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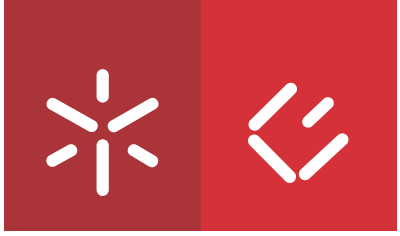
Mona Mohamed Reda El-Badry

Choice Architecture in Social Marketing: A Study on Health Behaviour in Egypt

July 2025

Mona Mohamed Reda El-Badry **Choice Architecture in Social Marketing: A Study on Health Behaviour in Egypt**

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Escola de Economia, Gestão e Ciência Política

Mona Mohamed Reda El-Badry

Choice Architecture in Social Marketing: A Study on Health Behaviour in Egypt

Doctoral Thesis
PhD Programme in Management
Speciality of Business Administration

Work developed under the supervision of
Professor Ana Maria Soares
and
Professor Beatriz Casais

July 2025

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Finally, I dedicate this work to my parents, family, professors, and friends, who blessed my work, believed in me every step of the way and offered unconditional support to finish.

STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration.

I further declare that I have fully acknowledged the Code of Ethical Conduct of the University of Minho.

Choice Architecture in Social Marketing: A Study on Health Behaviour in Egypt

Abstract

Social marketing tools have changed citizens' attitudes and behaviours, especially in health-related issues. Governments and non-governmental organisations around the world have utilised social marketing to achieve this goal. In developing countries, which face multiple challenges in public health, including problems with citizens' literacy, accessibility to healthcare and misunderstanding of healthy habits, social marketing tools are particularly needed. Choice architecture is a policy design strategy that aims to obtain automatic responses. Its use in social marketing has the forms of nudge and shove. This study aims to 1) discuss the successful factors perceived by health professionals and a policymaker to design an effective social marketing campaign in developing countries, considering their particularities mentioned above, and 2) measure the effectiveness of choice architecture by using a shove approach through the health belief model (HBM). One public health campaign conducted in Egypt was considered to achieve the study objectives - the first phase of the 100 million SIHA campaign. Two studies were conducted: the first is qualitative research that discusses the perceived successful factors of the campaign, considering the context of a developing country. Fourteen interviews with health professionals and one interview with a policymaker in the health ministry in Egypt revealed that the Egyptian government used a choice architecture approach called shove with a deliberated purpose of generating health-behaviour change. The study also showed other perceived successful factors in the campaign's design, such as the role played by community leaders due to their trustworthiness for citizens, communicating the campaign and pushing the desired citizen's health behaviours. The second study aimed to answer the question about the effectiveness of the shove form of choice architecture through the framework of the Health Belief Model. A survey was distributed through a convenience sample to measure the behavioural responses to the campaign. The results from 726 Egyptian citizens showed the effectiveness of the shove form of exchange in social marketing through the HBM framework. The results contribute to sustaining the effectiveness of choice architecture in social marketing, primarily through shove, as an effective, low-cost social marketing policy to improve citizens' health behaviours. The relevance of such a contribution considers the fact that this topic was unresearched in the context of developing countries.

Keywords: Choice architecture \ Nudging\ Public health \ Shove\ Social Marketing.

Arquitetura de escolha no marketing social: Um estudo sobre o comportamento de saúde no Egito

Resumo

As ferramentas de marketing social têm sido importantes na obtenção de mudanças nas atitudes e comportamentos dos cidadãos ao longo do tempo, especialmente em questões relacionadas com a saúde. Governos e organizações não governamentais em todo o mundo têm utilizado o marketing social para este fim. Nos países em desenvolvimento, que enfrentam múltiplos desafios na saúde pública, considerando os problemas de alfabetização dos cidadãos, acessibilidade aos cuidados de saúde ou incompreensão de hábitos saudáveis, as ferramentas de marketing social são particularmente necessárias. A arquitetura de escolha é uma estratégia de desenho de políticas que visa obter respostas automáticas. O seu uso no marketing social assume forma de shove e nudge. Este estudo tem como objetivo 1) discutir os fatores de sucesso percebidos pelos profissionais de saúde e por um formulador de políticas para projetar uma campanha de marketing social eficaz nos países em desenvolvimento, considerando as particularidades acima mencionadas, e 2) medir a eficácia da arquitetura de escolha usando uma abordagem "shove" através do modelo de crenças em saúde (HBM). Uma campanha de saúde pública realizada no Egipto foi considerada como um bom case study para analisar este problema de investigação – a primeira fase da campanha dos 100 milhões de SIHA. Foram realizados dois estudos: o primeiro é uma pesquisa qualitativa que discute os fatores percebidos de sucesso da campanha, considerando o contexto de um país em desenvolvimento. Quatorze entrevistas com profissionais de saúde e uma entrevista com um decisor político do Ministério da Saúde no Egipto permitiram-nos descobrir que o governo egípcio utilizou a abordagem shove de arquitectura de escolha deliberadamente para gerar mudanças nos comportamentos de saúde. O estudo também mostrou a perceção de outros factores na concepção da campanha, tais como o papel desempenhado pelos líderes comunitários devido à sua credibilidade junto dos cidadãos, comunicando a campanha e promovendo os comportamentos de saúde desejados. O segundo estudo teve como objetivo responder à questão sobre a eficácia da forma shove de arquitetura de escolha através da estrutura do HBM. Foi distribuída um questionário por meio de uma amostra de conveniência para medir as respostas comportamentais à campanha. Os resultados de 726 cidadãos egípcios mostraram a eficácia da forma de troca shove no marketing social através da estrutura HBM. Os resultados contribuem para sustentar a eficácia da arquitectura de escolha no marketing social, especialmente através da forma de shove, como uma política eficaz de marketing social de baixo custo para melhorar os comportamentos de saúde dos cidadãos. A relevância deste contributo sustenta-se no facto de este tema não ter sido pesquisado no contexto dos países em desenvolvimento.

Palavras-chave: Arquitetura de escolha \ Marketing Social\ Nudging\ Saúde pública. \Shove.

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List of Abbreviations and Acronyms

CCTs : Conditional Cash Transfers

CDC : Centers for Disease Control and Prevention

CRF : Chronic regulatory focus

HBM : Health Belief Model

HCV : Hepatitis C viral infection

NCDs : Non-Communicable Diseases

SBST : Social and Behaviour Team

SCT : Social Cognitive Theory

SEM : Structural Equation Model

SES : Socioeconomic status

SIHA : Health in Arabic

SM : Social Marketing

SWB : Subjective Well-Being

TPB : Theory of Planned Behavior

TRA : Theory of Reasoned Action

WHO : World Health Organization

WOM : Word of Mouth

1. Chapter 1 - Introduction

1.1. Research Background

Any society needs to improve its citizens' quality of life, especially for the financially constrained citizens (Buheji, 2018). Among the approaches that can be used for behaviour change problems and social issues, social marketing stands out as a powerful tool for influencing attitudes, beliefs and behaviours by leveraging principles from commercial marketing to promoting positive social change (Kotler & Lee, 2016). Marketers, sociologists, psychologists, dietitians and healthcare experts have been interested in social marketing since the 1950s to solve social, ecological and public welfare issues (Todua & Jashi, 2018). Social marketing tries to address social problems by planning, designing, executing and controlling behavioural change programs. These initiatives impact the planning, pricing, communication, distribution and research of social products (Dann, 2010; S. Kumar & Preetha, 2012). Examples include stress reduction classes, smoking cessation, clinical screenings and counselling services. Moreover, advancements in social marketing methodologies have evolved, offering policymakers enhanced tools to address and improve behaviours with greater efficacy (Dietrich et al., 2022).

Social marketing campaigns are primarily used in public health to offer solutions that enhance the quality of life for their target audience. Insights from behavioural science and social marketing research are vital for better incorporating individuals' roles into conservation strategies and achieving specific behavioural outcomes (Green et al., 2019). Even public health practitioners have used social marketing initiatives in the health care system (Chriss, 2015). Besides, social marketing communication in public health, desired health behaviours and health protection generally focus on enhancing the community's environment to decrease or remove dangerous and unhealthy factors (Akbar et al., 2022). By changing the community's surroundings, health protection enhances everyone's health and well-being, and health protection tactics are the most successful in enhancing public health (Wymer, 2015). Furthermore, social marketers have created health promotion programs that enlighten individuals on making healthier choices to attain longer and higher-quality lives (Wymer, 2015). According to the World Health Organization (WHO), the world is confronting a significant rise in chronic diseases, accompanied by economic and social issues arising from inequalities between regions, countries and within nations, as well as growing risks to the environment and sustainable development. As a result, according to WHO, social marketing can be a tool for changing public health

and political and economic behaviour (WHO, 2017). Governments worldwide should understand human behaviour because it is at the heart of developing interventions to address significant social and health challenges, ranging from public health to climate change, crime and active participation in the political process (the Authority of the House of Lords, 2022). Intervention from the government is essential as managing public health challenges frequently requires considerable resources, the establishment of new legislation or the effective implementation of current restrictions. This means government intervention could greatly benefit from effective social marketing campaigns (Schmidtke et al., 2021).

Choice architecture, a term introduced by Thaler & Sunstein (2008), refers to the concept that the presentation of an option to a decision-maker may significantly impact the selection made. Hence, choice architects usually influence choices in a way that can be compared to architects: the architecture of a structure affects the behaviours of its people through the configuration of doors, hallways, staircases, and restrooms. Similarly, presenting a choice can influence an individual's decision-making process (Johnson et al., 2012). By controlling the choice architecture through nudges, choices can be positively influenced, potentially resulting in significant and long-lasting behavioural change. Nudges assist people in making decisions that support their long-term objectives and general well-being by gently influencing them (Leal, 2022). Policymakers can use choice architecture to change a specific behaviour. In addition, choice architecture is gaining increasing interest from both public and private sector organisations due to its ability to advance economic and other objectives, including public health, and its relatively low cost (Sunstein, 2014b).

However, the existence of choice architecture implies the existence of a "choice architect," who creates environmental interventions and nudges to predictably direct behaviour. These nudges are designed to change behaviour by appealing to two different ways of thinking: deliberate and impulsive. This encourages people to make choices that will lead to the results they seek (Mele et al., 2021). For a positively framed approach, French (2011) proposed the Behavioural Forms Exchange Matrix, which includes four quadrants describing the exchange forms governments and public institutions can use in behavioural interventions: the important two for this study are a nudge, a soft push in the right direction for passive behaviours, which refers to helping people make better decisions without limiting their liberty. It gently influences people's choices, guiding them towards positive results. On the side of disincentives is *Shove*, which means to push someone forcefully (restriction of choice) and is preferred over passive choices. However, the difference between nudge and shove is very light, since they have the same strategy: giving the choice to the consumer, following the choice architecture

concept. The slight difference is that shove gives a choice and penalties, while nudge gives a choice without consequence, i.e. "nudge" defines a subtle, non-overt, and light push or encouragement to help someone make a better choice. Conversely, a "shove" suggests a more forceful or powerful push, frequently suggesting greater influence. While "shoving" would entail more forceful methods that might restrict freedom of choice, "nudging" refers to leading people in a way that feels natural and respectful of their liberty when it comes to behaviour change (Mojašević & Nikolić, 2021). They still have the same benefit since nudge/shove activities have lower costs than other traditional marketing approaches and can help policymakers improve societies with the available tools (Wymer, 2015). While choice architecture has been used to refer to interventions, "nudging" emerged as the most widely used tool for this kind of intervention since it provides a delicate, non-coercive means of influencing behaviour while maintaining people's freedom (Marchiori, Adriaanse, & De Ridder, 2017).

These interventions work better when they impose restrictions as an external control rather than depending solely on behavioural change when limiting choices (Shove). However, if the mandated energy-saving behaviour falls short of the community's established standards (Dulleck et al., 2018), it may decrease compliance and complacency in energy-saving efforts. Considering the particularities of developing countries with a lower average standard of living and people less informed about conducting voluntary health behaviour, research is required to comprehend the effectiveness of shove in this context (Kulik, 2024).

The Health Belief Model (HBM) was among the first hypotheses to be developed to explain how health-related behaviour has changed; a certain health issue provides a common framework for evaluating or influencing a person's behaviour; this theory is built on the idea of choice, based on individuals' perception of the outcome or the situation (Tarkang et al., 2015). However, the individual choice can be built based on their own experience or the outcome they need. Matching with the idea of choice architecture, this idea makes it the most suitable theory to be applied to improve health behaviours as it all depends on individual choice based on the outcomes they are looking for (Landais et al., 2020).

Most social marketing campaigns have been conducted in developed countries, and special interventions like choice architecture have been applied in developed countries, England and the United States of America (Roger et al., 2023). However, there is still a lack of information about using choice architecture in developing communities. Hence, this research attempts to study the impact of using choice architecture as a social marketing tool in a developing country. Previous results about this research question in the UK showed that choice architecture was effective in improving public health

behaviours (Local Government Association, 2013). So, this study follows the same methodology as this previous study as the study mainly evaluates the health campaign that used choice architecture tools and measured its impact on public health behaviours because this study chose a public health campaign in Egypt to study the successful factors and measure the effectiveness of using the choice architecture tools as an intervention tool to impact Egyptian health behaviours.

1.2. Research Objective

This study aims to determine if shove as a form of choice architecture, a practical approach, could improve citizens' health behaviours in developing countries. It is widely explored that problems in developing societies related to thinking and acting logically and reflectively in a social context positively correlate with cognitive skills (Almulla & Al-Rahmi, 2023). Due to the possibility of differing results when using the same behaviour change models, the distinction between the traits of Egyptian and British residents has opened a **research gap**; demographic differences between **England** and **Egypt** are shaped by factors such as population size, age structure, fertility rates, urbanisation, and life expectancy. These differences influence healthcare, education, labour markets, and social policies. During the last decade, shove and nudge have been famous forms of social marketing for their subtle approach to behaviour change. These are some key demographic contrasts: Population Size and Growth. England's population was approximately 56 million in 2021, with slow growth driven by immigration and life expectancy, while Egypt's population reached around 104 million in 2023 with a higher but gradually declining growth rate; Age Structure, England has an ageing population with a median age of 40, raising challenges for pensions and healthcare, while Egypt's younger population, with a median age of 24, presents opportunities and challenges in education and employment; Life Expectancy. England's life expectancy is around 81 years with regional disparities, while Egypt's is lower at 73 years, influenced by healthcare access and socio- economic factors and Economic Development and Poverty Rates. England has a high standard of living with income inequality concerns, while Egypt faces more significant economic challenges, with higher poverty rates and youth unemployment. England has a more developed education system, higher literacy rates, greater gender equality, and a higher average income. However, income inequality persists, whereas Egypt faces challenges in education accessibility, gender disparities, lower incomes, and higher poverty rates, particularly in rural areas, despite ongoing progress.

- However, there is a dearth of studies focusing on interventions applied in developing societies (Prasetyo, 2020). Therefore, the study aims to evaluate a choice architecture campaign that follows a shove approach in developing countries using the health belief model to ascertain its effectiveness. The following research questions were formulated: **Main Research Question**: What successful factors are perceived by health professionals and policymakers?
- **RQ1**: What are policymakers' reflections on designing an effective social marketing campaign in developing countries?
- **RQ2**: What is the effectiveness of a social marketing campaign using shove as a form of choice architecture with health belief model variables?

1.3. Methodology

To answer the research questions, this research focuses on a campaign developed in Egypt - the 100 million SIHA campaign. This was a large-scale nationwide health campaign to do a checkup to screen Hepatitis C viral infection (HCV) and non-communicable diseases (NCDs) supported by the World Health Organisation as part of an ongoing transformation change aiming at implementing Universal Health Coverage in Egypt (WHO, 2022). The research focuses on the first stage of the campaign from November 2018 to February 2019. We chose this stage because it started and ended before the coronavirus pandemic. The strategies, designs, and procedures used to determine, pick, prepare, and analyse the research topic are all included in the research methodology. This study investigated the variables impacting people's health-related behaviours using a sequential mixed-methods research approach. Furthermore, a pragmatic perspective that combined interpretivism and positivism was embraced (Tenuche, 2018). The study is cross-sectional; the first study aimed to understand the social marketing techniques that the government has used to improve health behaviours in the first stage of 100 million SIHA. This first study follows a qualitative approach, describing health professionals' experiences, creating the hypothesis, and investigating why or how a phenomenon happens. This qualitative study took place in the spring of 2021 and sought to identify the contributing elements for the first stage of the 100 million SIHA campaign to achieve that; 14 interviews were carried out with one of the policymakers and 13 health professionals of the Health Ministry in Egypt. The data were analyzed by using thematic analysis, and the results allowed a better understanding of the topic and

contributed to the development of the proposed research model to be assessed in the second stage of the study.

This research aims to assess and validate the efficacy of choice architecture by utilising a shove-based methodology. By applying behavioural change models in diverse country contexts, it seeks to fill a significant research gap about the varying effects of these models. It specifically investigates how there may be differences in behavioural outcomes between Egyptian and British citizens due to demographic differences, especially in income and educational attainment. While Egypt's varied socioeconomic circumstances may mediate these effects differently, the UK's more incredible average wealth and educational attainment, for instance, may improve people's ability to understand and react to behavioural interventions. Developing more complex and culturally sensitive behavioural tactics requires understanding these contextual differences. The study's second phase (Empirical Study II) used a quantitative methodology to investigate this hypothesis empirically.

The second study seeks explicitly to assess the effects of applying the HBM under the push formulation in a health promotion campaign in a developing nation, namely among citizens of Egypt. The relationship between the success factors found in study one (choice architecture, community leaders and free healthcare) and health check-ups to encourage residents to adopt or maintain a healthy lifestyle under the framework of HBM theory was assessed. The study involves a survey of a convenience sample of Egyptians to gather data on their health behaviours, attitudes and beliefs. Also, it includes questions on their exposure to various social marketing campaigns and techniques, including choice architecture. A questionnaire was developed to measure the variables: Perceived susceptibility, Perceived severity, Perceived benefits, Perceived barriers, Cues to action and Motivation to health check-ups influencing health check-ups, particularlyin specific demographics (age, income, education and gender). A five-point Likert and semantic scales from earlier research were used to evaluate these variables (Grewal et al., 2004; Tice et al., 1995). In all, 726 adults and youth responded to the questionnaire in the summer of 2023. Survey information was examined using statistical techniques to determine the relationship between social marketing techniques and consumer health behaviours (health check-ups), using structural equation modelling (SEM) and AMOS regression models for descriptive and inferential statistics.

1.4. Research Contribution

The study of choice architecture in social marketing, specifically using a shove strategy to affect public health behaviours in developing countries, benefits significantly from this research's theoretical and practical contributions. The study closes a significant gap in the literature by assessing the efficacy of shove-based interventions via the Health Belief Model (HBM). It provides empirical evidence of how organised social marketing campaigns can promote healthy behaviours like routine checkups. This study looks at how shove, a more aggressive and direct intervention than nudging, which subtly affects behaviour, can be best used in environments with limited resources.

The study provides health organisations and policymakers with information on the best practices for creating public health campaigns suited to developing countries. Through an analysis of the 100 Million SIHA campaign in Egypt, this study pinpoints essential elements that support campaign success, including the function of choice architecture, community leadership, and free healthcare services. The results offer valuable information for public health and government representatives who want to increase public involvement in preventive healthcare initiatives. Ultimately, this study contributes to discussing behavioural economics in public health. It offers evidence-based suggestions to policymakers for implementing affordable, scalable, and culturally appropriate health treatments in developing countries.

This study will help governments in developing countries conduct better public health campaigns that can significantly impact citizens' health and do so at a lower cost. Studying this concept in developing countries is very important because the lack of income and education in developing communities may determine different results from similar studies developed in developed countries (Alshaikh et al., 2020). The findings of the study will provide insights into the effectiveness of social marketing techniques in promoting health behaviours (health check-ups) in developing countries. The research studies the choice architecture applied in social marketing in public health in developing countries, aiming to contribute to the effectiveness of using choice architecture to improve citizens' healthy behaviours.

1.4.1. Theoretical Contribution

Previous research mentioned the impact of using choice architecture in public health in developed countries by using a nudge (Krawiec et al., 2021). Still, there is a lack of knowledge about the effectiveness of shove as a form of choice architecture in developing countries. The first study has been applied to investigate the perceived successful factors for the public health campaign 100 million SIHA by interviewing the health professionals and the policymaker. The purpose was to understand the tools used in the public health campaign in one of the largest developing countries. So, the results of study one illuminated the role of the shove form of social marketing in citizens' health behaviours and paved the way for designing study two, aiming at showing the effectiveness of shove under the lens of the HBM framework.

The second study studied the impact of using the choice architecture by using HBM variables to improve public health. An in-depth understanding of the fundamental elements and models for comprehending behaviour and behaviour modification can serve as a foundation for well-informed public health initiatives, assist in determining the factors that have the greatest influence on a given individual or population, and allow programme designers to concentrate on the most important concerns. Adapting this research will help policymakers utilisze choice architecture in developing countries because it could provide valuable insights, shed light on the efficacy of shove as a technique of choice architecture, and address the challenges associated with this approach in developing countries' policymaking landscapes.

1.4.2. Practical Contribution

This study has important practical implications for both governments and nonprofit organisations of developing countries because it will provide useful recommendations for policymakers and public health practitioners in developing countries to implement effective health promotion strategies to address the ongoing challenges of chronic diseases in developing countries. The research showed that choice architecture using the shove form was effective in impacting citizens' health behaviours in Egypt. This finding may help other developing countries to apply similar approaches to improve the health sector in developing communities with low-cost and effective tools. Understanding that will help the policymakers to improve citizens' public health at a lower cost and in a more effective way.

1.5. Organisation of the Thesis

The six chapters that make up this thesis cover the following topics: The background information on public health research and the function of social marketing technologies is the main emphasis of **Chapter 1, Introduction**. This chapter contributes to shedding light on the research problem and its goals, which examines what made Egypt's most successful public health campaign successful and whether shove had a significant impact on how Egyptians behaved about public health. The goal of the ensuing parts is to emphasize the study's importance. This chapter concludes with an overview of the research and a plan organisation of the thesis. **Chapter 2, Literature Review,** examines the key construct that motivates the research study: "**Health Behaviour in Egypt through Choice Architecture in Social Marketing".** The literature's goal is to create a theoretical framework based on knowledge of the findings of earlier research regarding the impact of using choice architecture in the public health sector as a social marketing tool to impact the citizens' health behaviour in Egypt. Several ideas, theories, models, and philosophies were emphasized when examining the literature to show that nudge and shove (choice architecture). As a result, the theoretical framework that generates the hypotheses and the model for additional testing in the study is presented in this chapter. **Chapter 3, Research Methodology**, outlines the research design. The goal of the research methodology chapter is to suggest how the data collection was planned for the study. Following the collection of data, the study examined the reliability and validity of the findings about the goals and objectives of the research. Various research method strategies for testing models are highlighted in this chapter. Following a review of the various approaches, this study determined which approach would be best for addressing the current research question, which is how to gather data, compile statistics, and analyse the information. This study used both qualitative and quantitative research methods, making it a mixed research project. To support the rationale behind the research conclusions and methodologies, the paper provides a thorough description of them. **Chapter 4, Qualitative Research Data Analysis,** outlines the conclusions and outcomes of the qualitative investigation. An interview guide was employed in this study to get the required data. As a result, this chapter is divided into sections based on the interview guide's questions and an overview of the interviewees' conversations. The primary ideas that emerged were concluded because of the conversations. These topics supported the development of further research hypotheses and models for quantitative testing. Lastly, a connection was made between the outcomes and the earlier inferences made from the literature review. **Chapter 5, Quantitative Research Data Analysis,** outlines the conclusions and outcomes of the quantitative investigation. The required data for

this study were gathered via an online questionnaire. The SEM structural equation model and the Amos statistical tools were then used to analyse the gathered data. The research results for the validity analysis, normalcy, frequency, reliability, and goodness of fit indices are presented in this chapter. In this work, structural equation modelling is used to examine the hypotheses. Lastly, a discussion of the findings of the literature follows. Finally, **Chapter 6, Research Conclusions and Recommendations,** is a summary that can be discovered in the research analysis between the qualitative and quantitative approaches. This chapter's research aims to provide insightful justifications for the conclusions drawn. Additionally, this study highlights the limitations, contributions, consequences, and recommendations for further research.

2. Chapter 2 - Literature Review

This chapter will review the relevant theoretical background of social marketing in public health. The literature review considers the difference between upstream and downstream approaches in social marketing. It highlights the health belief model as an important framework for measuring social marketing effectiveness in different population segments. The forms of change are explored, illustrating the effectiveness of choice architecture in improving health behaviours, with the shove and nudge tools.

2.1. Social marketing and public health

Social marketing was created as a new way to achieve significant population changes and favourably impact people's health and well-being, as social marketing is at the heart of health improvement in several countries (Todua & Jashi, 2018). Several social marketing programmes that promote public health are effective (Velema et al., 2018). However, most of the analysed intervention programmes were conducted within particular countries, with a sizable proportion in developed economies, such as the United States, the United Kingdom, Australia and New Zealand (Larney et al., 2017). A few initiatives involved several nations, and certain programmes targeted neighbourhoods, workplaces, restaurants, retail establishments, colleges and other specific contexts, while others sought to have an impact on the entire community. Most programmes emphasised healthier eating choices, a decrease in the intake of sugar-filled drinks and high-fat dairy products and a shift in behaviour among schoolchildren, teenagers and their parents, while a few programmes also targeted more general structural or societal changes, even though their primary goal was individual-level transformation (Truong et al., 2021). A notable example of social marketing in developed countries is in the United States, where social marketing is increasingly being promoted as a critical public health tool for influencing voluntary lifestyle habits, such as smoking, drinking, drug use and nutrition (French & Blair-stevens, 2015). In addition, the UK Department for International Development released research detailing the effectiveness of social marketing in influencing various health behaviours in developing nations (Stead et al., 2019).

The fundamental goal of social marketing is to adapt marketing principles and combine them with other approaches to influence behaviour adoption that benefits individuals and communities for the greater good (Lee et al., 2016). Kotler and Zaltman (1971) proposed the first definition of social

marketing, and the concept has developed over time, connecting marketing principles as tools to solve social problems. According to the comprehensive definition of social marketing, it is a structural and guiding framework rather than a single theory (Saunders et al., 2015). Social marketing is a tactic used to develop programmes that encourage or modify behaviour for the good of both individuals and the larger community (French et al., 2021a). Social marketing is defined as the intentional use of marketing strategies along with other methods to accomplish socially beneficial behavioural objectives. Social marketing aims to generate good and positive attitudes and behaviours to deliver societal benefits and people's intended goals (Alghizzawi et al., 2023). Social marketing influences target audience behaviours that benefit society and the individual by employing standard marketing ideas and strategies (Wymer, 2015). Marketers and politicians can also use social marketing in various ways to improve people's lives.

Social marketing emphasises both the process (equity, justice, and sustainability) and the results (efficiency and effectiveness) to guarantee that behaviour change is accomplished in a way that is both long-lasting and socially responsible (Saunders et al., 2015). Social marketing aims to affect settings, systems, policies, products and services and how markets are governed and controlled by shifting attitudes, perceptions, values and social norms. It has the potential to change behaviour in the long run. Social marketers may improve trust by agreeing to a single logo, slogan, and positioning plan for their marketing. A cohesive communication plan that functions well across all platforms and advertising channels is facilitated by this method (Key & Czaplewski, 2017). Research, best practices, theory, audience insights, and collaborations are all integrated into ethical principles to drive social marketing practice. This strategy ensures that focused, competition-sensitive, efficient, egalitarian, and long-lasting social change initiatives are delivered (Akbar et al., 2021). Recently, social marketing scholars have suggested that the concept of social marketing may be limited if it places excessive value on changing behaviour for the benefit of society as a whole and carefully follows a predetermined procedure. They contend that rather than promoting significant social change, this strategy has moved the emphasis of social marketing away from promoting real social change and towards evaluating success through the technical implementation of behaviour-influencing strategies (Saunders et al., 2015). The four modes of governance that policymakers might employ are hierarchy, market networks, and persuasion. Social marketing is one way governments have attempted to influence citizens; however, the primary issue is that social marketing initiatives are expensive (Eltahir & Xing, 2021). Policymakers must understand how social influence can be used and choose the strategy that will result in the most moral, useful, and

long-lasting behavioural change because social marketing is considered an expensive way to affect consumer behaviour (Mols et al., 2015).

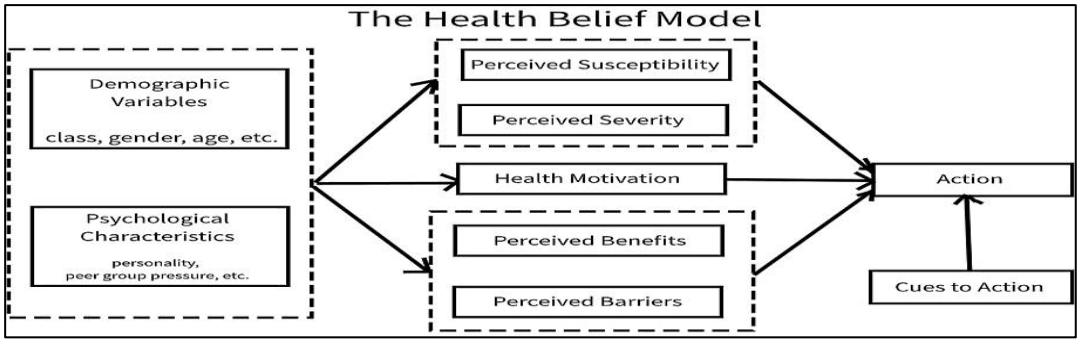
2.2. Health Belief Model

Behavioural change models are essential because they provide a useful framework for determining the underlying cause of any particular habit, which is a crucial first step in creating an effective behaviour change intervention (Luca & Suggs, 2013). Bandura's 1986 social cognitive theory builds on his previous social learning theory, which holds that we obtain various behaviours by watching others in our social environment.

The fact that biological therapies by themselves cannot ensure improved health has come to light more and more in recent decades. Social, economic, and political forces are among the factors that significantly affect health, yet they are outside the scope of the health sector (Kumar & Preetha, 2012). Public health and health promotion interventions that adopt an ecological approach have the best chance of succeeding; they should focus on individuals and address the organisational, interpersonal, and environmental elements that influence health behaviour (Glanz & Bishop, 2010). Effective behaviour changes interventions often draw upon various theories and models, including the health belief model, the theory of planned behaviour and the social Ecological model, among others. These theories provide a comprehensive framework for understanding the factors that influence health behaviours and offer specific strategies to promote behaviour change.

The Health Belief Model (HBM) is a valuable theory for researchers and practitioners in various health-related fields (Figure 1).

Figure 1: Health Belief Model.



Source: (Sheeran, 2015, p.32)

This model can provide a detailed explanation and justification of individual behaviour towards health-related concerns (Champion & Skinner, 2008). The HBM model focuses on individual perceptions of health risks and behaviours and provides a useful framework for designing and evaluating interventions to promote behaviour change (Kumar & Preetha, 2012).

Social psychologists in the US Public Health Service initially developed the HBM in the 1950s to explain why many people do not participate in programmes aimed at preventing and detecting illness. Subsequently, the model was extended to examine how individuals respond to symptoms (Kirscht, 1974), while Becker and Maiman (1975) added the behaviours in response to a diagnosed disease, including adherence to treatment regimens (Champion & Skinner, 2008).

However, Lewin's (1951) concept of valence was the main framework used to conceptualise the relationship between health beliefs and behaviours: the expectancy-value model is one of the theoretical frameworks that underpin the relationship between health beliefs and behaviour. Lewin's et al., (1951) suggested that behaviour is primarily influenced by two factors: (1) the importance an individual places on a specific outcome, and (2) the likelihood that a specific action will lead to that outcome. The model suggests that an individual's behaviour is influenced by their beliefs about the likelihood and consequences of a particular event and the value they place on the outcomes of that event. In the context of health, an individual's beliefs about their susceptibility to a particular health problem, the severity of its consequences and the potential benefits and costs of engaging in preventive behaviours can all influence their decisions to adopt or avoid those behaviours.

Both perceived severity and perceived susceptibility are crucial elements of the HBM since they affect how someone perceives the possibility of illness or disease. It is important to assess and address these perceptions in health interventions, as they can significantly impact a person's willingness

to engage in health-promoting behaviours. Perceived benefits and perceived barriers are also important components of the HBM, as they influence a person's decision-making process when considering health-promoting behaviours. When designing health interventions, it is important to emphasise the benefits of engaging in health-promoting behaviours and address perceived barriers that may prevent individuals from engaging in them (S. Kumar & Preetha, 2012).

The main theories of health communication have been thoroughly reviewed (Fishbein & Yzer, 2003); it has been suggested that four factors play a significant role in influencing an individual's intention and behaviour:

a) Perceived susceptibility: this refers to an individual's perception of their vulnerability to an illness or disease. It entails determining one's risk and possible unfavourable health consequences (Fishbein & Yzer, 2003).
b) Attitude towards a specific health behaviour: individuals develop attitudes based on their beliefs, experiences and intentions regarding a particular health behaviour. They weigh the pros and cons associated with the behaviour before deciding whether to adopt it (Fishbein & Yzer, 2003).
c) Perceived norms: an individual's behaviour is influenced by their social and communal surroundings. These norms might be either injunctive (perceptions of what others approve or disapprove of) or descriptive (perceptions of what others are doing) (Fishbein & Yzer, 2003).
d) Self-efficacy: Self-efficacy, on the other hand, is the belief in one's ability to carry out a particular activity. It plays a crucial role in behaviour change, as individuals are likelier to engage in behaviours because they believe they can successfully execute them (Fishbein & Yzer, 2003).

These four elements of the Health Belief Model collectively determine the mass media's success in health campaigns. The mass media, especially television and films, significantly shape modern lifestyles (Fishbein & Yzer, 2003). These channels' broad reach and effectiveness influence people's attitudes and behaviours relating to health (Fishbein & Yzer, 2003).

The HBM's emphasis on the perceived susceptibility and severity of a health threat highlights the importance of raising awareness about the risks associated with certain health behaviours (Tarkang & Zotor, 2015; Chin & Mansori, 2019). For example, in the context of COVID-19, interventions that emphasise the severity of the illness and the potential consequences of not taking preventative measures may be more effective in motivating behaviour change than interventions that focus solely on the benefits of such measures (Suess, Maddock, Dogru, Mody, & Lee, 2022). The HBM has also been applied in many studies to explain and predict exercise behaviour.

Furthermore, the HBM's consideration of perceived benefits and barriers to health behaviour acknowledges that individuals may weigh the benefits and obstacles of a specific activity before choosing (Kumar, 2016). This means that they need to perceive the risk of the health problem and view it as severe. A cue to action can act as a catalyst to overcome perceived barriers and motivate behaviour change (Kumar, 2016). Interventions that address perceived barriers, such as access to resources or social support, may be more effective.

In conclusion, according to the Health Belief Model, people are more likely to engage in particular behaviours if they believe they are at risk for a health problem, think the problem will have a profound impact, believe that the target behaviour will help prevent the onset of health problems, and believe there are few obstacles to adopting the target behaviour (Sulat et al., 2018).

Individuals' perceptions of their risk or susceptibility to a health issue and the seriousness of the repercussions they believe will occur have an impact on their vulnerability. The term "perceived susceptibility" describes attitudes regarding the probability of contracting an illness or other health issue. Perceived severity is the degree of seriousness of the illness or the possible social consequences, as well as the medical and clinical consequences, such as death, disability, and suffering if the condition is not treated, and the impact of the condition on social relationships, family life, and the workplace (Sulat et al., 2018). People are more motivated to act in ways that prevent a negative health outcome when they have a stronger sense of how serious that consequence is. On the other hand, people will not be motivated to take action to prevent a health consequence if they think it will not significantly affect their lives. Perceived threat is the term used to describe the mix of perceived vulnerability and severity (Sulat et al., 2018).

2.3. Demographic factors and behavioural change

Humans have an innate need to seek pleasure and avoid pain (Tory Higgins, 1997). One principle is the motivational component of task performance, namely regulatory emphasis. Regulatory focus theory investigates individuals' motivations and how they pursue goals; more specifically, it explores how individuals align themselves with their norms and aims (Trevelyan et al., 2014). Prevention-focused individuals seek to minimise negative consequences and concentrate on security, safety, and responsibility; they strive to fulfil tasks and obligations. On the other hand, promotion-focused people seek and assess a desired end- state with more concern for the existence or lack of gain (positive result)

(Tumasjan & Braun, 2012). The two focuses differ based on people's underlying motivations, objectives, relevant outcomes, and the intended end-state (Fischer et al., 2020). Because they are goal-driven individuals, consumers invariably rely on their major regulatory focus when making purchases of items or services they want to own or experience (R. Li, Liu, Yao, & Chen, 2019).

2.3.1. Gender and Age in Behaviour Change

From the standpoint of socialisation, boys and girls have distinct traditional gender traits, such as autonomy or dependence, which prevent boys from utilising emotion-focused coping strategies (expressing weakness) and girls from using problem-focused coping strategies (solving problems). (Meyers-Levy & Loken, 2015). Montserrat et al., (2015) figured out that girls are more affected by significant life events than boys are, which could be because boys and girls adopt different coping strategies. These disparate perceptions and responses may be linked to varying degrees of Subjective Well-Being (SWB) since women experience greater stress and employ more emotion-focused coping mechanisms than men. SWB characterizes people's overall assessment of their life quality, which usually includes life satisfaction. Both the good and adverse effects of SWB have been linked to several significant outcomes for people, including stress, personality, and academic success (R. Li et al., 2019).

Several studies on gender differences in spatial abilities have found that women are better at recalling incidental events, which supports the idea that women's advantage in incidental learning has evolved from the need to remember locations around their habitats to gather edible plants to care for their families, unlike hunting, which necessitates a precise sense of direction to catch the target (vision), gathering plants grown in peripheral areas require various sorts of spatial abilities, such as visual scanning, to survey the area around a habitation, men and women behave differently while seeking information and taking risks, which this disparity can explain (Munion et al.,2019). Women typically perceive larger threats than men do, which causes them to look for safety information more frequently (Meyers-Levy & Loken, 2015). In previous research, several studies have examined gender differences in various behaviours related to information search, purchasing decisions and risk perception in different contexts and, for instance, Kim et al., (2011) discovered that there are notable gender disparities in the way that people seek information online, with women showing a more thorough approach than men. Barber (2009) concluded hat women tended to read reviews and utilise more information when buying wine to lower risks (Kim et al., 2011). Similarly, P. Li et al., (2016) found that women exhibited greater

concern for quality in restaurant consumption. It is crucial to consider gender differences in various domains, including information search, purchasing decisions, risk perception and advertising preferences. Understanding these differences can help tailor marketing strategies, communication approaches and product offerings to effectively target different genders and meet their specific needs and preferences (Meyers-Levy & Loken, 2015). However, gender is important in psychological characteristics like personality traits, emotion, and Chronic Regulatory Focus (CF) but not in cognitive aspects like Word of Mouth (WOM) intention. Several studies have examined how gender affects word-of-mouth (WOM) in the hospitality sector, but their findings have been conflicting (Gutermuth & Hamstra, 2024). While some researchers discovered that gender has little influence on word-of-mouth (WOM) in the context of dining at restaurants or staying at hotels, others found that gender has a favourable impact on WOM during festivals (Sun & Ham, 2022). In addition to disparities in actual power, how these differences are psychologically depicted varies between genders. For example, Schubert (2004) shows that men feel and act more powerfully than women and have a stronger connection to power. Women have less hope for control when they make a fist, a gesture associated with power, than males.

Additionally, men are naturally capable of activating the concept of power (Sassenberg et al., 2013). Participating in health-related activities shows a positive correlation with age because health is expected to both decline and improve. Furthermore, age is regarded as the most important critical preventive measure (Kim & Kim, 2020).

2.3.2. Socioeconomic factors and education in behaviour change

Income, occupational social class, and level of education are key markers of socioeconomic status. Higher education is likely to enable a better position in the job market, which in turn delivers higher income, demonstrating the interdependence of these measures. As a result, these metrics have frequently been used interchangeably to describe socioeconomic status. These indicators, however, also reflect various facets of socioeconomic status, and, as a result, their effects on health-related behaviours may take distinct forms. For instance, education imparts abilities, information, and skills that may be crucial for avoiding or giving up negative habits (Phelan, Link, & Tehranifar, 2010). Since education has been shown to most clearly distinguish between health behaviours and associated biological risk factors, it has been the most extensively utilised indicator of socioeconomic position (Laaksonen et al.,

2003). Education acts as a pool for stress reduction and promotes behaviours. Well-educated individuals are more likely to secure healthier jobs, live in conducive neighbourhoods and interact with peers who prioritise healthier lifestyles. The positive impact of education on health is further accentuated by its association with higher income levels. Various channels, including stress reduction, improved decision-making, better information gathering, increased likelihood of health insurance, access to healthier employment and the cultivation of healthier behaviours, underscore the multifaceted ways in which education contributes to overall well-being. Research into the causal link between education and health-related behaviours, such as smoking, drinking, exercise, dietary choices and body mass index (BMI), yields mixed findings. While some studies find no conclusive evidence of a direct causal link, others present significant protective effects of education, particularly on factors like BMI (Zajacova & Lawrence, 2018). The role of gender is considered in data analysis, aiming to eliminate shared unobservable and discern gender-specific impacts. The distinction between behaviours as personal consumption decisions incurring costs and the intrinsic benefits of education, such as stress reduction and improved decision-making, is crucial. This distinction has implications for policy decisions, as the awareness of health benefits stemming from education, whether private or free, shapes the case for or against public policy interventions. In essence, recognising the complex interplay between education, behaviours and health outcomes is essential for informed policy formulation aimed at enhancing public health (Brunello & Fort, 2014).

However, Brunello & Fort (2014) distinguishes between mediating effects that are short-term and those that are long-term. Both education and a dynamic health equation that connects education to current health and the whole history of health behaviours-which are influenced by previous health conditions-have an impact on health outcomes. Utilising an instrumental variables (IV) approach and a static health equation, the researchers capitalise on exogenous differences brought about by modifications to mandatory schooling regulations in several European nations between the 1940s and 1960s. Although the total influence of education on health can be estimated using this method, there is no clear method for estimating the mediating effects of behaviours because there are no reliable instruments for health behaviours. Besides the indirect effects mediated by differences in wealth, socioeconomic circumstances, and other invisible health behaviours, education may also have direct effects on health through improved knowledge and abilities. Education is linked to improved health outcomes and reduced death rates, according to earlier research done in European nations (Brunello & Fort, 2014).

However, Brunello & Fort (2014) observe that the existing empirical evidence on the causal relationship between education and health remains inconclusive and is confined to a limited number of countries (Denmark, France, Germany, the Netherlands, the United Kingdom, and the United States). Second, the estimated contribution of behaviours to the education gradient varies significantly amongst the few available studies, depending on the identification strategy and model specification. One explanation for the somewhat greater returns for women could be that the sample's average educational attainment is lower for women than for males and that marginal returns may decrease as education levels rise. Furthermore, compared to males, women may give greater weight to health-related knowledge acquired through education. This does not always result in more changes in their health-related behaviours, but it may lead to more frequent trips to the doctor. This is corroborated by the fact that when the number of chronic diseases diagnosed by a physician is considered, the gender gap widens. Furthermore, compared to males, women may value health-related knowledge acquired via schooling more. The gender gap widens even more when one considers the number of chronic illnesses that physicians diagnose.

Methods for altering social and health-related behaviours include the following: the goal of persuasive or social influence tactics in advertising and public relations efforts is to promote voluntary behaviour modification without limiting personal preference to encourage action; these strategies use emotional and cognitive appeals, including humour, terror, social standards, and the spread of knowledge. Regulatory measures such as laws, rules, and taxes are used further to discourage adverse effects, including smoking or careless driving. Behavioural economics and communication theory-based message framing are used in conjunction with these to elicit emotional reactions that can gently guide people towards safer or healthier choices, especially when it comes to risky behaviours like drinking alcohol or texting and driving (Higgins et al., 2012).

People with higher levels of education tend to have better health outcomes and are more likely to adopt healthy behaviours. This occurrence shows that, within the health production function, there is a smooth and continuous link between health-related demands and education. To explain the actual relationship between education level and health behaviour, researchers have put forth three primary sorts of explanations, or efficiency mechanisms. According to the theory of productive efficiency, education is a form of human capital and should be considered when calculating the health production function. According to the concept of allocative efficiency, people with greater levels of knowledge are better able to allocate resources within this function, which leads to improved health outcomes. Efficiency mechanism variations presuppose that people with greater educational attainment are more

likely to choose healthier lifestyles. Crucially, these mechanisms imply an ongoing link between health production inputs and education, even in the face of potential unobserved individual variations and future opportunity costs. Studies looking at how education affects health outcomes frequently use efficiency theories. These ideas suggest that people with higher education levels are less likely to participate in unhealthy behaviours because they have better information processing skills or are more aware of the dangers of harmful behaviour (Cowell, 2006).

Using data from the United States, Cowell (2006) investigated the mechanisms through which education may influence health behaviour. The researcher discovered that a high school education lowers the average predicted probability of smoking by more than three percentage points and that an individual who is more future-focused is likely to put more money into their education and participate in healthy behaviours.

Human relationships and networks in the workplace can have an impact on health-related habits. Income has a stronger correlation with material well-being and financial resources that may influence health behaviours through consumption than the other socioeconomic status characteristics. Also, income is typically considered a measure of financial wealth, but it also reveals more general social factors (Laaksonen et al., 2003). Although it is evident that all health choices in industrialised nations do not require money, a lack of material means may influence health behaviours by imposing financial barriers that discourage people from making good decisions (Europe) (Laaksonen et al., 2003).

2.4. Upstream and Downstream Social Marketing

Social marketing aims to change behaviours through both upstream and downstream approaches. Coordination of upstream (environmental, policy changes) and downstream (individual behaviour changes) strategies is necessary for effective social marketing (Lee, N. R., & Kotler, 2011). To bring up changes in social or cultural levels, social marketing should be implemented consistently throughout time (Khajeh et al., 2015). Politicians, legislators, public servants, decision-makers, regulators, managers, educators, and the media are among those who have an impact on the environmental and structural components of society and must be aware of external factors that could influence this decision when the downstream audiences are directly impacted (Key & Czaplewski, 2017). The Centres for Disease Control and Prevention (CDC), for instance, encourages smokers to give up or abstain from smoking near children's grounds. (Brown, 2016) involves organising actions to enhance the likelihood of

behavioural change by boosting efficacy as determined by the response process. In a public health metaphor, the phrases "upstream" and "downstream" refer to two different ways to avoid and deal with health concerns (Wood, 2016).

While upstream approaches aim to bring about desirable individual conduct, frequently without the conscious involvement of the individual, upstream social marketing involves modifying and employing marketing and other strategies to influence the attitudes and behaviour of decision-makers (Lee, N. R., & Kotler, 2011). The "upstream" strategy, for instance, has been employed to guarantee that social marketing affects its implementers by altering the organisation's culture, procedures, and structure (Khajeh et al., 2015). Marketers who take a strategic approach to an upstream social marketing venture focus on a long-term, well-thought-out plan that will result in more reasonable expectations and efficacy. Media outlets, educators, and lawmakers are the ones who engage in upstream social marketing (Key & Czaplewski, 2017). Upstream social marketing can target people at the government, business, or organisation level. Upstream social marketing gives people in important policy decision-making roles a way to sway upstream decision-makers' political opinions to reduce wicked situations (French et al., 2010). Upstream social marketing is a strategy used by social marketers to impact the adoption of policies and solutions because it shifts the focus from the individual or community level of downstream and midstream social marketing to the macro/structural environment. In particular, it seeks to alter attitudes and behaviours, like "voting behaviours, participation in cabinet and committee meetings and policy debates, rulings, corporate policies, adjudications, and the application of legal precedents and principles" (Kennedy et al., 2018).

Downstream social marketing places a strong emphasis on the individual and gives the consumer accountability for change. Within the microsystem, the individual is at the centre of a nested sequence of ever-expanding environmental effects, starting with friends, family, and school. Most of the downstream social marketing operates at this level, focusing on the individual, possibly, but not always, within the framework of a microsystem such as a family, job, or school (Jeff French et al., 2010; Lee, N. R., & Kotler, 2011). This may be called micro-social marketing (Khajeh et al., 2015). However, the impacts on behaviour change are typically too complicated and powerful to be effectively addressed by microsocial marketing alone (Wood & Rünger, 2016). An example of downstream in the health field is Tobacco cessation programs. Almestahiri et al., (2017) investigated several studies that were downstream-oriented. Individual smokers at risk of certain tobacco-related effects were the focus of downstream treatments. Four studies assessed prior and present tobacco cessation efforts aimed at diverse types of smokers in different areas, employing a range of treatments, venues, and messaging.

Interventions that target these individuals can provide immediate advantages, such as quit attempts or smoke cessation. These studies discovered a favourable correlation between increased awareness of tobacco campaigns, intentions to quit, knowledge about the harms of smoking, and/or reported changes in actual smoking behaviour.

All governments and civil society organisations are constantly working to understand how and why individuals act the way they do to create and carry out social interventions that are most likely to help citizens live fulfilling lives. As a result, Jeff French stated that governments are frequently legitimately paternalistic because part of their role is to guarantee that residents are safeguarded and to improve their living environment (French et al., 2010).

To show how different public health policies affect people, a 5-tier health impact pyramid has been developed (Fig. 2). In the pyramid, the base represents public acts and interventions that have the biggest influence on the people with the least amount of work. Health promotion greatly influences public policies, and prevention is more economical and successful than treatment (Frieden, 2010). The elements of the pyramid are as follows:

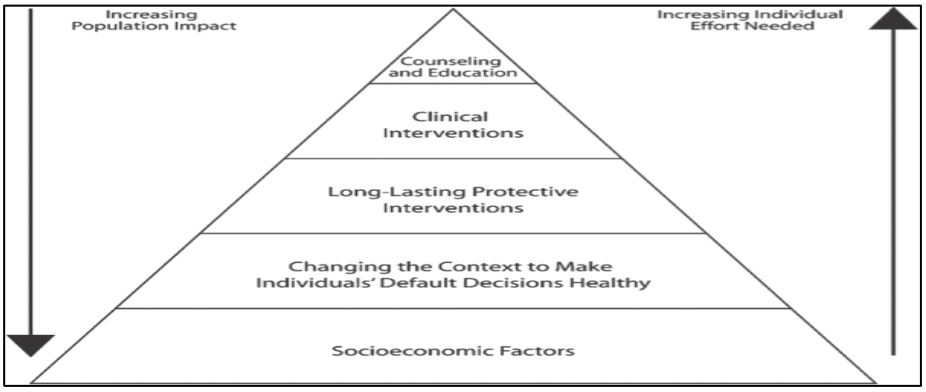
1. Key determinants of health both within and between nations include socioeconomic variables like better education and poverty reduction. Exposure to environmental dangers is increased by characteristics such as poverty, low educational attainment, relative deprivation, and restricted access to sanitation, even if the exact mechanisms via which socioeconomic status affects health may not always be evident. There is a strong correlation between cardiovascular risk factors, such as smoking, and educational achievement. Finally, poverty is a contributing factor to the higher prevalence of illness in society (Frieden, 2010).
2. Interventions that change the surroundings to encourage healthy decision-making are the default option, regardless of education, income, service accessibility, or other social elements that establish more advantageous environmental contexts and design communities, like promoting physical activity, passing laws that support public transportation, and encouraging people to walk, bike, and drive instead of drive, are examples of the context to promote healthy choices. According to the prospect theory, people's reactions vary depending on how messages are delivered, exposing the advantages or disadvantages of activities (Frieden, 2010).

- Depending on a person's motivation or ability to control their emotions, both positive and negative emotional appeals may be used as tools to modify conduct in various contexts with varying reactions. Therefore, by using threats to dissuade people from acting in a particular way, negative

appeals explain the costs and unforeseen repercussions of attitudes and behaviours. Negative appeals, on the other hand, do not show long-term impacts because fear-based advertisements get monotonous and predictable, lose their effectiveness with repetition, and elicit negative emotions in viewers, such as guilt, shame, and fear (Casais & Proença, 2022).

3. Since long-lasting protective treatments must reach people individually rather than collectively, they typically have less impact than interventions represented by the bottom two levels. Long-lasting protective interventions do not require continuing therapeutic care (Brennan & Binney, 2010; Helmig & Thaler, 2010a; McKay-Nesbitt et al., 2011).
4. Clinical interventions are continuous interventions in the field of medicine. According to Frieden's (2010) research, cardiovascular disease prevention measures have the most significant potential impact on health. These therapies' overall impact is constrained by their ineffectiveness, inconsistent and unpredictable adherence, and lack of accessibility. Furthermore, even in systems that ensure universal health coverage, the treatments can be identified. In the United States and other nations lacking universal health care coverage, this is a serious issue. Implementing electronic record-keeping, modifying financial incentives, and changing physician practices to promote preventative care and proactively manage chronic diseases increases the likelihood of achieving this aim.
5. Although counselling and educational interventions are typically the least successful, they do constitute health education (given during clinical interactions and education in other venues), which is seen as the core of public health action. When used regularly and repeatedly, educational interventions can significantly impact the field and are frequently the only ones available (Frieden, 2010). Public health interventions that alter the health context come after attempts to address socioeconomic variables at the base of the pyramid (Frieden, 2010), such as safe roads and clean water, long-term preventative measures (including vaccinations), direct clinical care, and top-level counselling and education. Campaigns in the mass media that encourage healthy behaviour and discourage unhealthy ones are essential components of public health programmes. The goal of these programmes is to avoid chronic diseases by changing the information environment and causing behaviour changes (Randolph & Viswanath, 2004).

Figure 2: The health impact pyramid.



Source: (Frieden, 2010, p. 591)

However, health check programmes must increase public awareness for people to be aware of the programme's goals and characteristics and make an informed decision about accepting the invitation (WHO, 2022). The term "narrowcast", or "silver cast", is now more appropriate for mass media channels because of their more focused, smaller audiences and the financial pressure on each channel to serve the needs of certain psychographic or demographic groupings. Reaching large audiences has therefore grown more difficult for public health organisations, as doing so today necessitates distributing scarce resources across a variety of specialised media platforms (Nicely Aken, 2008).

Mass media interventions, either alone or in conjunction with other initiatives, have the power to dramatically impact population health behaviours. The rule itself applies to a wide spectrum of public health media initiatives. However, there are definite exceptions, including campaigns that have significantly impacted behaviour modification and ones that have had no effect (Nicely Aken, 2008).

Two key characteristics of successful public health media campaigns are that they usually contain well-crafted messages that are disseminated to the target audience frequently enough to be seen, heard, and remembered. The significance of adhering to these principles has been widely recognised and has received significant attention in the field of public health, even if the art and science of creating effective health messages are still evolving (Burgess et al., 2015). The classic social marketing paradigm aligns with health promotion and disease prevention by targeting individuals to educate, alter attitudes, and modify behaviours (Wymer, 2015).

Frieden's (2010) framework, designed to address public health interventions through a tiered approach, can be adapted for developing countries by emphasising local socioeconomic conditions, governance structures, and infrastructural limitations. In these contexts, the foundational level of Frieden's pyramid-socioeconomic factors-should prioritise poverty reduction, education, and food

security as key determinants of public health outcomes. The next level, changing the context to make healthy choices the default, must consider infrastructural challenges such as inadequate healthcare facilities and limited access to clean water. Policies should focus on cost-effective interventions like fortifying staple foods and improving sanitation. Strengthening long-lasting protective interventions, such as vaccinations and maternal health programmes, requires innovative approaches like mobile health (mHealth) and community health workers to overcome healthcare accessibility barriers. Clinical interventions must account for workforce shortages by implementing task-shifting strategies, where trained non-physician healthcare workers provide essential services. Finally, individual counselling and education should leverage culturally appropriate health communication strategies, such as radio programmes and community gatherings, to reach populations with limited literacy.

2.5. Behavioural Economics in Behaviour Change

Behavioural economics can be used as a tool or an approach depending on the situation. It considers the psychological, sociological, and emotional aspects that affect human decision-making and challenges the conventional wisdom of rational decision-making. This multidisciplinary approach highlights the significance of comprehending cognitive biases, emotions, and heuristics in economic behaviour and helps explain why humans frequently depart from strictly rational decisions. A crucial component of this strategy is nudging, which is frequently used to gently influence people to make better decisions without limiting their freedom (Sunstein & Thaler, 2008).

Behavioural economics is a tool that offers practical insights for influencing policy, enhancing judgment, and maximising results across a range of industries. Behavioural insights are used by governments, corporations, and healthcare institutions to develop behaviour-influencing interventions. For example, policymakers create "nudge" regulations like default settings for retirement savings to encourage decisions that align with people's long-term interests. Similarly, to create pricing strategies that appeal to consumers' psychological inclinations and increase sales and customer loyalty, marketers use behavioural concepts, and healthcare providers often use behavioural economics to promote treatment compliance and healthy lifestyle choices (Sunstein & Thaler, 2008)

However, behavioural economics is increasingly acknowledged as a tool for influencing human behaviour regarding complicated and long-term decisions. It recognises that humans are frequently influenced by cognitive biases, emotions, and social influences, in contrast to classic economic models

that presume people make decisions based on complete rationality and long-term advantages. People may find it challenging to act in their long-term best interests because of these factors, particularly when it comes to preparing for retirement, leading a healthy lifestyle, or following a treatment plan; by comprehending the psychological aspects that influence decision-making, behavioural economics aims to assist in forming and altering intricate, long-term behaviours. Insights such as social norms and nudges are frequently used in behavioural interventions to help people make better decisions that will benefit their long-term health (Loewenstein & Chater, 2017).

Health Behaviour Change: Another area where behavioural economics has shown promise is altering health behaviours, such as stopping smoking, upping physical activity, or following a doctor's prescription. Time-inconsistent preference, the propensity for people to prioritise immediate gratification (like the pleasure of tobacco) over long-term advantages (like better health), impacts many of these behaviours. This problem is addressed by behavioural economics using strategies such as goal setting and commitment devices. Behavioural economics is an applicable multidisciplinary field that provides valuable methods for influencing behaviour in various contexts and a greater understanding of human decision-making (Sunstein & Thaler, 2008). Applying behavioural insights can help us create better business plans, public health outcomes, and policies-all of which will improve decision-making in both individual and group settings. However, integrating behavioural Economics and Social Marketing for Effective Public Interventions can be effectively combined to drive behavioural change by leveraging insights into human decision-making while using strategic communication and incentives to influence choices. Social marketing applies commercial marketing principles to promote positive social behaviours, such as health improvement or environmental conservation, while behavioural economics examines cognitive biases and heuristics that shape decision-making. The synergy between these fields is evident in interventions that use nudges (Sunstein & Thaler, 2008) to subtly guide behaviour without restricting choice. Choice architecture techniques, like altering product placement or emphasising immediate benefits, enhance social marketing efforts in public health and sustainability domains. Integrating behavioural economics into social marketing creates more cost-effective, scalable, and impactful interventions by aligning interventions with how people naturally make decisions (Sunstein & Thaler, 2008)

2.6. Choice architecture

The term "choice architecture" emphasises external variables that organise the information and alternatives' context, layout, and design, hence influencing how people behave. Nudge: Improving Decisions about Health, Wealth, and Happiness, authored by Cass R. Sunstein and Thaler (2008), is where the term first appeared. The term "choice architecture" was invented to illustrate how behavioural economic insights may be utilised to affect decisions while maintaining objective values. In the area of Nudges, decision architecture was stated to reduce biases caused by restricted rationality. Limitations such as cognitive capacities, problem difficulty, and decision-making time may be addressed if choice architects guide individuals toward favourable options.

When elaborating on choice architecture, Thaler & Sunstein (2008) were inspired by Donald Norman's book The Design of Everyday Things, published in 1990, which was written by a cognitive scientist and design researcher. The key takeaway from Norman's book is that designers need to keep in mind that people are constantly presented with a plethora of options and cues; thus, things must be built for simplicity of use (Münscher et al., 2016). Six "tools" were identified by Thaler & Sunstein (2008) for decision architects: recognising defaults, predicting mistakes, providing feedback, comprehending mappings, arranging difficult decisions, and providing incentives (Fischer Hübner et al., 2024).

A choice architect must consider two factors. A wider selection increases the likelihood of satisfying consumer preferences (Sunstein & Thaler, 2008). However, it also increases the cognitive burden on consumers who must evaluate more options. Therefore, the decision-maker's willingness and satisfaction with the process and the nature of the decision-making process itself are important considerations (Johnson et al., 2012). While choice architecture interventions can play a significant role in reducing disparities, they are not a complete solution. Many disparities are deeply rooted in systemic issues, stemming from historical, societal, or macroeconomic factors. Addressing these disparities effectively requires broader interventions, including changes to laws and macroeconomic elements (Sunstein & Thaler, 2008). Furthermore, using incentives or providing new information can effectively complement nudges (Loewenstein & Chater, 2017).

Thaler and Sunstein's (2008) tools of the choice architect include defaults, expecting error, giving feedback, understanding mappings, providing incentives and changing the order of choice defaults; these are the options that people receive if they do not make an active choice, and they can be used to

encourage desirable behaviour. Expecting error involves anticipating where people may go wrong and providing information or guidance to prevent it. Giving feedback helps people understand the outcomes of their decisions, while understanding mappings involves presenting information in an approach that is simple to understand. Providing incentives can encourage desirable behaviour, and changing the order of choice can affect the options people choose. Moreover, Johnson et al. (2012) distinguishes between tools used to structure the choice task, such as defaults and limited options, and those used to describe the choice options, such as information about the consequences of the options. Any manipulation that occurs to the choice architecture can lead to a change in consumers' decisions. These manipulations, often called "nudges," are generally inexpensive and cost-effective for both businesses and governments (Benartzi et al., 2017). This explains their widespread adoption by policymakers and marketers, establishing over 200 "nudge units" globally across various sectors (Mrkva et al., 2021).

Every choice presentation has an implicit default, implying that if one option is set as the default, it will be selected more frequently than if another option is set as the default. Therefore, everyone shapes choices and is a choice architect, from parents offering their children alternatives for sleep to the government offering its citizens pension options (Johnson et al., 2012). Accordingly, marketing research has looked at how choice architecture features like sorting and defaults affect customer behaviour (Mrkva et al., 2021). Nudges' low costs and significant average impact have made them ubiquitous in marketing corporations and policy circles (Balawi & Ayoub, 2023). Nudges are not enough alone; they can be a component of a strategy that lessens inequities and influences decisions generally; nudges impact consumer choice discrepancies (Mrkva et al., 2021). Overall, nudge provides a framework for understanding how people make decisions and how to design choice architectures that encourage better decision-making (Mele et al., 2021).

One example of the choice architecture approach encompasses policymakers and healthcare providers using choice architecture principles to enhance the attractiveness and accessibility of breast screening for the target population (Quigley, 2013). By incorporating breast screening with other healthcare services, policymakers can enhance its perceived value and mitigate cognitive and logistical barriers that may hinder women from attending screening appointments (Chan et al., 2023). Furthermore, extending breast screening services to rural areas and underserved locations enables policymakers to address health inequities and ensure equitable access to vital screening services for all women. Ultimately, the application of choice architecture principles can contribute to a higher breast screening uptake and improved health outcomes for women (Mills & Sætra, 2022). While different behaviours are influenced by various psychological, social, and emotional aspects, multiple techniques

are needed to impact them when long-term behaviours, like saving for retirement or leading a healthy lifestyle, entail matching current actions with future advantages, short-term behaviours, like impulsive purchases or excessive eating, are motivated by instant rewards because they offer quick gratification, short-term behaviours can be challenging to change and frequently call for prompt nudges or rewards. However, present bias makes long-term behaviours challenging because future benefits do not seem appealing. Some methods for influencing long-term behaviours are simplifying choices, automating processes, or utilising default settings-like automatic retirement savings enrolment support long-term objectives (Loewenstein & Chater, 2017).

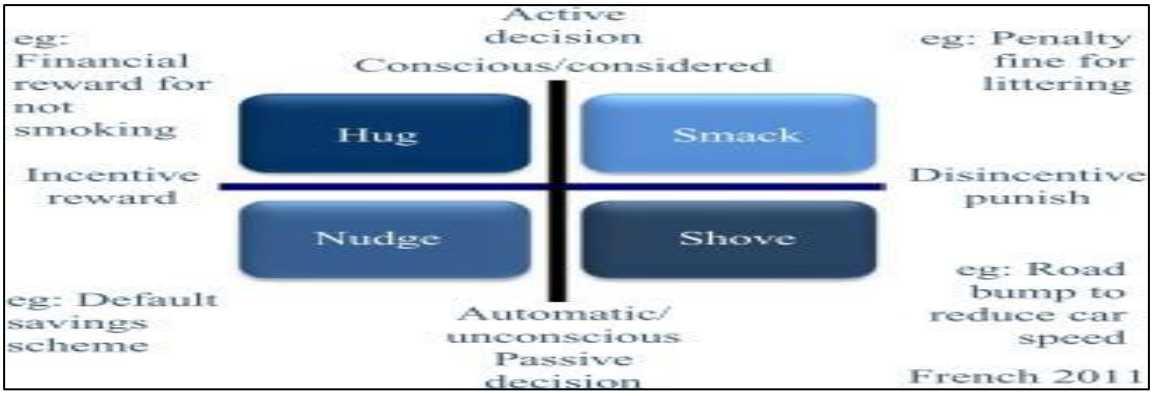
When it comes to short-term behaviours, nudging is typically thought to be a more successful technique than "shoving." Nudge: a nudge gently points people toward a better decision without limiting their autonomy. It is effective for short-term behaviours because it exploits psychological biases (such as present bias) to promote quick, forceful action. One way to encourage someone to make healthier decisions or avoid impulsive purchases is to put nutritious snacks at eye level or offer rapid rewards. Shove: a "shove" is a more aggressive strategy that usually consists of orders or powerful rewards that make someone take action. Although applicable in certain circumstances, it may not be viable long-term and cause resistance or animosity (Mertens et al., 2022).

2.7. Nudge and shove

Thaler & Sunstein (2008) coined the nudge principle in their book *Nudge*, and Richard Thaler won a Nobel Prize in 2017 for this contribution to the Nudge principle. They consider nudge as any aspect of the decision environment that alters people's behaviour predictably without forbidding any options or significantly changing their economic incentives (Hausman & Welch, 2010, p.125). Thus, a nudge is a behavioural intervention that influences people's actions indirectly by altering the circumstances and surroundings to promote improved decision-making and choices; a nudge has gained widespread recognition in business, economics, and healthcare (Savigamin, Mahakit, & Stithit, 2022). So, a nudge means giving a positive choice to the individual in the external environment. Moseley & Stoker (2013) consider nudging as an active exchange where people rationally assess the exchange, evaluating the advantages and disadvantages of the benefits and costs compared to the traditional policy tools, including financial incentives, bans and mandates and, more recently, information campaigns. Hence, nudging helps improve decisions about health, wealth and happiness (Marchiori et al., 2017). According to French (2011), there are four approaches to bringing social change; these levels of interventions are

hugs (rewards), no action taken, merely keeping an eye on the circumstances, or disseminating information to educate and inform people when smacks (punishments) can either limit option regulation to limit people's options or eliminate choice regulation. Nudges (default choices) give people the option to modify their behaviour or direct their choice by altering the default, such as choosing healthier options. The default settings for individuals and Shoves (limited options) use financial or other incentives to make individuals choose to pursue activities, or they use the same tools to disincentives to make people choose not to pursue certain activities. These choices are based on behavioural forms like The Exchange Matrix (French, 2011) (Fig 3).

Figure 3: Exchange matrix.



Source: (French, 2011 p.159)

The Exchange Matrix (French, 2011) is a framework used to analyse interactions, and decision-making is based on behavioural forms of exchange. It categorises exchanges based on the level of mutual benefit, power dynamics, and the nature of the relationship among parties. The model is often applied in organisational behaviour, leadership, and social exchange theory to understand how individuals or groups make choices based on perceived rewards, costs, and reciprocity. Key elements like resource scarcity, informal economies, and power disparities can be addressed by modifying the framework, which classifies exchanges according to behavioural types like negotiated, reciprocal, or generalised exchanges. Informal exchanges, such as social networks and community-based reciprocity, frequently impact developing countries more than official institutional structures (Melkamu, 2023). Adapting the French, (2011) social marketing framework in developing countries involves contextualising its core principles-such as behaviour change orientation, segmentation, and stakeholder engagement-within these regions' unique socio-economic, cultural, and infrastructural realities. While the framework emphasises a systematic, theory-based approach to influencing behaviour, its implementation in low-resource settings requires flexibility and sensitivity to local contexts. For instance,

public health campaigns in developing countries must often navigate limited funding, low literacy rates, and entrenched cultural norms. To remain effective, the framework can integrate local insight mechanisms-such as participatory research and community-based delivery models-to strengthen the relevance and acceptability of interventions. Moreover, the concept of "exchange," a key benchmark, should prioritise non-monetary incentives like trust, social recognition, and convenience. The "methods mix" may also lean more heavily on community engagement, mobile health (mHealth), and radio or interpersonal communication rather than digital platforms, depending on access levels. A helpful illustration comes from digital behaviour adoption patterns in emerging markets, where microblogging outpaces traditional social networking due to cultural preferences and access modes, suggesting that interventions should be tailored to the dominant communication forms in each context (Jobs & Gilfoil, 2012). Hence, the framework's core can remain intact but requires cultural calibration and infrastructural accommodation to drive behavioural impact effectively in developing countries.

The model can also incorporate power imbalances, especially between governments, businesses, and marginalised groups, to represent the distinct exchange dynamics in different contexts.

Nudge and shove are simple interventions in choice design that can guide individuals using psychological effects or to overcome them. They are favourable interventions because they maintain the freedom to choose (Sunstein & Thaler, 2008). Nudge and shove are concepts that emphasise the importance of choice architecture in shaping human behaviour by altering the environment; they can be used to encourage people to make better choices without limiting their ability to choose differently (Mele et al., 2021).

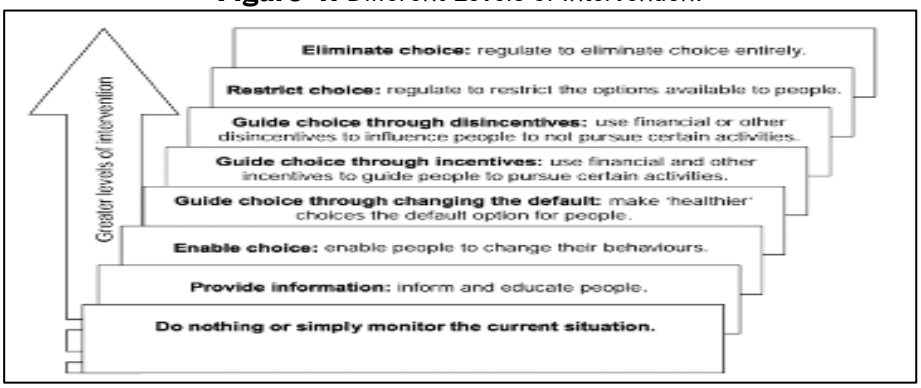
"Shove" implies pushing someone firmly, but "nudge" means to push someone softly. The difference between these interpretations is clear and has important applications in the realm of developing and implementing policies (Mojašević& Nikolić, 2021). However, Nudge and shove tactics concentrate on encouraging behaviours and private choices that are advantageous for society and typically in the long run for the individual, rather than attempting to alter one's value system or expand access to information (Sunstein & Thaler, 2008). Policy-makers have applied nudge and shove to increase policy effectiveness. Also, they called a "Nudge" for cognitive strategies to make a person do something, especially to make good choices for themselves (Oullier et al., 2010). Lehner et al. (2016) also gathered data to aid in evaluating how nudges effectively change behaviour. Thus, nudges are probably suitable for routine actions and difficult choices that are typically too demanding for a person's cognitive abilities (Sunstein, 2015). Sunstein's justification of government-imposed nudges for the

benefit of the individual (also known as "paternalism") against those who worry that they violate personal freedom is found in "Why Nudge?" (Rachlin, 2015).

According to Sunstein (2015) a nudge should not be confused with a shove, and people always have the option to make decisions that go against the advice of a nudge. Sunstein (2015) refers to the growing corpus of research in behavioural economics and psychology that emphasises biases and poor decision-making, especially the propensity to put off future repercussions in favour of new satisfaction. As Sunstein puts it, people who make decisions based on long-term factors are freer than those who make decisions based only on short- term gain. Governments have the power to enhance the welfare of their populace by implementing choice architecture or long-term reinforcement contingencies that shape behaviour (Rachlin, 2015).

According to Williams et al., (2019) interventions can be done in different ways and levels (Fig 4). The "ladder of intervention" established by the Nuffield Council on Bioethics has established the intervention (Williams et al., 2019).

Figure 4: Different Levels of Intervention.



Source: Williams et al. (2019)

Dulleck et al., (2019) report the outcomes of tests of these four behavioural economics levers or treatments. It suggests that while the small Shove may offer short-term benefits, both the Smack and the Shove eventually cause reactance as users decide to use more electricity to regain their independence. As a result, future interventions ought to focus more on pleasant approaches (such as hugging and nudging) and aim to give customers a choice whenever feasible. Moreover, according to the research, a minor Shove was tried and shown to be effective, while a moderate Shove was found to be the most effective lever over the long run (greater contributions and a lower rate of decay). Therefore, a modest Shove may encourage more contributions from less pro-social customers in broader contexts. However, participants should be contacted and requested to alter their behaviour in a particular setting.

Certain Sloves that limit customer choices can be implemented by regulators, such as the requirement for new tapware to have a minimum star rating or the regulation of energy-efficient lighting bulbs (Dulleck et al., 2019).

Moreover, the Big Data age has increased the efficacy of nudging, prompting questions about how it affects liberty in both positive and negative ways. According to Sætra (2019), there are three main reasons for this improved efficacy: a better understanding of individuals, advanced theories of human behaviour and the capacity to target individuals through multiple platforms, including social media and internet advertising. However, there are moral concerns regarding coercion and liberty raised by this data manipulation by public and commercial organisations.

2.8. Libertarian paternalism

Paternalistic vs non-paternalistic interventions are a contentious dichotomy in modern political and intellectual discourse. Proponents of paternalistic policies frequently give lengthy explanations for interfering with people's freedom of choice. Libertarian paternalists seek objectivity by organising choices in a way that encourages individuals to make choices that their rational selves, or System-II, would support. Furthermore, externalities are defined by libertarian paternalists to include scenarios in which the rational System-II self pays the price for decisions made by the irrational System-I self. These expenses are known as internalities as both selves are present in a single person. Libertarian paternalists can analyse and comprehend the intricacies of decision-making and its consequences for individual autonomy and societal welfare (Rebonato, 2014).

The term paternalism refers to theoretical ideas that include interfering with someone's autonomy or liberty to further one's interests. It involves a collision of ideals, with liberty up against other individual or group-related concerns. Libertarian paternalism has a complex definition of interference; it holds that modifying settings of choice to suit the interests of the chooser does not constitute interference if the chooser is free to act independently in that situation. On the other hand, paternalism can also entail creating choice scenarios that prioritise the chooser's desires (Grill, 2012). These ideas led to the development of two distinct but connected forms of paternalistic interventions: 1) Nudge-derived libertarian paternalism and 2) Shove-derived coercive paternalism (Mojasevic & Nikolik, 2021).

Paternalistic acts are usually characterized by benevolence and are frequently aimed at the one who is being interfered with. On the other hand, situations in which interventions aim to benefit entities other than the immediate recipient, including averting injury or giving advantages to other people, are not the same as dirty paternalism. The psychological underpinnings of paternalistic meddling stem from the conviction that the person will ultimately benefit, especially in situations where concrete advantages are not immediately apparent. Paternalism encompasses not just individual relationships but also laws and regulations, regardless of the initial reasoning behind them. It entails doing action for the individual's perceived good, irrespective of the particulars of that good and is frequently consistent with objectivist conceptions of the good. It takes both an embrace of paternalism and an objectivist view of the good to justify intervention intended to forward goals the individual disapproves of (Grill, 2012).

In the previous sections, we explained that choice architecture and paternalism are intervention tools that could impact behaviours, but they are different in their use. Some public health campaigns prefer a paternalistic approach because they mainly target improving citizen health. Grill (2012) highlighted that the government usually uses paternalism regarding citizens' health.

Differentiating between moral paternalism and moralism is crucial since the former emphasises the person's welfare while the latter focuses on advancing morality. Legal paternalism, on the other hand, disregards personal preferences or circumstances in favour of affecting bigger populations. Because of the innate power relations between patients and carers, paternalism is common in medical settings. This may show up in an institutional setting. When paternalistic actions are applied to groups and in the interpersonal connections between carers and patients, where carers may adopt a paternalistic position and offer instructions with the hope that patients will comply, even when their intentions are good (Grill, 2012).

Paternalism can be rough and questionable in terms of a government's morality, while libertarianism can backfire when agents make decisions that directly diminish their welfare. When the two extremes are separated, they both produce unique issues that tend to impede advancement. On the other hand, nudge theory and libertarian paternalism serve to reconcile the two ideas and deftly affect people's behaviour without overtly forcing an agent to make a choice (Sunstein, 2015).

2.9. Nudge under the lens of choice architecture and libertarian paternalism

Social marketing is associated with libertarian paternalism, a more general political notion, it is important to understand that nudging is not a new concept; rather, it is based on psychological and sociological theories that have existed for more than a century. Nudge concept demonstrates how our surroundings greatly impact and constrain our actions, frequently more than we are aware of. The main sources it uses to explain why people frequently behave differently from the standard economic models of rational decision- making are behavioural economics and social psychology; it also stems from libertarian paternalism, an ideology that encourages people to behave in their own best interests while preserving their freedom to do otherwise (Sunstein, 2015). However, as with many policies that restrict freedoms and choices, behaviour change policies are not necessarily as gentle as they may appear. Legislation, regulations, and actions that change economic incentives are notably excluded from the original definition of nudging. Despite these limitations, nudging can refer to a broad spectrum of tactics intended to alter social or physical settings in ways that increase the likelihood of particular behaviours (Roland, 2011). Lehner (2016) Nudges are effective because they help correct the biases and errors that arise in human behaviour, especially in situations where individuals are not able or willing to invest significant cognitive effort, as Thaler & Sunstein (2008) explained.

Furthermore, they argue that nudges are acceptable for choices that have delayed impacts, are difficult, or occur seldom. Learning is difficult in such instances since there is no feedback or understanding of the relationship between the aim and the outcome. Furthermore, Lehner et al., (2016) stated that any attempt to influence people's judgement, choices, or behaviour can be deemed a nudge if it predictably impacts behaviour, as altering behaviour does not always imply changing minds."

The popularisation of behavioural economics suggests that consumers are influenced by people they trust. Applying nudges to situations where people have already made up their minds and are willing to act on a question is crucial for their success; this may restrict the range of actions that nudges can promote, excluding, for example, topics that are more contentious or call for longer-term thought (Moseley & Stoker, 2013b). Moreover, these interventions have been carried out via a variety of strategies, including social marketing campaigns and giving feedback to people or groups via online platforms or mail, the effectiveness of online feedback is supported by research, but the other approaches have less evidence (Currie et al., 2022). The crux of the matter is to discern what "form" of exchange will work in which situation with a specific target audience (French, 2011b). For example, Richard Titmuss (1970) stated that paying for blood donation would go against essential social values and

decrease or eliminate people's willingness to donate blood, potentially reducing the availability of blood donors. However, in the context of policymaking, framing describes how a legislator might frame a problem to persuade target groups to react in particular ways. Because nudges can make the advantages of change more rapid, the social marketing process builds a deep and lasting understanding of people's true wants, which may be more complex than a long life free from disease (Burgess et al., 2015; Sunstein & Thaler, 2008; French, 2011b). This is crucial since adopting healthy habits rarely has instantaneous, pleasurable effects (Higgins et al., 2012).

Moreover, Howlett (2016), has different targets with varying resources, abilities, and attitudes when assessing whether they would comply. Nudges frequently support other strategies to simplify people's access to advantageous programmes and subsidies (Howlett, 2016). Sometimes, but often not, as externalities reveal, consider the issue of violent crime as evidence that mandates and prohibitions have their place and that nudges are not always the ideal method for achieving policy objectives (Sunstein, 2015).

Through focused and segmented programmes that raise the acceptability of particular ideas and encourage action and behaviour consistent with those concepts, social marketing aims to affect people's behaviour (Andreasen, 2002). In the field of public health, social marketing initiatives have been most prevalent. These consist of initiatives to help people quit smoking and to teach them how to properly react to cold and flu symptoms (Moseley & Stoker, 2013). However, Thaler and Sunstein mentioned that nudge is one of the powerful mechanisms that policymakers can use because it alters by changing the default setting to optimise social welfare in a choice architecture (Sunstein & Thaler, 2008). Moreover, for that importance, in 2010, a nudging unit was established in the UK. Other nations, such as Australia, Germany, the Netherlands, Singapore, and the United States, quickly followed (Ledderer et al., 2020). To increase contributions, an Executive Order issued in September 2015 instructed federal agencies to integrate behavioural science into their programs. Additionally, it has been suggested that citizens be automatically enrolled in organ donor registers or pension savings programmes (Benartzi et al., 2017). Both cases receive empirical support (Moseley & Stoker, 2013).

Many authors have claimed that nudging is an effective tool, and it has been effectively used by governments, such as in public health initiatives and savings accounts (Sunstein & Thaler, 2008). Also, Nudge can be a useful strategy for encouraging a variety of sustainable and pro-environmental consumption habits (Oullier et al., 2010; Sunstein, 2014b; Thaler, 2004). Moreover, evidence suggests that nudges are most effective when people already know what is correct and only need the option to be

reminded of it. To counterbalance the harmful effects of other actors (business, media) attempting to subtly influence human behaviour and so minimise unwanted behaviour (consumption of fatty, salty, and sugary foods), policymakers can employ nudges in two ways (Sunstein, 2014b). Secondly, elevating conduct is desirable to motivate specific behaviours, such as eating healthy foods (Lehner et al., 2016; Moseley & Stoker, 2013).

Although nudging is frequently seen as an affordable policy tool, it might not always result in noticeable behavioural changes, particularly when contrasted with more direct interventions like legislation. While nudging can be quite successful in bringing about small behavioural changes, its effects are frequently less significant than anticipated, especially in sectors like food, alcohol, and tobacco control where industry self-regulation has previously failed. Because nudging is less invasive and allows for a small influence on public behaviour, governments may prefer it; this strategy has drawbacks because it falls short in addressing widespread public health concerns, where more robust legislative actions may be required to effect more significant and long-lasting behavioural changes (Benartzi et al., 2017; Thaler, 2013; Michael Hallsworth et al., 2018; Roland, 2011).

Nevertheless, there is little data to support the idea that nudging can enhance population health and lessen health disparities. The effectiveness of nudging interventions in altering behaviour in general populations, however, has not been well examined. Their capacity to bring about the kind of long-term, sustainable change required to enhance health was not evaluated (Green et al., 2019).

Furthermore, there are two approaches to improving public health. The first focuses on identifying and treating high-risk individuals, such as those with excessive blood pressure, to reduce the risk of stroke. The second strategy seeks to alter the population's overall distribution of a risk factor, for example, by lowering average blood pressure and salt intake to lower the overall incidence of stroke (Platt, Keyes, & Galea, 2017).

The low (or zero) expenses, rapid outcomes (including significant financial savings), and efficacy of nudging while maintaining individual freedom are the main reasons for its growing popularity. Nudges may be more effective in some situations than more expensive and coercive techniques. Default rules, simplification, and the application of social norms, for instance, have been demonstrated to occasionally provide even more potent impacts than significant financial incentives (Benartzi et al., 2017). However, nudging suggests that none of the options should be difficult, hard to avoid, economically or socially motivated, or noticeably more time or trouble-consuming (Marchiori et al., 2017).

Nudging is like many other policies that limit freedoms and choices; behaviour change strategies are not always gentle. Also, nudging could entail various methods for altering social or physical surroundings to encourage certain behaviours (Roland, 2011). As a result, corporate and governmental organisations have become increasingly interested in using nudges in recent years, owing to their low cost and ability to promote economic and other goals, including public health (Sunstein, 2014).

Because nudging is a method for influencing decisions to choice, it falls within the category of "libertarian paternalism," as Thaler & Sunstein (2008) define it (Hausman & Welch, 2010); it is also regarded as the philosophy that underpins the nudging strategy (French, 2011).

Libertarian paternalism, derived from the notion of nudging, and forceful paternalism, derived from the notion of shoving, are two different but related types of paternalistic interventions (Gane, 2021). Coercive paternalism is about aims, but libertarian paternalism is about means. This is how these two forms of paternalism vary from one another (Mojašević & Nikolić, 2021).

Nudges are libertarian paternalism because they leave the options available to agents substantially untouched. Most public policy attempts to elicit behavioural change in government initiatives to achieve government objectives (Howlett, 2016). To clarify, paternalism necessitates a technique to guide people's decisions to promote their well-being. Moreover, Münscher et al. (2016) suggest three categories of nudges based on their impact on the process of making decisions: knowledge, structure, and support for decisions, while Baldwin (2014) categorises nudges according to how they support emotions, volitional, and cognitive processes. Finally, Hagman et al. (2015) differentiate pro-self-nudges, which encourage behaviour that benefits the individual, from pro-social nudges, which encourage behaviour that benefits society. They discover that pro-self-nudges are more positively perceived (Mele et al., 2021).

Critics, including Bovens (2009) and Rebonato (2014), raise concern that nudges can be deceptive and compromise personal freedom and the possibility of biases towards specific groups or worldviews (Kuyer & Gordijn, 2023). They also argue that nudges may be insufficient in addressing larger societal problems and advocate for more structural changes. However, proponents of nudging, such as Sunstein & Thaler (2008) and Mele et al., (2021), counter these arguments by asserting that nudges, when employed appropriately and ethically, can be a valuable tool for promoting positive behaviour change while respecting individual freedom of choice. They emphasise the potential of nudging to influence behaviour in a subtle and non-coercive manner.

In conclusion, the debate surrounding nudges encompasses criticisms regarding their potentially manipulative nature, impacts on autonomy, biases towards certain groups or worldviews and their effectiveness in addressing larger societal problems. Proponents assert that nudges, when used responsibly, can be effective in promoting positive behaviour change while upholding individual freedom of choice. Further research and ethical considerations are necessary to fully understand the implications and optimal use of nudges in various contexts. In contrast with the libertarian character, nudges recognise each person's right to act or even to change their mind as they see fit (Oullier et al., 2010). Hence, it is accurate to say that some nudges are a type of "soft paternalism" since they influence people to take a certain course (Gane, 2021). Nevertheless, nudges are designed to preserve total freedom of choice (Sunstein, 2014b) while shoves are appropriately described as a form of "strict paternalism" (Sætra, 2019). However, citizens lack information or expertise and cannot absorb the complicated and varied information sources presented; that is the beginning point for nudging (López et al., 2020). Also, Thaler & Sunstein (2008) identified the types of tools that governments can use to engage in nudging practices and considered three intervention points: framing, persuasion and norm-creation. To convert concepts concerning broad micro foundational mechanisms influencing behaviour into workable policy actions, defining persuasion as affecting people's beliefs or perspectives while just drawing attention to and focusing on aspects of a problem (Mertens et al., 2022). However, Thaler & Sunstein (2008) identified the light nudge as a framing, not a persuasive activity, since citizens, rather than governments, must be the ultimate choosers (Sunstein & Thaler, 2008; Moseley & Stoker, 2013).

In addition, governments are using behavioural science methods more frequently to influence people's behaviour to achieve policy goals. These days, governments are using a variety of nudge interventions to affect people's choices without using force or drastically altering financial incentives (Benartzi et al., 2017). Many nudges aim to make people's lives easier, safer, or more accessible. Examples include public warnings, educational campaigns, decreases, and the revelation of information on health or finances (Murayama et al., 2023). Presenting details regarding an economic stimulus and the incentive's design, as opposed to the motivator itself, would be the nudge (Sunstein, 2014b).

Many nudge initiatives entail regulatory changes, including modifying the restrictions on payroll giving or the defaults for organ donations when residents pay their vehicle taxes (Peter, 2013). Nudges can persuade people to behave appropriately and comply with government wishes through various strategies, including financial incentives, fines and penalties, moral persuasion, and education-all which governments may have at varying degrees of supply; however, nudges are not always meant to benefit the people they are used to encouraging (Meyers-Levy & Loken, 2015; Whittington, 2024). Establishing

a clear and precise separation between "soft" and "hard" government tools is challenging, making it difficult to make firm assessments regarding the effectiveness of behaviour modification initiatives (Peter, 2013).

The wide range of approaches is reflected by the other terms that have started being used to describe interventions other than nudges. Techniques like direct incentives, such as vouchers in return for healthy behaviour, can be labelled as hugs (Dulleck et al., 2019). At the same time, tougher measures that restrict choice, like restricting takeaways from schools and taxation on cigarettes, are shoves. Smacks is the term used to describe prohibitions, such as the prohibition of smoking in public areas (Local Government Association, 2013).

The claim that nudging might equate to covert coercion is problematic, particularly when it is driven by Big Data (Sætra, 2019). Instead of blaming the complexity of legislation for not working, these issues must be addressed. Although nudges are frequently seen as soft prods in the desired direction, the application of big data might turn them into aggressive actions that obstruct personal freedom (Sætra, 2019). This problem is further complicated by nudge marketing, which is like government nudging but lacks the paternalistic element. Despite justifications for openness, nudges' subliminal impact endangers people's freedom. The understanding that nudging may erode a person's power over their decisions refutes (Hausman & Welch, 2010, p.124) claims that it is not intrinsically coercive. Moreover, nudging is more successful when it is opaque, more like surreptitious manipulation than reasoned argumentation (Kuyer & Gordijn, 2023). Although others contend that nudging lacks sufficient force, it is important to understand that the only effective ways to sway legal acts are via reasoned argument and candid discussion (Bouter et al., 2022). Strong and successful nudging might be seen as a kind of compulsion given the underlying assumptions that nudging affects behaviour and gains more potency with Big Data. Consequently, evaluating the effects of nudging and considering personal freedom and autonomy is crucial (Sunstein, 2015).

Behavioural science units across the world advise policymakers on the use of ‘nudge’ techniques to improve health, wealth and happiness. Nudges use psychology to steer people toward or away from making choices by designing choice architectures that frame or highlight options in particular ways (Mills & Whittle, 2025). Nonetheless, the claim is that effective policymaking necessitates a strong alignment between behavioural interventions and the context of the issue. Sometimes, when the environment is ready for the desired conduct to emerge, and there are few compensatory or opposing influences, a straightforward nudge-like intervention may be enough to encourage a particular behaviour. In some

situations, nudge-like interventions could not work because they call for extra actions that address the environment or because the target population is diverse and does not always react similarly to the intervention. Policymakers are right to be concerned that nudges alone, like any other intervention, are rarely the best way to improve decisions about happiness, prosperity, and health, even in the face of the optimism that they will be beneficial without altering incentives or rules. It is essential to properly characterise social issues outside the parameters of the choice architecture to build a more systematic understanding of the scope of behavioural interventions (Meder et al., 2018). Sometimes, some policymakers need to shift from nudge to shove to grant achieving a good choice for the whole community (Sætra, 2019).

Libertarian paternalism requires us to recognise that people's free choices do not always correspond with the interests of society or even of the individual. Libertarian paternalism includes interventions that aim to reduce people's inescapable cognitive biases and poor decision-making abilities by using these biases to sway people's decisions in a way that is consistent with their long-term goals. These treatments aim to steer people towards the decisions they would make if they had unrestricted time, knowledge and the rational decision-making abilities ascribed to Homo Economicus, they are readily reversible (Rebonato, 2014).

2.10. Shove under the lens of choice architecture and coercive paternalism

While nudges influence policymakers worldwide, especially in public health, shoves come from the same idea of giving a choice, but in this approach, the policymaker gives a restricted choice. Examples include smoke cessation in Scotland and other countries when the government forbade smoking in public places and workplaces; also, the case of the United States of America public health legislation, including regulation of the salt content of food, taxation of non-nutritious foods and control of the availability of sugar-sweetened beverages on sale in schools, the economic benefit for the USA alone from a public health intervention that would cause a modest (3 g per day) reduction in salt intake is estimated to be in the region of $10–24 billion per year and that is evidence of the power of shove intervention in public health (Methven & Caskey, 2014).

Shove thus refers to giving a restricted choice to the individual (Sætra, 2019). However, both nudge and shove are choice architecture tools. However, sometimes when it comes to the sake of public health, policymakers prefer to give restricted choices or, in other words, use a shove as in the

examples mentioned above. Moreover, governments are not afraid to consider more draconian approaches, as shown by the fact that consultations were carried out on plain cigarette packaging (Local Government Association, 2013). However, in the end, both are intervention tools that have been used to impact behaviours. However, both have been used in public health awareness in England, and both have impacted the citizens' behaviours (Local Government Association, 2013).

As already mentioned, policymakers should recognise the various methods of social influence and choose the tactic that promotes the most ethical, practical, and sustainable behavioural change, as social marketing is viewed as an expensive approach to shaping consumer behaviour (Mols et al., 2015). The nudging attractiveness point is the low cost, which is much more pertinent in an era of fiscal austerity. It complements conventional policy instruments, such as legislation and regulation (Sunstein & Thaler, 2008). Kotler & Lee (2016) questioned the popularity of behavioural economics, which they view as a mere "branch of marketing" and, as they hinted, an embarrassment to most academics, in response to social marketing expert French (2011), concern about "why nudging is not enough." Regarding scientific rigour and disciplinary history, Kotler asserted that social marketing is more sophisticated than behaviour change. Changing policy in social marketing programmes can motivate individuals to change their behaviours, but that is difficult to sustain unless the environment supports that change in the long run (Weinreich, 2016).

Moreover, Sunstein (2014a), claimed that the individual's choice regarding society and individual welfare is mandatory. It could be the right action to lead an individual to the right choice, and a mandatory choice is the shove. Also, a shove is more effective than a nudge when it relates to society's welfare because a nudge always depends on individual choice without any penalties.

As mentioned, coercive paternalism is grounded in the concept of shove. This paternalistic intervention is based on regulation, and it is anti-liberal and intrusive by nature. Thus, unlike libertarian paternalism, it is a hard form of paternalism (Mojasevic & Nikolik, 2021). In the context of coercive paternalism, the fundamental principles can be visualised within representing liberty and regulation, indicating that a "shove" is significantly more forceful than a "nudge." Coercive paternalists argue that by restricting certain immediate actions, they facilitate the fulfilment of long-term goals. This perspective is primarily driven by the intention to mitigate present bias. However, it necessitates substantial confidence in determining what individuals value most throughout their lives ((Oliver, 2015). Moreover, Kahan (2000), claimed that with the high severity of the cases, the decision-makers must use the hard shove to influence the behaviours in the right direction for citizens.

While nudges have been criticised for being manipulative and potentially crowding out more effective regulatory measures, shoves involve too much interference in personal lifestyle choices. Instead of (or perhaps in addition to) attempting to regulate citizens' behaviours, behavioural economics can help inform the proper regulation of private corporations (Oliver, 2018). As a behavioural policy instrument with roots in nudge theory, pushing presents several ethical issues, especially about autonomy, transparency, and fairness. Shoves are more coercive, restricting options or enforcing strong deterrents to discourage behaviours, in contrast to nudges, which maintain freedom of choice while leading people towards desirable behaviours, which calls into question whether organisations or governments have the authority to control personal decisions for the benefit of the public. Another ethical concern is the transparency of shoving, since laws intended to change behaviour by limitations (such as greater taxes on unhealthy goods or prohibitions on dangerous substances) may not always be explained clearly, which could lead to people being misled or manipulated. Fairness and equity must also be considered, as shove can disproportionately affect vulnerable groups that might not have the available funds or knowledge to adjust to the limits placed on them. Bans on sugar-filled beverages, for example, may have unanticipated economic repercussions for low-income consumers who depend on reasonably priced food options (Arneson, 2015; Hausman & Welch, 2010).

Additionally, there is disagreement regarding the long-term efficacy of shove because too restrictive laws may spark opposition and erode public institutions' credibility. Different viewpoints on its justification are offered by ethical frameworks, including deontology (which examines whether pushing respects moral obligations and rights) and consequentialism (which concentrates on the results of shoving). The ethical justification of shove depends on transparency, stakeholder involvement, and striking a balance between autonomy and the general welfare (Arneson, 2015; Hausman & Welch, 2010).

2.11. Hypotheses and Research Model

2.11.1. Hypotheses

The Health Belief Model is a valuable framework for understanding and promoting behaviour change in various health contexts. Its emphasis on individual perceptions of health risks and behaviours provides a useful tool for designing and evaluating interventions to promote behaviour change, and its widespread use in research and practice attests to its utility as a conceptual framework. It is important

to consider each component of the HBM when designing health interventions and to tailor interventions to the specific needs and perceptions of the target population (Tweneboah Koduah, 2018). That is why the research needs to investigate how the HBM can be effective in impacting citizens' behaviours by using choice architecture.

Based on the previously presented literature review, this research will study the effectiveness of using Health Belief Model variables with a choice architecture. Several prominent researchers studied HBM and public health (Carpenter, 2010; de Vries, 2017; Sulat et al., 2018; Wichachai, Songserm, Akakul, & Kuasiri, 2016; Wong, Alias, Wong, Lee, & AbuBakar, 2020). The health belief model variables were found to be very effective in motivating health behaviours (Shmueli, 2021). Several prominent researchers studied the impact of using choice architecture to improve public health (Dolan, 2016; Kellen Mrkva, Nathaniel A. Posner, Crystal Reeck, 2021; Leal et al., 2022; Quigley, 2013; Velema et al., 2018). Choice architecture is very effective with all its tools (nudge, shove, smack and hug) in impacting health behaviours (Local Government Association, 2013).

The research will study the effectiveness of using Health Belief Model variables with a choice architecture, especially that the Shove strategy contributes to explaining the successful factors for the most successful public health campaign in a developing country (Egypt) and how the Egyptian government influenced Egyptian citizens to desired health behaviours by HBM variables under shove campaign; the demographic has moderated the relationship between the HBM variables and the desired health behaviour (health check-up). Several prominent researchers studied HBM and public health (Carpenter, 2010; de Vries, 2017; Sulat et al., 2018; Wichachai et al., 2016; Wong et al., 2020). According to (Shmueli, 2021), the health belief model variables were very effective in motivating health behaviours. Several prominent researchers studied the impact of using choice architecture to improve public health (Dolan, 2016; Kellen Mrkva, Nathaniel A. Posner, Crystal Reeck, 2021; Leal et al., 2022; Quigley, 2013; Velema et al., 2018). According to (Local Government, 2013), Choice architecture is very effective by all its tools (nudge, shove, smack and hug) in impacting the citizens' health behaviours in England; the study will research the impact of using the health belief model variables with choice architecture under shove campaign in developing countries because of the lack of data about that topic till now.

Based on the previously reviewed literature, a set of hypotheses is developed for the current study:

Perceiving a health issue as personally relevant will help someone take the necessary steps to prevent it; for instance, those who believe they are at risk for HIV/AIDS are more likely to use condoms

to prevent the disease from being spread through sexual contact. Activities that heighten an individual's perception of susceptibility to the health condition are necessary for this to occur. According to this theory, people who fear getting a chronic illness should either take preventive or curative activities.

Recognising susceptibility to a particular issue or illness may not always inspire one to take the required precautions unless one understands that developing the condition will have significant social and bodily repercussions; one can take the necessary steps to prevent these adverse effects only after realising the extent of a condition's harmful effects (Tarkang & Zotor, 2015a). Thus, the following hypothesis is proposed:

H1. Perceived susceptibility to chronic diseases impacts adopting the desired health behaviour

Perceived severity refers to the degree of seriousness of the sickness or the potential medical and clinical repercussions (such as death, disability, and suffering) as well as possible social repercussions (impact of the conditions on employment, family life, and social interactions) if the illness is left untreated (Tapera et al., 2019). Based on previous studies about the effectiveness of the health belief model variables in motivating health behaviours (Shmueli, 2021), the following hypothesis is proposed:

H2. Perceived severity of chronic diseases impacts adopting the desired health behaviour

Beliefs in the effectiveness of the suggested course of action to lower risk or the severity of impact are referred to as perceived advantages. Perceived benefits are favourable elements seen in the formation of protective behaviour (Yildirim & Kocaağalar Akince, 2022). The individual must think that a particular activity will assist them in avoiding or stopping a problem from happening. Because of the predicted results, this belief gives one the courage to act; according to the HBM, consistent condom usage should be positively correlated with one's faith in the success of condom use in avoiding HIV/AIDS (Tarkang & Zotor, 2015). Perceived benefits are opinions regarding the efficacy of suggested preventative health actions (Tarkang & Zotor, 2015), such as health check-ups.

H3. Perceived benefits impact the adoption of desired health behaviour

Perceived barriers depend on individual perception of the obstacle of behavioural change, so it could be the cost of the product or service or perceiving risk or discomfort like feeling pain related to carrying out specific behaviours (Kim & Kim, 2020). Barriers can be tangible barriers like financial

resources, and intangible barriers can be psychological like fear of pain or inconvenience (Washburn, 2020). Perceived barriers pertain to an individual's perception of the material and mental expenses associated with the recommended behaviours; several obstacles may influence the decision to act; the following are examples of perceived barriers to health actions: phobias, psychological and physical barriers, accessibility issues, individual traits, and potential obstacles to engaging in preventative behaviours, such as unpleasantness, difficulties, and expense (Tarkang & Zotor, 2015). The term "perceived barriers" describes a person's perception of the psychological and material costs of the recommended behaviours. People's decisions to behave may be influenced by several obstacles, fears, psychological and physical barriers, accessibility issues, individual traits, and potential obstacles; perceived barriers to exercising preventive behaviours include things like cost, inconvenience, and unpleasantness (Tarkang & Zotor, 2015). Perceived barriers are the internal and external obstacles that patients believe to exist during BSE, mammography, and breast cancer screenings for women (Yildirim & Akince, 2022).

H4. Perceived barriers impact adopting the desired health behaviour

When someone feels motivated to perform the required action after having faith in their ability to do so, that is a cue to action, by understanding how to overcome the anticipated obstacles, one will benefit from the necessary action. It requires the individual to be motivated to follow instructions, be concerned about their health, be open to seeking and accepting medical care, and participate in healthy activities (Tarkang & Zotor, 2015). Cues to action are anything that prompts or reminds people to act; examples include newspaper articles on breast cancer, friend advice, and media publicity (Tweneboah Koduah, 2018); therefore, the following is hypothesised:

H5. Cues to action impact the adoption of the desired health behaviour

Motivation was described as a feature characteristic by most of the authors; Deci and Ryan's (1980) and Cox's (1982) definitions of the dominant trait, the degree of need or drive for competency and self-determinism in health behaviours were the basis for this definition. It is also proposed that the study of goal orientations or incentives is what motivates people. The preparation for behaviour was often the primary focus of those who defined motivation as a state attribute (Carter & Kulbok, 2002).

According to the Health Belief Model, individuals must experience or employ tactics to motivate them to carry out the anticipated activity (Yildirim & Akince, 2022).

H6. Motivation to health behaviours impacts the adoption of desired health behaviour.

Interaction hypotheses

Research on gendered consumption has been significant, and scholars have used a variety of viewpoints to explain how men and women behave differently (Lin & Chen, 2016). In a review of gender differences in consumer behaviour, five significant distinctions between men and women were noted Meyers-Levy & Loken, (2015): women are more sensitive to negative information and more cautious in their responses; men are more self-oriented, whereas women are more other-oriented; women pay more attention to details when processing information; and men and women process data differently, with women being more thorough and men generally more selective. Since education has been demonstrated to impact health behaviours and related biological risk factors significantly, it is frequently regarded as the most reliable predictor of socioeconomic position. Furthermore, a person's profession can influence their health-related behaviours because it frequently involves networks and people relationships (Meyers-Levy & Loken, 2015). Income has a stronger correlation with material well-being and financial resources that may affect health behaviours through consumption than any other socioeconomic position factor. Although income is typically considered a measure of financial resources, it also reflects broader social factors. Although it is evident that all healthy choices in industrialised nations (Europe) do not require money, a lack of material means may influence health behaviours by imposing financial constraints that prohibit making good choices (Laaksonen et al., 2003).

One important idea holds that poverty and scarcity influence decision-making by focusing more time and energy on urgent activities, frequently at the expense of secondary choices or future-focused concerns. This emphasis on quick decisions may reduce the impact of nudges, particularly if the greater focus on quick decisions increases accuracy and motivation (Shah, Mullainathan, & Shafir, 2012). The socioeconomic status (SES) of the people that policymakers serve varies, and our research can assist them in determining which customers their nudges will most likely affect. Understanding the heterogeneous effects of nudges could benefit businesses by enabling them to target consumer segments, potentially increasing the effectiveness of nudges. SES has strong positive associations with numeracy, domain knowledge, and anxiety, all of which we believe shape susceptibility to nudges. Additionally, researchers have proposed that comprehending heterogeneity might help explain why nudges frequently less significant impacts have when used on a larger scale (Hossain, 2020).

Consumer behaviour is greatly impacted by socioeconomic differences, which have an impact on a variety of things, including the brands and items that customers pick, their ability to obtain credit, and how they are treated in stores. A nother factor is financial literacy and numeracy, since customers who struggle in these areas frequently feel more anxious and uncertain when making financial decisions. Furthermore, older people and those with lower socioeconomic status (SES) and educational attainment are more susceptible to marketing fraud and deception, in terms of assets and liabilities, such as stocks, retirement savings, credit card debt, and payday loan debt. There are also notable differences between high- and low-SES consumers, these differences affect both present-day behaviour and future wealth compared to customers with greater certainty. Uncertain consumers are more prone to create their preferences on the fly rather than depending on stable preferences (Mrkva et al., 2021).

Although some theorists contend that people with greater experience or knowledge may be less impacted by choice architecture, numerous studies have demonstrated that nudges not only have an impact on consumers' decisions generally but also cause differences in their choices. The effectiveness of nudges was moderated by domain knowledge and numeracy; nudges impacted consumers with lower domain knowledge and numeracy than those with higher knowledge and numeracy; nudges specifically had a more significant impact on low-SES customers, meaning that they benefited more from nudges intended to assist them in selecting a wise course of action than did high-SES consumers (Mrkva et,.al 2021). Based on this evidence, we proposed that gender, age, level of education, and income level moderate the relationships between HBM variables and health behaviours.

H7: Demographics (Age, Gender, Education and income) moderate the relationships between HBM and adopting the desired health behaviour.

These demographic disparities show how England and Egypt have different socioeconomic contexts; England is more economically advanced and socially progressive, whereas Egypt continues to struggle with issues of poverty, education, gender inequality, and economic growth.

Education: high literacy rates and comparatively little gender inequality define England's more advanced educational system. Egypt's educational system, on the other hand, is getting better, although there are still issues in rural regions, such as greater dropout rates and notable gender gaps, particularly in higher education. Gender: although problems like the gender pay gap still exist, England has made significant strides towards gender equality, especially in the workplace and in education. Though progress is being made, gender disparity is still higher in Egypt, where cultural barriers prevent women from accessing jobs and education. Income: England struggles with significant income

inequality despite having a higher average income and a comparatively high standard of living. Egypt's poverty rates are greater, and its average income is significantly lower, with a large informal economy contributing to economic disparities (Office for National Statistics, 2019; WHO, 2022).

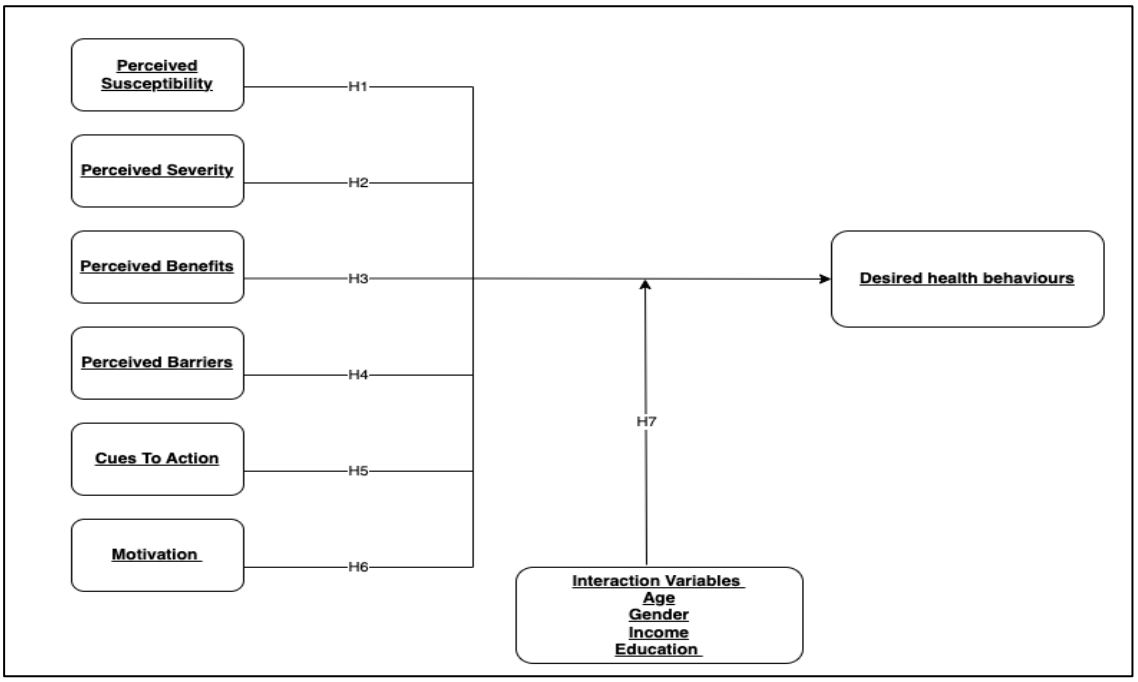
2.11.2. Research model

The difference between the characteristics of Egyptian and British citizens has created a research gap, as these differences may lead to varying outcomes when applying the same behaviour change models. These differences influence healthcare, education, labour markets, and social policies.

This study examines the impact of utilising choice architecture, specifically in the form of a "shove," to encourage Egyptian citizens to undergo health checkups. The primary objective is to assess the effectiveness of this approach in developing countries, given its proven success in England. Since this method has been implemented in Egypt's largest health campaign, the study aims to evaluate its effectiveness under differing socioeconomic conditions, particularly to income and education levels.

These hypotheses are captured by the research model below (Fig.5)

Figure 5: Research model



3. Chapter 3: Research Methodology

3.1. Introduction

The study questions and goals are highlighted in this chapter. Two empirical studies are included in the study design. Based on in-depth interviews, the first study is an exploratory, qualitative investigation. The second method involves using quantitative research, which is based on surveys, to test conceptual model-derived research hypotheses. The tools, procedures for gathering data, and techniques for data analysis employed in each study are displayed in this chapter.

3.2. Research Questions and Research Goals

The goal of an explanatory study is to link the cause and effect of a condition. This causal design allows one to see how the independent variable affects the dependent variable. This kind of study manipulates and tracks changes in the independent variable to observe how they affect the dependent variable (Creswell, 2003). This study aims to understand the effectiveness of the health belief model in developing countries used in the public health sector in Egypt to improve sustainable health behaviours by using the choice architecture. The characteristics of Egypt as a developing country environment may need more interventions to effectively improve citizens' public health. The objective is to analyse choice architecture in the case of a campaign that follows a shove perspective by using HBM variables, specifically:

- Exploringe the successful factors of a campaign using shove as a form of choice architecture.
- Measuring the impact of using the shove concept through HBM variables.

To be able to achieve the study goals, we must answer the Research Questions shown below:

- **Main Research Question**: What successful factors are perceived by health professionals and policymakers?
- **RQ1**: What are policymakers' reflections on designing an effective social marketing campaign in developing countries?

- **RQ2**: What is the effectiveness of a social marketing campaign using shove as a form of choice architecture with health belief model variables?

3.3. Research setting

The research was designed to understand the social marketing tools that have been used by policymakers and the impact of using the choice architecture under the shove campaign through HBM variables to improve sustainable health behaviours. Because behavioural change models provide a useful framework for determining the underlying reason for any particular behaviour, a crucial first step in creating an effective behaviour change intervention, they are useful in influencing behaviour change (Luca & Suggs, 2013). The HBM's inclusion of self-efficacy as a key factor in promoting behaviour change also emphasises the importance of fostering individuals' belief in their ability to carry out a certain behaviour. Interventions that provide individuals with the skills and resources necessary to engage in healthy behaviour may be more effective than interventions that rely on providing information about the behaviour (Chin & Mansori, 2019; First et al., 2015).

As the research setting for our study, we have focused on the "100 Million Siha" campaign, an extensive national program in Egypt designed to screen for non-communicable diseases (NCDs) and hepatitis C virus (HCV). This initiative is a component of Egypt's ongoing efforts to implement Universal Health Coverage and is supported by the World Health Organisation (WHO, 2022). The study paid special attention to the campaign's first phase, which ran from November 2018 to February 2019 and was fully completed before the COVID-19 epidemic. The chosen campaign is justified because it achieved its target successfully by encouraging citizens to do health checkups to have the cure and have the campaign card, then measured the impact of using choice architecture as a shove campaign through the HBM variables. According to the International Organization for Migration (IOM, 2019), Egypt’s Ministry of Health and Population, in collaboration with WHO, UNHCR, and IOM, conducted numerous health awareness and screening initiatives as part of the “100 Million Siha” campaign. These efforts targeted early detection and treatment of Hepatitis C among migrants and refugees across several governorates, including Cairo, Giza, Alexandria, Damietta, and Al Qalyubia. Hepatitis C, often asymptomatic in its early stages, poses serious health risks, such as jaundice, fatigue, abdominal pain, and, in severe cases, liver cirrhosis or cancer. Recognising these risks, Egypt extended free screening and treatment services to its migrant and refugee populations starting in March 2019. The Ministry manages this initiative through 309 screening centres nationwide, all linked to treatment and

management facilities. “100 Million Siha” is Egypt’s largest national health campaign and the most extensive hepatitis-focused initiative globally. Beyond Hepatitis C, the Ministry remains committed to integrating migrants and refugees into broader preventive and therapeutic healthcare services. International organisations have widely praised the campaign’s inclusivity and effectiveness IOM Egypt, 2019.

Blair-Stevens and French (2006) introduced eight benchmark criteria to evaluate social marketing initiatives' strategic quality and behavioural impact. These criteria are, (1) Behavioral Goal, emphasising measurable behaviour change; (2) Customer Orientation, focusing on a deep understanding of the target audience; (3) Theory-Based, grounding interventions in established behavioural theories; (4) Insight, uncovering underlying motivations and barriers through qualitative research; (5) Exchange, ensuring perceived benefits outweigh the costs for participants; (6) Competition, addressing competing behaviours or influences; (7) Segmentation, tailoring messages to different audience subgroups; and (8) Methods Mix, employing a combination of strategies across multiple channels.

Social Marketing and Choice Architecture in the "100 Million Siha" Campaign. The "100 Million Siha" campaign embodies core elements of social marketing, aligning with several of these benchmarks. It targeted:

1) Behavioural change by promoting mass screening for Hepatitis C and healthier lifestyles to combat non-communicable diseases (IOM Egypt, 2019).
2) Audience Segmentation – Different campaign phases targeted specific demographic and geographic groups to maximise reach and effectiveness.
3) Value Exchange – Free screening and treatment lowered the perceived cost of participation, making health checks more accessible.
4) The campaign also applied a potent marketing mix:
    - Product: Free healthcare services
    - Price: Zero cost to the public
    - Place: Over 8,000 screening sites nationwide
    - Promotion: TV, social media, and community outreach Finally, it demonstrated sustainability using domestically produced treatments, ensuring long-term access and cost-efficiency. While not all benchmarks, such as theory use or competition analysis, are explicitly addressed, the campaign's design and implementation reflect a firm adherence to foundational social marketing principles.

The campaign's choice architecture employed "nudge" tactics as opposed to compulsion (shove) (Cartwright, 2022):

- Default Options: Participation was more likely when testing locations that were widely accessible in public spaces.
- Social Norms: By publicly attending screenings, national leaders and celebrities fostered a culture of health-consciousness.
- Ease of Access: Mobile clinics and extended hours made testing less difficult.

By fulfilling these requirements, the campaign effectively used nudge theory and social marketing concepts to promote broad changes in health-related behaviour. Instead of using a purely nudge strategy, the campaign card system in "100 Million Siha" leans more towards a shove architecture.

How the "Shove" Strategy of the Campaign Card Works, a shove entails more forceful interference than a nudge, which gently influences decisions while maintaining freedom.

- Conditional Access: Rather than merely promoting compliance, citizens were frequently forced to provide documentation of their screening (via the campaign card) to receive further medical treatments.
- Institutional Enforcement: To ensure participation, government agencies and workplaces established a structure more akin to a mandate than a voluntary health examination.
- Behaviour Enforcement: The card directly impacted access to necessary services, making opting out far more difficult than a gentle prod (such as SMS reminders or awareness campaigns) (Cartwright, 2022).

3.4. Ontology and epistemology

An essential choice when conducting research is the study's philosophy. The research philosophy describes the origin, character, and progression of knowledge and refers to the strategies that must be used for gathering and analysing data (Creswell, 2003). Four worldviews can be used by research to approach the examination, as defined by Creswell (2003) and Kaushik & Walsh (2019): pragmatism, advocacy/participatory, social constructivism, and post-positivism. According to the post-positivist worldview, information about human behaviours and activities is always truthful (Kaushik & Walsh, 2019). Allowing the research to exchange findings and evaluate the foundations impartially using factual statements that influence the results is the best part of this paradigm. Accordingly, theories and

models need to be testable and measurable (Creswell, 2003). To refine and construct a better theoretical model, post-positivism typically compares ideas to facts gathered to confirm or refute findings (Kaushik & Walsh, 2019; Morgan, 2007).

The interpretive viewpoint, sometimes known as social constructivism, recognises that things have subjective meanings; the researcher's viewpoint and life experiences have the biggest impact on this (J. Creswell et.al, 2011; Kaushik & Walsh, 2019). The methodology takes the research's historical and cultural context into account. According to social constructivism, researchers must engage in fieldwork to gain firsthand knowledge of people's behaviours within the study's setting (Adams, 2006; J. Creswell et al., 2011). This type of paradigm gives rise to an action agenda that links the survey's "social inquiry" conclusions to adopting and implementing a solution.

The advocacy/participatory worldview emphasises the context of problems such as oppression, empowerment, inequality, and dominance. This paradigm, in contrast to constructivism and post-positivism, produces insights by establishing a personal relationship with study participants (Romm, 2015). Therefore, the advocacy/participatory paradigm studies social problems that need refinement and change (J. W. Creswell, 2003; Kaushik & Walsh, 2019).

Lastly, the pragmatic worldview describes an approach to understanding information that is action- and problem-solving oriented to support dedication and advancement towards resolving the research challenge and questions, as choosing the best approach to learn from the many qualitative and quantitative research methodologies is what pragmatics do (Kaushik & Walsh, 2019). According to Kaushik and Walsh (2019), the researcher generates actionable knowledge to change reality in a meaningful way. The pragmatic worldview has been criticised by research for eschewing philosophy and theory in favour of practical outcomes. This strategy may be undermined by irrational assumptions, considering a restricted context and data that may not be broadly relevant to social practices.

This study takes a practical approach after considering different philosophical viewpoints. It makes the empirically explorable assumption that there are numerous realities. To put it another way, research can reveal objective facts that are separate from human experience. However, only through human experience can we comprehend these realities, which have their roots in the environment. This method, which acknowledges the complexity of social phenomena (Brierley, 2017), can be used to study and measure values and other interpretive meanings.

Therefore, **Study 1** supports the social constructivist premise that people try to understand the world around them and give subjective interpretations to the things and experiences they come across;

the researcher chose to concentrate on the intricacy of viewpoints rather than condensing them into a small number of concepts because of the multiplicity and diversity of these meanings, so the goal of the study is to rely as much as possible on the participants' perspectives on the subject under investigation. The questions become increasingly inclusive and thorough to provide participants with the opportunity to interpret a scenario, which is typically established through conversations or interactions with other individuals (Creswell et al., 2011). For the researcher to closely observe what individuals say and do, the better the questions, the more open-ended they can be. They are not merely ingrained in people; rather, they are created via social interaction (thus social constructivism) and by cultural and historical conventions that influence people's daily lives (Creswell, 2009).

Through their interactions with the world they understand, humans create meaning through open-ended questions that qualitative researchers frequently use to entice participants to express their opinions; individuals interact with and understand their surroundings according to their historical and cultural contexts, and each of us is born into a world whose meaning is influenced by our upbringing, so qualitative researchers seek to comprehend the participants' environment by immersing themselves in it and gathering firsthand information, however, their past and experiences have an impact on how they interpret the results (Creswell et al., 2011). Meaning is fundamentally socially generated; it emerges from and is shaped by interactions with human communities. Qualitative research typically uses an inductive process with a human population. Most qualitative research is inductive, with the researcher deriving meaning from the field data they gathered (Creswell et al., 2011).

Study 2 aimed to measure the impact of using the choice architecture as a shove concept through HBM variables. It involves identifying and measuring relationships between two or more variables without manipulating them; hence, it follows a positivistic approach.

Since empiricism emphasies objective information free from researcher prejudice and is foundationalist, rationalist or empiricist, positivism-often associated with experiments and quantitative research-is seen as a type of empiricism. Empiricism holds that knowledge must be factual and unbiased. Positivists hold that reality is quantifiable and universal, e.g., a patient's weight is the same no matter who measures it. Among positivism's main attributes are: 1) Phenomenalism, only facts confirmed by science are taken seriously; 2) Deductivism, creating theories and testing them to discover laws; 3) Objectivity, science must be devoid of value; 4) Inductivism, laws are created because of gathering information, proponents of positivism contend that deductive reasoning and controlled experimentation

may provide an objective, external reality; for instance, knowing an event occurs allows us to trace its cause, suggesting that what we observe directly reflects reality (Ryan, 2018).

Building upon established theories, quantitative approaches rely on deductive reasoning. Key instruments for gathering data are both experimental and non-experimental designs, including surveys (Creswell, 2003). Deductivism is a method of thinking where testable hypotheses are derived from a general theory, after which these hypotheses are put to the test through experiments or observations. The theory is supported if the data support the hypothesis; if not, it might need to be updated. Deductivism is fundamental to science because it enables scientists to infer logical conclusions from known information (Creswell, 2003). This approach is widely employed in disciplines where systematic theory testing is essential to their validity, such as the natural and social sciences.

3.5. Research Strategy

The methodology used in this study is a mixed approach, a strategy that blends or links qualitative and quantitative forms known as mixed methods research. Philosophical presumptions, applying qualitative and quantitative methodologies, and tending methodologies in a study are all part of it. To make a study stronger overall than qualitative or quantitative research, it is more than just gathering and evaluating both types of data; it also entails using both methodologies together (Creswell et al., 2011). Qualitative and quantitative research techniques are combined in a mixed-methods study design to comprehend a topic better. Explanatory (quantitative) and exploratory (qualitative) phases are integrated in a systematic order.

Sequence of Exploratory and Explanatory Approaches

1. Exploratory Phase (Qualitative First)

   This phase is used to explore a topic, generate hypotheses, or identify key variables; methods may include interviews, focus groups, ethnographic studies, or content analysis of textual data.

   The goal is to better understand participants' experiences, attitudes, and perceptions. For example, in the case of the 100 Million Siha Campaign, qualitative data might be collected through interviews with healthcare professionals to understand barriers to participation.

2. Explanatory Phase (Quantitative Second)

This phase follows the qualitative research and is designed to test hypotheses, measure the relationships between variables, and generalise findings; methods include surveys, experiments, or statistical analysis of large datasets. After identifying key themes in the exploratory phase, a survey could be conducted to assess public awareness, participation rates, and behaviour changes resulting from the campaign.

3.6. Research design:

We started with exploratory research because we needed to explore which social marketing techniques were perceived by social marketing designers as effective in the public health sector in a developing country, to answer **RQ1:** What are policymakers' reflections on designing an effective social marketing campaign in developing countries?

RQ2: What is the effectiveness of a social marketing campaign using shove as a form of choice architecture with health belief model variables? To answer both, the current study sought to understand and evaluate the success factors of the first stage of the 100 million SIHA campaign in Egypt, which lasted for three months, from November 2018 to January 2019.

We followed a cross-sectional study because data were collected at different times from different samples. For Study One, the data collection took place from April 2021 to June 2021; the interviews were phone-call interviews with an average of 10 to 20 minutes with 13 health professionals and one policymaker in the health ministry in Egypt aimed to understand their role and perceived impact on Egyptian citizens' health behaviours and explore more about the Egyptian government's techniques to encourage citizens to check up for their health. In short, this study showed that a choice architecture under the shove concept approach was used.

Study Two has been applied to measure the impact of HBM variables on Egyptian citizens' health behaviours under the context of a shove campaign. The data collection took place between July 2023 and the end of August 2023 using the survey method. A questionnaire was distributed online to reach a large sample.

3.7. Study1

3.7.1. Research Goals

The study objective is to answer the research question about the successful factors perceived by health professionals and policymakers to design an effective social marketing campaign in developing countries, considering their particularities. Clarifying the contribution of choice architecture and the other success factors in motivating citizens to check up on ongoing campaigns and follow-ups, the results of the study would help to:

1. Highlighting the value and importance of health campaigns (Mahfouz, 2019).
2. Understand how to design an effective social marketing strategy for public health in a developing country. The importance of community leaders is to promote community issues and national campaigns by providing information on current events in the health field immediately and effectively in small cities and villages to raise the level of health awareness of citizens.

3.7.2. Research design:

Study one is an exploratory research seeking to establish a connection between a situation's cause and effect. The relationship between social marketing techniques and citizens' health behaviours in a developing country, what success factors helped the campaign achieve the target and understand if the policymaker applied a shove in the public health campaign in Egypt and if it impacted citizens' behaviours.

Qualitative research: This study aims to investigate and comprehend the meanings that people or groups ascribe to a human or societal situation. Questions and techniques are developed during the research process, and data are usually gathered in the participants' natural environment. The material is analysed using an inductive methodology, progressing from particular facts to more general topics. The relevance of the data is interpreted by the researcher, and the final report has a flexible format. This method strongly emphasises an inductive manner that captures the situation's complexity while concentrating on meanings, investigate and comprehend the interpretations people or groups make on a social or human issue, as well as emerging processes and questions that are part of the research process. Usually, data are gathered in the participant's environment. Inductive data analysis progresses

from specifics to broad ideas; the meaning of the data is interpreted by the researcher, and the final written report's structure is adaptable; participants in this type of research advocate for a methodology that respects an inductive style and an emphasis on personal significance and how crucial it is to depict the intricacy of a situation (Creswell et al., 2011).

Through direct data collection and immersion in the participants' environment, qualitative researchers seek to comprehend the context or setting. Additionally, they interpret the results, which are shaped by their individual experiences and backgrounds. Inductive reasoning is the main method used in qualitative research, where the researcher uses the facts gathered in the field to create meaning (Creswell et al., 2011).

3.7.3. Method of Data Collection: Semi-Structured Interviews

Numerous instruments are available for qualitative research: Observation, interviews, document analysis, and audio-visual materials are examples of qualitative data collection techniques Creswell, 2003). Semi-structured interviews were used in this study to obtain qualitative data (Creswell, 2003). The researcher and the participant or participants have one-on-one conversations during an interview; there are three types of interviews: semi- structured (has specific questions), unstructured (based on questions that can change from one interview to another), and structured (consists of fixed questions to be asked in a precise order) (Creswell et al., 2011).

This study used semi-structured interviews to gather detailed information about the participants' attitudes, ideas, and behaviours about civic engagement (Gill et al., 2008; Harris & Brown, 2010). The individuals were interviewed in a formal setting using a semi-structured approach, but the study's questions were pre-planned.

An interview guide is required to conduct a semi-structured interview. The guide is a prepared list of questions the researcher plans to ask during the interview. The guide offers a series of questions or subjects in a predetermined order so that the interviewee can carry on a free- flowing conversation without interruption (Harris & Brown, 2010).

Table 1 presents the main objectives of the interview, and Table 2 illustrates the questions that are asked in the semi-structured interviews.

Table 1: The Main Objectives of the Interview

Objectives	Reference:
1. Explore the social marketing techniques that have been used in the campaign.	(Andreasen, 2012). (Moseley & Stoker, 2013a). (Stead et al., 2007).
2. Identify the perceived successful factors of this public health campaign in Egypt	(Webb, Sniehotta, & Michie, 2010).
3. Understand how 100 million SIHA campaign, achieved the target	(Andreasen, 2012; Helmig & Thaler, 2010b; Jamil, 2018) Jones, (2012) (Frieden, 2010). (Sunstein, 2014b). (Roland, 2011).

The interview guide was pilot tested to ensure the questions were pertinent and understandable. Before conducting a full-scale research study, a pilot test is a small-scale preliminary investigation used to assess the study's viability, question structure, and clarity. Five interviewees took part in a pilot test for this project. The interviews were conducted face-to-face in Arabic. Each interview lasted between twenty and forty minutes on average.

Table 2: Questions in the Semi-structured Interview.

Questions: top manager (policy maker)	CODE
1. Did the health minister coordinated with the minister of internal affairs to ask for the campaign card to renew the official paper for citizens?	Choice architecture
2. From your position, have you ever been told that the campaign card will be important for citizens to renew their official papers?	Planning to use shove
Question: middle management	
1. What was your mission in the campaign? 2. How has the training programme been done to allow you to do your mission in the 1st stage in 100 million SIHA campaign? 3. Did you play any role to motivate citizens to check-up?	Exploring the application for intervention tools Exploring if the shove technique was planned
4. How did you train your employees (team) to do their role? 5. Have you ever heard in your training about that the campaign card will be necessary to renew your official documents?	Understand the perceived successful factors and choice architecture
- 5.A if/no how did you hear about the campaign? - 5.B if/yes did you tell your employees (team) to use this piece of information?	Understand the perceived impact of the choice architecture
- 6. Out of your experience from the report and feedback from your employees, what was the main reason for citizens to check-up? A. Free check-up B. The campaign cards. C. Medical teams	Understand the perceived impact of choice architecture
Questions: First line	
1. How did you train to do your role in the campaign? • Reach citizens. • Check-up and protection	Explore the perceived successful factors of the campaign
2. What was your role to motivate citizens? 3. Out of your experience from interacting with citizens, what are the reasons for them to come to checkup?	Understand the perceived successful factors of the campaign and choice architecture
A) They need the paper to renew their IDs. B) It's a free checkup with paid medicine. C) Medical team	Understand the perceived impact of the choice architecture.
4. Out of your experience from the training that you had, have you ever heard about the importance of the campaign card to renew the official papers? 5. Have you ever motivated citizens to checkup by using the information of the campaign card?	Understand the perceived impact of choice architecture

3.7.4. Ethical Issues

Ethical considerations play a crucial role in the collection and reporting of data in studies using the qualitative research approach, the commitment makes it possible for the inquiry to take the study participants' needs, rights, values, and preferences into account (Creswell, 2003). Consequently, to safeguard the interviewee's rights throughout the data-gathering process, this study has addressed these issues. The University of Minho's ethical norms and procedures were adhered to in this investigation. Before beginning the interviews, the researcher formally and orally described the goal of the study and the expectations for the interviewee; additionally, the researcher stressed that the interview might conclude whenever the subject felt uncomfortable and provided examples of the private conditions that would be considered.

3.7.5. Conducting interviews

There are two major drawbacks to conducting interviews: participants may be reluctant to talk openly in front of a researcher, and they may embellish certain parts of the conversation; shifting the attention to the person's motive for change is the goal of the strategies of "change talk" (arguments for a change) and "sustain talk" reduction (arguments for preserving the status quo). Here are a few instances (Hardcastle et al., 2015):

Running head start: This technique involves the counsellor asking open-ended questions to explore the perceived benefits or advantages of maintaining the current behaviour (status quo). Understanding the individual's perspective on the positive aspects of their behaviour becomes a starting point for further exploration.

Looking forward: This technique involves helping the individual envision a future where they have successfully made positive changes to their behaviour. Discussing the potential benefits and positive outcomes of change can increase motivation and willingness to consider alternative behaviours.

Values exploration: This technique focuses on identifying and discussing the individual's values relevant to their health and well-being. Connecting behaviour change with deeply held values can enhance motivation and create a sense of alignment between their aspirations and actions.

3.7.6. Population and Sampling

This study focused on the Cairo and Menoufia populations. The most important target for the research is to find out the technique that was used in the first stage of the 100 million Siha campaign to help it achieve its target. As the population in Menoufia was easy to access, most of the interviews were from the Menoufia governorate and Cairo.

In qualitative investigations, "The intent is not to generalise to a population, but to develop an in-depth exploration of a central phenomenon" (Creswell et al., 2011, p.203). The easiest way to accomplish this process is to use a deliberate sampling technique. Purposive sampling, sometimes called judgmental sampling, will be used in this qualitative investigation (Etikan, 2017). A non-random strategy called purposeful sampling necessitates that the researcher finds suitable participants who can supply the information for which kinds. Studying the population is necessary (Bernard, 2017). In qualitative research, purposeful sampling is increasingly used to highlight how it may help gather deep insights from the best sample when the number of participants is not predetermined. The interview sample size was determined by applying the theoretical saturation criterion. Interviewing people until a particular point at which no more novel subjects' surface from the interviews is referred to as reaching a saturation level (Bowen, 2008; B. Saunders et al., 2018).

3.7.7. Interviewees Profile

14 interviews were conducted with health professionals and one policymaker of the Egyptian health minister from different levels of management. Table (3) shows the interviewees' traits and the interview duration.

Table 3: Description of The Interviewee's Profile.

Number	Respondents	Position	Major	Place	Duration
1	P1: Dr. Shaimaa Tahoon	one of the supervisors on the campaign - middle manager	Pharmacy	Menoufia	25 mins
2	P2: Dr. Doaa Elbattrawy	Manager of the west Clinique (health unit) - middle manager	Medicine	Menoufia	22 mins
3	P3: Ms. Doaa Lotfy	Head of Nursing (kafr Tanbadi health unit) - first line manager.	Nursing	Menoufia	30 mins
4	P4: Ms. Asha	Head of the community leaders in the health units - first line manager	Head of nursing Public service	Menoufia	37 mins
5	P5: Dr. Bassant kalila	One of the supervisors on the campaign - middle manager.	Pharmacy	Menoufia	40 mins
6	P6: Dr. Rasha Ahmed	Coordinator in 100 million SIHA campaign	Medicine	Menoufia	30 mins
7	P7: Dr. Mona Fathy	Coordinator in 100 million SIHA campaign	Pharmacy	Menoufia	25 mins
8	P8: Dr. Ola Saeed	Supervisors on health units	Medicine	Menoufia	30 mins
9	P9: Dr. Doaa sherif	Pharmacy in the campaign team	Pharmacy	Menoufia	20 mins
10	P10: Dr. Sara Mohamed	Pharmacy in the campaign team	Pharmacy	Menoufia	15 mins
11	P11: Dr. Manar Mohamed	Pharmacy in the campaign team	Pharmacy	Menoufia	20 mins
12	P12: Dr. Walaa Fathy	Supervisors on the campaign	pharmacy	Menoufia	30 mins
13	P13: Ms. Samia	Head of nursing in the campaign	Nursing	Menoufia	40 mins
14	P14: Dr. Saher Zayed	Assistant for the health minister in Giza district	Health minister assistant Medicine	Cairo	20 mins

3.7.8. Data analysis

Thematic analysis was used to understand the data by grouping replies into themes. Most interview questions included yes-or-no responses, making them open-ended. To conduct a thematic analysis, the researcher divided it into three themes: exploring the application of intervention tools to improve public health, understanding the perceived successful factors and choice architecture to improve public health, and the perceived impact of the choice architecture for improving public health. Through the identification of patterns in the participants' responses, the data might be understood on a deeper level. This method made it clear from the interviewees' comments that a sizable portion of them were in favour of using choice architecture. The thematic analysis went beyond simple descriptive statistics to unearth significant patterns and interpretations, summarising the data and offering insights into the underlying consensus among participants.

3.8. Study2:

3.8.1. Research objective

Researchers can analyse attitudes and behaviours, estimate the number of customers using a service or product, document trends, discover more about a population's demographics, and provide anecdotal evidence by using quantitative research (Moradi, 2021). Hence, the study aims to explain the relationship between the choice architecture as a shove campaign by using variables of HBM and Egyptian health behaviours and understand whether the demographics could impact health behaviours. Also, it included questions on their exposure to various social marketing campaigns and techniques, including choice architecture and community leadership (Allen, Titsworth, & Hunt, 2013).

3.8.2. Research design

This study follows a quantitative approach, the postpositivist worldview uses pre-and post-test assessments of attitudes and an experimental approach to the inquiry (Creswell et al., 2011). In this instance, the researcher examines a hypothesis by establishing specific hypotheses and obtaining data to support or refute them. The data are gathered using a tool that measures attitudes and analysed using statistical methods and hypothesis testing (Creswell et al., 2011). It is a way to test objective hypotheses by looking at how variables relate to one another. It is then possible to measure these factors, usually on instruments, to enable statistical examination of numbered data; participants in this type of research have preconceived notions about how to test theories deductively (Moradi, 2021).

Survey research investigates a population sample to generate a numerical or quantitative description of its beliefs, attitudes, or trends. It includes cross-sectional and longitudinal research that gathers data through structured surveys or interviews (Creswell et al., 2011) to extrapolate results from a sample to the entire population.

3.8.3. Sampling

Selecting a representative subset of the population to participate in a study is known as sample design, and it is an essential feature of high-quality research. To determine the characteristics of the

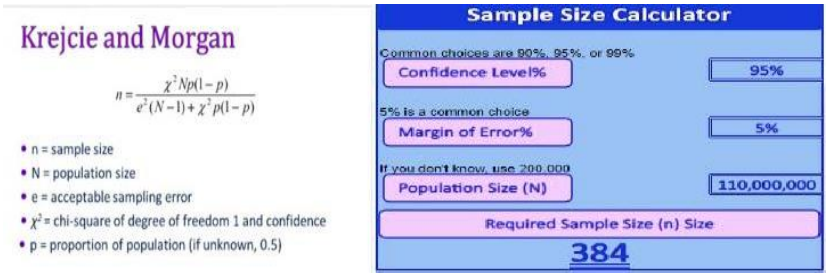
complete population and make statistical inferences, sampling is the process of choosing people or groups from the population; in market research, researchers commonly employ various sampling techniques, enabling them to obtain insightful information without polling the entire community. This method is a crucial cornerstone of any research design since it is economical and time-efficient (Neuman, 2014).

Sampling is the process of taking units from a population to be researched and extrapolating the findings to a larger population set (Creswell et al., 2011). Etikan (2017) declared that there are two categories of sampling techniques: non-probability sampling and probability sampling. A sampling frame, or a list containing the names of all the population members, is needed for probability sampling. Nevertheless, obtaining such a list can be challenging in some investigations. Consequently, the non-probability method was applied. When using non-probability sampling, the researcher must choose the study subjects based on relevant criteria. Hence, providing an equal chance in units of the population under investigation is not a concern of non-probability selection.

For the study, a convenient nonprobability sample has been used. Convenience sampling produces valuable information when convenience sampling studies should control and evaluate the survey sample's representativeness to minimise selection bias and increase the study's utility. Finally, using larger samples is one strategy for adding additional data. Larger is often better when it comes to sample size (Skowronek & Duerr, 2009).

Therefore, the sample will be all the Egyptians and non-Egyptians who lived in Egypt during the last five years and attended the first stage of the 100 million SIHA campaign in Egypt and their age from 18+, because it was offering the health check-ups to all the people in Egypt, who can fill the questionnaire and convenient for them; the minimum sample size will be 384 participants from different categories, or different levels of education, social standards, levels of income, different age groups and places of living (see Fig.6).

Figure 6: Sample size calculator.



The questionnaire was distributed online according to Google Forms, through social media, and in health care units in two cities in Egypt (Cairo and Menoufia) to meet part of the sample that does not usually use the internet. The researcher applied the questionnaire face-to-face to provide variety in the sample and to be able to ask about the different levels of income, education, and social standards.

The sample size for this study is 726 participants, including Egyptians and non-Egyptians who have lived in Egypt for the last 5 years, ages 18+ and, from different income and educational levels.
The sample was divided into 3 parts:

First part: the citizens who heard about the campaign and did the check-up.

Second part: the citizens who heard about the campaign and did not do the check-up.

The third part: the citizens who have not heard about the campaign.

3.8.4. Method of Data Collection:

The research used quantitative research to measure the relationship between the variables of the health belief model and shove campaign to improve health behaviour, by using the survey to ask the sample about the campaign and understand their intention and motivations, to be able to know why they did or did not do the action (health check-up), then being able to have sustainable health behaviour. A 5-point Likert scale questionnaire, with 1 denoting "strongly agree" and 5 denoting "strongly disagree," was used to perform a cross-sectional survey; age, income, education level, and gender were among the three sociodemographic profile-focused sections of the questionnaire (Neuman, 2014). The understanding and effects of social marketing interventions on health check-up behaviours and the HBM constructs perceived vulnerability, severity, advantages, barriers, self-efficacy, and cues to action were assessed in Sections 2 and 3 (Tweneboah Koduah, 2018).

The questionnaire used five-point Likert scale questions for a variety of reasons: The 5-point Likert scale is simple to understand and use for survey administrators and respondents alike. It takes less time and effort to complete than higher-point scales. It fits mobile device screens better than higher-point scales. Five-point Likert scale questions were used in the survey for several reasons: both survey administrators and respondents will find the 5-point Likert scale easy to use and comprehend; compared to higher-point scales, it requires less time and effort to complete; andi better fits the screens of mobile devices than higher-point scales (Neuman, 2014).

The survey was pre-tested; first to be distributed to the experts and get feedback and comments to improve it if they do not understand it, to make it convenient for the research, and then translated from English to Arabic by an expert translator. The following table presents the questionnaire statements used to measure the research variables.

Table 4: Questionnaire Statements

Research Variable	Statements
Cues to Action	I felt better or good physically after beginning to take-action.
	I follow specific advice from the health care provider.
	I saw an advertisement or service related to this health campaign.
	I found out about the campaign card through the health provider or community leaders working in the health services.
Perceived Severity	I was afraid of virus C because it caused the death of so many people.
	I have no willingness to undergo any check-up or visit the doctor unless there is a sever case.
Perceived Susceptibility	I worry a lot about getting chronic diseases because of my family history.
	It is likely that I will get virus C.
	It is likely that I will get high blood pressure.
Perceived Barriers	Having the check-up outside the campaign is expensive.
	I had no intention to afford the check-up or the medical care.
	Having the check-up outside the campaign takes too much time.
	I underwent the check-up because it was for free.
Perceived Benefits	If I did the checkup, so it could be easier for me to receive the campaign card.
	I underwent the checkup, so I could be reassured that I have no chronic diseases.
	Having the check-up during the campaign was the best way for me to get access to free medical care.
	I wanted to get the check-up over with to continue my daily life routine.
	Having the check-up will decrease my chances of dying from hepatitis C virus.
Motivation to Check-Ups	The quality of the medical care encouraged me to do the check-up.
	Convenient location for doing the check-up, (home or work).
	I was afraid of not being able to renew my official papers without the campaign card.
	I was motivated by the health community leaders.
	I am afraid of potential health problems.
	I like that it costs nothing to undergo the check-up.
	I was encouraged by friends and family.
	I wanted to know my health condition.
Filter questions	Did you hear about 100 million SIHA campaign?
	Have you ever heard that you would need the campaign card to renew your official papers (passport\ ID\ driving license)?
	Did you have the check-ups during the campaign?

3.8.5. Data analysis methods:

The statistical equation refers to a mathematical relationship or formula used in statistical analysis to describe the relationship among variables or to estimate parameters. The specific form of the equation depends on the statistical model or method being used. Statistical equations are commonly used in different analyses of multiple regression equations, ANOVA equations and chi-square

test independence. The researcher will use the structural equation model, a statistical technique that can be used to analyse the relationship between a single dependent variable and several independent variables. Even more, the model does not have a mediating variable and has a moderation variable. Additionally, the benefits of quantitative research include the ability to generalise results to a particular population, the size of data sets, the fact that results are representative of a population, the ability to share and replicate documentation of the research framework and methods, and the ability to replicate studies over time through standardised approaches (Allen et al., 2013).

Analysing the underlying causes of motivated or pre-contemplative states about health habits and how interventions could specifically target them should be the first step in increasing the effectiveness of interventions for uninspired people. When working with people who are less driven to change, relational motivational interviewing approaches, such as reframing, overshooting, coming alongside, shifting focus, and emphasising autonomy, may be helpful (Hardcastle et al., 2015). It is important to recognise and understand the influence of cues in the environment and the reward-based outcomes associated with unhealthy behaviours, such as unhealthy eating, smoking, and excessive alcohol consumption. These behaviours are often reinforced by the dopaminergic pathways in the brain, making them powerful and difficult to override through conscious control alone. It requires significant cognitive resources and motivation to overcome these strong neural associations between cues and actions (Hardcastle et al., 2015).

3.8.6. Summary of Research Design Phase1:

Qualitative Research Approach “Study I”: The purpose of phase I is to answer the question: "What are successful factors perceived by health professionals and a policymakers to design an effective social marketing campaign in developing countries?" To explore how the first stage of the 100 million SIHA campaign worked and how it achieved its target, we seek to understand the factors the Egyptian government has used to impact desired health behaviours (doing the check-up).

Data Collection Method: Semi-structured interviews.

Sample size: Interviews continued until the point of data saturation, which is reached when no more fresh insights can be obtained from the data (Bowen, 2008). We used "purposeful sampling," which calls for the selection of pertinent individuals who are willing to assist in providing data appropriate for the research (Bernard, 2002).

Time Horizon: April to June 2021. Cross-sectional: The information was collected over a few months.

Phase2:

Quantitative Research Approach "Study II": The purpose of phase II is descriptive - to measure through the health belief model (HBM) the effectiveness of the shove form of social marketing under the umbrella of the choice architecture by social marketers in Egypt on changing Egyptian health behaviours. The study aimed to measure the effect of using HBM variables on improving health behaviours in Egypt. Furthermore, the research aimed to understand the impact of age, income, education level and gender among the variables.

Data Collection Method: Online and face-to-face questionnaires were a dministrated.

Sample size: A target of 384 responders was set. According to Krejice and Morgan (1970), if the population was infinite, then this number of questionnaires was employed. Convenient sampling is a cost-effective sampling option that provides convenient access to the sample under study. Because of this sampling, the study must contact people who are representative of the group under study (Hameed: Taherdoost, 2016) and are accessible and approachable. **Time Horizon:** July and August 2023 Cross-sectional (The data was gathered just one time). **Population:** The research was conducted in Egypt. This decision was made for obvious practical reasons-the researcher is situated here-but it was also a pertinent one, considering Egypt as one of the biggest developing countries which is suffering from virus C and chronic diseases.

Table 5: Conceptual and Operational Definitions of the Variables

Variable	Conceptual definition	Operational Scales
Cues to Action	Cues to action are when an individual feels the desire to take the necessary action after believing that one can do so.	(Jones et al, 2000; Kumar & Preetha, 2012; Tarkang & Zotor, 2015)
Perceived Severity	Perceived severity is the feeling about the seriousness of illness or consequences if the illness is untreated, including both medical and clinical consequences (such as death, disability and pain) and possible social consequences (effect of the conditions on work, family life and social relations).	(Chin & Mansori, 2019; Hornsey, Chapman, Alvarez, et al., 2021; Tarkang & Zotor, 2015b; C. Wang et al., 2021)
Perceived Susceptibility	Perceived susceptibility: this refers to an individual's perception of their vulnerability to an illness or disease. It involves the assessment of personal risk and the likelihood of experiencing negative health outcomes.	(Champion, 1999)
Perceived Barriers	Perceived barriers depend on individual perception of the obstacle of behavioural change, so it could be in the cost of the product or service or perceiving risk or discomfort like feeling pain related to carrying out specific behaviours.	(Hornsey et al., 2021; Wang et al., 202; Champion, 2016)
Perceived Benefits	Perceived benefits refer to one's beliefs in the efficacy of the advised action to reduce the risk or seriousness of impact. Hence, perceived benefits are positive aspects perceived in the development of the protective behaviour	Suess, et al., 2022a; Choo et al., 1991; Champion, 2016)
Motivation to Check-Ups	Motivation as a trait characteristic. The predominant trait definition was based on definitions by Deci and Ryan (1980) and Cox (1982): the degree of need or drive for competency and self-determinism in health behaviours.	(M. J. Wang & Lo, 2022),
Demographic variables	Income, Gender, education and age have been the most widely used indicators of socioeconomic position, as they have been found to most clearly discriminate health behaviours and related biological risk factors.	Developed by the researcher based on the literature review

Based on the operationalisation of variables and the specific research setting, we present the operationalisation of the hypothese formulated in the context of the present research:

H1. Perceived susceptibility to chronic diseases impacts adopting the desired health behaviour

H2. Perceived severity of chronic diseases impacts adopting the desired health behaviour

2A: The family's health history impacts doing the check-up.

2B: Worrying about having chronic diseases without symptoms impacts doing the check-up.

H3. Perceived benefits impact the adoption the desired health behaviour

3A: The perceived benefits of free check-ups impact doing the check-up.

3B: The perceived benefits of having the campaign card impact doing the check-up.

3C: Benefits of free medical care impact doing the check-up.

3D: Having good care of virus C gives citizens more chances to live healthily, impacting their ability to do check-ups.

H4. Perceived barriers impact the adoption the desired health behaviour

4A: The high cost of health check-ups impacts doing check-ups.

4B: The high cost of medical care impacts doing the check-up.

4C: The time needed for Check-ups impacts doing the check-up.

H5. Cues to action impact the adoption the desired health behaviours

5A: Feeling better after the action impacts doing the check-up.

5B: Following the advice from the community leaders impacts doing the check-up.

5C: IS that impacted doing check-ups.

5D: Following the doctor's instructions to have a healthy life impact doing check-up.

H6. Motivation to health behaviours impacts adoption the desired health behaviour

6A: The quality of the medical care impacts the check-up.

6B: The convenient location to check up impacts doing the check-up.

H7. Moderating hypothesis:

H7: Demographics moderates the relationships between HBM and the desired health behaviours.

H7A: Demographics (Age, Income, Education and Gender) moderate the relationships between perceived susceptibility and doing the check.

H7B: Demographics (Age, Income, Education and Gender) moderate the relationships between perceived susceptibility and doing the check.

H7C: Demographics (Age, Income, Education and Gender) moderate the relationships between perceived susceptibility and doing the check.

H7D: Demographics (Age, Income, Education and Gender) moderate the relationships between perceived susceptibility and doing the check.

H7E: Demographics (Age, Income, Education and Gender) moderate the relationship between perceived barriers and health behaviours of citizens' check-ups.

H7F: Demographics (Age, Income, Education and Gender) moderate the relationship between cues to action and health behaviours of citizens' check-ups.

Data Analysis Techniques

1. Building Indicators

The equal weights method was applied, as no statement was prioritised over others. For each indicator, the scores of the related statements were summed and then divided by the number of those statements. It is a statistical technique that consolidates a group of related statements (or factors) into a single indicator. These indicators, organised in row form, are then used to address the hypotheses (Netemeyer et al., 2003).

2. Cronbach's Alpha

The internal consistency coefficient, which measures the percentage of total variance shared by all the items that make up the scale and is assumed to correlate to the underlying construct being measured, indicates the dependability of a scale. Cronbach's alpha has a range of values from 0 to 1, and the closer the alpha is to 1, the more stable the questionnaire is. More specifically, if Cronbach's alpha score exceeds 0.6, we may state that the questionnaire is reliable (Brunner & Süß, 2005).

3. Confirmatory Factor Analysis

This study examines how the variables relate to one another to determine whether they can be combined into a more manageable collection of baseline factors. This analysis will be used to evaluate the internal validity of the questionnaire.

The loadings in factor analysis explain how the factors relate to the observable variables. By analysing the factor loadings, you can determine how strongly each variable and each factor are related. Furthermore, you can determine which observed variables match a particular factor (Haque, 2022).

The amount of variance collected by a construct to the amount of variance caused by measurement error is measured by the average variance extracted (AVE) (Daniati et al., 2021). It is often used to evaluate discriminant validity using the following "rule of thumb": the positive square root of each latent variable's AVE must be higher than its highest correlation with other latent variables (Brunner & Süß, 2005). In this case, discriminant validity is established at the construct level.

4. Correlation Analysis

The Pearson correlation coefficient is used in this study to quantify the correlation between two numerical variables to determine the direction and intensity of the relationship between the variables. A positive coefficient indicates a direct association, whereas a negative coefficient indicates an inverse relationship (Haque, 2022). This coefficient takes values between -1 and 1, where the relationship is considered weak if the absolute value of the coefficient is between 0 and 0.3, and it is considered moderate if the value is between 0.3 and 0.7 and substantial if the value is greater than 0.7 (Holman, 1966). Finally, we decide whether there is a significant relationship at 95% confidence or not by comparing the p-value to the 5% significance level.

5. Normality Test

A normality test is used to examine the variable distribution scale. If the variables are normally distributed, a parametric test will be applied, but if they are not normally distributed, then a non-parametric test will be used for the inferential statistics; the null hypothesis of these tests is that data follows a normal distribution so if the significance value is less than 0.05, then the normality of the data will be rejected and vice versa the research study sample size which is above 30 to 50 participants can run parametric tests, especially in multivariate research (Bougie, 2019).

For example, the Shapiro-Wilk test is frequently used to determine whether a sample is drawn from a normal distribution, and confirming normality is a necessary precondition for many statistical tests; in the **Shapiro-Wilk** test, the null hypothesis (H0) assumes that the sample is drawn from a normally distributed population; in the **Kolmogorov-Smirnov** test, the empirical cumulative distribution function (ECDF) of the sample data is compared with the expected normal distribution, and if the difference is significant enough, the null hypothesis of normality is rejected (Andy, 2013). If the p-value of this test is less than the chosen α, the null hypothesis can be rejected and it can be concluded that the population is not normal (Green & Salkind, 2005).

6. Structural Equation Modeling

Structural equation modelling (SEM) addresses concerns about mediator variable models. This statistical technique assesses the hierarchical relationship between a few variables. The "path analysis"

graphical tool is used to check a model for mediating influence. Like every model, its effectiveness must be confirmed (Hair et al., 2021; Peugh & Feldon, 2020).

There are several primary methods by which structural models may be estimated, namely: maximum likelihood (ML) estimation, weighted least squares (WLS) or asymptotically distribution-free (ADF) methods. For robustness, we use a distribution-free method where the results are the same, so we use the distribution-free method to avoid the non-normality of the data. The significance of the paths is determined according to the p-values, while the path's effect is determined according to the regression coefficient (Hair et al., 2021; Peugh & Feldon, 2020). As with any model, the efficiency of the model must be checked, and this is done using the goodness of fit measures:

- Incremental Fit Index (IFI): It varies from 0 to 1 with 1 being a perfect fit,
- Relative Fit Index: It varies from 0 to 1 with 1 being a perfect fit,
- Comparative Fit Index (CFI): If a CFI close to 1 indicates a very good fit,
- Normed Fit Index (NFI): It ranges between 0 and 1, and a model with a perfect fit would produce an NFI of 1,
- Turker-Lewis Index (TLI): It ranges between 0 and 1, and a model with a perfect fit would produce a TLI of 1,
- Root Mean Square Error (RMESA): The model is a good fit with RMESA less than 0.05. The software packages used for analysis are SPSS and AMOS.

3.9. Summary and Conclusion

This chapter reports on the application of a mixed research approach. Two empirical studies were carried out using this methodology. The data were subjected to theme analysis in the empirical study I, a qualitative research approach that employed semi-structured interviews. The findings of the qualitative research provided important new information about the examination of effective elements that the Egyptian government has employed. These realisations led to modifications in the created model, which will now be examined in more detail in Empirical Study II. To test the effectiveness of employing health belief model variables under the shove campaign while moderating this link by the demographic variables, the second empirical study looked at the model and the emerging research hypotheses. The results of the research, both qualitative and quantitative, are presented in the following chapters.

4. Chapter 4: Findings and discussion of study I

4.1. Introduction

In this chapter, thematic analysis was used to determine the main ideas or themes of the study based on the qualitative data gathered from semi-structured interviews. The qualitative data analysis is the study exploring if tools of choice architecture can be considered as a successful factor that is perceived by the policy maker and health professional in public health behaviours in developing countries. So, we evaluated the first phase of one of Egypt's most extensive public health campaigns to improve the population's public health. The researcher was interested in the interviewees' health professionals and policymakers because first-line managers are the people who are on the front line and interact with the citizens. In contrast, the middle managers were responsible for training the first-line managers on the campaign objectives to be done and informed by the high management of the plan that was happening during the campaign. They can analyse the citizens' behaviours and why and where most of the citizens did the check-up. The interview with the policymaker was to discover if the health minister in Egypt was prepared to use the shove campaign and how they applied it. That will help to achieve the study I objective by exploring the successful factors perceived by health professionals and policymakers.

The following research questions are the main emphasis of this study:

- **RQ1**: What are policymakers' reflections on designing an effective social marketing campaign in developing countries?
- **RQ2**: What is the effectiveness of a social marketing campaign using shove as a form of choice architecture with health belief model variables?

4.2. Exploring the application of intervention tools to improve public health

The main objective of the question is to understand the health professionals' role in encouraging citizens to do health check-ups or the medical part. Most of the respondents (9 out of 10 participants) mentioned their role in increasing awareness among Egyptian citizens. The questions for this code have been asked about how the participants used to motivate citizens and about the training process the first-line managers, community leaders, and middle-line managers had already taken (Quigley, 2013).

That agrees with the responses; for example, interviewee 4: Miss Aisha, Team leader for the community leaders, stated: *''We were increasing awareness about hepatitis C''*

Interviewee 11: Dr. Manar Mohamed, a pharmacist in the campaign team stated: *"Yes, I motivated citizens, and I even reached to their homes to talk to them".* Only one of the first-line managers mentioned that she did not have any role in motivating citizens when only one of the middle managers out of three participants said that yes, she had a role in motivating critics.

Interviewee 5 Dr. Bassant Kalila, one of the supervisors on the campaign - middle manager, stated: *''Yes, I played a role in motivating citizens to check up by taking the medical team to the factories in my services area and informing the workers there they will need the campaign card, plus the high traffic on the campaign because it offered a free check-up'.*

They were also asked whether they had been informed that using the information on the campaign card was required to renew their official papers. They used this piece of information to convince the citizens to do the check-up. The context in which we make decisions is referred to as choice architecture (Quigley, 2013). Five out of nine first-line managers and community leaders mentioned that they were informed to use this information to motivate citizens to achieve the campaign target in their training program. Interviewee 2, Dr Doaa Elbattrawy, a doctor responsible for data entry, confirmed that: *"Yes, I have been informed in my training to use this piece of information to motivate more people to come and check-up, and even with that, I needed the campaign card to renew my driving license."*

Moreover, two of the middle managers said that it was the community leaders' role, and the only function they had was training the first line and making an agreement with corporate to achieve the campaign target. The significance of community leaders in social marketing is particularly evident in the public health sector, where community participation has been emphasised as a crucial component of primary health care. Answers pointed to the role of community leaders in achieving the desired health behaviour. For example, interviewee 4: Miss Aisha, team leader for the community leaders, stated: *"The role of the community leaders was as important as the role of medical teams to achieve the campaign target or maybe was more important because the community leaders were one of the people and all the people trusted her, and she used to go to their houses to encourage them to check up their health and telling them the benefits of the campaign, as it was the free medical care and the importance of having the campaign card allowed them to travel abroad to work easily and renew their official papers."*

Accordingly, community leaders significantly impact awareness and individual behaviour. This is consistent with the findings of McMahon et al., (2017), who discussed the events of the Ebola epidemic

in Sierra Leone in 2014–2015. The significance of community leaders in social marketing is particularly evident in the public health sector, where community participation has been emphasised as a crucial component of primary health care.

Even more, the importance of community leaders shows more significance in low-income countries because these countries rely on community volunteers and health committee members to support the formal health system by engaging in health services, such as referrals and health education, proving the importance of their role (El-Akel et al., 2017). Answers pointed to the role of community leaders in achieving the desired health behaviour. For example, interviewee 4: Miss Aisha, team leader for the community leaders, stated: *"The role of the community leaders was as important as the role of medical teams to achieve the campaign target or maybe was more important because the community leaders were one of the people and all the people trusted her, and she used to go to their houses to encourage them to check up their health and tell them the benefits of the campaign, as it was the free medical care and the importance of having the campaign card to allow them to travel abroad to work easily and renew their official papers."* As the interviewees' responses mentioned, they motivated citizens by using campaign card rumours. They also mentioned that the traffic on the campaign was very high because they offered free medical care, too.

4.3. Understand the perceived successful factors and choice architecture to improve public health

Questions about success factors were given to the interviewees by asking them questions and letting them choose one or two or all and explain why, out of their experience, most of the achieved targets came to check-ups. Most of the answers for the first line and middle managers were selected. A (free check-up & medical care), B (campaign card to renew the official papers), which represents the shove concept, C (Medical Teams); 5 out of the 13 answers selected (A) as the main reason that leads the citizens to come to do the check-up, which agrees with what mentioned previously in literature clinical intervention represented ongoing clinical interventions (Frieden 2010) when 7 out of 13 noted that A/B most of them explained that most of the citizens came because they offered very good medical care. However, it did not achieve the campaign target, so the health professionals had to use the rumour of the campaign card to motivate citizens to have check-ups. They mentioned that most young male citizens attended check-ups to get the campaign card. And only 1 out of 13 interviewees chose B.

Interviewee 10: Dr Sara Mohamed, a pharmacist in the campaign team, stated: *''The rumour of the campaign card was the main reason for young males to come to check-up and we even used it at the end of the first stage of the campaign to achieve the campaign's target''*

Choice architecture is frequently used interchangeably with terms like behavioural economics, libertarian paternalism, nudging, and pushing (Bucher et al., 2016). Non- regulatory behavioural interventions may include providing information to encourage rational decision-making, altering the physical environment (e.g., lighting, décor, or item placement), modifying default options (e.g., pre-portioned salad servings versus self-serve salad bowls), and leveraging social norms and salience (Bucher et al., 2016). That agrees with what the first-line managers explained: A / were the two reasons behind the success they mentioned. For example, Interviewee 1, Dr Shaimaa Tahoon, one of the supervisors on the campaign, stated: *"Most of the old and low-income people came to check up and make sure that they are okay when the youth and males in low-income people came to be able to renew their official papers to allow them to work as microbus drivers and renew their passports to work abroad. Also, I cannot identify which reason of these two was the most important as the two reasons were essential and mentioned by citizens who came to check-up themselves",* and Interviewee 3, Doaa Lotfy, Head of Nursing (Kafr Tanbadi health unit), first line confirmed: *"Most older people came to have the benefit of free check-ups when most of the youth people their target was the campaign card".* Interviewee 4, Ms. Aisha, Head of the community leaders in the health unit, first line manager, confirmed: *"The majority of the citizens come to check-up because they need the campaign card".* Also, Interviewee 7, Dr Mona Fathy, Coordinator in 100 million Siha campaign, confirmed: *"At the end of the campaign, most of us used the rumour of the campaign card to achieve the campaign target when most of the older people came to have free check-up"*

Because social marketing campaigns are expensive, some people have resorted to a less expensive method of behaviour modification: choice architecture, which predictably modifies people's behaviour without significantly altering their economic incentives or prohibiting any options (Eltahir & Xing, 2021) and is assumed to have their effect because people are sensitive to social norms when social marketing has arguably the instrument of choice for governments seeking to persuade citizens (Mols et al., 2015). The literature review suggested that the choice architecture approach encompasses using choice architecture principles by policymakers and healthcare providers to enhance the attractiveness and accessibility of health behaviour for the target population (Mills & Sætra, 2022). Behavioural science methods are being used by governments more and more to influence people's conduct to achieve policy goals. Governments are changing people's choices through various choice architecture

interventions without using force or making major adjustments to financial incentives (Benartzi et al., 2017). Moreover, that is what Interviewee 14, Dr Saher Zayed, head of the health office in Giza, a policy maker, confirmed:

> *"All government organisations were working to achieve the campaign target because it was the first health campaign under the name of the Egyptian president and it had to reach its target; that is why choice architecture as a shove concept was one of the social marketing tools that the government relied on to achieve its target because shove help policymakers to achieve their target by giving the individual a restricted choice."*

Dr. Saher meant that, when they discovered the importance of community leaders' role in influencing health behaviours in Egypt's small towns and villages, they found that because people trusted them since they are usually people from these towns, they could affect people's behaviours more than ads on television and radio.

4.4. Understand the perceived impact of the choice architecture for Improving Public Health

The questions for this code were asked whether they had been informed that using the information of the campaign card was required to renew their official papers. Thaler & Sunstein (2008) mentioned that choice architecture is one of the powerful mechanisms that policymakers can use because it alters choice architecture by shifting the default position to maximise social welfare. Choice architecture refers to the context in which we choose and make decisions (Quigley, 2013). Five out of nine first-line managers and community leaders mentioned that they were informed to use this information to motivate citizens to achieve the campaign target in their training programme. This piece of information was confirmed by Interviewee 5: Dr Basant Kalila, one of the supervisors on the campaign, middle manager, stated: *"We have been informed by the head office in the health minister to inform citizens about the importance of having the campaign card to be able to renew their official papers"*

Choice architecture is a favourable intervention because it maintains the freedom to choose (Thaler, 2008). Both choice architecture and paternalism are intervention tools that could impact behaviours. Still, they are different in the way of use, so some public health campaigns prefer paternalism because they mainly target improving the citizens' health. However, if choice architecture adopts a nudge strategy, paternalism adopts a shove, and all these tools social marketers can use to improve

citizens' health behaviours, as Grill (2012) mentioned, the governments usually use paternalism when it comes to citizens' health.

The health professionals used the information on the campaign card to convince the citizens to do the check-up. That was confirmed by Interviewee 2, Dr Doaa Elbattrawy, a doctor who was responsible for data entry, who stated: *"Yes, I have been informed in my training to use this information to motivate more people to come for and check-up, and even with that, I needed the campaign card to renew my driving license."*

Moreover, to understand whether this was a choice architecture from the policymakers, the question for the policymaker was to explore if the information that the campaign card was needed for official purposes was deliberate within the choice architecture approach to change Egyptian citizens' health behaviours. Persuasion can be used by policymakers, and governments have used social marketing as a means of persuading citizens, but the main issue with social marketing campaigns is their high cost. This may be why some have resorted to a less expensive method of behaviour modification: choice architecture, which modifies people's behaviour predictably without eliminating options or drastically altering their financial incentives (Eltahir & Xing, 2021). That agrees with what interviewee 14, Dr Saher Zayed, head of the health office in Giza, who stated: *"Yes, I have been informed of this piece of information, and we had to inform our employees to use it, but I do not know if it was part of the minister's plan or not"*

Choice architecture has been shown to impact many health campaigns worldwide (Meder et al., 2018) but measuring that impact in Egypt is unclear. That is why the research explored the successful factors of the social marketing campaign in public health by using choice architecture and asking the interviewees if they used this tool to improve the citizens' check-ups.

We discovered that choice architecture was representative of the campaign card's rumour as a motivation for citizens to do the health check-up because the campaign card was very important to renewing national ID, passport and driving license, and it was one of the social marketing tools used in the first stage of the 100 million SIHA campaign. Findings suggest that using the campaign card's rumour (shove technique) played a role in motivating Egyptian citizens to check up. Moreover, the researcher discovered the impact of choice architecture on citizens' behaviours and the huge impact of using it from the policy maker, which can lead the policy maker to develop or improve any behaviours by using a cheap and affordable tool for the government in developing country.

The interviews provided empirical evidence that choice architecture was one of the factors the Egyptian government has applied to improve health behaviours and contributed to the campaign's success. After interviewing one policymaker and thirteen health professionals in the Egyptian health ministry, the study discusses the successful factors health professionals and policymakers perceive in designing an effective social marketing campaign in developing countries. The results of the exploratory research suggest that choice architecture was a deliberate technique used to achieve the desired behaviours of the campaign. The results suggest that choice architecture as a shove is an accessible and affordable instrument that can be used by policymakers to shape or modify a variety of behaviours effectively, and this is very useful for governments in developing countries.

Summary of Chapter 4

This chapter employs thematic analysis to explore the role of choice architecture in shaping public health behaviours in developing countries, focusing on Egypt's most significant health campaign. The study examines perspectives from policymakers and health professionals, particularly first-line and middle managers, who played a crucial role in citizen engagement and campaign implementation. Key research questions include identifying critical factors for effective social marketing campaigns and assessing the impact of the "shove" technique, a form of choice architecture within the Health Belief Model framework.

The findings highlight that health professionals were responsible for medical services and actively involved in raising awareness and motivating citizens to participate in health check- ups. Community leaders played a vital role in motivating the public, as their trustworthiness and close connections with the local populations enhanced campaign outreach. A significant factor influencing citizen participation was using the campaign card, which was rumoured necessary for renewing official documents such as passports and driving licenses. This "shove" strategy, aimed at subtly guiding behaviour without eliminating choices, proved an effective social marketing tool.

Interview responses indicate that policymakers intentionally leveraged choice architecture to maximise participation, offering a cost-effective alternative to traditional social marketing campaigns. The study also underscores the broader impact of behavioural economics in public health, suggesting that such interventions can be particularly beneficial in resource- constrained settings. Ultimately, the research concludes that choice architecture, mainly using the campaign card, was instrumental in

driving behavioural change and could serve as a model for future public health initiatives in developing countries.

5. Chapter 5: Findings and discussion of study II

5.1. Introduction

This section presents the findings of empirical research II. Study Two's objective is to find out how effectively choice architecture and the Health Belief Model (HBM) work together. The purpose of this study is to investigate how citizens' behaviours may be affected by and improved through the combination of these two frameworks. Through an analysis of this synergy, the study will shed light on whether the HBM can effectively influence public behaviour when combined with choice architecture.

According to Google Forms as mentioned in the methodology chapter, 800 people clicked on the link to the survey, which was posted on several social media groups. Only 726 questionnaires were finished, however. The data analysis is presented in this chapter, together with descriptive analysis (central tendency, dispersion, percentiles, etc.), validity analysis, reliability analysis, and the use of the SEM structural equation model to test hypotheses.

5.2. Sample demographics

The respondents in this study came from a variety of sociodemographic backgrounds, including age, gender, and city of residence. This part will tackle the research sample socio- demographic characteristics of the selected sample. Table 6 below presents an overview of the characteristics of the participants in terms of frequency and percentage. Female participants represent 61.4% of the sample while their male counterparts are 38.6% of the participants. Regarding age, only 20.8% of survey participants are aged from 18 to less than 28 years old, followed by 37.5% of the participants aged from 28 to less than 38 years old, 23.1% of the participants aged from 38 to less than 48 years old, 8.3% of the participants aged from 48 to less than 58 years old and finally 10.3% of the participants aged 58 years old or above. Regarding the education level, only 25.5% of survey participants had pursued a middle education, followed by 43.5% of the participants who had pursued a university education, 24.8% of the participants had pursued a higher education, while 6.2% of the respondents had pursued other educations.

Table 6: Description of Demographic Characteristics of The Participant (n=726).

Variable		Frequency	Percentage
gender			
	female	446	61.4%
	male	280	38.6%
age			
	from 18 to less than 28	151	20.8%
	from 28 to less than 38	272	37.5%
	from 38 to less than 48	168	23.1%
	from 48 to less than 58	60	8.3%
	58 and above	75	10.3%
educational level			
	middle education	185	25.5%
	university education	316	43.5%
	high education	180	24.8%
	other	45	6.2%
income			
	from 2000 to less than 4000	233	32.1%
	from 4000 to less than 6000	163	22.5%
	from 6000 to less than 8000	69	9.5%
	from 8000 to less than 10000	78	10.7%
	10000 and above	183	25.2%

5.3. Assessment of Normality

According to Sekaran (2003), the variable distribution scale is analysed using a normality test. A parametric test will be utilised if the variables are normally distributed; if not, a non-parametric test will be employed for the inferential statistics. In these tests, the null hypothesis is that the data are distributed normally; therefore, the data's normality will be rejected if the significance value is less than 0.05, and vice versa (Bougie, 2019).

The tests' results, shown in the following table, revealed that not all study variables were normally distributed because the significance value of those variables was below 0.05.

However, according to Sekaran (2003), a research study sample size of more than 30 to 50 participants can perform parametric tests, especially in multivariate research, as the valid sample size is 726 replies (Bougie, 2019). Additionally, suppose the study's sample size is big or moderate. The results may still show precision and accuracy, even though the parametric test may be violated when the data variables are regularly distributed (S. B. Green & Salkind, 2005).

Table 7: Normality Tests.

	Kolmogorov Smirnov			Shapiro-Wilk		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
Independent Variables						
Cues to Action	0.106	726	0.000	0.957	726	0.000
Health Motivation	0.078	726	0.000	0.963	726	0.000
Perceived Severity	0.122	726	0.000	0.951	726	0.000
Perceived Susceptibility	0.093	726	0.000	0.969	726	0.000
Perceived Barriers	0.138	726	0.000	0.934	726	0.000
Perceived Benefits	0.096	726	0.000	0.954	726	0.000
Dependent Variable						
Health behaviours to Check-Ups	0.106	726	0.000	0.936	726	0.000

The initial enquiries concern the participants' knowledge and actions regarding the campaign and shove concept: (1) Were you aware of the 100 million SIHA campaign? (2) Were you informed that you would require the campaign card to renew your official documents (passport, ID, and driver's license)? (3) Were you able to get checked out during the campaign? (4) Can you recall the date of your check-up? (5) Can you recall the location of your check-up? (6) If you were checked out by medical teams, where was it conducted? The outcomes are displayed in Table (8).

Results show that 92.1% heard about the 100 million SIHA campaign, 66.7% heard about the campaign card representative of the shove concept, 84.7% of the participants had the checkup, 52.9% had the checkup between January 2019 and April 2019, 46.6% had the checkup with the health team (Qwafal) in different places, and 43.5% had the checkup in their workplaces.

Table 8: Part of the Results

Sample	Frequency	Percentage
Do not hear	**57**	**7.9%**
Hear and did not do	**57**	**7.9%**
Heard and do	**612**	**84.3%**
Did you hear about 100 million SIHA campaign?		
Yes	669	92.1%
No	57	7.9%
Do you ever heard about that you will need the campaign card to renew your official papers?		
Yes	484	66.7%
No	242	33.3%
Did you have the check-ups during the campaign?		
Yes	615	84.7%
No	111	15.3%
Do you remember when did have the check-up?		
Between **October** 2018 and	342	47.1%
December 2018 between January 2019 and April 2019	384	52.9%
Do you remember where you had your check-up?		
health unit	313	43.1%
health team	338	46.6%
other	75	10.3%
If you have the check-up with the medical teams, do you remember where?		
at work	316	43.5%
near the home	167	23%
in the street	42	5.8%
in the club	159	21.9%
in a religion place	42	5.8%

5.4. Descriptive Statistics of Constructs

In research, descriptive statistics are used to organise and summarise data. With the aid of descriptive statistics, a study can more easily explain the relationship between the variables in a sample group (Blanca et al., 2013). In this section, the descriptive analysis is comprised of the following: Minimum, Maximum, Mean, Standard Deviation, and Coefficient of Variation for each statement (Table 9).

5.4.1. Cues to Action

The survey comprised **four** statements to measure the cues to action, where respondents tend on average to neutrally agree to these statements, as the mean values range from 2.5 to 3.5. The statement with the highest agreement is "I felt better or better physically after beginning to take action,"

while the one with the lowest agreement is "I saw an advertisement or service related to this health campaign."

The homogeneous statement, with lower variance, is "I felt better or good physically after beginning to take action," with a COV of 38.9%. The non-homogeneous statement, with the highest variance, is "I found out about the campaign card through the health provider or community leaders working in the health services," with a COV of 55.7%.

5.4.2. Perceived Severity

The survey comprised **two** statements to measure the perceived severity, where respondents tend on average to neutrally agree to these statements, as the mean values range from 2.5 to 3.5.

- The statement with the highest agreement is "I have no willingness to undergo any check-up or visit the doctor unless there is a severe case", while the one with the lowest agreement is "I was afraid of virus C because it caused the death of so many people".
- The homogeneous statement, with lower variance, is "I was afraid of virus C because it caused the death of so many people" with COV equals 51.3% while the non-homogeneous statement, with the highest variance, is "I have no willingness to undergo any check-up or visit the doctor unless there is a severe case" with COV equals 51.4%.

5.4.3. Perceived Susceptibility

The survey comprised **three** statements to measure the perceived susceptibility, where respondents tend on average to disagree with these statements as the mean values range from 1.5 to 2.5.

- The statement with the highest agreement is "It is likely that I will get virus C" while the one with the lowest agreement is "I worry a lot about getting chronic diseases because of my family history".
- The homogeneous statement, with lower variance, is "It is likely that I will get high blood pressure," with a COV of 41.2%. The non-homogeneous statement, with the highest variance, is "I worry a lot about getting chronic diseases because of my family history," with a COV of 46.4%.

5.4.4. Perceived Barriers

The survey comprised **four** statements to measure the perceived barriers, where respondents tend on average to disagree with these statements as the mean values range from 1.5 to 2.5.

- The statement with the highest agreement is "Having the check-up outside the campaign takes too much time" while the one with the lowest agreement is "Having the check-up outside the campaign is expensive".
- The homogeneous statement with the lower variance is "Having the check-up outside the campaign is expensive," with a COV of 54.3%. The non-homogeneous statement with the highest variance is "I underwent the check-up because it was for free," with a COV of 61.9%.

5.4.5. Perceived Benefits

The survey comprised **five** statements to measure the perceived benefits, where respondents tend on average to disagree with these statements as the mean values range from 1.5 to 2.5. The statement with the highest agreement is "I underwent the checkup, so I could be reassured that I have no chronic diseases," while the one with the lowest agreement is "If I had done the checkup, it would have been easier for me to receive the campaign card."

The homogeneous statement, with lower variance, is "I wanted to get the check-up over with to continue my daily life routine," with a COV of 48%. The non-homogeneous statement with the highest variance is "Having the check-up during the campaign was the best way for me to get access to free medical care," with a COV of 49.4%.

5.4.6. Motivation to Check-Ups

The survey comprised **five** statements to measure the motivation for check-ups, where respondents tend on average to disagree with these statements as the mean values range from 1.5 to 2.5.

The statement with the highest agreement is "I was motivated by the health community leaders" while the one with the lowest agreement is "I wanted to know my health condition". The homogeneous statement, with lower variance, is "I like that it costs nothing to undergo the check-up," with a COV of

51.8%. The non-homogeneous statement, with the highest variance, is "I was motivated by the health community leaders," with a COV of 49.2%.

Table 9: Descriptive Statistics for each Construct and Statement (n=726)

Question	Sample Size	Minimum	Maximum	Mean	Standard Deviation	COV
Cues to Action	726	1	5	2.5107	0.97564	38.9%
I felt better or good physically after beginning to take-action	726	1	5	2.75	1.171	42.6%
I follow specific advice from the health care provider	726	1	5	2.7	1.256	46.5%
I saw an advertisement or service related to this health campaign	726	1	5	2.12	1.264	59.6%
I found out about the campaign card through the health provider or community leaders working in the health services	726	1	5	2.47	1.375	55.7%
Perceived Severity	726	1	5	2.5744	0.96667	37.5%
I was afraid of virus C because it caused the death of so many people	726	1	5	2.46	1.262	51.3%
I have no willingness to undergo any check-up or visit the doctor unless there is a sever case	726	1	5	2.69	1.383	51.4%
Perceived Susceptibility	726	1	5	2.9242	0.95937	32.8%
I worry a lot about getting chronic diseases because of my family history	726	1	5	2.72	1.262	46.4%
It is likely that I will get virus C	726	1	5	3.24	1.18	36.4%
It is likely that I will get high blood pressure	726	1	5	2.81	1.157	41.2%
Perceived Barriers	726	1	5	2.3481	1.0146	43.2%
Having the check-up outside the campaign is expensive	726	1	5	2.09	1.134	54.3%
I had no intention to afford the check-up or the medical care	726	1	5	2.55	1.341	52.6%
Having the check-up outside the campaign takes too much time	726	1	5	2.56	1.225	47.9%
I underwent the check-up because it was for free	726	1	5	2.19	1.356	61.9%
Perceived Benefits	726	1	5	2.4107	0.85057	35.3%
If did the checkup so it could be easier for me to receive the campaign card	726	1	5	2.17	1.212	55.9%
I underwent the checkup, so I could be reassured that I have no chronic diseases	726	1	5	2.62	1.171	44.7%
Having the check-up during the campaign was the best way for me to get access to free medical care	726	1	5	2.5	1.236	49.4%
I wanted to get the check-up over with to continue my daily life routine	726	1	5	2.4	1.152	48.0%

Question	Sample Size	Minimum	Maximum	Mean	Standard Deviation	COV
Having the check-up will decrease my chances of dying from hepatitis C virus	726	1	5	2.36	1.155	48.9%
Motivation to Check-Ups	726	1	5	2.2235	0.81152	36.5%
The quality of the medical care encouraged me to do the check-up	726	1	5	2.5	1.212	48.5%
Convenient location for doing the check-up, (home or work	726	1	5	2.07	1.096	52.9%
I was afraid if not being able to renew my official papers without the campaign card	726	1	5	2.27	1.271	56.0%
I was motivated by the health community leaders	726	1	5	2.59	1.275	49.2%
I am afraid of potential health problems	726	1	5	2.31	1.122	48.6%
I like that it costs nothing to undergo the check-up	726	1	5	1.88	0.974	51.8%
I was encouraged by friends and family	726	1	5	2.33	1.254	53.8%
I wanted to know my health condition	726	1	5	1.83	1.051	57.4%

The following table presents the average of each variable across the sample; it is mentioned that the higher value indicates the higher agreement. Table (10) illustrates the results comparing the variables of the HBM across the sample, and the results showed that most of the people with high motivation to check-up did not hear about the campaign while most of the people who perceived benefits heard about the campaign, but they did not have the-check-up. While most of the people who perceived susceptibility heard and did the check-up.

Table 10: Comparing Variables Across the Sample

Sample	Do not hear	Hear and did not do	Heard and do
HEALTH MOTIVATION	2.7070	2.6181	2.5461
PERCEIVED SEVERITY	2.6491	2.4474	2.5792
PERCEIVED SUSCEPTIBILITY	2.7193	2.6959	2.9646
PERCEIVEDBARRIERS	2.7193	2.5395	2.2958
PERCEIVED BENEFITS	2.7404	2.7895	2.3448
MOTIVATION TO CHECKUPS	2.6667	2.5066	2.1558

5.5. Reliability and Validity Analysis

Running the Factor Analysis is of great importance for deductive research as it will sort out the most meaningful and valuable constructs stated within the utilized model in the study (Bougie, 2019). The internal consistency coefficient (Cronbach's Alpha) reflects the reliability of a scale as it captures the

proportion of total variance that is common to all items that form the scale, which presumably corresponds to the underlying construct being measured.

Cronbach's Alpha reflects that statements are more reliable than 0.5 for main indicators; sub-indicators range from 0.624 to 0.850. Also, the values of average item correlation indicate the validity of the questionnaire. The results of the Factor Analysis show that all items are loaded in their constructs as suggested in the proposed model, as the loading of all items is greater than 0.5. Also, AVE values indicate that the constructs could explain more than 50% of the statements, indicating high internal validity (Bougie, 2019).

Table 11: Reliability and Validity of the Questionnaire in each Category by Using Cronbach's Alpha coefficient

Constructs	Number of Statements	Cronbach' s Alpha	Average Item Correlation	AVE	Item	Loading
Cues to Action	4	0.770	0.661	60%	cues to action (1)	0.835
					cues to action (2)	0.852
					cues to action (3)	0.682
					cues to action (4)	0.715
Perceived Severity	2	0.624	0.566	53.3%	perceived severity (1)	0.730
					perceived severity (2)	0.730
Perceived Susceptibility	3	0.771	0.658	64.5%	perceived susceptibility (1)	0.721
					perceived susceptibility (2)	0.800
					perceived susceptibility (3)	0.881
Perceived Barriers	4	0.813	0.621	64.3%	perceived barriers (1)	0.787
					perceived barriers (2)	0.841
					perceived barriers (3)	0.779
					perceived barriers (4)	0.798
Perceived Benefits	5	0.764	0.593	52.3%	perceived benefits (1)	0.571
					perceived benefits (2)	0.810
					perceived benefits (3)	0.824
					perceived benefits (4)	0.756
					perceived benefits (5)	0.616
Motivation to Check-Ups	8	0.850	0.615	51.7%	motivation to check-ups (1)	0.789
					motivation to check-ups (2)	0.801
					motivation to check-ups (3)	0.593
					motivation to check-ups (4)	0.718
					motivation to check-ups (5)	0.749
					motivation to check-ups (6)	0.753
					motivation to check-ups (7)	0.731
					motivation to check-ups (8)	0.782

5.6 Inferential Data Analysis

5.6.1. Correlation Test

Reliability analysis is essential to minimise measurement mistakes and display them (Bryman, 2012). Reliability, according to Hair et al. (2014), is a measure of internal consistency. To make sure that the measures are related to one another, the reliability analysis examines the measurement items' consistency throughout the investigation. The reliability analysis used in this study is the Cronbach alpha method. A scale's Cronbach alpha must be greater than 0.70 to be considered dependable (Creswell, 2003; Mcquitty & Wolf, 2013). The following table (11) illustrates the values of Pearson's correlation coefficient for the main constructs, and from these values we can conclude that:

The cues to action variable have a significant positive moderate relationship with each of health motivation, perceived barriers, perceived benefits, and motivation to check-ups. However, it has a significant positive weak relationship with perceived severity and susceptibility.

The health motivation variable has a significant positive strong relationship with each of perceived severity, perceived susceptibility, perceived barriers, and perceived benefits. However, it has a significant positive moderate relationship with motivation to go for check- ups.

The perceived severity variable has a significant positive moderate relationship with each of perceived susceptibility, perceived barriers, and perceived benefits. However, it has a significant positive weak relationship with motivation to check-ups.

The perceived susceptibility variable has a significant positive moderate relationship with each of the perceived barriers, perceived benefits, and motivation to go for check-ups.

- The perceived barriers variable has a significant positive moderate relationship with both perceived benefits and motivation to check-ups.
- The perceived benefits variable has a significant positive strong relationship with the motivation to check-ups.

Table 12: Pearson's Correlation Coefficients

	Cues to Action	Health Motivation	Perceived Severity	Perceived Susceptibility	Perceived Barriers	Perceived Benefits	Motivation to Check-Ups
Cues to Action	1						
Health Motivation	0.472**	1					
Perceived Severity	0.220**	0.718**	1				
Perceived Susceptibility	0.263**	0.747**	0.451**	1			
Perceived Barriers	0.448**	0.756**	0.322**	0.358**	1		
Perceived Benefits	0.488**	0.760**	0.356**	0.415**	0.547**	1	
Health behaviours Check-Ups	0.552**	0.662**	0.254**	0.385**	0.613**	0.745**	1

** Correlation is significant at the 0.01 level (2-tailed).

5.6.2. Reliability and Validity Analysis

Running the Factor Analysis is of great importance for deductive research as it will sort out the most meaningful and valuable constructs stated within the utilised model in the study (Bougie, 2019). A scale's internal consistency coefficient, or Cronbach's Alpha, indicates its reliability. This measures the percentage of variance shared by all the scale's items, which most likely relates to the measured underlying construct.

Cronbach's Alpha reflects that statements are more reliable than 0.5 for main indicators and sub-indicators; it ranges from 0.624 to 0.850. Also, the values of average item correlation indicate the validity of the questionnaire. The results of the Factor Analysis show that all items are loaded in their constructs as suggested in the proposed model, as the loading of all items is greater than 0.5. Also, AVE values indicate that the constructs could explain more than 50% of the statements, which indicates high internal validity (Hair et al., 2021).

5.6.3. Hypotheses testing

SEM with AMOS has been used to study the relationship between health behaviours regarding check-ups and each of the independent variables in the presence of a moderation effect of the demographic variables.

The researcher can observe from the table below that all the model's goodness-of-fit indices are within reasonable bounds, with values for the NFI, RFI, IFI, TLI, and CFI all approaching 1. A good fit for the structural model is also indicated by the RMSEA value being less than 0.05. It is crucial to remember that the Chi-Square test is extremely sensitive to sample size, even though its significance level indicates that the model does not fit well. For evaluation, the researcher will thus rely on the other fit metrics (Peugh & Feldon, 2020; Ummah, 2019).

Table 13: Goodness of fit indices

Indices	Abbreviation	Recommended Criteria	Results	conclusion
Chi-Square	χ^2	P-value > 0.05	16.669	Not Good Fit
Degree of Freedom			13	
Level of Significance			***	
Normed Chi-Square	$\frac{\chi^2}{DF}$	$1< \frac{z^2}{DF} <5$	1.282	Good Fit
RMESA	Root Mean Square Error of Approximation	< 0.05 Good Fit < 0.08 Acceptable Fit	0.021	Good Fit
NFI	Normed Fit Index	> 0.90	0.963	Good Fit
RFI		> 0.90	0.994	Good Fit
IFI		> 0.90	0.921	Good Fit
TLI	Tucker-Lewis Index	> 0.90	0.987	Good Fit
CFI	Comparative Fit Index	> 0.90	0.965	Good Fit

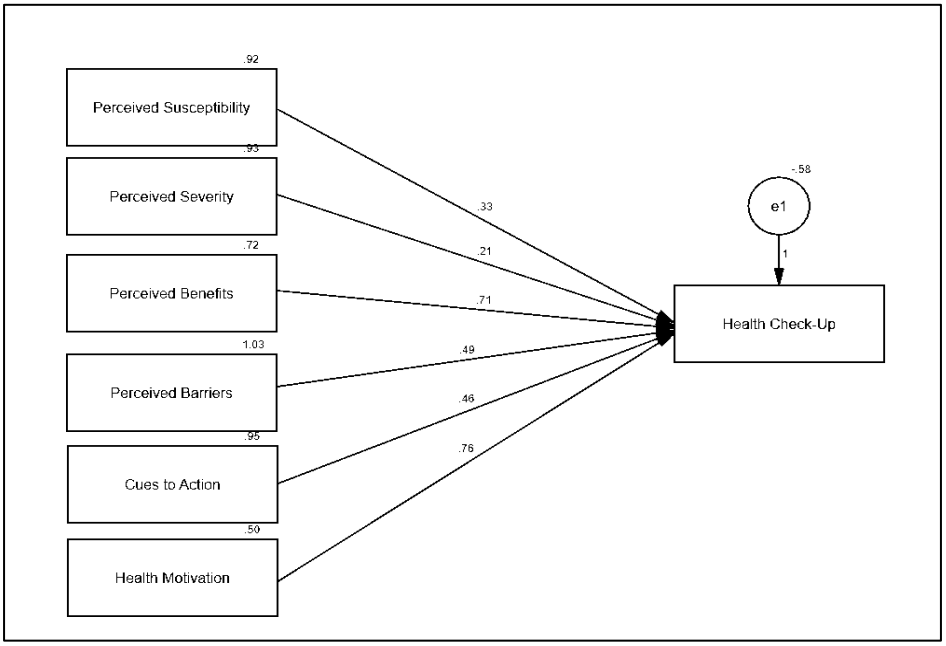
- There is a significant direct impact from the perceived susceptibility on the health check-up, where the health check-up will increase by about 0.326 as the value of the perceived susceptibility increases by one unit, with confidence 95%.
- There is a significant direct impact from the perceived benefits on the health check-up, where the health check-up will increase by about 0.711 as the value of the perceived benefits increases by one unit, with confidence 95%.

The perceived barriers have a significant direct impact on the health check-up, which will decrease by about 0.490 as the value of the perceived barriers increases by one unit, with confidence 95%.

The cues to action have a significant direct impact on the health check-up. As the value of the cues to action increases by one unit, the health check-up will increase by about 0.459, with a 95% confidence level.

- There is a significant direct impact of health motivation on the health check-up, where the health check-up will increase by about 0.761 as the value of the health motivation increases by one unit, with confidence 95%.

Figure 7: Regression Model



The researcher can observe from the table below that all the model's goodness-of-fit indices are within reasonable bounds, with values for the NFI, RFI, IFI, TLI, and CFI all approaching 1. A good fit for the structural model is also indicated by the RMSEA value being less than 0.05. It is crucial to remember that the Chi-Square test is extremely sensitive to sample size, even though its significance level indicates that the model does not fit well. For evaluation, the researcher will thus rely on the other fit metrics (Peugh & Feldon, 2020; Ummah, 2019).

Table 14: Regression Weights

Model	Unstandardized Estimate	Standardized Estimate	Sig.	Result
H1 - Perceived Susceptibility health behaviours	0.326	0.920	0.040	Supported
H2 =Perceived Severity health behaviours	-0.213	0.934	0.253	Supported
H3 =Perceived Benefits health behaviours	0.711	0.723	0.000	Supported
H4 =Perceived Barriers health behaviours	-0.490	1.029	0.005	Supported
H5 =Cues to Action health behaviours	0.459	0.952	0.000	Supported
H6 =Health Motivation health behaviours	0.761	0.499	0.000	Supported

Table 15: Goodness of Fit Indices

Indices	Abbreviation	Recommended Criteria	Results	conclusion
Chi-Square	χ^2	P-value > 0.05	16.669	Not Good Fit
Degree of Freedom			13	
Level of Significance			***	
Normed Chi-Square	$\frac{\chi^2}{DF}$	$\frac{z^2}{DF}$ 1<— <5	1.282	Good Fit
RMESA	Root Mean Square Error of Approximation	< 0.05 Good Fit < 0.08 Acceptable Fit	0.021	Good Fit
NFI	Normed Fit Index	> 0.90	0.963	Good Fit
RFI		> 0.90	0.994	Good Fit
IFI		> 0.90	0.921	Good Fit
TLI	Tucker-Lewis Index	> 0.90	0.987	Good Fit
CFI	Comparative Fit Index	> 0.90	0.965	Good Fit

5.6.4. Moderation Effect

- **Gender**

In this section, the researcher uses a multigroup analysis to investigate the moderating influence of gender on the proposed relationships depicted in the structural model (Ummah, 2019). The following table summarises the results of the MGA group Analysis, and from it, we can conclude that:

- The coefficients for the male and female groups do not differ significantly at 95% confidence, indicating that gender has no moderating influence on the relationship between perceived benefits, severity, and susceptibility and the health checkup.
- The relationship between each barrier, cues to action, and health motivation during a health checkup is moderated by gender, with a greater effect on men.

Table 16: Path Coefficients and Significances

Group	Structural Path	Coefficient	Critical Value
Females	Perceived Susceptibility health behaviours	0.345	
Males		0.341	0.52
Females	Perceived Severity health behaviours	-0.198	0.14
Males		-0.212	
Females	Perceived Benefits health behaviours	0.689	-0.86
Males		0.703	
Females	Perceived Barriers health behaviours	-0.597	-2.87
Males		-0.121	
Females	Cues to Action health behaviours	0.468	-3.98
Males		0.588	
Females	Health Motivation health behaviours	0.563	-5.82
Males		0.781	

*** Note that if the critical ratio > 2 this means that there is a significant difference

- **Age**

There is no significant difference between the coefficients for age at 95% confidence. This means that age has no moderation effect on the relation between perceived susceptibility, severity, cues to action, health motivation and health behaviours.

- There is a Moderation effect of age on the relationship between each of the benefits, and barriers, with health behaviours such that the effect for higher age is higher.

Table 17: Path Coefficients and Significances

Group	Structural Path	Coefficient	Critical Value
< 38	Perceived Susceptibility health behaviours	0.327	-0.63
≥ 38		0.331	
< 38	Perceived Severity health behaviours	-0.312	0.876
≥ 38		-0.324	
< 38	Perceived Benefits health behaviours	0.532	-3.86
≥ 38		0.767	
< 38	Perceived Barriers health behaviours	-0.459	-3.61
≥ 38		-0.321	
< 38	Cues to Action health behaviours	0.345	-0.98
≥ 38		0.376	
< 38		0.357	0.43
≥ 38	Health Motivation health behaviours	0.351	

*** Note that the f critical ratio > 2; this means that there is a significant difference

- **Educational Level**

There is no significant difference between the coefficients for those who have university degrees and others at 95% confidence. This means that the educational level has no moderate effect on all relationships.

Table 18: Path Coefficients and Significances

Group	Structural Path	Coefficient	Critical Value
University degree	Perceived Susceptibility health behaviours	0.335	0.45
Other		0.324	
University degree	Perceived Severity health behaviours	-0.298	0.876
Other		-0.305	
University degree	Perceived Benefits health behaviours	0.542	0.076
Other		0.541	
University degree	Perceived Barriers health behaviours	-0.476	-0.34
Other		-0.452	
University degree	Cues to Action health behaviours	0.341	0.42
Other		0.332	
University degree	Health Motivation health behaviours	0.352	0.15
Other		0.341	

*** Note that if the critical ratio > 2 this means that there is a significant difference

- **Monthly Income**

- There is a Moderation effect of income on the relationship between each of all variables except severity, with health behaviours such that the effect for higher income is higher.

Table 19: Path Coefficients and Significances

Group	Structural Path	Coefficient	Critical Value
< 6000	Perceived Susceptibility health behaviours	0.245	4.38
≥ 6000		0.451	
< 6000	Perceived Severity health behaviours	-0.287	1.23
≥ 6000		-0.312	
< 6000		0.321	6.086
≥ 6000	Perceived Benefits health behaviours	0.634	
< 6000	Perceived Barriers health behaviours	-0.256	4.76
≥ 6000		-0.472	
< 6000	Cues to Action health behaviours	0.345	4.65
≥ 6000		0.541	
< 6000	Health Motivation health behaviours	0.267	5.32
≥ 6000		0.561	

*** Note that if the critical ratio > 2 this means that there is a significant difference

5.7 Concluding Empirical Study II

Following the collection of the necessary quantitative data, the study used the SEM and AMOS programmes to perform multiple analyses. The sociodemographic backgrounds of the study's participants vary in terms of gender, income, city, and marital status. Participants are all 18+ who were living in Egypt during the last 5 years. According to the preliminary questions, 92.1% of survey participants heard about the 100 million SIHA campaign and 66.7% of survey participants heard that they would need the campaign card to renew their official papers like passport, ID and driving license, while only

84.7% among survey participants have check-ups during the campaign. The research used scales the Cronbach alpha analysis; the scales are reliable with a Cronbach alpha above 0.7.

In this study, the research tests the hypotheses using SEM with the AMOS programme. Based on the hypotheses testing, there is a significant impact on healthy behaviours for check-ups, and perceived susceptibility increases for males and females regardless of their age, educational level or even income. There is a significant impact on healthy behaviours and perceived severity: most participants aged from 38 to 48 with a middle level of education with low income increased their healthy behaviours when they perceived severity. There is a significant impact on health behaviours to check-up and perceived benefits, especially for males aged 48 or above with a level of education and with a middle level of income while most females regardless of the other factors have the health behaviours to check-up when they perceived benefits. Most of the participants with middle level of education and low income aged 18-48 increased their health behaviours to check-up when they perceived benefits. There is a significant impact on health behaviours and perceived barriers for males who were highly educated, at age 48 and above, with a middle level of income: their health behaviours to check- up decreased when they perceived barriers. There is a significant impact on health behaviours, such as check-ups and cues to action for males aged 48 or more with a middle level of income and who are highly educated. Also, cues to action increased health behaviours to check-ups for most participants with low and middle levels of income, with middle level of education. There is a significant impact on health behaviours to check-ups and motivation to health behaviours for females and males in the middle level of education, with a low and middle level of income and males aged 48 or more with a high level of education and middle level of income increased health behaviours to check-up when health motivation increased. The results of this investigation will be covered in more detail in the upcoming chapter.

HYPOTHESES

H1. Perceived susceptibility to chronic diseases influences the health behaviour of citizens

Our results illustrate a significant impact on healthy check-up behaviours and an increase in perceived susceptibility for males and females, regardless of age, educational level, or income. This agrees with previous studies that have found that increasing perceived susceptibility and addressing it can increase individual vaccine uptake (Arumugam, M Kumar, & R, 2016; Hornsey, Chapman, & Oelrichs, 2021; C. Wang et al., 2021).

H2. Perceived severity of chronic diseases influences the health behaviour of citizens

The results illustrate that there is a significant impact on healthy behaviours and perceived severity, most of the participants, aged from 38 to 48 with a middle level of education with low income, increased their healthy behaviours when they perceived severity. Moreover, that agreed with studies have found that increasing severity can increase vaccine uptake among individuals (Arumugam et al., 2016; Hornsey, Chapman, & Oelrichs, 2021; C. Wang et al., 2021). A higher impression of severity and vulnerability is likely to improve individual motivation to execute risk-preventative behaviour, whereas a stronger perception of rewards from present practices will impede risk-preventative actions (Janmaimool, 2017).

H3. Perceived benefits influence the willingness to health behaviour of citizens

The results showed there is a significant impact on health behaviours to check-up and perceived benefits, especially for males aged 48 or above, with a level of education and with a middle level of income, while most females, regardless of the other factors, have the health behaviours to check-up when they perceived benefits. Most of the participants with middle level of education and low income aged 18-48 increased their health behaviours to check-up when they perceived benefits. Agreed with the literature perceived benefits refer to the individual's beliefs about the positive outcomes of engaging in health behaviour, Overall, the HBM remains a relevant and useful framework for understanding health behaviour and designing effective interventions (Suess et al., 2022).

H4. Perceived barriers impact the health behaviours of citizens.

The results showed that there is a significant impact on health behaviours and perceived barriers for males who were highly educated, at age 48 and above, with a middle level of income: their health behaviours to check-ups decreased when they perceived barriers. Moreover, the literature agrees that perceived barriers refer to the perceived negative aspects of engaging in the behaviour (Suess et al., 2022), which influences a person's decision-making process when considering health-promoting behaviours. When designing health interventions, it is important to emphasise perceived barriers that may prevent individuals from engaging in specific behaviours (S. Kumar & Preetha, 2012).

H5. Cues to action impact the health behaviours of citizens.

The results showed that there is a significant impact on health behaviours to check-ups and cues to action for males aged 48 or more with a middle level of income and who are highly educated. Also, cues to action increased health behaviours to check-ups for most participants with low and middle levels of income with middle level of education. This agreed with the literature that health interventions should consider the most effective cues to action for the target population, (HBM) suggests that cues to action, such as information from third parties, can prompt health-related behaviour, including vaccination, the government, media, and scientific community have played a significant role in shaping individuals' perceptions of disease severity and vaccination benefits, which can influence their willingness to vaccinate (Suess et al., 2022).

H6. Motivation impacts the health behaviours of citizens.

The results illustrate that there is a significant impact on health behaviours from check-ups and motivation to health behaviours for females and males in the middle level of education with a low and middle level of income and males aged 48 or more with a high level of education and middle level of income increased health behaviours to check-ups when health motivation increased. This agrees with the literature. Policy interventions, such as improving access to affordable healthcare, could help reduce health disparities by addressing the underlying social determinants of health (Tarkang & Zotor, 2015b). Protection motivation is influenced not just by threat assessment but also by coping evaluation, which measures a person's ability to engage in risk-preventive actions (Janmaimool, 2017). Marketing studies have looked at how choice architecture features, like sorting and defaults, affect customer behaviour (Kellen Mrkva et al., 2021).

H7: Demographics moderates the relationships between HBM and the health behaviours of citizens.

H7A: Age moderates the relationships between perceived susceptibility and health behaviours of citizens.

Holding the other variables constant, there is an insignificant difference in the mean of the health behaviours regarding check-ups for those aged 18 to less than 28 and those aged 48 or above.

Holding the other variables constant, there is an insignificant difference in the mean motivation to check-ups for those aged 28 to less than 38 and those aged 48.

- The value of the health behaviours to check-ups for those aged from 38 to less than 48 years old is lower than the value of the health behaviours to check-ups for those aged 48 years old or above by about 0.803, holding the other variables constant.
- The value of the health behaviours to check-ups will increase by about 0.184 as the value of the health motivation, the cues to action, perceived severity, perceived benefits, and perceived barriers increases by one unit for those aged from 38 to less than 48 years old, holding the other variables constant. When the value of the health behaviours to check-ups will increase as the value of the perceived benefits increases by one unit for those aged from 18 to less than 28 years old and for those aged from 18 to less than 28 years old, holding the other variables constant.

H7B: Income moderates the relationships between perceived susceptibility and health behaviours of citizens.

- There is an insignificant difference in the mean of the health behaviours to check-ups and income holding the other variables constant. The value of the health behaviours to check-ups will increase as the value of the cues to action, perceived severity, perceived susceptibility, perceived barriers, perceived benefits, and health motivation increases by one unit for those gained from 2000 to less than10000 pounds low and middle level of income, withholding the other variables constant.
- The value of the health behaviours to check-ups will decrease by about 0.033 as the perceived susceptibility increases by one unit for those gained from 4000 to less than 6000 pounds, holding the other variables constant.

H7C: Gender moderates the relationships between perceived susceptibility and health behaviours of citizens.

Holding the other variables constant, the value of the health behaviours to check-ups for the females is higher than the value of the health behaviours to check-ups for the males by about 0.638.

- The value of the health behaviours to check-ups will increase by about 0.377 as the value of the cues to action increases by one unit whether the participant is male or female, holding the other variables constant.

- The value of the health behaviours to check-ups will increase by about 0.262 as the value of the health motivation increases by one unit for females, holding the other variables constant.
- The value of the health behaviours to check-ups will increase by about 0.289 as the value of the cues to action increases by one unit whether the participant is male or female, holding the other variables constant.

H7D: Education moderates the relationships between perceived susceptibility and health behaviours of citizens.

There is an insignificant difference in the mean of the health behaviours to check-ups for those who pursued university education and those who pursued higher education, holding the other variables constant. That agrees with the literature. People with greater education levels often have better health outcomes and are more likely to adopt healthy behaviours (Cowell, 2006).

The value of the health behaviours to check-ups will increase as the value of the health motivation, perceived severity and the value of the cues to action increases by one unit for those pursuing middle education, holding the other variables constant. The value of the health behaviours to check-ups will decrease as the value of the perceived barriers, perceived susceptibility increases and perceived benefits by one unit, regardless of the educational level of the participants, holding the other variables constant.

Summary of Results

The study used Structural Equation Modelling (SEM) with AMOS to examine the relationship between health behaviours related to check-ups and various independent variables while considering the moderating effects of demographic factors. The goodness-of-fit indices confirmed that the structural model fits well despite the chi-squared test being sensitive to sample size.

The key findings indicate that perceived susceptibility, perceived benefits, cues to action and health motivation significantly affect health check-up behaviours. In contrast, perceived barriers have a significant adverse effect. Perceived severity, although included in the model, did not show a significant impact. Moderation effects: **Gender** does not moderate the relationship between perceived benefits, severity, and susceptibility to health check-ups. However, gender moderates the relationship between barriers, cues to action, and health motivation, with a more substantial effect observed in men. **Age** does not moderate the relationship between perceived susceptibility, severity, cues to action, or health

motivation with health behaviours. However, it moderates perceived benefits and barriers, where older individuals experience a more substantial impact. **Educational Level**: No moderation effect was found for educational level on any of the relationships. **Income** moderates the effect of all variables except perceived severity, with higher-income individuals showing a more substantial impact.

However, the findings suggest that increasing perceived susceptibility, benefits, and health motivation while reducing perceived barriers can improve participation in health check-ups. Gender, age, and income influence the strength of these relationships. The study highlights the importance of effective targeted health campaigns to address these factors.

6. Chapter 6: Conclusion

The study sought to measure the effectiveness of choice architecture by using a shove approach through the health belief model (HBM) to improve the health behaviours of Egyptian citizens. It focused on the first stage of the 100 million SIHA campaign, one of Egypt's most successful health campaigns. To accomplish that goal, the study was divided into two empirical studies using a mixed-method technique.

The first study used semi-structured interviews for qualitative research, which looks for fresh perspectives to build the conceptual framework and testable hypotheses by investigating the successful factors that have been used by policymakers to motivate citizens to have health check-ups. Results showed that choice architecture influenced citizens' responses, and health professionals mentioned that citizens behaved accordingly.

The second study used a quantitative approach, administering a questionnaire to citizens to gather objective data to assess the hypotheses and provide answers to the research questions. The study aimed to understand whether using the choice architecture as a shove campaign effectively motivates citizens to check up. A questionnaire was applied to a large sample of Egyptian citizens, and the results illustrate that choice architecture as a shove campaign was effective by using the Health Belief model variables.

According to the literature review, choice architecture has a significant positive influence on the health care system, and shove is an effective approach when it comes to community health (Mojašević & Nikolić, 2021). Moreover, applying the HBM in public health campaigns proved hugely successful in different countries (Daniati et al., 2021). Accordingly, in the interviews that were done to understand the successful factors, the policymaker mentioned that they had a plan to use the choice architecture to make the campaign achieve its target, especially the shove concept in the idea that you must have proof of the health check-up campaign card if you need to renew your official papers. The interviews that were conducted suggest that choice architecture was one of the factors that motivated citizens to check up. The study created the final research model and hypotheses to be investigated in Empirical Study II, the quantitative research, based on the literature review and empirical Study I. Chapter five presents the findings from the second empirical investigation. It discusses testing hypotheses and comparing the results with past findings, research conclusions, ramifications, recommendations, limitations, and ideas for further study.

The study aimed to understand the effectiveness of the shove form of social marketing under the umbrella of the choice architecture and the effectiveness of using HBM under the shove campaign. To achieve this objective, the research had to investigate the research questions.

Study 1 aimed to answer the research question **RQ1:** What factors do health professionals and policymakers perceive as critical for designing an effective social marketing campaign in developing countries, particularly in the context of the Shove (Social marketing for Overcoming Vaccine Hesitancy) campaign? To answer the research questions, the researcher had to do study one. To be able to know the successful factors perceived by health professionals and investigate if the policymaker used the choice architecture on purpose, the results for the qualitative study based on the interviews illustrated in chapter four mentioned that choice architecture was one of the variables to be considered by the health minister in Egypt, which impacts the Egyptian citizens 'health behaviour (check-up).

Based on these results, the research model has been developed in **Study 2** to be able to answer **RQ2**: What is the effectiveness of a social marketing campaign using shove as a form of choice architecture with health belief model variables? The purpose of the quantitative research was to test the theories that surfaced from the qualitative and literature review research. The purpose of this study is to measure the effectiveness of the Shove campaign by using variables of the health belief model to influence Egyptian citizens' health behaviour.

However, 92.1% of survey participants heard about the 100 million SIHA campaign while only 7.9% of the participants did not hear about this campaign. When, 66.7% of survey participants heard that they would need the campaign card to renew their official papers like passport, ID and driving license while only 33.3% of the participants did not hear about this issue. That 84.7% of survey participants had check-ups during the campaign, while only 15.3% of the participants did not have any check-ups during the campaign. That 47.1% of survey participants had a check-up between October 2018 and December 2018, while 52.9% had one between January 2019 and April 2019. That 43.1% of survey participants have a check-up in a health unit, 46.6% of the participants have a check-up in a health team, and 10.3% of the participants have a check-up in another place. Only 43.5% of survey participants have their check-up at work, followed by 23% of the participants who have their check-up near their home, 5.8% of the participants have their check-up in the street, 21.9% of the participants have their check-up in the club, while 5.8% of the participants have their check-up in a religion place.

6.1. Contributions

The results of this study proved that choice architecture is an important factor for the government to influence the citizens' behaviour by analysing it, by HBM variables cues to action, perceived benefits, and motivation to health check-ups. Moreover, the role of community leaders has been determinant in citizens' health behaviours in addition to offering free health care from the government. This agrees with previous research (Quigley, 2013) that mentions that choice architecture can have a huge impact if the entire environment works together. Also, I agree with the study Local Government Association (2013) in the United Kingdom, which noted that the UK government formed the Behavioural Insights Team, the "nudge unit" at the Cabinet Office in July 2010. Due to its effectiveness, the two-year financing was extended and even expanded to Australia. Its impact has extended to other government agencies as well, such as the Department of Health, which in a 2010 public health white paper stressed the need for initiatives to be implemented with balance. Impressive outcomes have come from the team's work, including a trial that increased late tax payments by 15% and a court case where warning letters were six times less successful than personalised text messages. An internal review made a five-year savings forecast of £300 million. The team's techniques, which include "nudging" and "shoving," have been used elsewhere with remarkable results, such as a rise in donor registration from 38% to 60% in Illinois. By focusing interventions on community needs, providing resources for assessment, and utilising community support, local authorities can implement these tactics. For instance, the "Beat the Street" initiative, launched by Reading Borough Council, encouraged walking by having 4,000 locals, 60% of whom were schoolchildren, walk 50,000 miles in three months. When Egypt applied the same intervention in the public health sector, the results of the study agreed on the effectiveness of the choice architecture shove concept by answering the main research question: What are the successful factors perceived by health professionals and policymakers? Research Question 1: Policymaker reflection on designing an effective social marketing campaign in developing countries?

Research Question 2: What is the effectiveness of a social marketing campaign using shove as a form of choice architecture? Their analysis shows that spending money on choice architecture tools can sometimes be over 40 times more effective than the next best approach, which is a significant outcome for governments with limited funding (Buheji, 2018).

6.2. Critical Analysis

The study comprehensively investigates the potential effects of choice architecture using a shove approach on the health behaviours of Egyptian citizens within the framework of the Health Belief Model (HBM). The study effectively combines qualitative and quantitative methodologies, enhancing the reliability of its conclusions. Using semi-structured interviews, the first empirical study successfully identifies important elements that health professionals and policymakers believe are essential to creating effective public health campaigns. A more sophisticated understanding of the strategic use of choice architecture in influencing individuals' health decisions is made possible by this qualitative phase. The second empirical study demonstrates the efficacy of the shove approach in increasing health check-up participation. It supports the qualitative findings with quantitative analysis via a structured questionnaire and emphasises how perceived rewards, cues to action, and motivation greatly impacted citizens' health behaviours. One of its strongest points is the study's recognition that outside factors, such as community leadership and government-funded healthcare, influence public reaction significantly. The study also supports data from worldwide that choice architecture works well in public health programmes, such as the UK's "nudge unit" and other beneficial interventions worldwide. The study also highlights the push approach's cost-effectiveness, showing that it can be a good substitute for public health initiatives that need more resources. However, some restrictions should be considered. The report does not detail the possible opposition or moral dilemmas with the shove method, especially regarding the consequences of requiring health examinations before official documentation may be renewed. Furthermore, even if the results are strong, a longitudinal study would have shed more light on the intervention's long- term effects on health-related behaviours. Furthermore, more thorough knowledge of how various population groups react to shove-based interventions would have been possible with broader demographic segmentation. In conclusion, the study significantly advances public health and social marketing domains by confirming the efficacy of choice architecture using the HBM framework. Its practical implications for policymakers in wealthy and developing countries highlight the potential of employing modest yet effective behavioural nudges to propel public health programs. Future studies should focus on demographic-specific responses, long-term efficacy, and ethical issues to further improve the use of choice architecture in health campaigns.

6.3. Implications for Theory and Practice

The study aimed to measure the effectiveness of the shove form of social marketing under the umbrella of the choice architecture through the health belief model (HBM) to improve the health behaviours of Egyptian citizens, and the results proved that the shove campaign was effective for motivating Egyptian to health behaviours, which proved that HBM variables are effective with the choice architecture, especially shove concept when the policy maker playsthe parental role.

By implementing the choice architecture in the health campaign with HBM variables, the policymakers can guarantee the success of the campaign as long this campaign achieves its target and impacts all the categories of citizens' behaviours by using the shove concept under the campaign card to renew the official documents. Studying the impact of using the shove with HBM variables in developing countries will be very helpful for the practitioners in public health in social marketing in all the developing and developed countries too, to follow the same technique to improve or change health behaviours for their citizens with low cost without forbidding any option for them.

6.4. Limitations of the Current Work

The COVID-19 situation restricted the data collection of interviews in person. Consequently, the number of interviewees was restricted. An online questionnaire was distributed to gather data for the second study. Comparing online administration to physical distribution, there are a few drawbacks. Because of these drawbacks, respondents' responses may not always be accurate (Maison et al., 2021), even though the researcher collected some data for the questionnaire physically by going to the health units in low-income and middle-income places to be able to meet all the sample characteristics. When distributing the surveys, the study employed non-probability sampling as the sampling frame was not accessible. The analytical strategy selects individuals who suit the information needed for the research topic with the aid of this subjective sampling (Bernard, 2017). This action is therefore regarded as convenience sampling. Convenience sampling produces a sample that might not accurately reflect the population since it is a non-probability sampling technique (Taherdoost, 2016). Furthermore, non-probability sample characteristics may result in judgement errors made by the study. Participants can be highly biased towards certain questions and withhold the truth. Furthermore, the results of research conducted using purposive, non-probability sampling, cannot be generalised.

6.5. Suggestions for Future Research

Future studies can go in several ways to build on the research findings, given the constraints of this study. First, the research identifies a few ideas, including the effectiveness of a shove concept as a choice architecture tool in improving citizens' public health in developing countries. This served as a guide for the inquiry into the motivations of citizens to adopt healthy behaviours in a developing country. For example, future studies can investigate additional tools for choice architecture or use the shove concept in other health behaviour campaigns. Egyptian citizens are facing a very hard situation related to the economy, which can impact their health behaviours or their ability to do check-ups, which can lead to a labour shortage in Egypt. So, the policymaker needs to be able to motivate the citizens to have healthier behaviours. Future studies can study whether the shove concept could impact addiction behaviours in Egypt as long the addiction is one of the health problems facing Egypt. Also, future studies can search if the shove concept will help to an early awareness of breast cancer in Egypt because Egypt did a campaign for breast cancer. However, it was not as successful as the first stage related to Virus C and chronic diseases. The results showed that women in Egypt have health motivation in Egypt, so it is a good idea to study in the future why women are not involved more in breast cancer campaigns.

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APPENDICES

Questionnaire



This questionnaire will help identify and enhance sustainable health behaviours in Egypt. The information you provide will be used for research purposes only and will be confidential.
Thank You for your participation.

هذا الاستقصاء سيساعد لتحديد وتحسين استدامة السلوك الصحي في مصر، وكل المعلومات التي ستمد بها الباحث ستستخدم لأغراض بحثية وستكون سرية.

شكراً لمشاركتكم.

مبادرة ١٠٠ مليون صحة، التي قامت بها الحكومة المصرية تحت رعاية رئيس الجمهورية الرئيس/ عبد الفتاح السيسي والامراض المزمنة، التي أنقذت ملايين من حياة المصريين.C للقضاء علي فيرس

1. هل سمعت عن حملة 100 مليون صحة عام 2018؟

1. Did you hear about 100 million SIHA campaign?

A. نعم /Yes B. لا / No

2. هل تتذكر انه تم اعلامك انك ستحتاج كارت هذه الحملة لتجديد اوراقك الرسمية (رخصة القيادة، جواز السفر، البطاقة الشخصية)؟

2. Do you ever heard about that you will need the campaign card to renew your official papers (passport\ ID\ driving license)?

A. نعم /Yes B. لا / No

3. هل قمت بالفحص الطبي التابع لحملة ١٠٠ مليون صحة

3. Did you have the check-ups during the campaign?

A. نعم /Yes B. لا / No

4. هل تتذكر متي قمت بالفحص؟

4. Do you remember when did have the check-up?

A. ما بين (أكتوبر ٢٠١٨- ديسمبر) ٢٠١٨ B. ما بين (يناير ٢٠١٩ - ابريل) ٢٠١٩

5. هل تتذكر أين قمت بالفحص؟

5. Do you remember where you had your check-up?

A. الوحدة الصحية B. مع القافلة الطبية C. أو آخر

6. إذا كنت قمت بالفحص مع القوافل الطبية، هل تتذكر اين؟

6. If you have the check-up with the medical teams, do you remember where?

A. العمل B. قريب من المنزل C. الشارع D. النادي E. دور العبادة

7. العمر age

A. ١٨ اقل من ٢٨ B. ٢٨ اقل من ٣٨ C. ٣٨ اقل من ٤٨ D. ٤٨ اقل من ٥٨ E. +٥٨

8. التعليم Education Level

A. تعليم متوسط B. تعليم ثانوي C. تعليم جامعي D. تعليم عالي

9. الدخل Income

Cues to action

A. ٢٠٠٠ اقل من٤٠٠٠ B. ٤٠٠٠ اقل من ٦٠٠٠ C. ٦٠٠ ٠ أقل من ٨٠٠٠ D. ٨٠٠٠ أقل من ١٠٠٠٠ E. ١٠٠٠٠+

لا اوافق بشدة Strongly disagree	لا أوافق disagree	حيادي neutral	أوافق agree	اوافق بشدة Strongly agree	
					1) شعرت انني افضل او جيد بدنيا بعد قيامي بالفحص الطبي I Felt good or better physically after doing the checkup.
					2) أتبعت نصيحة محددة من المشرف الصحي I follow specific advice from the health care provider.
					3) رأيت اعلان عن منتج او خدمة ذات علاقة بالحملة I saw an advertisement or service related to this health campaign.
					4) سمعت عن معلومة كارت الحملة من المشرف الصحي ورائدات الصحة I found out about the campaign card through the health provider or community leaders working in the health services.

Perceived severity

لا اوافق بشدة Strongly disagree	لا أوافق disagree	حيادي neutral	أوافق agree	اوافق بشدة Strongly agree	
					5) كنت خائف من فيروس سي لأنه تسبب في وفاة الكثير من الناس. I was afraid of virus C because it caused the death of so many people.
					6) لا أرغب في إجراء فحص طبي أو زيارة الطبيب إلا إذا كانت الحالة حرجة. I have no willingness to undergo any check-up or visit the doctor unless there is a sever case.

Perceived susceptibility:

لا اوافق بشدة Strongly disagree	لا أوافق disagree	حيادي neutral	أوافق agree	اوافق بشدة Strongly agree	
					1) أشعر بالقلق الشديد من الإصابة بأمراض مزمنة بسبب التاريخ الأسري. I worry a lot about getting chronic diseases because of my family history.
					2) من المحتمل أن أصاب بفيروس سي. It is likely that I will get virus C.
					3) من المحتمل أن أصاب بمرض ضغط الدم. It is likely that I will get high blood pressure.

Perceived barriers

لا اوافق بشدة Strongly disagree	لا اوافق disagree	حيادي neutral	أوافق agree	اوافق بشدة Strongly agree	
					1) إجراء الفحص الطبي خارج الحملة مكلفًا Having the check-up outside the campaign is expensive.
					2) لم يكن لدي النية لتحمل تكاليف الفحص والرعاية الطبية. I had no intention to afford the check-up or the medical care.
					3) إجراء الفحص الطبي يستغرق الكثير من الوقت خارج الحملة Having the check-up outside the campaign takes too much time.
					4) لقد أجريت الفحص لأنه كان مجانيًا. I underwent the check-up because it was for free.

Perceived benefits

لا اوافق بشدة Strongly disagree	لا أوافق disagree	حيادي neutral	أوافق agree	اوافق بشدة Strongly agree	
					1) قمت بالفحص لكي يكون من السهل ان احصل على كارت الحملة. If did the checkup so it could be easier for me to receive the campaign card.
					2) بعد قيامي بإجراء الفحص الطبي تأكدت انه لا داعي للقلق من اصابتي بالامراض المزمنة. I underwent the checkup, so I could be reassured that I have no chronic diseases.
					3) كان إجراء الفحص الطبي أثناء الحملة هو أفضل طريقة بالنسبة لي للحصول على رعاية طبية مجانية. Having the check-up during the campaign was the best way for me to get access to free medical care
					4) قمت باجراء فحص طبي لمواصلة روتين حياتي اليومية I wanted to get the check-up over with to continue my daily life routine.
					5) سيقلل إجراء الفحص من فرص الوفاة من فيروس التهاب الكبد الوبائي سي. Having the check-up will decrease my chances of dying from hepatitis C virus

Motivation to check-up

لا اوافق بشدة Strongly disagree	لا أوافق disagree	حيادي neutral	أوافق agree	اوافق بشدة Strongly agree	
					1) جودة الرعاية الطبية تشجعني على إجراء الفحص طبي. The quality of the medical care encouraged me to do the check-up.
					2) موقع مناسب لإجراء الفحص الطبي Convenient location for doing the check-up, (home or work)
					3) كنت أخشى ألا أتمكن من تجديد أوراقي الرسمية بدون الحملة. I was afraid if not being able to renew my official papers without the campaign card.
					4) لقد تم تحفيزي من قبل رائدات الرعاية الصحية I was motivated by the health community leaders.
					5) أخشى المشاكل الصحية المحتملة I am afraid of potential health problems.
					6) يعجبني أنه لا توجد نفقات لازمة للفحص I like that it costs nothing to undergo the check-up.
					7) تشجعت من خلال عائلتي وأصدقائي I was encouraged by friends and family.
					8) اتمني ان افهم حالتي الصحية I wanted to know my health condition.