **Online meeting tool Microsoft Team**

Microsoft Teams is a proprietary business communication platform developed by Microsoft, as part of the Microsoft 365. The virtual space offers workspace chat and videoconferencing, file storage, and application integration. (Team, 2022)

- **Collaborative tool Miro to create, collaborate and communicate**

Miro is a cloud-based collaboration tool. The solution features a digital whiteboard that can be used for research, ideation, building customer journeys and user story maps, wireframing and a range of other collaborative activities. (Miro, 2022)

6.4 Procedure

The workshop spanned across 10 days, with an average of 2 hrs.

Table 5: Day-wise Agenda of the workshop

Days	Agenda	Duration

Day 1	• Discussion over the protocol • Introduction to the theoretical models	1hr
Day 2	• Discussion on the Theoretical Models	2hrs 5mins
Day 3	• Discussion on the Theoretical Models	2hr 55 mins
Day 4	• Introduction to the Qualitative data	2hr 11 mins
Day 5	• Identifying statements related to information seeking • Clustering Information	2hr 15mins
Day 6	• Behavior analysis of the participants • Categorizing them into different persona types to build archetypes.	47mins
Day 7	1. Need analysis -Identifying the What, How and When	1hr
Day 8	2. Identifying different categories of information	2hr 49mins
Day 9	3. Identifying Metaphors to depict the journey of women's body	55mins
Day 10	4. Ideating on different design ideas to come build the model	36mins

6.5 Ethics followed in Research

The workshop was initiated after explaining the protocol and signing of the consent. Where the consent included points on monitory benefits, rights to publications, breach of copyright, confidentiality, withdrawing from the study and recording of all the sessions.

7.1 Phase 2-B

7.2 Objective

The objective of this was to get experts review to understand the acceptance and efficacy of the model in the contect of information giving to bring about health behavior change.

7.3 Method

7.3.1 Sample

The team of experts comprised of Healthcare professionals in the field of Health Communication Design, NGO workers, Doctors, School Counsellors and Mother of Adolescents,

7.3.2 Tool

- Online platforms Jitsi, Team, Google Meet
- Collaborative working tool, Miro

7.3.3 Procedure

The experts would be shown the concept of the model, along with its content and working of it. Feedback would be taken in a systematic way, further iterations would be done wherever needed.

Chapter 4 – Phase 1 – Qualitative and Quantitative study

1. Overview

Phase 1 aims to get an understanding of the knowledge, awareness, information seeking behavior and overall perspective towards reproductive health and well-being amongst adult females of all age groups. It also aims to understand how knowledge regarding their health has evolved over the years, where women have become vigilant towards their well-being once they have started seeing the implications or have encountered health issues related to theirs reproductive health.

Concurrent Mixed Method has been followed using Qualitative and Quantitative methods. Hence Phase1 has been divided into two parts, where Phase1-A is a Qualitative Study conducted amongst 30 women in the age group of 22 – 60. Phase1-B is a Quantitative Online Survey conducted for over 300+ (Work in Progress) women in a the same age group of women.

Where the Sample of Qualitative has been collected from the 2 and 3 tier cities. For the Quantitative study, to maintain maximum diversity reflecting the diversity in socio-demographic setting, data is being collected from all major parts of India.

2.1 Phase1-A – Qualitative

A detailed semi-structure interview was conducted where the women were asked to describe her journey towards understanding her reproductive health and well- being, from her Menarche, till now. As the participant were allowed to narrate their story, without leading questions, hence they were able to overcome barriers and inhibitions to share their personal experiences. Probing was done in places wherever the context was not evident. This process helped to get a deep-rooted cultural influence, that has been an important part of their understanding. The age range helped to get an understanding of the change in trends, patterns, and practices.

2.2 Analysis of the interview data

The 970 minutes of audio recording were transcribed in excel sheet, where each statement was put in separate line for the convenience of coding and analysis. The interviews were analyzed using Thematic Analysis approach, where various categories and patterns in the data were identified around the core phenomena as defined by Braun and Clarke's (2006) The stepwise method used to analyze the data is described below:

- Familiarization with data by reading, re-reading, and immersion in the data
- Generation of initial codes
- Sorting the different codes into potential themes and collating the relevant data extracts within the relevant themes
- Reviewing and refining the themes, illustration of thematic maps
- Further defining of the themes along with sub-themes and analysing inter-relations among the themes
- Analyzing and interpreting

2.3 Overview of the results

2.3.1 Codes that emerged

- The broad codes that emerged from the qualitative data are as follows
- Attitude – Health Seeking, Risk Perception, Casual, Ignorant,
- Influencers – Socio Cultural, Tradition, Family, Friends, Technology, Doctor
- Knowledge seeking – Information Seeking, Self Exploration, Myths, Traditional norms and practices
- Experience – Sexual Abuse, Menstruation

2.3.2 Overall Analysis

It was observed that only 4 women were aware of the difference between Reproductive and Sexual Heath, and the effect of Hormones in the body. 24 of them were able to formulate an assumption. The remaining were unaware about the difference and considered both as the same thing. Most of the women were not informed about their periods when they got it the first time. Even when they had it, the biological understanding of the that came at a much later stage in life. 2 women pursuing their Doctoral Research admitted that they got the procedural knowledge about menstruation from their male partners. 2 women had to undergo abortion as they conceived before marriage. According to them although they were aware of contraceptives, however, did not know how and when to use it. Almost all women agreed that they had no knowledge about sexual wellbeing while they were growing up and learnt about it from various sources during their course of life. Where women under the age of 40 tried to develop understanding from internet or other sources. The women above 45 developed their understanding through their life experience, where in instances where they did not face any health issues are still unaware of it.

3 Phase 1-B – Quantitative

Where the purpose of the qualitative study was to get an in depth understanding of women towards their reproductive health and well-being. The quantitative study aimed at understanding the awareness of level of reproductive health and well being with a larger sample size, and diverse socio demographic setting. Hence the 22 questions survey was developed from the gaps in knowledge identified in the first 10 interviews. This was circulated using snowball technique, where the source of the data was controlled, so that data could be received covering major part on India, and sectors where there are significant cultural differences.

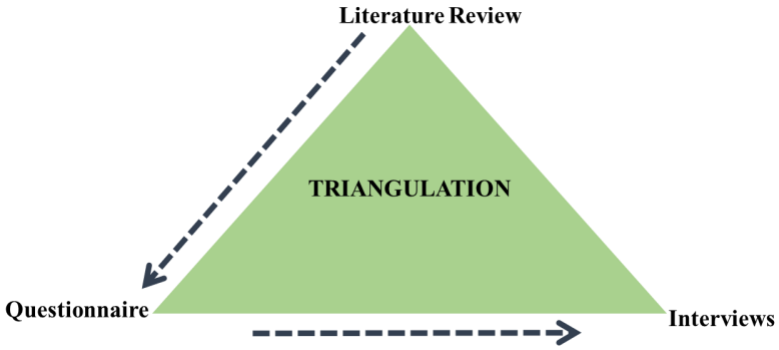
4 Overview of the results

As the data collection is still in process, the image presented is a representation of the data trend of some of the significant questions.

5 Analysis of Phase 1 – Triangulation Method

To build an understanding of the cross-cultural factors that influence the information gap and information seeking amongst women about their reproductive health and wellbeing, Triangulation method was used to analyze the data. That is defined by Cohen, Manion and Morrison (2000:112) as the use of two or more methods of data collection to study a particular phenomenon.

Where according to Jakob (2001) " - by combining multiple observers, theories, methods, and empirical materials, researchers can hope to overcome the weakness or intrinsic biases and the problems that come from single-method, single-observer, and single-theory studies. Often the purposes of triangulation in specific contexts are to obtain confirmation of findings through convergence of different perspectives. The point at which the perspectives converge is seen to represent reality."



6 Results

As data quantitative data collection is still in progress, hence the results and analysis will be presented in the final thesis.

Chapter 5 – Phase 2 – Workshop for building the model

A series of workshop was conducted to build the Social-Communication model, using the method of Co-Design. Co-design, is defined as a participatory design methodology which helps in the development of interactive, satisfying and user-centered interventions. This process is also known as Experience-based co-design because the participants for the workshop were of age group (20-24) have exchanged their adolescence experience around reproductive health. This collaboration has resulted in connecting narratives to form a better inquiry and validate decisions with each other. The benefits of using Co-Design are, it helps to get continuous evolution of ideas, it helps collaboration with intense discussion across various behavioral models, it provides active learning, critique and implementation of ideas.

The workshop was divided into 2 Parts – Immersion and Creation

1. **Part A – Immersion**

As the participants came from diverse education and cultural background it was necessary for them to understand the context of the study. Hence to sessions were divided into following steps.

Step1 – Introduction to the theoretical framework of Health Psychology, Theory of planned behavior, Stages of change. Social Communication, Risk Perception, Nudge, Speculative and Critical Design Thinking.

Step 2 – To make the sessions interactive each participant selected one topic that they felt interested in. Reference material was provided to them by the facilitator which they read and came in the next session. The participants discussed their topic guided by the facilitator who identified the relevant points that are needed for the study further elaborating them.

Step3 – The participants were then given the qualitative data transcripts that was generated in Phase 1-A of the study. Each participant took 2-3 interviews depending on the time availability. The purpose was through read them to get an understanding of the context and situation indifferent scenarios

Step4 – The statements that gave evidence of Knowledge and Information Seeing were identified and clusters were formed based on *Ideal Situation* and *Not So Ideal Situation.* The purpose of this was to understand the gap based on which the social communication model could be developed.

Step5 – Behavior analysis was done for each respondent, to build a persona/archetype that could be identified as different personality.

2. Part B Creation

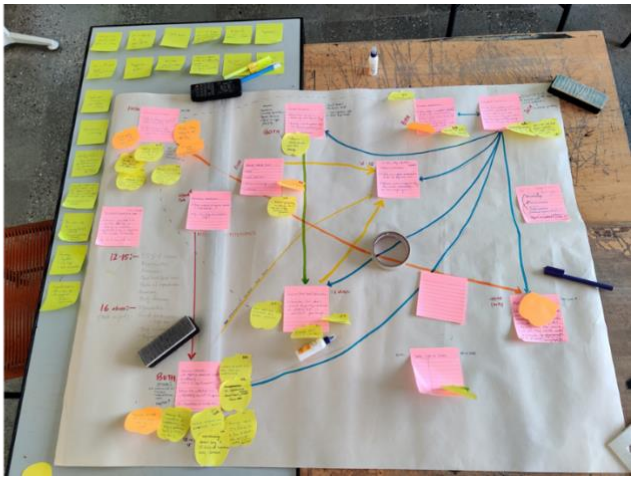
Once the participants were thorough with the content and have identified the target audience based on the socio-demographic setting, behavior analysis and information categorization. The next part was to create the communication model. For this the following steps were taken.

Step 1 – 8 persona/archetypes were identified based on the behavioral analysis of the respondents, further mapping them with the personality types of Jung's Personality Type theory.

Step 2 – Categories were identified for different kind of information types as

Step 3 – Brainstorming session was done to come up with different metaphors that would describe the journey of a women's life. This was part of the Speculative and Critical Design Thinking where the communication model is intended to be developed using different metaphors that could influence their behavior in a gamified way

Step 4 – Concept maps were build using gamified way of information giving methods that could be customized depending of different personality types.



3. Overall outcome of the workshop

Categories were identified that gave directions to build the Conceptual Framework.

1	Necessary Information	Information regarding reproductive health and wellbeing. What it is? Why it is important? Making them understand their responsibility towards themselves. Eg: Importance of Menstruation
2	Critical Information	Critical information is like classified information that an adolescent need to know, but probably at a certain point when they are mature enough the perceive it. Probably under the guidance of an expert. Eg: Difference between Sexual health & reproductive health
3	Exclusive / Need Based Information	Information that reflections of personal life journey, experience or situation that an individual goes through
4	Recurring Information / keep a check on	Information that is repeated at regular intervals and is important to keep a track on. It is exclusive & need-based

	what is not normal	information. Eg: Constant reminder to person to keep a check on person (alert for mentoring) so How many hours we should sleep for a better health?
5	Time Based / Staggered over a period of lifetime Information	Information that needs to be provided when they are prepared to experience practically and try to understand the concept holistically. Eg: How to have a safe sex?
6	Cosmetic Information	Information where the effects of reproductive health are visible physically. Eg - acne, weight gain. Where the approach towards the cause is more related to physical well being then physiological understanding.
7	Myths / Misinformation	Information that individuals/groups have been exposed to which are absolutely wrong with no scientific basis. These potentially affect the way that they view or act upon their health needs/requirements. E.g. Gaining weight after marriage or pregnancy, Your body will reflect your age in a negative way
8	Scientific Information (Hormones)	Information that needs a conceptual understanding of each term around reproductive health to have a better understanding and it brings together various concepts and methods to have connections. Eg: What are hormones & why they are important for our menstrual cycle, Uterous lining, difference between reproductive health and sexual

		health
9	Conceptual Information	Information that is needed to build a conceptual understanding of a condition, i.e why it works the way it works. Eg - Exercise your belly region to keep your reproductive organs healthy. Cycling, bollywood dancing, belly dancing
10	Social / Cultural norms	Information transferred as a result of socio-cultural influence without understanding, reflecting and identifying the cause and effect behind the norm. E.g. Not entering temple while on your period, Don't touch a pickle while on period etc.

4.2 Way Forward

4.2.1 The way forward to the completion of the thesis are as follows

a. Completion of the Quantitative Data

b. Compilation of Analysis for Qualitative and Quantitative data

c. Inclusion of Expert Review

d. Discussions

4.2.2 Details of the chapter to be included in final Thesis

Phase 1 would be split in 2 chapters - chapter 4 and 5. Hence the chapter breakup would be

- Chapter 4 – Qualitative Study Results – This would be covering the details of the qualitative study, emerging codes and the rationale behind it

- Chapter 5 – Quantitative Study Results – This would include the statistical analysis of the data generated

- Chapter 6 – Analysis of the overall study – This would include the compilation and analysis of the qualitative and quantitative study using triangulation method

- Chapter 7 – Co-Design workshop - This would cover the details of the workshop, process, progression and rationale behind the process

- Chapter 8 – Experts Review – This would include the comments suggested by the experts and iterations done based on them.

- Chapter 9 – Discussion

- Chapter 10 – Limitations, Suggestions, and Implication

- Executive Summary

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