Chapter 6

Development of a Social Communication Framework for Health Behaviour Change

This chapter discusses the triangulation method that converges the qualitative and quantitative data findings. Furthermore, it integrates the analysis results with psychological theories and concepts to develop a social communication framework for health behaviour change. The discussion includes identifying the gaps pertaining to reproductive health and their implications on the overall well-being of women and highlighting the need to psychoeducate adolescents for their future health and well-being. The purpose of the interventional framework is to encourage adolescents to speculate about their future well-being and health.

1.1 Method of Analysis and Framework Building

The triangulation method was used to converge the results of the quantitative and qualitative studies. Triangulation refers to using multiple methods or data sources to develop a comprehensive understanding of the subject (Patton, 1999). There are different types of triangulation, including method triangulation, where multiple data collection methods are used to measure the same phenomenon; theory triangulation, where different theories are used to analyse and interpret data; and data source triangulation, where data are collected from various sources to gain multiple perspectives (Carter et al., 2014). The current study uses a combination of method, theory, and data triangulation.

For this research, the results of the qualitative and quantitative studies were merged using the thematic analysis proposed by Clarke et al. (2015). The resulting themes were further supported by theory and models wherever applicable. This process confirmed the persistent gaps in the understanding of reproductive health and well-being among women. Accordingly, a social communication framework is proposed to psychoeducate women about their reproductive and sexual well-being and increase self-awareness and self-reliance. This framework has an underpinning of theoretical models and concepts of psychology.

1.2 Thematic Analysis of the Qualitative and Quantitative Studies

The themes that emerged from converging the qualitative and quantitative data can be categorised in four broad categories:

1. current understanding of reproductive and sexual health among women
2. sociodemographic factors affecting knowledge building
3. attitude towards information seeking
4. influence of age on information seeking

1.2.1 Current Understanding of Reproductive and Sexual Health

In response to the question on the understanding of reproductive and sexual health, of the 30 qualitative participants, six had a thorough understanding because one of them worked in healthcare, whereas the others wanted to stay informed regarding their well-being. In addition, four participants managed to differentiate between reproductive and sexual health; seven felt that reproductive health was related only to reproduction; two had a basic understanding that they had developed through lived experience. The understanding of the remaining ten participants was based on assumptions, of whom one considered both topics to be the same, relating it with the mind and body or menstruation.

The responses to the term 'healthy' included aspects such as a disease-free life, sufficient energy for daily activities, hygiene, lifestyle, prioritising the mind over the body, and a combination of mental and physical well-being. Some participants commented that the meaning of the term has evolved over the years.

It was evident from the responses that the understanding of reproductive and sexual health depended on the attitude and information-seeking behaviour of an individual rather than their age and location. Women from the older age groups could articulate responses based on their lived experience and the motivation to stay fit. The understanding of hormones and their effect on a woman's well-being varied from a theoretical to basic conceptual understanding. However, it was mostly based on lived experience and information assimilated from personal sources, which included messages and information from social media. Overall, the understanding that was developed was not comprehensive; whatever information had been gathered from various sources, authenticated or unauthenticated, was assumed to be accurate. Further, the information was limited to participants' current requirements.

While the qualitative participants could articulate an answer, the results of the quantitative study revealed that of the 696 participants, none were able to correctly answer all

the questions. The knowledge pertaining to a particular topic was strongly dependent on the participant's age. In the qualitative and quantitative studies, the participants aged 21–35 years mentioned mental well-being, whereas those older than 50 years had responses that were more related to physiological well-being.

Age was an important factor influencing the understanding of reproductive health and well-being. Most qualitative participants confirmed that they had developed knowledge about the topic around adolescence, but developed a conceptual understanding of it much later. Discussing reproductive health is considered a taboo in Indian culture. Thus, during adolescence, discussions on reproductive health are limited to period care. Other information related to reproductive health is obtained mostly from lived experience or others' experience with no prior information or knowledge. The results indicated that most of the qualitative participants above the age of 31 had been unaware of and unprepared for menstruation when it first started; those below the age of 31 had been aware about menstruation because of sessions conducted in school. Furthermore, the quantitative results showed that women of all age groups had acquired information about reproductive health between the ages of 12 to 20. However, in response to the question 'How much would you rate the knowledge of your reproductive health and well-being?', most of the quantitative participants indicated they 'know nothing about it' with response rates of 52% among those aged 21–30 years, 49.8% among those aged 31–45 years, 57.7% among those aged 46–60 years, and 51.3% among those aged 61 years and above.

1.2.2 Sociodemographic Factors Affecting Knowledge Building

Sociodemographic variables play an underlying yet significant role in developing knowledge systems. This is especially true in the context of reproductive health and well-being— a topic that is not openly discussed in most parts of the world due to bias and stigma associated with discussions on the topic.

While it has been acknowledged that information about reproductive health and well-being must be introduced during adolescence, adolescents' sociodemographic settings affect their opportunities for information seeking and knowledge building.

The ecological systems theory explains the influence of social environments on human development (Bronfenbrenner, 2005). It proposes that the environment an individual grows in affects every facet of their life and determines their cognitive processes, emotions, and preferences. The effects of environmental influences may not be permanent, as a change in environment or exposure to knowledge through education can lead to changes in perception.

The theory posits that individuals are part of and influenced by five systems: (a) microsystem, which includes the closest environments and adults an individual interacts with during their growing years; (b) mesosystem, which includes the relationships between the groups in the microsystem; (c) exosystem, which are the factors that affect an individual's life without directly interacting with the individual; (d) macrosystem, which consists of the cultural elements that affect the individual and everyone around them; (e) chronosystem, which is the stage of life and the situation that the individual is experiencing in the present.

Evidence aligning with the elements of the theory was identified in the qualitative and quantitative studies. The themes discussed in the following sections highlight the links with the ecological systems theory.

1.2.2.1 Influence of Family. Families play an influential role in forming attitudes towards reproductive health and well-being. On the one hand, there were women aged 50–55 years who had progressive parents and parents-in-law who could guide them about reproductive health and well-being. On the other hand, there were 24-year-old research scholars with an upbringing in traditional families with no understanding of the topic. Discussions suggested that there had been a change in the trend in conversations around reproductive health. This was more pertinent in situations where older generations of women had faced a health issue, which subsequently increased their vigilance towards the well-being of their daughters. In such situations, mothers would initiate a thorough knowledge transfer to their daughters. In some instances, a senior or designated and knowledgeable family member would assume the responsibility of informing the younger members of the family. However, most of these discussions were on procedural aspects such as period hygiene or cultural practices that are prevalent in families. Reproduction is not accepted culturally as a topic for an open conversation in most Indian families; hence, these conversations would be initiated based on the needs and circumstances. This was further validated by the quantitative data, where for the question about one's sources of information about reproductive health and well-being, the response 'Family' was chosen by 5.3% of the women participants aged 21–29 years and 20.5% of those aged 61 years and above.

1.2.2.2 Lack of Knowledge Sharing. There was a clear indication of a lack of knowledge sharing by mothers and other senior women in the family. Such information was largely practical in nature and a conceptual understanding was incidental and situational; hence,

most women were unprepared for issues related to reproductive health. Two participants mentioned that despite having mothers who were practising doctors, reproductive health issues were not discussed openly until they had physiological symptoms that needed medical attention. According to most of the participants, their mothers tried to shield them from any adverse situation. If any information was given, it was related more to self-protection rather than awareness of one's own body. Further, the information given was cryptic and used metaphorical expressions, which were deciphered over the course of time. Some participants recalled practices that had been mandated by their grandmothers, such as homemade remedies for periods and cramps or combinations of foods that help during pregnancy. However, the purpose and the context of such information was never explained. Thus, the participants remained clueless about the scientific principles behind the recipes and ingredients.

1.2.2.3 Dependence on Men. Most of the qualitative participants relied on their male partners to obtain information about reproductive health. The restrictions imposed on women from discussing these topics prevented a thorough understanding of periods, menstruation, sex, hormones, contraceptives, menopause, and so on. In most cases, women remained ignorant about these topics unless they had a male partner who would inform them or until they married. This was reported by two participants: a 26-year-old and a 42-year-old. Both of them were doctoral students residing in an urban metropolitan city; yet, they had no conceptual understanding of why periods occur and had been uncomfortable discussing such topics until they were provided an explanation by their partners. One participant commented that she was able to cope with her periods better after her husband taught her how.

1.2.2.4 *Cultural Constraints.* Cultural constraints are a hindrance to the understanding of reproductive health and well-being. From notions such as 'good girls should not talk about these topics' to the diverse cultural practices prevalent in India, women are constantly restricted from making informed choices regarding their well-being. More than 50% of the qualitative participants believed in the notion mentioned above and resisted acquiring information about reproductive health.

Several women had to adjust to the cultural norms that were practised in the families they married into. As new brides, most women did not have much of a voice and had to abide to rules they did not believe in. While there were a few who were able to change and adjust to dealing with the cultural constraints, some had lived with such constraints for most of their lives.

1.2.2.5 Adverse Effects of Incomplete Information. The qualitative data suggested that the women experienced the adverse effects of incomplete information, which were related to periods (i.e., some believed that periods occur occasionally and were disappointed by its monthly occurrence). More than 90% of the qualitative participants believed that the purpose of periods and the uterus and ovaries was related only to having babies. The quantitative data suggested a similar pattern, where for the question about the function of the ovaries, the highest proportion of accurate responses (34.2%) was among participants aged 31–45 years, and for the question about what the uterus facilitates, that proportion was 52.3% among participants aged 61 years and above. The quantitative data showed an interesting pattern where the women in the older age groups had more accurate responses for such questions.

In another scenario, a victim of sexual abuse remained terrified for many months that she might become pregnant at any time. Contraceptive use was another topic that people were uninformed about. Some women were uninformed about contraceptives because their in-laws had wanted them to conceive early, whereas some others did not have any conceptual understanding of contraceptive use and had had an accidental pregnancy.

1.2.2.6 Effect of Shifting Locations on Knowledge Building. The residential location of an adolescent and the environment they lived in during adolescence had a strong influence on health information-seeking behaviour regarding reproductive health and well-being. The data gathered for the qualitative and quantitative studies included the participants' current location and the location of early education. The results showed that while the learnings that are imbibed during one's foundational years define future patterns of life, a change in location to one with diverse cultural settings can lead to a change in world view.

1.2.3 Attitude Towards Health Information Seeking

An individual's information-seeking behaviour depends on their attitude towards health information. The reception and perception of health-related information vary individually. Attention refers to the cognitive capacity to concentrate on learning critical aspects, and can be divided into passive and active attention. Further, health information-seeking behaviour depends on an individual's attitude towards the type of attention they decide to allocate for their well-being (https://www.braingymmer.com/en/blog/attention/). Individuals attend to information that has immediate implications or repercussions. In some situations, risk

perception may lead to active attention, whereas in other situations, there may be a casual approach towards any health-related information. The qualitative data demonstrated evidence of both passive and active attention in participants' attitude towards health information. The following sections focus on the categorisation of these attentional attitudes.

1.2.3.1 Seeking Relevant Information. A few qualitiative participants were self-aware and wanted to keep themselves informed with respect to understanding their body and its physiological aspects. They would be eager to read books and converse with individuals with whom they felt comfortable discussing these topics. One qualitative participant mentioned that, before her wedding, she visited a gynaecologist to learn about marriage and what it entails. The characteristics mentioned above reflect an attitude of active attention, which is ideal for health information-seeking behaviour.

1.2.3.2 Casual Attitude. Some qualitiative participants remained passive towards any scientific and conceptual understanding of sexual and reproductive health, which resulted in serious consequences. Two qualitative participants became pregnant when they were minors despite being aware of contraceptives, as they had wanted to explore and experience their sexuality even after understanding the repercussions. Although they were aware of contraceptives, they did not know how to use them.

1.2.3.3 Learning From Alarming Health Experiences. Lived or observed experience played an important role in creating an attitude of awareness. A lack of awareness leads to a lack of risk perception, undermining the magnitude and severity of any consequences. This in turn leads to a lack of health-protective and -preserving behaviour.

Alarming health experiences lead to health-seeking behaviours that are marked by self-awareness. Some of the qualitiative participants had had personal experiences that worked at a metacognitive level, making them vigilant about care of themselves and finding mechanisms for improving self-awareness and self-management.

One qualitative participant had to help a friend deal with her painful periods, which compelled her to learn certain things, after which she became more vigilant towards her own well-being. Another qualitative participant took care of herself proactively as there were some health-related complications that ran among women in her family. One qualitative participant, after many years of ordeals and trying several treatment procedures, was able to address her

hormonal issues. She did not have any female family members to guide her and thus sought information from random sources; consequently, she was prescribed pills that caused further issues.

Qualitative participants with adolescent daughters made the latter aware by sharing information and attempting to create opportunities for open conversations. They also felt that although the present generation is generally aware and well-informed, overexposure may lead to misinformation, and as mothers, they tried to monitor the source of information.

1.2.4 Overall Findings

The above findings suggest that the qualitative participants were unaware of the future implications of their reproductive health and well-being, unless they faced health consequences. The qualitative and quantitative study results indicated that learning could be attributed more to experience and less to knowledge. These experiences could be lived experiences or the shared experiences of close associates that led to risk perception.

The results aligned with the components of the health belief model (Rosenstock, 2004), according to which a lack of health behaviour stems from a lack of perceived susceptibility and perceived severity. This is an outcome of casual attitudes that arise from demographic and psychological characteristics. These variables prevent individuals from understanding the severity of the consequences of health risks. The results suggested a clear lack of risk perception; in most cases, there had been no conscious attempt to make oneself informed about reproductive health and well-being. Inducing constructive fear may motivate health behaviour change in unexpected situations (Maddux & Rogers, 1983). Similarly, sharing lived experiences to envision future implications can encourage self-reliance and self-awareness in terms of one's well-being (Bruine de Bruin & Bennett, 2020). Thus, there need to be mechanisms that encourage women to speculate about their health and become more conscious of their life choices. Such mechanisms need to be designed for adolescents, who are at a prime transitional age where the most formative learning occurs.

Converging the qualitative and quantitative data with the health belief model and ecological systems theory validated the issues that exist in the understanding of reproductive health among women across different ages. This further emphasised the need for interventions designed specifically for adolescents to help them speculate about their future health and adopt measures for becoming self-reliant. To address this need, the researcher proposed an interventional social communication framework for adolescents to increase

awareness of their reproductive health and well-being. The following section discusses the components of the framework and how they might function.

1.3 Components of the Social Communication Framework

The proposed interventional module covers psychological theories and concepts of reflexive and participatory consciousness (Earley, 2002), the transtheoretical model (TTM; DiClemente & Prochaska, 1998; Thaler & Sunstein, 2020), and risk perception (Hoorens, 2020). These concepts were integrated into an onion framework (see Figure 36), where the core components are participatory and reflexive consciousness, which lead to the stages of change. Nudge, risk perception, and provocations are used to sift through the various stages of change. This section discusses the psychological concepts and theories used in the framework and how they were integrated to construct a social communication model.

1.3.1 Participatory and Reflective Consciousness

Recent years have seen the emergence of a focus on the topic of the social evolution of consciousness, where consciousness refers to the inner life of an individual, including their thoughts, attitudes, emotions, motivations, and spiritual experiences. Although the biological evolution of consciousness has occurred over millions of years, the social evolution of consciousness is more recent and has been formulated into models by several authors. The model used for the current study was developed in 1997. It covers consciousness as well as all aspects of society, including the evolution of technology (the material realm) and social structures (the social realm), and explains humanity's scientific, humanitarian, and artistic advances as a species (Earley, 2002).

Some authors have presented theories that explain the evolution of consciousness during specific periods of historical transitions (Berman, 1981; Whyte, 2017). The propose framework delineates two interrelated dimensions of consciousness: participatory and reflexive. Participatory consciousness pertains to the innate sense of vitality and interconnectedness with the world. In this mode, people relate to the world primarily through intuition, emotion, the body, and the immediate present, and reality is experienced as animate, organic, and spiritual. Reflexive consciousness refers to the ability to

Figure 1

Gamified Social Communication Framework for Health Behaviour Change

understand ourselves and the world through the mediation of images and ideas, and emphasises reflecting on one's experience rather than simply experiencing the world, which offer the opportunity to conceptualise and analyse. Further, it allows for an objective understanding and enhances our ability to plan and control our environment (Earley, 2002).

Over the years, the trend has shifted from reflexive to participatory consciousness. The consequent loss of meaning has resulted in a detached consciousness with impaired empathy

and the tendency to perceive everything in objective and machine-like terms (Krasevac, 1993). Over the course of history, the two complementary phenomena of reflexive and participatory consciousness have been opposed to each other. The emergent quality of reflexive consciousness has been growing, whereas the ground quality of participatory consciousness has been suppressed and devalued. The present-day scenario reflects a crisis because of the increasing domination of emergent qualities and suppression of ground qualities.

This imbalance between ground and emergent qualities applies to the social arrangements and economic systems that emphasise material growth (emergent) at all costs, trampling over community and self-reliance (Daly & Cobb, 2017).

As the modern era ends, the loss of ground qualities is causing serious problems for society, individuals, and the world (Krasevac, 1993). Human society has devalued participation and privileged understandings based on empirical data and logic, leading to a sense of deadness and detachment. Many people feel separated from nature, isolated from community, and disconnected from their emotional, creative, artistic, and spiritual selves. People are attracted to money, security, power, and appearances and 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 heading as a species.

To resolve the planetary crisis humanity faces today and enter a new era of social evolution, ground qualities need to be reclaimed and integrated with emergent qualities through consciousness. Changes in consciousness are important in and of themselves, as they affect our social arrangements. Consciousness is crucial to the process of social change because it is the realm in which it is easiest to promote change incrementally on an individual basis. Humans possess the capacity to modify their consciousness in a healthy direction; therefore, consciousness can be developed incrementally.

Earley's (2002) 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 feelings and impulses. In reflexive consciousness, activity tends to be organised, planned, and structured. Ideally, both these modes of consciousness should be available to us. In other words, reflexive and participatory consciousness must be integrated to understand reality. The qualities associated with these two types of consciousness are shown in Figure 37.

Figure 2

Modes of Knowledge

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

Note. From 'The Social Evolution of Consciousness', by J. Earley, 2002, *Journal of Humanistic Psychology*, *42*(1), p. 129 (https://doi.org/10.1177/0022167802421006). Copyright 2002 by SAGE Publications. Reprinted with permission.

Understanding consciousness and its different aspects that reflect societal paradigms becomes relevant and evident in the present context of health communication. With the advent of AI, which can monitor and supervise many actions, people have increasingly started depending on AI to the extent that humans are beginning to resemble cyborgs. There is a tendency to overrule existing practices and consider them unreliable and unscientific. This prevents a lack of understanding of simple and logical elements, further becoming influenced by the external popular culture and norms.

1.3.2 The TTM (Stages of Change)

The transtheoretical model, also known as the stages of change model, was developed in 1983 by Prochaska and DiClemente through studies comparing and examining the experiences of smokers who quit, finding that some quit on their own whereas others required further treatment. Importantly, research shows that people quit smoking if they are willing to (Marks et al., 2018). The TTM proposes that individuals move through six stages of change: precontemplation, contemplation, preparation, action, maintenance, and termination. For each stage of change, different intervention strategies are effective at moving an individual to the next stage of change, eventually leading them to the maintenance stage, which is the ideal situation (DiClemente & Prochaska, 1998). Figure 38 shows a diagram of the stages of change model.

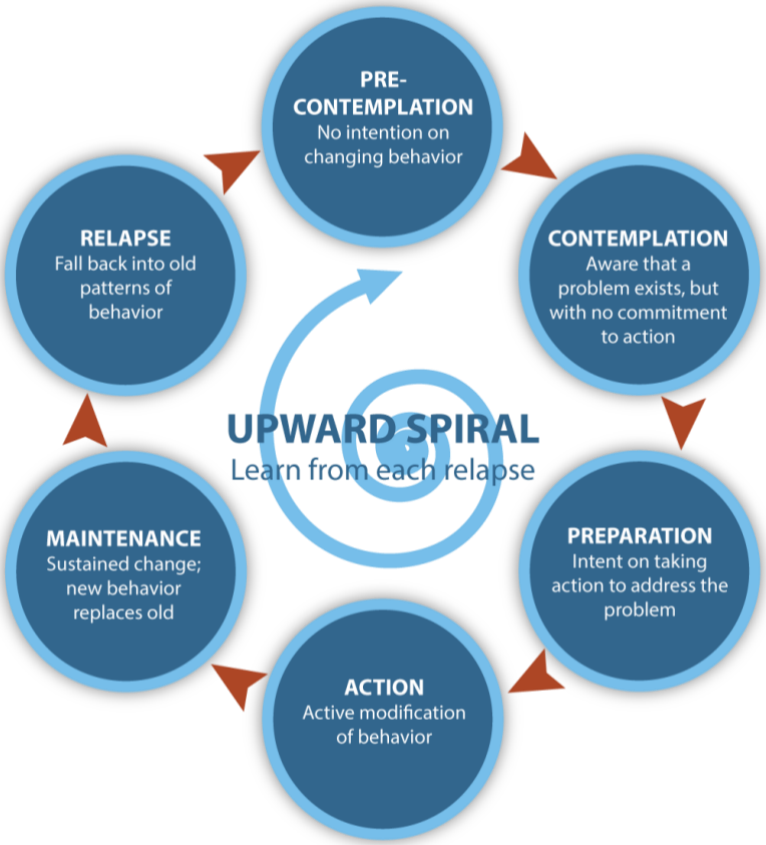
In addition, Prochaska and DiClemente (1983) proposed a rule of thumb for at-risk populations, estimating that 40% of such populations are in the precontemplation stage, 40% in the contemplation stage, and 20% in the preparation stage. Their research suggested dramatic improvements in recruitment, retention, and progress using stage-matched interventions and proactive recruitment procedures. The most promising outcomes to date have been found with computer-based individualised and interactive interventions, especially computer-based programmes with personalised counsellors. Notably, results for stage-matched programmes may be similar for participants who are reactively and proactively recruited.

The TTM focuses on an individual's decision making and is a model of intentional change. It operates under the premise that individuals typically do not swiftly and definitively change their behaviours. Rather, change in behaviour, especially habitual behaviour, occurs continuously through a cyclical process. Thus, it is a model that can be applied to different behavioural theories and constructs where they may be the most effective.

The TTM also provides suggested strategies for public health interventions to address people at various stages of the decision-making process, resulting in interventions that are effective and tailored (i.e., a message or programme component that has been specifically created for a target population's level of knowledge and motivation). Further, it encourages the assessment of individuals' current stage of change and accounts for relapses in the decision-making process. The stages of change are described in detail in Table 8.

Figure 3

The Stages of Change Model



Note. From http://www.northrockleadership.com/the-transtheoretical-model-of-change.html.

Table 1

Stages of Change

Stage	Behaviour pattern	Assumed tentative duration
1. Precontemplation	• No intention of action in the foreseeable future • Unaware that their behaviour is problematic or produces negative consequences • Underestimating the pros of behaviour change and excessively emphasising the cons of behaviour change	6 months
2. Contemplation	• Intention to start a healthy behaviour in the foreseeable future • Recognising that a behaviour may be problematic • More thoughtful and practical consideration of the pros and cons of changing a behaviour, with equal emphasis on both	6 months
3. Preparation (Determination)	• In this stage, people are ready to act • Taking small steps towards behaviour change • Believing that changing one's behaviour can lead to a healthier life	30 days
4. Action	• A recent change in behaviour, with the intention to keep moving forward with that behaviour change • Exhibiting this intention by modifying the problem behaviour or acquiring new healthy behaviours	6 months
5. Maintenance	• In this stage, individuals have sustained behaviour change for more than 6 months, and intend to maintain the behaviour change going forward	More than 6 months

Stage	Behaviour pattern	Assumed tentative duration
6. Termination	• Individuals in this stage focus on not relapsing to the earlier stages • Individuals have no desire to return to their unhealthy behaviours and are confident about not relapsing • This stage is rarely reached, as individuals tend to stay in the maintenance stage, and it is often not considered in health promotion programmes	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 changes, which are listed in Table 9.

Despite its importance, the TTM has certain limitations:

- It does not account for the social context, such as socioeconomic status and income, in which change occurs.
- The boundaries between the stages are arbitrary and there no set criteria to determine an individual's stage of change.
- The duration of time an individual must spend in each stage cannot be the same for everyone; thus, how long a person can remain in a stage is undefinable.
- The model assumes that all individuals create coherent and logical plans in their decision-making process.

Table 2

Progress Through the Stages of Change

Stages	Traits
1. Consciousness raising	Increasing awareness about the healthy behaviour
2. Dramatic relief	Emotional arousal about the healthy behaviour, whether positive or negative
3. Self-re-evaluation	Self-reappraisal to realise that one's healthy behaviour is part of who they want to be
4. Environmental re-evaluation	Social reappraisal to realise how one's unhealthy behaviour affects others
5. Social liberation	Environmental opportunities that exist to demonstrate that society is supportive of the healthy behaviour
6. Self-liberation	Commitment to change behaviour based on the belief that achievement of the healthy behaviour is possible
7. Helping relationships	Finding supportive relationships that encourage the desired change
8. Counter-conditioning	Substituting healthy behaviours and thoughts for unhealthy behaviours and thoughts
9. Reinforcement management	Rewarding the healthy behaviour and reducing the rewards of the unhealthy behaviour
10. Stimulus control	Re-engineering the environment to have reminders and cues that support and encourage the healthy behaviour and remove those that encourage the unhealthy behaviour

1.3.3 Nudge

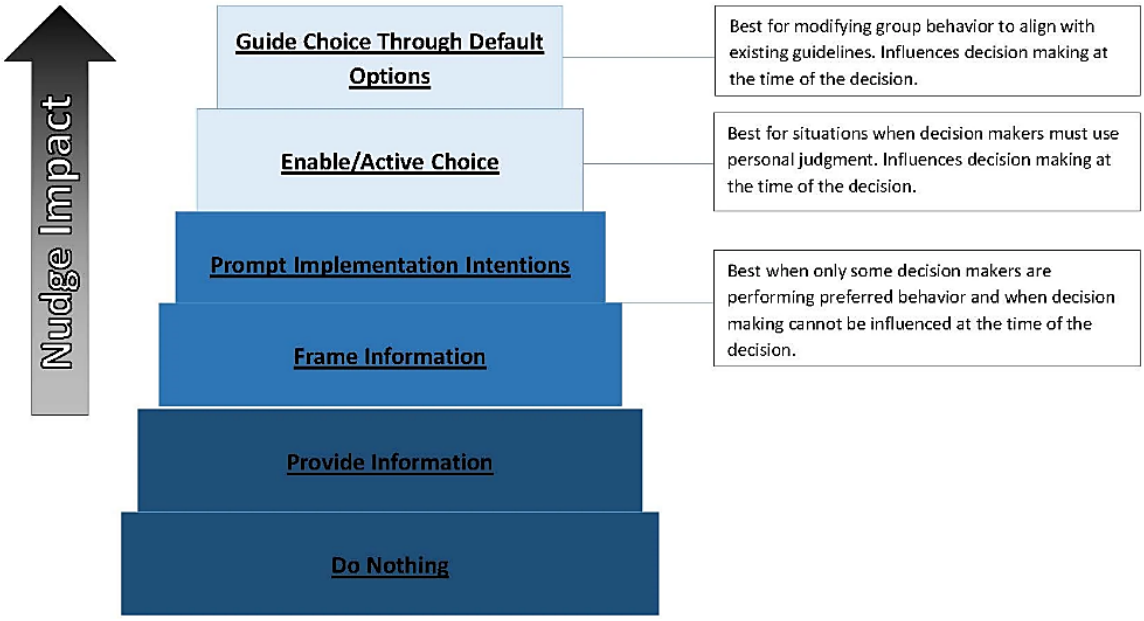
Nudges are subtle changes to choose an architecture or framing of information that can significantly influence behaviour without restricting choice (Thaler & Sunstein, 2020), and they are based on psychological and behavioural economic research on human behaviour and cognition (Lin et al., 2017). They are a set of techniques developed by psychologists to promote 'better' behaviour through 'soft' rather than 'hard' interventions (mandates, bans, fines, etc.). In other words, people are not punished if they fail to follow nudges. In healthcare settings,

nudges can be used to improve patient outcomes and health care delivery (Patel et al., 2018). There is a significant opportunity to expand the use of nudges in healthcare settings through intentional design, rigorous experimentation, and systematic evaluation. Significant research evidence validates this notion: for example, 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 et al., 2018; Kim et al., 2018; Patel et al., 2018).

Nudges vary in their approach and effectiveness. Figure 39 shows a ladder of nudge interventions that can be used by health professionals and policymakers to help guide the development and implementation of nudges in clinical settings.

Figure 4

Ladder of Nudge Interventions with Best Practices Recommendations



Note. From 'Designing Nudges for Success in Healthcare', by J. D. Harrison and M. S. Patel, 2020, AMA Journal of Ethics, 22(9), p. 797 (https://journalofethics.ama-assn.org/article/designing-nudges-success-health-care/2020-09). In the public domain.

Nudges at the bottom of the intervention ladder provide information and can be used to deliver infrequent messages to influence daily decisions (Patel et al., 2018). The nudges in the

middle of the ladder either frame extant information or encourage goal-directed implementation intentions that specify the location, timing, or method of enacting goal-directed behaviour (SA et al., 2022). From an overall perspective, nudges tend to succeed when they are well-fitted to the workflow of critical decision makers. Nudges towards the upper end of the ladder are delivered during decision making by using evidence-based options as the default or offering active choices (Renfree et al., 2016).

The concept of 'nudge' has been used as an effective behaviour change mechanism that preserves freedom of choice without engaging an invidual's deliberative capacities. Research shows that choice architecture interventions promote behaviour change with small to medium effect sizes (Mertens et al., 2022). Choice architecture interventions significantly vary in effectiveness depending on the domain and technique. Across various domains of behaviour, interventions focusing on the structure and organisation of choice options (decision structure) regularly surpass those focusing on reinforcing behavioural intentions (decision assistance) or describing alternatives (decision information).

1.3.4 Risk Perception

Risk perception refers to 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, also known as perceived risk, motivate people to seek health services, such as genetic testing or prophylactic surgery (Rimal & Real, 2003). An individual's thoughts and feelings about the risks they face are an important determinant of protective behaviour. Risk perceptions are characterised by two main dimensions: the degree to which a risk is dreaded and unknowns (Harvard Health, 2011). Dread risks are uncontrollable, catastrophic, involuntary, inequitable, fatal, new, global, and not easily reduced, whereas unknown risks are not understood by science, unobservable, new, and delayed in their effect.

The estimation of risk perception or people's judgement about future outcomes may result from either an analytical or experiential process (Hoorens, 2020). An analytical process would involve deliberatively and systematically considering the various dimensions of the risk, such as the likelihood of certain events, the utility of these events, and the number of individuals affected. In contrast, an experiential process would involve an affective and intuitive reaction

to the risk in question. While both types of processes can be useful, they may also result in foreseeable deviations from the magnitude of the risk

Individuals are expected to make health decisions while navigating choices that require weighing the risk of consequences with the advantages of taking action. Behaviours contributing to disease initiation and progression are often pleasurable (e.g., smoking or overeating), and the motivation to forgo such pleasurable behaviours or engage in inconvenient preventive behaviours is believed to be driven to some extent by beliefs about the probability that a health consequence will occur (Rogers, 2010). Correlational evidence supports an association between risk perceptions and health behaviours that is at least moderate in magnitude (Floyd et al., 2000).

Risk perception is a highly personal process of decision making that is based on an individual's frame of reference that develops over a lifetime, among many other factors. Over the years, substantial research indicates that in matters of making health and safety decisions, humans do not always worry the most about the most pressing threats (Slovic, 1987). A growing body of literature has examined how risk perceptions are formed. Risk perceptions are often targeted in health behaviour change interventions, and individuals' perceived susceptibility to a threat forms a key component of many health behaviour change theories. Meta-analytic evidence suggests that interventions that are successful in engaging and changing risk perceptions produce subsequent increases in health behaviours (Noar & Zimmerman, 2005). A more recent meta-analysis of experimental evidence also supports the role of risk perceptions in health decision making in successful health behaviour change interventions (Sheeran et al., 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 & Klein, 2002). Indeed, evidence suggests that in the general population, individuals can differentiate among specific threats when forming risk perceptions.

The theories discussed above were integrated to build a gamified version of the framework.

1.4 Gamification of the Social Communication Framework

The social communication framework proposed in this research was designed in the form of an onion framework, integrating psychological theories and concepts in a gamified manner. Gamification has witnessed extensive exploration as a platform for constructing

efficacious health interventions. In addition to rendering content interactive and captivating, it offers the opportunity to integrate psychological theories and concepts that can be leveraged to formulate mechanisms for health-promoting behaviour change. The proposed social communication framework would make individuals conscious of their health choices through information seeking, knowledge building, self-maintenance, and self-goals. It includes nudges, which would lead to risk perception and advance individuals from the pre-contemplation to the contemplation stage. Upon advancing to the contemplation stage, individuals receive a hard nudge to promote risk perception, thereby guiding them towards the determination and action stages through the knowledge they have acquired independently. Soft nudges can be used for monitoring and management, and in case of relapses, hard nudges can be reinitiated.

The willingness to stay healthy and safe becomes the driving force for behaviour change. The gamified social communication framework proposed in this research would help promote well-being by not only imparting information and raising awareness but also establishing a self-development mechanism rooted in informed decision making. Discussions around reproductive health and well-being are still considered a stigma in several parts of the world. Interventions informed by this framework have the potential to empower adolescent girls to assume responsibility for their health and overall well-being. In addition, the model could be used to build self-directed technological interventions, thereby giving adolescent girls autonomy of choice. Chapter 7 discusses the components that could be used to create a social communication model (see Figure 40 for a schematic representation) based on the proposed framework.

Figure 5

Schematic Representation of the Gamified Social Communication Model