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**“Knowledge, perception, action and intention to
modify healthy lifestyle behaviour in Omani
patients at risk of stroke”**

Salwa Alalawi

Thesis presented in fulfilment of the requirement of the
degree of Doctor of Philosophy

The University of Edinburgh

2018

Declaration

I hereby declare that this thesis has been completed by myself and that the work has not been submitted towards any other degree or professional qualification. I confirm that the work I submitted is my own except where stated otherwise by reference or acknowledgement.

Salwa Alalawi

Preface

This dissertation is submitted for the degree of Doctor of Philosophy in Nursing Studies at the University of Edinburgh. The purpose of this dissertation is to explore healthy lifestyle practice in Oman. However, countries worldwide can benefit from both individual and community level strategies included in this study to tackle noncommunicable diseases (NCDs). The study makes contribution to knowledge as it suggested extension to the Health Belief Model to include religious factors as an individual factor that influence the health decisions. Also, implications to practice were suggested.

Abstract

Morbidity due to noncommunicable diseases (NCDs) has become a worldwide epidemic. As a result, the United Nations (2015) Sustainable Developmental Goals (SDGs) included goal (3.4) that aims to reduce the premature mortality from NCDs by one third. All countries, regardless of income, are required to develop strategies and achieve a reduction in the burden of NCDs. This study, conducted in the Sultanate of Oman, aimed to explore individuals' knowledge, perceptions, actions and intentions to modify their lifestyle to reduce their risk of stroke. The Health Belief Model (HBM) was used as the underpinning theoretical framework to provide a broader conceptual understanding of the Omani sociocultural and structural influences on individuals' lifestyles. A convergent mixed methods design within a realist social constructionism methodology was used. Both quantitative (344 questionnaires) and qualitative (10 interviews) data were integrated using a narrative weaving approach.

The study results confirm that both agency and structure influenced the adoption of healthy behaviours in Oman. The study indicates that the study participants are likely to engage in health-related behaviours when they perceived the benefit of such a course of actions in term of it reducing their risk of stroke. The study found that in the Omani setting, individual factors such as fear, family experience and physical sickness, the psychological status of chronic conditions and a cost-benefit analysis of the behaviour influence the individuals' decisions to practise a healthy lifestyle. The major finding in the study showed that perceptions of risk vary among individuals who share the same culture and religion, particularly individual perception of religious belief was found to influence their susceptibility to stroke risk. In addition, the study identified some sociocultural and structural factors that influenced the individuals' decisions to engage in a healthy lifestyle.

This study presents an extended HBM to incorporate the role of individual religious beliefs as an individual factor. The study suggests that health improvement plans are needed in Oman to develop both individual- and community- level interventions to achieve the target of SDGs for NCDs.

Lay summary

The global warning about the burden of noncommunicable diseases (NCDs) including cardiovascular diseases and stroke, means that countries worldwide need to rise the challenges presented by the high prevalence of NCDs. Whilst, governments' are moving to establish legislation and interventions, there is a need to empower individuals towards healthy lifestyles and healthy decision making. This priority of health promotion intervention needs to be coordinated with other political, legislation or social movement to tackle NCDs.

This study explores the knowledge, perceptions, actions, and intentions to modify the risk of developing stroke among 'at risk' Omanis. The study explores these concepts through the constructs of the Health Belief Model (HBM). This mixed methods study explores the individual participants' perceptions of their risk of having a stroke and the factors that influence their decisions to adopt healthy lifestyle behaviours.

The study shows that there are individual and environmental factors that influence a person's decisions with regard to health. The study found that an individuals' perceptions of religious beliefs influence their susceptibility to health risk. In addition, the study reports the importance of social factors (experiential learning among family members, friends or neighbours, social visiting) and other structural factors (weather, the absence of medical emergencies ambulance service in Oman).

The study suggests modifying the HBM to incorporate the perception of religious beliefs as an individual factor. The study recommends that the health promotions in Oman to adopt individual- and community- level interventions to address the burden of NCDs.

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أشكر زوجي (نصر) وأولادي (شهد وعبد الرحمن وشموخ ونور) وعائلتي على الدعم والتضحيات التي قدموها
لجعل هذا ممكنا.

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Glossary

Allah: the name of God in Arabic.

NCDs: NonCommunicable Diseases

CVDs: Cardiovascular Diseases

WHO: World Health Organisation

HBM: Health Belief Model

SDGs: Sustainable Developmental Goals

MDGs: Millennium Development Goals

MOH: Ministry of Health

DALYs: The Disability-Adjusted Life Year

SES: Socio-Economic Status

GCC: Gulf Council Countries (Oman, Saudi Arabia, Kuwait, Qatar, Bahrain, United Arab emirates)

Health-related lifestyle behaviours: lifestyle behaviours that influence individual`s health

Health preventive behaviours: healthy behaviours that promote healthy lifestyle such as diet control, regular exercises, limits of alcohol, or medication adherence.

AF: Atrial Fibrillation

CHF: Chronic Heart Failure

NHS: National Health Service, United Kingdom

UK: United Kingdom

DASH diet: Dietary Approach to Stop Hypertension

AHA: American Heart Association

CEA: Carotid Endarterectomy

CAS: Carotid Artery Stenting

TIA: Transient Ischemic Attack

Quran: Islam's Holy book

MHLC: Multidimensional Health Locus of Control

GLHC: The God Locus of Health Control

QUN: Quantitative Research Method

QUL: Qualitative Research Method

SQR: Stroke Recognition Questionnaire

Chapter 1 Introduction

1.1 Introduction

The shift in the burden of diseases from communicable to noncommunicable diseases (NCDs) has attracted the attention of the global health community. In response to this, health promotion policies, strategies and guidelines have been developed to tackle NCDs. Although there has been a slight reduction in the rate of mortality for NCDs, the morbidity and burden of NCDs has risen. This necessitates further understanding of the issues pertaining to health and health-related decisions, exploring particularly the factors that lead an individual to take a certain health action or decision. The global challenge of tackling NCDs has affected countries at all levels of income and development, including developing countries. The Sultanate of Oman (where this study was conducted) is no different.

This chapter highlights the structure of the thesis and the focus of each chapter. Furthermore, this introductory chapter discusses the rationale for the topic, the aims and objectives of the study and the study questions.

1.2 The structure of the thesis

The thesis is structured using an IMRAD structure that is Introduction, Methodology, Results and Discussion. The thesis comprises six chapters: Introduction, Review of the Literature, Methodology, Results, Discussion and Implications. The following sections outline the focus of each chapter.

1.2.1 Introduction

This chapter introduces the emergent global interest in NCDs and the importance of the study within the Omani context. It also outlines the study aim, objectives and the research questions. Moreover, this chapter aims to introduce the main points that are covered in each chapter in this thesis.

1.2.2 Review of the Literature

The literature review chapter discusses the main points around NCDs, cardiovascular diseases (CVDs) and stroke. Furthermore, stroke prevention and health promotion strategies are discussed. The chapter also reviews individuals and examines the structural factors that influence an individual's ability to make healthy decisions.

These factors are discussed based on the empirical knowledge, followed by a focused review of Omani perspectives. Oman is a Muslim country which has a variety of cultural backgrounds represented within its population. Islamic practice and beliefs influence daily life in the country; as a result, a number of perspectives of Islamic promotion of health and preventive health practice are explored in the review chapter.

1.2.3 Study Method and Methodology

In this chapter, the method and methodology of the study are presented. In addition, the researcher reflects on the learning journey during this PhD study. Realist social constructionism was used as a study methodology. This conceptual framework combines the roles of agency and structure since both influence individuals' behaviours and decisions. Individuals make conscious decisions that are based on their beliefs and dispositions developed from social interactions. Further, the chapter describes the convergent mixed-methods design that was employed to answer the research questions. Qualitative and quantitative approaches were integrated to form a complementary understanding and build on the results of both the qualitative and quantitative findings. In addition, the study method of qualitative and quantitative data analysis is described. Then, the method of integration is explained.

1.2.4 Results

A narrative-weaving approach was used to describe and integrate both the quantitative and qualitative results in this chapter (Curry, 2015). Using the Health Belief Model (HBM) constructs, the study's themes and quantitative results were integrated. The results reveal the factors that influence the Omani participants' ability to make healthy decisions. The participants' knowledge and perceptions of the risk of stroke and their present healthy lifestyle behaviours and intentions to adopt more preventive health behaviours are reported. Factors that influence the behaviours of the individuals, such as knowledge, age, physical sickness and chronic illness, are presented. In particular, the role of Islam in shaping health behaviour is identified as an important finding. In addition, there are many sociocultural and structural factors that can act as either motivators or barriers to the making of preventive health decisions.

1.2.5 Discussion

The HBM constructs and conceptual meaning were confirmed by the study results. An individual's decisions about health are influenced by the extent to which they perceive the benefit of healthy behaviours. This chapter elaborates the HBM constructs within Omani society and the influences of these on individuals' healthy decisions. Furthermore, the chapter discusses the role of religion in influencing decisions related to health, with a focus on Islam. The associations between health and religion have been well established in the literature, yet the influence of religious beliefs has not been demonstrated in HBM studies. Although several authors have included religion as a variable in their study, this has been restricted to either demographic data or as a cultural variable. This study shows that individuals who share the same culture have varying individual perceptions with regard to their religious practice. The chapter concludes with the suggestion to extend the HBM to consider religious beliefs as an individual or personal factor that influences risk perceptions.

1.2.6 Implications for Theory, Practice and Research

This chapter explains the study's main contribution to knowledge; that is, the role of religious beliefs in influencing individuals' risk perceptions of diseases. In addition, this chapter suggests a number of health promotion interventions at the individual and community levels aimed at tackling NCDs, CVDs and stroke.

1.3 Rationale of the topic to health promotion

Understanding human action and reactions is very complicated. Although there is much in the way of health interventions and government legislation in high-income countries aimed at reducing the burden of NCDs, the issue continues to be amplified. The global interest in an effort to tackle NCDs including CVDs and stroke has succeeded in reducing the mortality, but further action is required to reduce morbidity and the burden of these diseases. Adding to the increase in the ageing population, attention should also be drawn to the rise in the prevalence of NCDs among young age groups. Despite this, the previously set Millennium Development Goals (MDGs) included no actions with regard to NCDs. In contrast, however, the United Nations Sustainable Development Goals (SDGs) 2015 do include provision for a better future for the coming generation, with 17 goals and themes addressing poverty eradication, sustainable energy, water and better sanitation, health and human settlement. The goals

were followed by strategies and plans of action incorporating the role of government, community initiatives and individuals, all interacting to achieve the goals. Individuals have a crucial role to play within this framework; fundamentally it is their beliefs and attitudes, abilities and capabilities that implicitly influence healthy decisions. Individuals make decisions based on their beliefs and attitudes that they have developed from their surroundings. Recognising an individual's beliefs and attitudes is integral to understanding how he or she appraises healthy behaviours and copes with the challenges (Downie et al., 1996). More attention is given to the importance of people's attitudes towards themselves, with this element having a strong association with health-enhancing behaviours (Downie et al., 1996). Studies seeking to understand people's actions in relation to illness have tended to find that adherence to treatment, for example, is related to individual self-regulation or control (Blaxter, 2010). Individuals' attitudes with regard to their perceived susceptibility or vulnerability has been shown to be related to the uptake of preventive action or behaviours (Downie et al., 1996). HBM is possibly the best-known model highlighting the function of beliefs in decision-making (Naidoo and Wills, 2016). The concept of perceived vulnerability is an integral part of the HBM. It suggests that an individual's perception of being susceptible to a disease and their perceptions with regard to the relative costs and benefits of any preventive behaviours are related to the likelihood that they will engage in such healthy behaviours (Downie et al., 1996). This form of cost/benefit analysis can be influenced by sociocultural, economic or other structural factors, and it is these underlying factors that need to be further explored in order to understand their influence from the perspectives of individuals. This study uses the HBM to explore the factors that influence individual healthy decisions among Omani participants 'at-risk' of stroke. Moreover, this study's findings and implications can be applied to many countries with multiculturalism, specifically to their Muslim populations. This is because Muslims share religious beliefs and many health-related life practices despite the fact that they come from different cultures or live in different societies.

1.4 Significance of the study from the Omani perspective

This study was conducted in the Sultanate of Oman, which is one of the countries in the Arabian Gulf. It is located in the south-east of the Arabian Peninsula. Based on the

population clock at the National Centre of Statistics and Information on 5 October 2017, the population of Oman is 4,636,712. Of this total, only 2,527,235 are Omanis (Oman NCSI, 2017). In the early 1970s, there were high morbidity and mortality rates of communicable diseases such as malaria, trachoma, pulmonary tuberculosis and hepatitis in Oman (Alshishtawy, 2010). In 1970, when the Oman Renaissance started by His Majesty the Sultan Qaboos Bin Said assumed rule of the country, life in Oman changed dramatically. The development of oil and gas as a major source of national income led to increases in national Gross Domestic Product (GDP), which in turn led to extreme changes in people's lives. This development brought prosperity and social and economic progress to all the people of Oman, with health now becoming a primary concern (Alshishtawy, 2010). Due to health prevention and control plans related to communicable diseases, the country's average life expectancy rose from 49.3 years in the 1970s to 71.6 years in 2008 (Alshishtawy, 2010).

Yet despite the better health care interventions, rapid urbanisation, sedentary lifestyles and poor dietary habits have led to a shift in the burden of disease (Hosseinpoor et al., 2012, Al-Mawali, 2015). In fact, there have been dramatic changes in people's lifestyles and health-related lifestyle behaviours over the last 47 years in Oman, with a focus during the early 1970s on building health infrastructure and the prevention of communicable diseases (Alshishtawy, 2010). Later, as part of the country's five-year plans, strategic planning and health interventions began to prioritise the early prevention of disease and the role of community involvement in health promotion interventions that focused efforts to tackle the challenges of the country's demographic, economic and social changes (Alshishtawy, 2010).

In common with other countries, the burden of disease had shifted from communicable to noncommunicable diseases, bringing challenges for Omani patients, families and the health care system today. The prevalence of NCDs in Oman is alarming (Al-Mawali, 2015, Mabry et al., 2017). NCDs lead to approximately 68% of total deaths in Oman, with CVDs accounting for 33% of this figure (Al-Mawali, 2015). In 2016, NCDs accounted for 47.6% of total outpatient morbidity and 40.3% of inpatient discharges in Ministry of Health (MOH) institutions in Oman (Oman D.H.I.S, 2016). Diseases of the circulatory system were the leading cause of morbidity among men

and the second leading cause among women in MOH institutions in 2016 (Oman D.H.I.S, 2016). Moreover, 18% of 30- to 70-year-olds have a high probability of dying from NCDs (Al-Mawali, 2015).

Although these statistics reveal the current challenges that the health care system in Oman is facing, the actual problems may be greater still as the prevalence of modifiable risk for NCDs is rising. As an example, 10% of youth use tobacco products, and 12% have been affected by passive smoking (Al-Mawali, 2015). In addition, it has been determined that one in five Omani adults spends prolonged periods sitting, which is understood to be a factor that can lead to deleterious health consequences (Mabry et al., 2017). Moreover, 84% of adolescents engage in insufficient levels of physical activity, high blood pressure in adults is seen in 25% of the population and obesity is seen in 21% of the population (Al-Mawali, 2015). Consequently, CVDs are the leading cause of death in Oman, accounting for around 30% of all MOH hospital deaths (Al-Mawali, 2015). Furthermore, Omani women share a common risk of NCDs with other nearby Arabian Gulf countries. The prevalence of obesity, physical inactivity, diabetes and hypertension among women in the six countries of the Gulf Cooperation Council (GCC; Oman, Saudi Arabia, the United Arab Emirates, Kuwait, Bahrain and Qatar) currently ranks as the highest globally (Alshaikh et al., 2017). In addition, these conditions are related to lifestyle-related diseases among the female population (Alshaikh et al., 2017).

In line with the global challenges posed by the spread of NCDs among youth and the increasing size of the ageing population as a proportion of countries' total population is the need for collective action aimed at health promotion interventions. Individual, government and community actions are required to move towards the adoption of preventive health behaviours as part of a healthy lifestyle.

Modification of diets, physical activity, smoking cessation, adherence to medication and other preventive health behaviours have been communicated to the public through primary health care education programmes, but lifestyle preventive health behaviours require long-term adherence. Making the change to a healthy lifestyle and adhering to it in the long term requires more than general knowledge (Alm-Roijer et al., 2004). Besides knowledge, there are also social, cultural, environmental and financial factors

that all play a part in influencing Omanis' decisions to adopt a healthy lifestyle. Sociocultural factors influence behaviours, beliefs and health decisions (Elliott et al., 2013). Chronic illness requires long-term management, with some diseases, such as the management of diabetes, for example, demanding self-management approaches that require patients to be knowledgeable, skilful and to adhere to a treatment regime. The trajectory of chronic illness has moved from a curative approach to a long-term management approach (Murray et al., 2017). Long-term management impacts on the developmental process, especially in a country such as Oman that is undergoing rapid demographic transition (Kamran et al., 2007).

Recently, NCDs such as cardiovascular disease, diabetes, hypertension and obesity have been ranked among the leading contributors to morbidity and mortality rates in Oman (Elliott et al., 2013, Riyami et al., 2012, MOH, 2015). These indicators point to a rise in the risk of developing stroke. Kamran et al. 2007 argued that although the amount of available stroke data in GCC countries is relatively small compared to that in developed countries, the morbidity and mortality rates are similar (Kamran et al., 2007). The MOH in Oman opened the country's first stroke unit at the Royal Hospital in Muscat in 2013. There has been a collaborative project between the MOH and the Royal College of Physicians in London to develop the Omani Stroke Manual. These efforts are at the treatment level, but more also needs to be done at the preventive level (Kamran et al., 2007, Al Shafae et al., 2006).

A study by Al Shafae and colleagues was the first of its kind in Oman to assess patients' stroke knowledge and risk perceptions. The authors found that the patients in the study were unaware of their increased risk of stroke due to their poor knowledge of the condition (Al Shafae et al., 2006). Although the study was conducted within a tertiary-level hospital at which patients from different areas in Oman are treated, there is an urgent need to investigate the perception and knowledge of stroke and its risk factors among high-risk patients in secondary health care institutions in Oman, which is where patients need to be knowledgeable about their illnesses and their risk of developing stroke in order to move towards better prevention. In addition, Al Shafae concluded that further studies are required in this area (Al Shafae et al., 2006). Despite the availability of treatment, there is a very significant lack of public

awareness with regard to the appropriate time to reach hospital following a stroke. Poor public knowledge about stroke and its risk factors has been observed (Al Shafae et al., 2006); it has also been stated that it is possible to prevent stroke incidence, reduce its impact and reduce the time to access treatment through increasing public awareness about stroke (Kamran et al., 2007). Delays in recognising the warning signs and risk factors of stroke can lead to complications that can be irreversible.

Although Al Shafae et al. (2006) suggested the development of an educational programme about stroke in 2006, with the intention of reducing the gap in patients' knowledge about stroke and risk perceptions (Al Shafae et al., 2006), there is currently no such educational programme in Oman about stroke for either the general public or at-risk patients. Having educational programmes about stroke at the level of the GCC has also been suggested (Kamran et al., 2007) and there is a strong need to develop such programmes at the national level. Prior to calling for the development of such a programme, this study explores 'at-risk' patients' knowledge and perceptions about stroke risk among the Omani population.

Initially, it is important to examine the knowledge, perceptions and level of stroke risk awareness among patients who have major stroke risk factors in their lives. The saying 'prevention is better than cure' is particularly relevant in the context of tackling stroke. The consequences of disability following a stroke can be reduced by preventive actions. Prior knowledge about stroke and recognising individuals' susceptibility to the condition can motivate them towards prevention. Awareness of stroke risk factors and warning symptoms is important for preventive purposes and for effective emergency treatment (Das et al., 2007). Effective stroke treatment needs prior knowledge and recognition of individuals' risk of stroke.

1.4.1 The aim, objective and questions of the study

This study aims to explore knowledge, perceptions, actions and intentions to modify health lifestyle behaviours to reduce the risk of stroke among at-risk Omani patients. The study is carried out among patients in Oman who can be classed as being at risk of stroke; as such, it includes mainly patients with diabetes, hypertension or heart disease.

1.4.1.1 The objectives of this study are:

1. To assess patients' knowledge of stroke, its risk factors, signs and symptoms and appropriate responses.
2. To explore patients' perceptions of their susceptibility to stroke.
3. To obtain insights about patients' perception of their perceived severity of stroke threat.
4. To assess patients' behaviours or intention to reduce their perceived stroke risk.

1.4.1.2 The study questions

Are Omani patients knowledgeable about stroke, its risk factors, signs and symptoms?

Are Omani patients aware of the appropriate action to take when there is a suspected case of stroke?

Are Omani patients aware of their own susceptibility to stroke?

Is Omani patients' alertness to their level of stroke risk related to their medical condition?

What actions or behavioural changes do Omani patients intend to adopt to reduce their perceived risk of stroke?

What are the factors that can assist in reducing their risk factors?

In summary, the burden of NCDs in premature death or early development of chronic illness is a global issue. Oman, as a developing country, seeks to improve and promote the health and well-being of its citizens. To do so, this study aims to explore the factors that influence individuals' health decision-making among 'at-risk' patients in Oman.

This chapter has explained the structure of the thesis and highlighted the focus of each chapter. Further, the chapter has elaborated the importance of the study from the Omani perspective as well as covered the global interest in this topic.

Chapter 2 Review of the Literature

2.1 Introduction

Global attention has moved to noncommunicable diseases (NCDs), although there has been a recent slight decline in the reported mortality of NCDs in developed countries. Despite this, the global burden of these diseases continues to be felt in those countries (Murray et al., 2012). Stroke as an NCD places a heavy burden on patients, families and health care systems and therefore requires serious action. At the health intervention level, the tackling of stroke is primarily based on lifestyle modifications (Endres et al., 2011, Chiuve et al., 2008). Individuals' preventive health behaviours are based on their ability to make healthy decisions. This ability can be influenced by many factors, including personal, social, environmental, religious and financial factors (Delamater, 2006). However, managing chronic illness requires long-term adherence to healthy lifestyle modifications. Health promotion plans should consider the factors that influence individuals' adoption of healthy behaviours and their adherence to those behaviours in the long term.

This literature review is divided into two parts. The first part reviews the global burden on NCDs and CVDs, with a focus on stroke. In addition, the preventive health care approach to lessening the burden of stroke is discussed. Furthermore, some of the factors that influence individuals' healthy decisions and adherence are elaborated.

The second part of the review focuses on the Omani context and the burden of NCDs on Omani society. Moreover, the review highlights health promotion from the Islamic perspective.

2.2 Part One

2.2.1 The global burden of noncommunicable diseases (NCDs)

Cardiovascular disease, cancer, chronic respiratory diseases and diabetes are the four major conditions that are commonly referred to as chronic or noncommunicable diseases (Unwin and Alberti, 2006). The very nature of such chronic illnesses means that they are long-term conditions. Whilst these NCDs are non-infectious, their spread presents a global crisis (Beaglehole et al., 2011). The shift from communicable to noncommunicable diseases was confirmed in the results of the Global Burden of

Disease Study 2010 (Murray et al., 2012), which confirmed NCDs to be the main cause of death and disability across the world (Sridhar et al., 2013). The World Health Organization (WHO) has estimated that NCDs were responsible for 61% of global mortality and 49% of the global burden of disease in 2005 (Riyami et al., 2012). This spread of NCDs has been accompanied by a wide range of behavioural, biological, social, environmental and economic factors (Kelly et al., 2012). The Global Burden of Disease Study 2010 showed that the number of individuals aged 75 years and older has risen globally, from 119 million in 1990 to 206 million in 2010 (Murray et al., 2012). While there has been a decline in communicable, maternal, neonatal and nutritional disorders (Murray et al., 2012), factors such as population growth, the ageing population, lifestyle, demographics and social changes have contributed to increase the number of deaths from NCDs (Sridhar et al., 2013, Murray et al., 2012). Again, this shift from communicable to noncommunicable diseases was reported in the Global Burden of Disease Study 2010 (Murray et al., 2012). Moreover, the Global Burden of Disease Study 2013 showed that 64% of deaths were caused by NCDs (Forouzanfar et al., 2015). The burden of disease is measured using age-standardised disability-adjusted life years (DALY), and although the DALYs rate due to NCDs showed a decline in the Global Burden of Disease Study 2015, the total burden for the majority of NCDs had increased (Feigin, 2016).

Cardiovascular and circulatory diseases, including both stroke types (ischaemic and haemorrhagic), were identified as among the main contributors to DALYs lost in the Global Burden of Disease Study 2010 (Murray et al., 2012). The DALYs rate measures the number of years of healthy life lost due to death and non-fatal illnesses or impairments for different age-sex groups and locations (Murray et al., 2012). NCDs count for 68% of global deaths and are projected to be the cause of 75% of deaths globally by 2030 (Rath et al., 2016). In addition, 90.5% of the stroke burden, as measured by DALYs, is attributable to modifiable risk factors that require control of behavioural and metabolic risk factors (Feigin et al., 2016).

There are many implications of the increasing prevalence of NCDs on the development process. For example, it could hinder the social and developmental process because of the chronic nature of the diseases and the debilitating course of treatment and

rehabilitation (Sridhar et al., 2013). The global rise in the incidence of NCDs has been found to be a barrier to achieving development goals including poverty reduction, health equality, economic stability and human security (Beaglehole et al., 2011). NCDs have major impacts on individuals of working age and their elderly dependents which can result in income loss, loss of opportunities for investment and overall lower levels of economic development (Unwin and Alberti, 2006, Byun and Evans, 2015). NCDs present an enormous and growing strain on health care systems worldwide and are the source of social and economic costs at both the national and household levels (Diem et al., 2016).

NCDs affect countries across the world, in all income groups, with almost 80% of NCDs occurring in low- and middle-income countries, thus demonstrating that NCDs are no longer diseases of wealth (Diem et al., 2016). Developing countries often face a double burden of diseases due to the continued prevalence of existing communicable diseases and the increasing epidemic of NCDs. This is occurring when most of these countries are focused on the prevention of communicable diseases, with less emphasis being placed on NCDs (Rath et al., 2016) and also when they are being challenged by the demands of basic development priorities (Kelly et al., 2012). In addition, the reported rates of mortality in low- and middle-income countries occur before the age of 60 years, with this level of premature death leading to substantial loss of human, economic and financial resources (Dugani and Gaziano, 2016). Such a challenge places a strain on the health care and developmental process in these countries (Rath et al., 2016). Income has been suggested as a predictor of stroke since age-adjusted rates of stroke are high among the poorest people (Johnston et al., 2009).

The rapid increase in NCDs was only addressed at a global level in 2011, following the United Nations call for a high-level meeting on NCDs in September 2011. Although there were many suggestions for a programme of international integrated responses aimed at addressing the increased burden of NCDs, these diseases and their risk factors were not included in the targets for the 2000–2015 MDGs (Sridhar et al., 2013). However, despite no significant or obligatory commitments being made, the meeting was successful in drawing the world's attention to the issue.

Following on from these developments, in 2013 the WHO incorporated the ‘25×25’ strategy that listed nine voluntary national targets as part of its Global Action Plan for the Prevention and Control of NCDs 2013-2020 (Pearce et al., 2015). The aim of this plan is to achieve a 25% reduction in the burden of NCDs by 2025. Two of the plan’s overarching targets are to reduce mortality from NCDs and to halt the rise in diabetes and obesity. The other specific targets are focused on reducing alcohol consumption, increasing physical activity, reducing dietary salt intake, reducing smoking, improving blood pressure control and enhancing treatment for those at risk of or suffering from the major NCDs (Pearce et al., 2015).

Recently, the United Nations Summit in 2015 adopted a series of Sustainable Development Goals (SDGs) (Norrving et al., 2015). These include 17 goals and 169 targets. Goal 3.4 aims to reduce premature mortality from NCDs by one-third through prevention and treatment. The suggested targets for each goal make them more achievable and measurable. This universal agenda seeks to build on the MDGs and set realistic expectations (Rath et al., 2016). However, achieving the SDGs involves cost-effective strategies, coordinating mandates between different sectors, strengthening health care systems, improving monitoring and expanding coverage of essential medicine, technologies and treatments (Fanzo, 2016). Substantial changes to the social, economic and public health infrastructure of various countries have been reported as efforts to achieve NCD action plans (Norrving et al., 2015). Though the plan is to support the lowest-income countries, the financial strain associated with strengthening health care systems involves all countries (Norrving et al., 2015). Achievement of both the SDGs and the WHO NCDs Action Plan 2013–2020 in low- and middle-income countries are financially challenging for those countries.

The increase in the prevalence and burden of NCDs has attracted the attention of the research community in terms of examining the prevalence and monitoring of diseases rather than forming explicit theories, thereby leading to increasing epidemiological attention being paid to identifying the determinants of chronic illness associated with an ageing population and modern living conditions (Abel and McQueen, 2013). Despite NCDs not being infectious and thus not spread via a microbial virus and transmitted among people, the global epidemiology and spread of these diseases does

contain hidden messages in terms of the fact that people's modelling and emulating of others' behaviours can lead to an increase in behaviour-related disease or illness. Globalisation and modern living have changed many aspects of individuals' lives, bringing associated changes in lifestyle behaviours. The leading risk factors for NCD are high blood pressure, tobacco use, high blood glucose, physical inactivity, obesity, high cholesterol and alcohol use (Diem et al., 2016). Many of these issues require a conceptualising of health-related behaviours and factors that influence the adoption of these behaviours. Responding effectively to NCDs is not a matter of changing individuals' behaviours in isolation; rather, it requires broader changes in social, economic, environmental and cultural contexts (Diem et al., 2016).

CVDs were found to be the main cause of death worldwide in the 21st century (Santulli, 2013). CVDs are the major cause of premature death and the main cause of morbidity out of all NCDs (Fanzo, 2016). Moreover, the Global Burden of Disease Study 2013 estimated that almost 30% of all deaths worldwide were caused by CVDs (Bhatnagar et al., 2015). CVDs represented the most common cause of preventable deaths globally (Santulli, 2013). CVDs were again among the leading causes of NCDs in the Global Burden of Disease Study 2015 (Feigin, 2016). In addition, the contributions of significant global changes in behaviour and lifestyle such as poor diet, tobacco use, physical inactivity, excess alcohol use and psychosocial factors are increasing cerebrovascular disease across countries and regions (Kelly et al., 2012). While the greatest burden affects low- and middle-income countries (Fanzo, 2016), countries across all income groups share a number of common major risk factors and are presented with similar challenges. In the UK, for example, the direct and indirect societal costs of stroke are estimated to be in the region of 8.9 billion pounds a year (Endres et al., 2011). The prevalence of cardiovascular risk factors is greatest in high-income countries (Mahmood et al., 2014) as the risk of stroke is more prevalent in high-income countries. While the increased incidence and mortality of stroke in low- and middle-income countries can be attributed to reduced access to primary care services in those countries (Johnston et al., 2009), the cost of CVD interventions, such as pharmacological spend, generate a relatively larger burden on the often very limited health care systems in developing countries (Suhrcke et al., 2012). This can be

identified as contributing to the increased incidence and mortality from CVDs in low- and middle-income countries.

Despite the recent decline in the incidence and mortality of CVD and stroke, a further rise is expected with increased population ageing (Marsh and Keyrouz, 2010). Also, the level of disability caused by CVD and stroke continues to have a high impact on patients, their families and countries' health care systems (Chuluunbaatar et al., 2016). The decline in CVD mortality means an increased number of people are living with CVDs and higher numbers of prescriptions are issued as a form of secondary prevention (Bhatnagar et al., 2015). Chronic illnesses such as stroke have an impact on individuals' quality of life, and their level of dependency impacts upon the improvement process. Living with long-term illness associated with poor outcomes can raise the burden of stroke for individuals, health systems and society as more patients survive a stroke and live with its impacts as a long-term condition (Crichton et al., 2016). In addition, CVDs have continued to be the biggest cause of mortality in women (Bhatnagar et al., 2015). Therefore, there is a need to apply evidence in public health settings to tackle both behaviour-related factors and the underlying social and economic conditions (Diem et al., 2016). The prevention of NCDs requires an inter-sectoral collaborative approach between governments, non-government organisations and the health sector to tackle the spread of NCDs (Norrving et al., 2015). NCDs and CVDs must be tackled at all sector levels.

2.2.2 Stroke: a Global Alarm

As a leading cause of mortality, morbidity and disability (O'Donnell et al., 2010, Chen et al., 2013), stroke threatens patients, families and health care systems. This threat can be reduced or even controlled through early intervention or management. The decline in stroke mortality during recent years has contributed to lives being saved but has also led to increasing numbers of people surviving with a disability as a consequence of increasingly ageing populations. The concept of stroke as a disease of the elderly is being challenged with recent evidence of younger people developing risk factors for stroke such as diabetes (Feigin et al., 2014). The proportion of young and middle-aged adults affected by stroke has increased, and this should raise warnings about stroke globally (Feigin et al., 2014). Developing countries face the challenge of having the

largest mortality and burden of CVDs (Suhrccke et al., 2012). Besides having a young population, the burden of stroke was greater overall in individuals younger than 75 years, especially in low- and middle-income countries (Feigin et al., 2014).

2.2.2.1 The global prevalence of stroke

Stroke is one of the major causes of mortality both in the UK (Syed et al., 2012) and worldwide (Feigin et al., 2014). The burden of ischaemic and haemorrhagic stroke varies globally. Differences can be noted in terms of prognosis, the prevalence of risk factors, treatment strategies and other factors (Krishnamurthi et al., 2013). Between 1990 and 2010, there was a significant increase in the burden of ischaemic and haemorrhagic stroke globally in relation to both its prevalence as a disease and the carer burden. More recently, however, a more positive outcome has been noted towards a reduction in mortality rates for both ischaemic and haemorrhagic stroke (Krishnamurthi et al., 2013). Over the past two decades, age-standardised rates of stroke mortality have decreased worldwide; nonetheless, there have been important increases in the absolute number of people who only have a stroke, stroke survivors, related deaths and the overall global burden of stroke (DALYS lost) (Feigin et al., 2014, Jaracz et al., 2015). This has led to around 33 million people living with stroke worldwide and a sizeable proportion of these suffering from a moderate or severe disability (Jaracz et al., 2015). Such a reduction is attributed to advances in diagnosis, preventive measures and the promotion of health improvement programmes (Krishnamurthi et al., 2013).

2.2.2.2 Definition of stroke and its major types

The World Health Organization (WHO) defines stroke as ‘rapidly developing clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of a vascular origin’ (Sacco et al., 2013). Stroke is characterised by a sudden onset of neurological symptoms and may be ischaemic or haemorrhagic in form (Mant, 2011). There are other subtypes, but these are the two most commonly known types of stroke. Eighty-seven per cent of strokes are ischaemic, nine per cent are the result of an intracerebral haemorrhage and four per cent are due to subarachnoid haemorrhage (Marsh and Keyrouz, 2010). Ischaemic stroke is caused by an occlusion that can result from a large artery atherosclerotic thromboembolism, cardiac thromboembolism, lacunar syndrome, non-

atheromatous arterial disease or haematological disorders (Baker, 2008), while haemorrhagic stroke is caused by bleeding from a blood vessel supplying the brain, commonly by the rupture of an aneurysm (Mant, 2011). Although the incidence of subarachnoid haemorrhage (SAH) is relatively low, it is known to have a significant effect on the rates of death and disability. In the UK, SAH mortality rates have increased to about 50%, with around 25% of patients at risk of death before reaching hospital (Luoma and Reddy, 2013). The disability caused by an SAH leaves one-third of survivors dependent on caregivers. Moreover, cognitive impairment affects patients' quality of life (Luoma and Reddy, 2013). It is essential that immediate management be carried out, guided by early diagnosis (Luoma and Reddy, 2013). Although haemorrhagic stroke is associated with a higher mortality rate, ischaemic stroke is more common.

2.2.3 Stroke risk factors

There are two types of stroke risk factors: modifiable and non-modifiable (Labarthe, 2010). The major modifiable risk factors are related to lifestyle and include hypertension, diabetes, smoking, obesity and other lifestyle-related disorders. Conversely, the non-modifiable risk factors are age, sex, genetics and ethnicity (Endres et al., 2011). Hypertension, current smoking, abdominal obesity, diet and physical inactivity make up more than 80% of the global risk factors for all strokes (Endres et al., 2011). Moreover, a systematic review that included 81 cohorts showed that smokers when compared with non-smokers had an excess risk of stroke with higher risk among women who smoke than men who smoke (Peters et al., 2013a).

Recently, 90% of the population-attributable risk of stroke was found to be associated with ten potentially modifiable risk factors; hypertension, smoking, diabetes, physical inactivity, diet, psychological factors, abdominal obesity, alcohol, cardiac causes and apolipoproteins (O'Donnell et al., 2016). Highly significant risk factors for ischaemic stroke are smoking, abdominal obesity, diet, physical inactivity, diabetes mellitus, alcohol intake, psychosocial factors, hypertension and apolipoproteins (O'Donnell et al., 2010). Hypertension has been found to be more associated with intracerebral haemorrhage than ischaemic stroke, whereas smoking, diabetes, apolipoproteins and cardiac causes were more commonly associated with ischaemic stroke (O'Donnell et

al., 2016). The INTERSTROKE study by O'Donnell et al. (2016) reported that stroke risk factors collectively account for a similar population-attributable risk in different regions of the world for both men and women and in younger and older populations (O'Donnell et al., 2016). The INTERSTROKE study was a standardised international control case-study in 32 countries across different regions, that assessed the modifiable risk factors associated with acute stroke. In fact, the majority of stroke risk factors are considered to be modifiable, which means they can be reduced through the adoption of a healthy lifestyle. While non-modifiable factors such age, sex and ethnicity remain a challenge, epigenetic mechanisms have shown promising potential over recent years in terms of their ability to reverse the risk of CVDs (Udali et al., 2013). The recent advance in genomics has demonstrated a possible anticipation of improvement in disease prevention and treatment (Relton and Smith, 2010). Since epigenetics can have a response to environmental cues, this has increased the hope of prevention, diagnosis and treatment of stroke (Matouk et al., 2012). Research studies have shown that epigenetic patterns are altered by environmental factors such as diet, smoking, alcohol intake, environmental toxicants and stress (Relton and Smith, 2010). As an example, taking curcumin as part of the diet has been found to induce genetic and epigenetic components to fight stroke because it produces a vascular defensive effect in persons at risk of a stroke (Kalani et al., 2015). However, cardiovascular epigenetics requires exploration in relation to both a mechanistic and clinical approach (Udali et al., 2013). Epigenetics is challenged by many factors such as cost and ethical issues. But identifying the association between epigenetic patterns and phenotypic traits could be useful in identifying at-risk individuals to promote non-epigenetic-based interventions such as lifestyle modification at an early age (Relton and Smith, 2010).

A recent systematic review showed that hypertension and diabetes can be considered as established risk factors of stroke (Alloubani et al., 2018). Alloubani et al. included clinical trials, published before 2016, that involved patients with hypertension and diabetes as a predictive risk factors for stroke. Many of those studies are well known such as the Framingham Heart Research Study, the UK transient ischemic attack (TIA) aspirin trial, Heart Outcomes Prevention Evaluation (HOPE), and UK Prospective Diabetes Study (UKPDS). The included clinical trials were dated between 1948

(FHRS) and 2016. Moreover, an intensive review of other stroke risk factors such as obesity need to be compared with hypertension and diabetes risk.

In this study, three major modifiable stroke risk factors were selected, including hypertension, diabetes and heart disease. In addition, age was considered in this review as the burden of stroke has been seen to impact both the young and ageing populations.

2.2.3.1 Hypertension

Hypertension is one of the major stroke risk factors (O'Donnell et al., 2010). Increased blood pressure contributes to both cardiovascular and cerebrovascular endpoints, including heart failure, myocardial infarction and stroke (Santulli, 2013). Across ages, gender and race, hypertension is the most robust modifiable risk factor for ischaemic and haemorrhagic stroke (Pandey et al., 2016). Higher incidence of stroke is accompanied by elevated systolic or diastolic blood pressure (Aronow, 2013). Hypertension is considered to be the greatest risk factor for all stroke subtypes (O'Donnell et al., 2010, Pandey et al., 2016). Worldwide, 51% of mortality due to strokes occurs due to elevated blood pressure, and hypertension is associated with 54% of stroke incidence worldwide (Gaciong et al., 2013, Pandey et al., 2016). Alloubani et al (2018) summarized their systematic review by emphasising the significance of treating hypertension to reduce the risk of stroke (Alloubani et al., 2018). Also, the risk of both stroke types (ischaemic and haemorrhagic) increases with existing hypertension, regardless of a history of coronary heart disease or stroke (Gaciong et al., 2013). Moreover, hypertension is considered to be more of a potent risk factor for intracerebral haemorrhage than ischaemic stroke (O'Donnell et al., 2010).

Besides its strong association with atherothrombotic brain infarctions and intraparenchymal haemorrhage, hypertension is very common among the general population (Mark L, 1991). The treatment and control of hypertension has the potential to reduce the burden of stroke. Evidence has shown that reducing blood pressure in mild, moderate or severe hypertension is effective in reducing the incidence of stroke (Gaciong et al., 2013). Moreover, the use of antihypertensive drugs as a primary prevention for stroke has shown a reduction in the incidence of stroke, with long-term use of thiazide diuretics also leading to less severe stroke symptoms (Shih et al., 2014). In fact, there is much evidence to suggest that these drugs can serve as a first-line

antihypertensive medication for primary stroke prevention (Shih et al., 2014). Patients with hypertension developed better functional outcomes after ischaemic stroke with long-term thiazide diuretics (Shih et al., 2014). In addition, the recurrence of stroke can be reduced by controlling blood pressure levels (Towfighi et al., 2014). Lifelong antihypertensive therapy has been shown to be effective with regard to both the primary and secondary prevention of stroke.

2.2.3.2 Diabetes

Diabetes mellitus is considered a worldwide cause of disability and a strong risk factor for stroke (Peters et al., 2014). Diabetes is found to exacerbate the development of atherosclerosis (Bastien et al., 2014). The deleterious effects of elevated glucose levels on the cardiovascular system are promoted by accelerated atherosclerosis. Hyperglycaemia is related to an increase in the magnitude of an ischaemic stroke and has been seen to worsen clinical outcomes following a stroke (Hewitt et al., 2012). Therefore, an increased risk of stroke has been reported among populations with diabetes mellitus (Khoury et al., 2013). With 108 million people living with diabetes in 1980, it was considered that about 422 million adults were living with diabetes globally in 2014 (Fanzo, 2016). It is expected that the incidence of diabetes will rise by more than a half in the next decade due to an increase in the prevalence of obesity and lack of physical activity. Diabetes is predicted to become the seventh leading cause of death worldwide by 2030 (Peters et al., 2014). In fact, the combination of diabetes and cardiovascular disease increases both the prevalence of mortality and of morbidity. Adults with diabetes are at greater risk of strokes than patients without diabetes (Carson et al., 2012). Recent research demonstrated that people with diabetes have 1.5 to 3 times the chance of having a stroke compared to people with no diabetes (Alloubani et al., 2018). The risk of ischemic strokes more than haemorrhagic strokes among adults with diabetes (Carson et al., 2012). Patients with diabetes are expected to have twice the risk of stroke compared to non-diabetic patients (Hewitt et al., 2012).

Diabetes in women has been found to pose greater risk factors than in men. Women with diabetes had a 27% greater relative risk of stroke when baseline differences in major cardiovascular risk factors were taken into account (Peters et al., 2014). Peters et al. (2014) systematic review assessed the estimated relative effect of diabetes on

stroke risk in women compared to men. This study showed that excess risk of stroke associated with diabetes is significantly higher in women than men (Peters et al., 2014). Their review provided evidence for the gender difference in diabetes related risk of stroke, but they highlighted an important limitation as the inability to examine the potential contribution that a women's obstetric and gynaecological history that might have influenced the risk of stroke among women (Peters et al., 2014).

Moreover, patients with type I diabetes mellitus had a markedly increased risk of stroke compared to those without diabetes and were estimated to suffer stroke 10 to 15 years earlier than non-diabetic patients (Hägg et al., 2014). In addition, a lacunar stroke, which is a small vessel disease, is most common in patients with type II diabetes at an earlier age with or without metabolic syndrome (Shah et al., 2008). The risk of having a stroke rises with the increase in diabetes duration (Hewitt et al., 2012). A population-based study found that one in four people with diabetes displayed stroke symptoms, thereby indicating that screening diabetes patients for stroke symptoms is warranted (Peters et al., 2014).

Treating hyperglycaemia has not shown beneficial outcomes in relation to either primary or secondary stroke prevention (Hewitt et al., 2012). Hewitt et al. (2012) argued that despite the effects of lowering stroke risk among diabetes patients through antihypertensive drugs, the effectiveness of reducing blood pressure to below 140 to prevent stroke among diabetes patients needs to be investigated further. Lifestyle modification is the most promising area in terms of reducing the risk of stroke among diabetes patients with adherence to their diabetes drugs.

2.2.3.3 Heart disease

Mortality post stroke is strongly associated with heart disease and atrial fibrillation (AF) (Mogensen et al., 2013). Heart failure is considered to be an independent risk factor for strokes (Agarwal et al., 2014). Approximately 25% of ischaemic strokes are caused by a cardiac embolism and about 10 to 24% of patients with ischaemic strokes have a history of chronic heart failure (CHF). It was found that AF leads to emboli in patients with CHF, which is a risk factor for ischaemic stroke but not for haemorrhagic stroke. In addition, ischaemic stroke can be associated with valve diseases (Endres et al., 2011). In comparison to patients with normal cardiac function, a patient with

cardiac impairment, either symptomatic or asymptomatic, was found to have more than twice the risk of stroke (Mark L, 1991). Those with baseline electrocardiographic abnormalities, including ST depression, left ventricular strain, left ventricular hypertrophy, major T wave inversion and overall major abnormalities, had considerably higher incidence rates for both thromboembolic and haemorrhagic stroke than others in normal baseline studies (Mark L, 1991). In addition, mitral valve prolapse has been demonstrated to have an association with stroke in young people. In 2010, ischaemic heart disease and stroke were two of the top five causes of death in all income groups in the Arab world, including Oman (Rahim et al., 2014). The prevention of atherosclerosis as a disease that affects the large and medium arteries of the entire arterial tree could lower the risk of ischaemic stroke and ischaemic heart disease (Marsh and Keyrouz, 2010).

2.2.3.4 Age

Ageing is associated with chronic illness, specifically CVDs and stroke. But premature and preventable casualties account for 16% of global deaths that occur at the most productive age of below 60 years, with around 42% of deaths occurring under the age of 70 years (Rath et al., 2016). However, the recent projected rise is due to the increasingly ageing populations of developed countries (Marsh and Keyrouz, 2010). Whilst developing countries including Arab countries continue to have relatively younger populations in comparison, as these populations age, the burden of NCDs and CVDs is expected to rise (Mokdad et al., 2014).

Nonetheless, the burden of stroke is not confined to the elderly population but is also known to extend to the younger generation. The traditional image of stroke as a disease of the elderly is increasingly being challenged. The incidence of stroke affecting young and middle-aged adults has increased (Feigin et al., 2014). A study conducted in Taiwan suggested that younger males with a history of smoking, hypercholesterolemia, hypertriglyceridemia and a high body mass index but no history of AF, prior stroke, systemic infection or upper gastrointestinal bleeding have a higher prevalence of stroke (Chen et al., 2013). The probability of dying from an NCD amongst Omani people aged 30 to 70 is 18% (WHO, 2014). This is attributed to the epidemic of diabetes worldwide and the increasing prevalence of cardiovascular risk factors, increasing the risk of stroke in middle-aged and younger adults (Feigin et al., 2014).

In addition, mitral valve prolapse has been demonstrated to have an association with stroke in young people (Mark L, 1991). Moreover, in a study that analysed Arab countries including Oman, the risk of diseases reported in the Global Burden of Disease Study 2010 showed that cigarette smoking and obesity have increased in the young population, raising the risk of CVD and stroke (Rahim et al., 2014). Therefore, stroke can be considered to be a disease of all ages (Feigin et al., 2014).

2.2.4 Impact of stroke on patients and caregivers

Stroke is a disease that causes disability, which puts a strain on patients, their families and the health care system. In fact, much of the burden of NCDs is now caused by disability rather than premature mortality (Murray et al., 2012). NCDs can often lead to slow and painful deaths after prolonged periods of disability (Beaglehole et al., 2011). However, the quality of life trajectory varies among patients with disabilities associated with chronic illness (Kim et al., 2016). The Corbin and Strauss Chronic Illness Trajectory illustrates different phases, including the pre-trajectory, trajectory onset, crisis, acute, stable, unstable, downward and dying phases (Burton, 2000). Following stroke incidence, patients face different scenarios including sudden death, severe disability, mild disability or mood disorders. There may also be an acceptable level of recovery in some cases. A study showed that one out of every five people having their first stroke lived for at least a further 15 years following the stroke (Crichton et al., 2016). Of the 2625 people having their first stroke, only 262 survived to 15 years, with one in ten of the 15-year survivors living with a moderately severe disability after their stroke (Crichton et al., 2016). Disability increased with poor outcomes in long-term survivors (Crichton et al., 2016). Moreover, long-term disability following a severe stroke is associated with gradual functional deterioration that involves a gradual loss of physical, social, psychological and spiritual function (Murray et al., 2017). Murray et al. (2017) suggested that early physical rehabilitation and social engagement are crucial to maintaining individuals' self-esteem as physical disability gradually leads to social withdrawal, depression and loss of hope over the long term (Murray et al., 2017).

2.2.4.1 Physical disability and psychological depression

Stroke that leads to disability and depression influences the quality of life of both patients and their caregivers. Stroke has a significant impact on the survival of patients'

overall physical functioning. Stroke survivors report having limited ability to perform activities of daily living and to experience other physical mobility problems. Physical inactivity has been found to be highly prevalent among stroke survivors (Billinger et al., 2014). In addition, about 21% were found to have cognitive problems with regard to mental processing (Finch et al., 2009). Discontinuity after discharge, feelings of discomfort and a reduced sense of self and the value of life have also been reported by people following a stroke (Satink et al., 2013).

Physical disability is the most common complication of stroke, leading to 50% of patients suffering from hemiparesis and 30% unable to walk without assistance (Scherbakov et al., 2013). In a study that analysed secondary data from a cohort of 448 stroke patients, patients were classified into different levels of disability ranging from very severe disability to mood disorders (Munyombwe et al., 2014). Stroke survivors' level of physical activity was reported to be low in quality, duration and intensity (Field et al., 2013). Patients with very severe disability tended to be elderly and have had a previous stroke, while patients for whom mood disorders showed a greater tendency in their activities of daily living were younger patients (Munyombwe et al., 2014). Inactivity and immobilisation after stroke are important factors leading to muscle wasting and atrophy (Scherbakov et al., 2013). Exercise and physical rehabilitation are suggested to be incorporated into the management of stroke survival (Billinger et al., 2014).

This impact on the life of stroke survivors may lead to an individual changing from being an independent person to one who becomes dependent on their caregivers. Unlike other diseases, the sudden onset of stroke leaves patients and their caregivers facing many challenges. Due to the lack of any psychological preparation due to the sudden occurrence of a stroke, the possibility of developing depression following a stroke event can be expected, especially for an individual with high disability. In a meta-analysis review of depression after stroke, the incidence of depression was found to increase by up to 52% within five years of a stroke (Ayerbe et al., 2013). In research studies that assessed patients more than once, most patients who have depression after stroke become depressed shortly after the acute stroke event (Ayerbe et al., 2013). Stroke survival with higher physical disability carried an increased risk of developing

depression (Ayerbe et al., 2015). Disability after stroke and depression pre stroke were considered as predictors of depression in stroke patients (Ayerbe et al., 2013). In addition, cognitive impairment, stroke severity, lack of social or family support and anxiety were among the other predictors (Ayerbe et al., 2015).

Early rehabilitation has been found to be more effective within the first three months of a stroke event since an individual's neurological function begins to improve within a few days of the stroke and continues to improve during the first three months after the stroke event (Baker, 2008). However, a delay in starting rehabilitation following a stroke can slow the rate of improvement. Minimal neurological improvements at one or two years after stroke have been reported (Baker, 2008). It is essential that patients are assessed and that rehabilitation is started as soon as possible after stroke incidence. Early rehabilitation could provide more hope at an early phase of stroke, thereby reducing the psychological pressure and optimising the physical well-being of patients following the post-stroke period.

2.2.4.2 The challenges of caregiving for stroke survival

The challenges that stroke survivors face can also be understood by looking at the ways in which they extend to caregivers. Patients and their caregivers share the burden of stroke (Rigby et al., 2009). The caregiver's burden is identified as the weight or load carried by a caregiver as a result of them adopting the caregiving role. Moreover, caregiving for stroke patients refers to the degree to which family members feel overwhelmed and strained in caring for their care recipient who has had a stroke (Byun and Evans, 2015). Physical and cognitive impairment after acute stroke places a high burden on patients' caregivers. Caring for a family member with stroke requires time and physical, emotional and psychological effort (Kruithof et al., 2016). Such a burden can be either objective (physical) and/or subjective (psychological) (Rigby et al., 2009). The physical burden on caregivers has been linked to an increase in incidences of depression, anxiety, cardiovascular disease and general ill-health (Rigby et al., 2009). While there is a belief that caregiving for a stroke patient can lead to deleterious effects on the health and physical well-being of caregivers, a study by Salter et al. (2010) suggested that formal caregivers do not necessarily witness a reduction in physical health (Salter et al., 2010). However, the burden of caregiving can have different impacts at different phases, such as there being a different type of burden during the

early post-stroke phase compared to the chronic phase (Byun and Evans, 2015). While the level of independence can be enhanced to a certain degree by an individual's response to rehabilitation, social support still has an essential role to play.

Unsurprisingly, the caregiver burden has been shown to have modifying effects on caregivers' quality of life. The high burden on caregivers presents negative predictors of caregivers' quality of life (Jeong et al., 2015). The high burden on caregivers is imposed by different factors like caring for patients, patients' loss of job, the poor health status of caregivers, low income and being a spouse (Jeong et al., 2015). These different aspects require a commitment from the family as the available caregivers. The family member in the form of a spouse or a specific person within the family who is appointed to caregiving responsibilities themselves requires strong social support. To lessen the burden on caregivers, caregiver assessment and intervention should be tailored to individual circumstances and contexts in consideration of the nature of the caregiving burden (Adelman et al., 2014).

2.2.5 Stroke Prevention: The Promises

As already discussed, an alarming rise in the incidence of strokes has been observed in developing countries due to an increase in lifespan and the increasing incidence of hypertension, diabetes, smoking and stress in daily life (Das et al., 2007). Developed countries also share similar factors that might raise the incidence of stroke or even increase the burden of surviving stroke. Preventive intervention programmes have been found to be very effective in terms of reducing the burden of the disease. The prevention of stroke and reducing its impact are emergent priorities for health care providers at the governmental level. As a result, stroke prevention is divided into primary and secondary prevention.

2.2.5.1 Primary stroke prevention

Primary stroke prevention is aimed at reducing the risk of developing stroke in asymptomatic people. In a study that used epidemiological measures to estimate the impact of primary prevention interventions on coronary heart disease (CHD), stroke and cancer, the implementation of an NHS health check program was expected to prevent 125 stroke events over a period of five years (Syed et al., 2012). Such health prevention plans can reduce specific risk factors by 5% annually (Syed et al., 2012).

Globally, the WHO's Global Action Plan for the Prevention and Control of NCDs 2013-2020 suggested nine targets for tackling NCDs. These targets are aimed at reducing behavioural risk factors that include the harmful use of alcohol, physical inactivity, salt/sodium intake and tobacco use. Lifestyle modification aimed at the prevention, treatment and control of blood pressure, diabetes and obesity were also recommended. In addition, the preventive treatment of heart attacks and stroke were addressed (WHO, 2013).

Primary prevention interventions ideally aim to maximise the health of the population and minimise the economic burden of CVDs (Syed et al., 2012). Therefore, primary prevention targets individuals characterised by high blood pressure, diabetes, hypercholesterolemia, cigarette smoking, alcohol consumption and physical inactivity since these factors can contribute directly to the incidence of stroke (Bogouslavsky et al., 2000). Aside from lifestyle modifications, primary stroke prevention should also consider pharmacological treatment as necessary (Bogouslavsky et al., 2000). In addition, surgical interventions are suggested as a primary prevention.

2.2.5.1.1 Lifestyle modifications

Lifestyle factors can elevate the risk of NCDs. Globally, food patterns are changing. Today, a high intake of fast food, reduced fruit and vegetable intake, frequent high-calorie snacks, skipping of breakfast, consuming food outside the home and eating while watching television or in front of a computer have all become common habits that increase the risk of developing NCDs and stroke (Rahim et al., 2014). In addition, modern living has had an impact on people's level of physical exercise. The availability of different transport methods at affordable prices has led to people becoming less physically active. Also, occupational patterns such as sitting for long periods in front of a computer have influenced the level of physical activity among individuals (Rahim et al., 2014). These and other factors have produced remarkable changes in the lifestyles of individuals around the world. Therefore, lifestyle modification is a priority for primary stroke prevention.

It is estimated that lifestyle modifications may prevent about 70% of strokes and over 80% of CHD worldwide (Endres et al., 2011). Lifestyle modifications aimed at stroke prevention have become well established over the last few years (Marsh and Keyrouz,

2010). Lifestyle modifications have been found to be associated with a lower risk of stroke, especially ischaemic stroke, and to have a beneficial impact on the primary prevention of chronic disease and long-term well-being (Chiuve et al., 2008). The Alloubani et al. systematic review emphasised that changes in lifestyle, including dietary changes, weight loss, aerobic activity and restricting alcohol intake, reduced the risk of stroke (Alloubani et al., 2018). Lifestyle modification interventions can improve the prognosis for patients with diabetes, hypertension, hypocholesteraemia and obesity, which then also decreases their risk of developing stroke accordingly (Kernan et al., 2014). A lifestyle modification approach is recommended for non-hypertensive individuals with acute elevation on a blood pressure reading to control their blood pressure through behavioural changes prior to starting therapeutic drugs (Meschia et al., 2014).

Lifestyle behavioural changes might include increased physical mobility, adopting a DASH (Dietary Approach to Stop Hypertension) eating plan, reduced calorie intake, limited alcohol intake, weight loss and stress reduction (White et al., 2013). Such modifications require lifelong behavioural changes that require a strong commitment and desire (Fronhlich, 2013). Multidimensional factors may lead to individuals facing pressure to change their behaviours, but it is also recognised that it is the individual's choice to take the healthy actions (Fronhlich, 2013). It is important to consider the costs and benefits of stroke prevention at different levels (Ebrahim and Harwood, 1999). At the individual level, a person should weigh up the cost and effectiveness of the preventive behaviours to be adopted. While many theories of behavioural change have been developed to address the issues of health behaviour change, the transtheoretical Health Belief Model of behaviour change and social cognitive theory are the most widely used and embedded in health policy and practice (White et al., 2013).

2.2.5.1.2 Pharmacological therapy

Alongside lifestyle modification, pharmacological therapy is recommended to reduce the risk of developing stroke. At the level of primary stroke prevention, drug therapy aims to provide prophylactic support for lifestyle modification aimed at reducing the risk of stroke by treating and controlling hypertension, heart disease and cholesterol levels. The use of antihypertensive drugs for pre-hypertension has appeared to lower

the risk of stroke (Meschia et al., 2014). However, the American Heart Association (AHA) guidelines for primary stroke prevention argue that there is no evidence of a particular class of antihypertensive drugs offering any form of special protection against stroke in all patients (Meschia et al., 2014). Blood pressure needs to be controlled to a target of 140/90 mmHg and the choice of drugs should be individualised (Meschia et al., 2014). A comprehensive systematic review and meta-analysis by Ettehad et al. (2016) showed that blood pressure lowering agents significantly reduced vascular risk across various baseline blood pressures and comorbidities. It should be noted that the Ettehad et al. systematic review included studies that had differences in trial populations, baseline comorbidities and treatment regimes which may have confounded differences recorded between subgroups of trials. Nonetheless, it provided a comprehensive systematic review that pooled 613815 patients from 123 randomized controlled studies. The Ettehad et al. review provides a strong evidence base for the benefits of blood pressure lowering treatment on the prevention of cardiovascular diseases. Ettehad et al. argued that calcium channel blocker therapy is more effective than other classes of drugs for stroke prevention, specifically among individuals with high blood pressure at risk of stroke (Ettehad et al., 2016).

The use of aspirin to reduce the risk of stroke among patients with AF is discouraged, while the use of oral anticoagulant therapy such as vitamin K antagonist (warfarin) is encouraged (Lip and Lane, 2015). A meta-analysis of randomised trials (Sharma et al., 2015) assessed the efficacy and bleeding outcomes for oral anticoagulants (Dabigatran, Apixaban, Rivaroxaban, Edoxaban) in the elderly with acute venous thromboembolism or for stroke prevention in atrial fibrillation compared with the use of Vitamin K antagonists. This study showed that those that included oral anticoagulants demonstrated at least equal efficacy to Vitamin K antagonists in managing thrombotic risks in the elderly. However, the bleeding patterns showed distinct features among the different drugs such as dabigatran was associated with higher gastrointestinal bleeding than Vitamin K antagonists (Sharma et al., 2015). Sharma et al. argued that insufficient published data was available about the use of anticoagulants and risk of bleeding in elderly. Therefore, suggested further studies are needed in this area.

Also, the use of aspirin is not encouraged in patients with diabetes but statins have been suggested for the primary risk of stroke (Meschia et al., 2014). Moreover, statins are recommended to reduce the risk of stroke among patients either with or at high risk of atherosclerosis (Meschia et al., 2014). The use of statins is expanding globally following recommendations from the WHO, the AHA and in European guidelines on cardiovascular disease prevention. The other major concern is found in relation to medication adherence (Lin et al., 2016). An American study that assessed the effectiveness of AHA guidelines to expand the use of statins demonstrated that the benefit from long-term statin use depends more on the disutility of taking pills than on the degree of cardiovascular risk (Heller et al., 2017). Also, another European study showed that the use of secondary cardiovascular disease prevention drugs remains low in Europe, with discontinuation reported over time (Achelrod et al., 2017, Piepoli et al., 2016). The 2016 European guidelines on cardiovascular disease prevention in clinical practice recommend the use of polypills, which are a combination of blood pressure-lowering and lipid-lowering drugs aimed at patients considered to be ‘at high risk’ and at those with established cardiovascular disease (Webster et al., 2017). This medication strategy aims to improve patients’ adherence to medication, but further studies are needed to identify its effectiveness (Piepoli et al., 2016). The use of these medications for many people might be lifelong, thereby rendering adherence to these drugs a lifelong decision. Adherence is important to ensure an effective outcome of the treatment. Reducing the number of pills taken daily or in fixed combinations can enhance drug adherence (Endres et al., 2011).

2.2.5.1.3 Surgical interventions

Another level of primary stroke prevention involves surgical intervention. Surgical intervention is mainly suggested for patients with carotid stenosis (Marsh and Keyrouz, 2010). The use of surgical interventions such as Carotid Endarterectomy (CEA) and Carotid Artery Stenting (CAS) for reducing the risk of stroke has been proven (Marsh and Keyrouz, 2010). CAS has emerged as alternative forms of stroke prevention in patients with carotid atherosclerosis (Kernan et al., 2014). However, an argument was raised around the safety, efficacy, rate of recurrent stenosis and durability of clinical benefits of the two interventions in order to compare the superiority of CAS or CEA (Marsh and Keyrouz, 2010). Studies have been undertaken comparing the safety and

efficacy of CEA and CAS and have added significantly to the knowledge base regarding the management of extracranial carotid disease (Kernan et al., 2014). The American Guidelines for stroke prevention and TIA which was based on the review of the published literature, emphasised that CEA or CAS should be based on the criteria that considered individual cases (Kernan et al., 2014). However, a clinical trial suggested the early benefit of aggressive medical management over surgical intervention for high-risk patients with intracranial stenosis (Derdeyn et al., 2014).

Among the three most commonly agreed methods of primary stroke prevention, patients' adherence to lifestyle modifications and their healthy decision-making are the most important factors. Health research in social science needs to address the factors that influence individual health decisions. To reduce the risk of stroke, patients are advised to make a lifelong commitment to their health. An individual's commitment to the concept of making health decisions could change over time; as such, the adoption of health behaviours needs to be followed up over time to ensure they are being continued.

2.2.5.2 Primary stroke prevention approaches

There are two complementary primary stroke prevention approaches: the 'high risk' strategy and the public or community strategy. The two approaches have different targets, but both aim to reduce the risk of stroke.

2.2.5.2.1 'High Risk' Approach

The so-called 'high risk' approach identifies individuals who are at the highest risk of developing stroke and recommends treatment (Fronhlich, 2013). This strategy is intended to reduce the risk of getting CVDs among asymptomatic individuals with elevated risk factors. Such a strategy aims at taking preventive action in asymptomatic individuals who have high risk factors by estimating their level of risk. The identification and management of patients with cardiovascular disease is conducted by measuring the high absolute risk (Feigin et al., 2015). As an example, the SCORE (Systematic COronary Risk Evaluation) is a risk score designed to identify individuals at high risk (Endres et al., 2011). Such a score is used to identify whether an individual is considered to be at high risk of develop CVDs, including stroke. Health interventions can thus be planned accordingly based on this individual risk. However,

restrictions on health care practitioners' ability to identify those individuals at risk might lead to target individuals being missed (Endres et al., 2011). Another challenge of this approach is the increased effort and time required as a result of an increase in the population who are at risk or at high risk of having a stroke. Feigin et al. (2015) argued that the majority of strokes within a population occur in those with mildly elevated stroke risk, and they suggested that population-wide preventive strategies may be more effective in reducing the risk of stroke across all levels of stroke risk (Feigin et al., 2015). This was predicted as the result of a risk assessment among people with low or moderate risk of stroke who will be less motivated to control their risk of stroke (Feigin et al., 2015).

2.2.5.2.2 Public or Community Approach

The noticeable decline in NCDs and stroke prevalence can be attributed to health prevention interventions. In addition, there is evidence to suggest that the decrease in stroke and heart disease prevalence in the United States and other high-income countries can be attributed to these populations' reduced tobacco consumption and increased adoption of healthy diets (Pearson et al., 2013). The population strategy focuses on the risk reduction approach across the entire population (Endres et al., 2011). The AHA updated its guidelines in 2011 to include a public health campaign called Life's Simple that is aimed at promoting ideal cardiovascular health (Meschia et al., 2014). The AHA Community Guide includes activities carried out at the community level, including surveillance, education, media, organisational partnerships, assurance of personal health services and environment and policy changes (Pearson et al., 2013). Another example of a population strategy is guidance issued by The National Institute for Health and Clinical Excellence (NICE) in the UK that is aimed at the prevention of CVDs at the population level (Endres et al., 2011). These comprehensive strategies or guidelines seek to raise awareness amongst the general public to prevent CVDs and strokes, rather than focusing only on a targeted group. The adoption of such a strategy for promoting the healthy lifestyle concept has been found to improve public health status. In spite of this, however, responding to NCDs is not simply a matter of changing individual behaviours in isolation; broader changes in social, economic, environmental and cultural contexts are also needed (Diem et al., 2016).

Although the WHO continues to support such an approach in many developing countries in order that the general public can benefit from these interventions, the effective implementation of these guidelines can be hampered by a lack of resources in some communities (Pearson et al., 2013). Nonetheless, the implementation of successful programmes aimed at the prevention of a noncommunicable disease crisis demands political commitment, legislation, multi-sector action, strengthened health systems and the continuous monitoring and assessment of progress as these measures can reasonably be expected to reduce the burden of NCDs (Rahim et al., 2014, Mokdad et al., 2014). In fact, effecting policy change requires strong political action and is often presented with many obstacles (Endres et al., 2011). Governments are advised to take preventive measures to reduce the burden of NCDs as they continue to place an enormous and growing strain on health care systems worldwide and are considered to be the source of social and economic cost at both the national and household levels (Diem et al., 2016).

2.2.5.3 Secondary stroke prevention

Secondary stroke prevention aims to reduce the risk of recurrent stroke among stroke survivors and in the event of a transient ischaemic attack (TIA) (Hankey, 2014). Since stroke recurrence is reported to account for 25 to 30% of preventable stroke, and to be more severe and disabling than acute stroke, secondary prevention requires rapid and accurate identification of the underlying cardiovascular factors followed by sustained treatment (Hankey, 2014). Lifestyle modification, pharmacological therapy and surgical interventions are recommended at this level of prevention.

2.2.5.3.1 Lifestyle modification and pharmacological therapy (combination of both)

Lifestyle modifications to control hypertension following stroke survival are considered a reasonable part of a more comprehensive hypertensive therapy (Kernan et al., 2014). Limiting dietary salt intake, weight loss, increased consumption of fruits, vegetables and low-fat dietary products in addition to regular physical exercise and limited alcohol consumption are all recommended as part of secondary stroke prevention (Kernan et al., 2014). The impact of lifestyle modification on secondary stroke prevention and TIA was examined by meta-analysis in Lennon et al.(2014). Although, promising blood pressure reductions were noted in multimodal lifestyle

interventions, there was insufficient evidence to support lifestyle interventions post-stroke or TIA alone (Lennon et al., 2014). Therefore, this must be carried out in combination with drugs for secondary stroke prevention. For the purpose of secondary prevention, it is suggested to use a high dose of statin therapy with atorvastatin to reduce the recurrence of stroke and TIA. The use of high-density, lipoprotein-raising treatments such as niacin to statin reduces the risks posed by atherosclerotic diseases (Marsh and Keyrouz, 2010). The AHA guidelines 2014 for the prevention of stroke in patients with stroke and TIA suggested the use of statin therapy with an intensive lipid-lowering effect to reduce the risk of stroke and cardiovascular events among patients who had suffered an ischaemic stroke (Kernan et al., 2014). Moreover, a combination of antihypertension or diuretics can be used based on individual factors (Kernan et al., 2014). It is important to consider that pharmacological therapy should be supportive and linked to lifestyle modification. (Kernan et al., 2014) found that lifestyle modifications were more effective among diabetes patients than the use of metformin alone. However, the use of statins in diabetes patients is also recommended.

Behavioural modifications should be established and planned prior to the discharge of acute stroke patients. The role played by an early initiation of and adherence to such modifications in achieving the desired effects in secondary prevention is supported (Tsai et al., 2014). At the time of the acute phase of stroke, patients might have higher adoption levels to behavioural changes with this sudden incident. Therefore, instilling a patient's psychological and physiological willingness to change is important for the adoption of health-related behavioural changes in the early stages. Further studies are required to assess if behavioural changes could be adopted more quickly following the acute phase of a stroke event.

2.2.5.3.2 Surgical and endovascular interventions

Surgical interventions are highly recommended to save lives and reduce disability following a stroke. Surgical intervention is recommended for both ischaemic and haemorrhagic stroke (Sykora et al., 2010). Possible interventions range from a thrombectomy to the surgical clipping of a ruptured aneurysm. A comparison of neurosurgical clipping and endovascular coiling interventions revealed the probability of death or dependency to be greater in a neurosurgical than an endovascular group, while disability-free survival was greater with the endovascular intervention

(Molyneux et al., 2015). After years of research that has aimed to investigate the durability of endovascular coiling versus neurosurgical clipping to treat ruptured cerebral aneurysms, Molyneux et al. (2015), at the end of their trial, outlined the importance of advising patients to adopt a healthy lifestyle (Molyneux et al., 2015). Yet despite such efforts, the effectiveness and usefulness of these interventions have not yet been verified (Sykora et al., 2010). In addition, patients who undergo bariatric surgery have a reduced risk of stroke and cardiovascular events compared with non-surgical control (Piepoli et al., 2016).

2.2.6 Time factor and stroke awareness

Time is a crucial factor when it comes to reducing the impact of disability following stroke events (Khatri et al., 2014). Early diagnosis of stroke can improve patients' recovery outcomes and is essential for immediate management to be provided (Luoma and Reddy, 2013). Whether ischaemic or haemorrhagic in type, time is a major challenge to determine the diagnosis and appropriate treatment for a stroke (Mort et al., 2016). As an example, following an acute ischaemic stroke the use of intravenous thrombolysis with Tissue Plasminogen Activator (t-PA) is approved (Marsh and Keyrouz, 2010, Goyal et al., 2015). Thrombolytic therapy is very effective in assisting recovery following an ischaemic stroke (Slark et al., 2012), but it has to be administered within a time period of 4.5 hours (Mort et al., 2016). In addition, post-stroke patients' adherence to medication needs to be considered. Data analysed from the interventional management of stroke revealed that any delay in the time taken to receive an angiographic perfusion led to a decrease in positive clinical outcomes in patients after a moderate to severe stroke event (Khatri et al., 2014). In addition, workflow and time had a great impact on the outcomes of endovascular treatment of acute ischaemic stroke (Goyal et al., 2016). To tackle the time challenge, there is new technology capable of relaying ultrasound images via satellite or a network from an ambulance to hospital to confirm a stroke diagnosis (Mort et al., 2016). Such innovative use of technology can improve early diagnosis to ensure timely and appropriate treatment.

Advances in stroke treatment have been met with the challenge of increasing public awareness, particularly in the case of patients who are at high risk, mainly about the

emergent and appropriate timing of receiving treatment. The initiation of immediate stroke treatment is attributed to greater awareness and knowledge of stroke risk factors and the warning symptoms of a stroke (Das et al., 2007). Despite this, acknowledgement of the urgency of treatment or even consideration of the fact that stroke may be preventable are both still lacking (Travis et al., 2003). Poor stroke awareness has been found to contribute to a delay in the arrival of patients at hospital emergency departments for immediate effective treatment (Das et al., 2007). This could be prevented if at-risk patients were more aware of the signs and symptoms of a stroke (Travis et al., 2003). With rapid recognition and action, a patient who has had an ischaemic stroke can be treated successfully within four and a half hours of the onset of symptoms (Lambert et al., 2013).

Both 'at-risk' patients and the wider public need to be aware of strokes and the issues around their prevention and the impact of time delays in getting treatment. In fact, poor health outcomes are associated with low levels of health literacy (Taggart et al., 2012). Awareness is considered to be the first stage in the move towards action. It is important that patients recognise potential stroke warning signs so that they are able to act upon the symptoms (Travis et al., 2003). A study conducted in the United States that aimed to compare knowledge about stroke and heart attack revealed that those patients who were at high risk of stroke were unable to identify the location, mortality rate, symptoms and risk factors of a stroke (Lambert et al., 2013). Only 31% of the study participants were aware of the appropriate time at which to reach hospital. The study concluded that knowledge about heart attacks is better than stroke knowledge (Lambert et al., 2013). Although efforts to educate the public in the UK about the signs and symptoms of a stroke using the act FAST (Face, Arms, Speech, Time) criteria, which is a UK government campaign to raise awareness of stroke signs and symptoms, has shown some effective improvement generally, it has had a limited effect on the population at high risk of stroke (Slark et al., 2012). There is a lack of knowledge even amongst stroke survivors, but patients who recognised their future risk had adopted some lifestyle modifications (Slark et al., 2012). These findings highlight the importance of educating patients who are at risk of a stroke. The adoption of a healthy lifestyle and adherence to drugs among patients with elevated risk factors are the result of awareness and knowledge about the risk factors (Homko et al., 2008). Issues

regarding healthy decision-making need to be considered when planning awareness about stroke since prevention demands lifestyle changes and a long-term commitment. These in turn involve understanding individuals' perceptions and attitudes towards the prevention of diseases in addition to their awareness, in order to ensure commitment.

2.2.7 The influence of life chances on life choices

The focus of the literature review so far has been on individual behavioural approaches to health improvement. The underlying premise is that health is a life choice. Nonetheless, when health is perceived as a life choice it is important to consider the reasons behind such choices. Elder-Vass (2010) explained that as individuals we make conscious decisions that reflect our beliefs and dispositions. These beliefs and dispositions are formed by a complex of causal interacting forces which include the social structure. The central issue to consider is whether life chances provide equal opportunity for individuals in a given society to make the right choices. There is now a plethora of evidence globally that health inequalities affect the ability of individuals to make choices in relation to their health, with such findings having been reported across countries with variations in incomes (Douglas, 2016, Katikireddi et al., 2013). Age, gender and living conditions all have an impact on healthy lifestyle choices (Cockerham, 2013). In addition, evidence shows that people in the upper and upper-middle classes tend to lead healthier lifestyles and have better health statuses than those in the lower classes (Marmot and Bell, 2016, Douglas, 2016, Cockerham, 2013). Social inequalities have been acknowledged to underpin health inequalities. Nonetheless, the attention of health professionals has been drawn to the necessary health behavioural changes rather than focusing on the social, economic and environmental factors that facilitate such health behavioural changes (Douglas, 2016, Katikireddi et al., 2013). The complexity of the problem is impeded by current policies at different levels, including health policies (Katikireddi et al., 2013), and each community sector is focused on its own development. The actual application of a holistic approach to tackle health inequalities is needed by involving all community sectors starting from local and national decisions made in schools, homes and government services (Marmot and Bell, 2012). In addition, Douglas (2016) explained that understanding of health inequalities needs to extend beyond clinicians and that leads the health sector to more focus on health intervention and health behavioural

approaches. Health promotive strategies need to be persuasive and more politics to make changes in partnerships with other disciplines in order to tackle health inequalities (Douglas, 2016).

The UK, as the global leader in highlighting and tackling health inequalities research, has undertaken a strategic review of health inequalities that suggests domains of actions to tackle health inequalities. These include addressing inequalities in child care, providing young adults and adults with access to health, housing, employment and at least minimum standards of quality of life, in addition to strengthening the role and impact of ill-health prevention (Marmot and Bell, 2012, Bambra, 2016). In addition, the United Nations Sustainable Development Goals (SDGs) 2015 aim to bring an end to poverty and hunger and to improve housing, employment and education to reduce social and economic injustice, which in turn will improve health equality. This builds on criticisms of the MDGs in 2000, whereby structural inequalities were only implicitly, rather than explicitly highlighted as outcome measures. Although these goals are very optimistic, converting them into meaningful actions is the challenge facing policymakers in all countries. Moreover, high-income countries have continued to struggle at their own pace to provide social, economic and health equality. Accordingly, additional support needs to be granted to low-income countries in order to achieve the strategies outlined in the SDGs. The issue of health inequality is either widely acknowledged in the literature or has been addressed by many health policymakers around the world, yet despite this, progress to provide a practical solution has failed and health inequalities have continued to widen (Douglas, 2016, Katikireddi et al., 2013, Garthwaite et al., 2016). A recent European study revealed that educational opportunities influence individuals' health-risking behaviours, with more educated individuals being less likely to smoke and more likely to engage in physical activity or to eat fruit and vegetables (Huijts et al., 2017). Marmot and Bell (2016) acknowledged the experience of Brazil in making progress to reduce health inequalities by managing their own social determinants of health, but the effectiveness of such a strategy needs to be assessed at the Brazilian national level in order to determine the extent of any gains in terms of social and health justice. The Brazilian experience is inspiring in terms of highlighting that each country needs to assess the

causes of the health inequalities present within its own society and to develop the strategies needed to tackle those inequalities.

Looking forward, researchers exploring health inequalities need to make an impact with regard to policy changes in order to effect a reduction in health inequalities; indeed, Bambra (2011) claimed that politics is the aetiology of health inequalities. The focus of health inequalities research suggests broadening the scope of the investigation to include the perspective of researchers from other fields, such as social, political, legislation and economic (Katikireddi et al., 2013, Bambra, 2011). The need for mixed-methods research methodologies to comprehend the complexity of health inequalities by interweaving different perspectives is suggested (Garthwaite et al., 2016). Insight from social and biological sciences supported by a chain of reasoning is needed to understand the causes of the social inequality that underpin wider health inequalities (Marmot and Bell, 2016). Moreover, the use of a realistic approach in research is very promising as it contributes to making changes in research methodology in such a direction as to not only recognise the social structure but also to explain the casual properties with regard to health and disease (Cockerham, 2013).

2.2.8 Factors that influence individuals' health decisions

Primary prevention has been demonstrated as being effective in reducing the risk of chronic diseases, in particular that of ischaemic stroke (Chiuve et al., 2008). Living a healthy lifestyle is the main aim of primary prevention. Yet the meaning attributed to 'healthy lifestyle' may vary even among health professionals. As an example, modest alcohol consumption is defined by some researchers as being from 5 to 30 g/d (gram per day) for living a low-risk lifestyle (Chiuve et al., 2008). Also, the WHO, in its Global Action Plan for the Prevention and Control of NCDs 2013–2020, considered the harmful use of alcohol (WHO, 2013). The different perceptions of the meaning of healthy lifestyle involves both patients and the public in general. Clear definitions of the terms healthy living or healthy lifestyle need to be provided for the benefit of the public. It should also be considered that being healthy or practising a healthy lifestyle may carry different meanings and perceptions among individuals from different backgrounds. In addition, health promotion and prevention plans and interventions

need to consider the different factors that influence individuals' health decisions and their adherence to these over a lifelong period.

A healthy lifestyle is associated with reducing the risk of behaviour-related diseases. The decision to adopt healthy behaviours and a healthy lifestyle is influenced by a range of factors, including individual, social, financial and environmental (Delamater, 2006). Preventive health behaviours such as smoking cessation, exercise and altering eating patterns tend not to be independent choices solely under individuals' control but rather are influenced by powerful social and environmental factors (Andersen and Nielsen, 2016). Individuals and society share the responsibility for having a healthy community. Government, individuals, private institutions and the public share these responsibilities to some extent (Pearce et al., 2015). The WHO sustainable developmental approach incorporates the three dimensions of economic development, environmental sustainability and social inclusion to develop sustainable prevention and control of NCDs (WHO, 2013). The governmental approach involves the setting of legislation to motivate healthy behaviours at the population level (Pearce et al., 2015), such as raising tax on tobacco, improving the environment, increasing health awareness, advertising campaigns aimed at promoting healthy behaviours and strengthening health care systems. Government responsibilities also extend to reducing inequities and disparities among members of the population in line with the aim of the SDGs to bring an end poverty and hunger (Kumar et al., 2016). Directing preventive health actions at the individual and population levels suggests the realising of better disease prevention outcomes (Pearce et al., 2015). Although health is a responsibility that is shared by both individuals and society, it is individuals who are ultimately responsible for making the decision of whether or not they adopt healthy behaviours. At the extreme end, it is important to facilitate the social determinants that influence individuals' health decisions. However, a person needs to be empowered to overcome obstacles when he or she values the importance of such healthy behaviours or decisions with regard to their health status in either the short or long term within their own circumstances. A cost/benefit analysis of health behaviours is important in health decisions (Martin et al., 2005). This argument can be supported as a substantial proportion of individuals in high-income countries have been found to be insufficiently physically active (Molema et al., 2016). Unhealthy behaviours and lifestyles, such as

obesity in high-income countries, are associated with an increased risk of NCDs as a result of individuals' choices regarding diet, exercise and lifestyle (Butland et al., 2007). Therefore, individuals' intrinsic motivation needs to be optimised in order for them to adopt healthy decisions.

However, socio-economic inequities in low- and middle-income countries in comparison to high-income countries represents a challenge for the health care systems in these countries to accommodate the changes required to promote healthy lifestyle interventions (Diem et al., 2016, Pearce et al., 2015, Di Cesare et al., 2013). Social, environmental and financial barriers currently stand as an obstacle to a healthy lifestyle among individuals, especially those with low socio-economic status (Humbert et al., 2006, Di Cesare et al., 2013). The commitment of the United Nations and the worldwide community is needed to counter health care disparities and inequities globally and to support lower-income countries. Collective action is required to tackle some of the social determinants of disease such as air pollution and inadequate water supply, depending on the circumstances in different countries (McKee et al., 2014). Preventive health actions at the population level, such as bans on smoking in public in high-income countries, seem to be more effective than individual action alone, which is insufficient particularly in low- and middle-income countries (Pearce et al., 2015). Therefore, a comprehensive collaborative approach and actions at the individual and population levels are required (Pearce et al., 2015).

The following section contains examples of the individual, social, financial, environmental and religious factors that influence health decision-making.

2.2.8.1 Individual factors

Individual or personal factors have an impact on health decisions and individuals' adherence to the adoption of healthy living. Age, gender, education level and knowledge are common personal factors that influence individuals' health decisions. Health knowledge is associated with specific preventive health behaviours (Taggart et al., 2012). Measuring health knowledge in relation to behavioural risk factors is central to the prevention of chronic diseases (Taggart et al., 2012). Low health knowledge has been reported as being associated with age, ethnicity and socio-economic status (Kaphingst et al., 2014). However, low health knowledge can also be driven by

cognitive dysfunction in elderly patients (Kaphingst et al., 2014). Nonetheless, health knowledge motivates people to make positive behavioural changes and leads to the sustainability of such behavioural changes (Taggart et al., 2012). Knowledge of health risk factors is associated with lifestyle changes (Alm-Roijer et al., 2006). Although knowledge is fundamental with regard to health actions, lifelong adherence is also associated with individuals' perceptions of the risk to their health status, with general knowledge being recognised as insufficient to change health behaviours (Alm-Roijer et al., 2004). If individuals are aware of their risk of developing diseases, they will probably act to reduce the risk, but if they do not know they are at risk, no action will be taken. This does not remove the presence of the risk, however, and specific knowledge of the risk factors is needed in combination with adherence to lifestyle changes, rather than merely general knowledge about disease (Alm-Roijer et al., 2004).

Gender difference in health knowledge has increasingly been highlighted. In a recent review, a study revealed knowledge of the warning signs of stroke to be lower in men (Berglund et al., 2017). Also, women were found to be more ready seekers of health care than men with regard to both physical and mental health concerns (Thompson et al., 2016). Health knowledge may vary depending on age and gender, and these factors affect decision-making ability. In addition, despite the importance of knowledge, this does not always translate into actions.

In addition, previous personal experiences with diseases impact individuals' decisions to practise a healthy lifestyle. A person's experience of the process of providing care for someone with a chronic disease, such as a family member or friend, can mean that they have witnessed the burden and the impact of such a disease either physically, psychologically and/or economically (Sautter et al., 2014). Yet a positive health benefit has been reported among caregivers, with spouses who provided 14 hours of caregiving or more having lower rates of mortality than those who provided no level of care to their spouse (Brown et al., 2009). Experiential learning develops from the experience of having had previous contact with the disease, thereby providing strong cues with regard to the adoption of healthy actions.

Another individual factor is the individual sense of control over health. Making lifelong health decisions requires a certain level of confidence in one's ability to

execute these changes within one's life. In dental care, for example, self-efficacy includes the ability to brush and floss one's teeth, which in turn is influenced by an individual's perception of their level of self-confidence to perform these behaviours successfully (Buglar et al., 2010b). The extent of an individual's beliefs regarding their own ability to perform healthy behaviours can lead to better outcome expectations (Strecher et al., 1986). Self-efficacy relates to an individual's beliefs about their ability to perform specific behaviours in certain circumstances (Strecher et al., 1986). Strecher et al. (1986) illustrated that self-efficacy affects an individual's choice of behavioural setting, the amount of effort spent on a task and the time they can resist barriers (Strecher et al., 1986). Therefore, individuals' beliefs regarding their ability to make lifestyle changes can influence their decisions, especially in the long term. But although self-efficacy reflects the personal locus control of health, there are other external loci of control that also influence individuals' healthy decisions (Wallston et al., 1999, Strecher et al., 1986).

2.2.8.2 Social factors

An individual is a unique element of the social unit, and social interactions are part of human nature. Naturally, a person develops their learning skills based on different values and beliefs that are learned early in life from their social environment. Besides individual factors, social determinants have also been found to have an influence on the decisions taken by an individual (Giles-Corti and Donovan, 2002). Social factors can include a social network, socio-economic status, social cohesion and neighbourhood factors (McNeill et al., 2006). These factors have been found to influence the practising of physical exercises (McNeill et al., 2006).

Having a social support network has been found to yield good effects on physical health. Evidence has shown that social support is associated with the cardiovascular, neuroendocrine and immune systems (Uchino, 2006). However, although these relationships are not fully understood, having good social support can impact upon individuals' healthy decisions in many ways. For example, youth have been found to consider practising sports in the presence of their parents and friends to be enjoyable, which then motivates them to engage in physical activity (Humbert et al., 2006). In addition, shared family meals have been determined to have a positive impact on the weight and eating patterns of the participants in a study, leading to healthier diets

among children and adolescents (Hammons and Fiese, 2011). Furthermore, living in small communities alongside people having similar interests has been shown to promote engagement in physical activity (Seguin et al., 2014). This in turn can enhance an individual's decision to adopt a healthy lifestyle. Lifelong commitment remains an issue to be considered, however, notably when the types of support outlined above are lost for different reasons, such as moving to a new area.

2.2.8.3 Cultural factors

Culture is an important determinant of health and health perceptions (Skolnik, 2008). There are various ways in which culture influences an individual's attitudes and beliefs towards health and health behaviours. Cultural influence is more implicit than social influence as individuals grow up surrounded by a particular set of cultural values and beliefs that are internally reflected in terms of their behaviours and decision-making. Perceptions regarding health and illness also vary across cultures (Skolnik, 2008). In many studies across cultures, the influence of culture has been reported. For example, cultural differences in ageing perception were found among Chinese, American and German individuals (O'brien et al., 2017), and the influence of cultural beliefs on health within a western biomedical health practice was observed in Taiwan (Li et al., 2017).

Although cognitive variables appear to be similar across cultures, in reality people's attitudes, perceptions and beliefs towards risky behaviours vary (Betsch et al., 2016). Therefore, for behavioural change strategies to be culturally competent requires understanding and consideration of both individual factors and cultural norms, including the conditions in which people live, grow, eat and die (Iwelunmor et al., 2014). It is important to appreciate that each culture has values that are positive, unique and also negative, and as such understanding is needed to develop a strength-based approach to public health intervention and education by utilising the positive aspects of each culture to promote healthy living (Iwelunmor et al., 2014, Melnyk et al., 2016). The influence of culture in promoting positive health behaviours has been recognised (Iwelunmor et al., 2014). In a Canadian study, Chinese and Punjabi participants derived less benefit from health care providers due to language and cultural barriers (Shum et al., 2017). In a multicultural setting, there is a need to understand the

relationships between culture and health, especially those that affect health-improving behaviours (Napier et al., 2014).

The discovery of oil in the GCC countries led to enormous and rapid changes in the lives of individuals. A Kuwaiti study reported different factors that influence adherence to healthy lifestyle practice such as traditional food, the frequency of social gatherings, high consumption of fast food, unwillingness, adverse weather conditions, lack of time and the excessive use of cars. Individuals' backgrounds and social factors should be addressed to improve the adherence to lifestyle modifications (Serour et al., 2007). A more recent study that assessed the management of weight gain among middle-aged Middle Eastern Muslim women reported that cultural values underpinned by religious beliefs influence women's motivation towards health behaviours (Al-Zadjali et al., 2014). The influence of cultural limitations on women in terms of their ability to engage in walking outside alone was considered as a predisposing factor for women to gain weight (Al-Zadjali et al., 2014). Even though there has been infrastructure development and improvements in living conditions, the impacts of culture, religion and social factors on health persist. Napier (2014) argued that even when cultures merge and change over time, human diversity ensures that beliefs and attitudes will persist so that systems of value remain autonomous and distinct (Napier et al., 2014). The issue is that even though cultural differences have been reported across different cultures and nations, theories of health behaviours and behavioural changes do not explicitly incorporate these differences (Betsch et al., 2016). Betsch et al. (2016) argued that even the theoretical constructs used to predict behaviours may differ in structure between cultures. Health research is encouraged to focus on how engaging with cultural variability in theoretical constructs can shape and expand theoretical assumptions (Betsch et al., 2016). The theorising of culture in health theories can lead to more practical efforts in global public health to understand the impact of culture on decision-making (Betsch et al., 2016).

2.2.8.4 Financial factors

Economic status is another influencer of health decisions. Recreational physical activities mostly require a financial payment to join. A study reported that the financial cost of the physical activity influenced the rate of participation in such activities among low socio-economic status youth (Humbert et al., 2006). Suggestions for providing

financial incentives to promote physical activity for those with low socio-economic status are discussed among policymakers. These kinds of incentives can further motivate individuals with chronic illness or even overweight or obese youth. Financial incentives are supported because they do not impact upon an individual's intrinsic motivation for losing weight (Sen et al., 2014). However, other studies have reported as inconsequential the long-term effects of financial incentives on physical activity (Molema et al., 2016). Financial incentives can help to increase adherence to preventive health behaviours in relation to such physical activity only if they are supported by knowledge and skills related to lifestyle changes (Molema et al., 2016).

Healthy eating and food consumption is another factor that has been found to be influenced by financial considerations. Healthy eating is essential to reduce the risk of CVDs, but financial issues around the cost of healthy foods need to be addressed. In fact, low diet cost has been positively associated with low levels of healthy eating (Rehm et al., 2015). The cost of healthy food is greater than that of less healthy food (Rao et al., 2013). The 2007 Foresight report on tackling obesity reported the association between obesity and the socio-economic status of individuals (Butland et al., 2007). The report suggested that further efforts to combat obesity in lower-income individuals can have positive consequences for both health and inequity (Butland et al., 2007). Poverty in many countries around the world has a very large influence on the ability of individuals to purchase healthy food. As such, bringing an end to poverty is necessary to have a healthy nation. Therefore, a reduction in the cost of adopting healthier diet patterns may lead to a corresponding fall in the consumption of unhealthy diets (Rao et al., 2013) across different income groups. Reducing the price of healthy food was shown to increase purchases of fruit and vegetables (Ball et al., 2015). This then motivates individuals with low income to purchase healthier food. Furthermore, raising awareness of the marketing and pricing of healthy food among both supermarkets and the public suggests there is a need to educate shoppers with regard to when, where and how to find and recognise healthy food (Rao et al., 2013).

2.2.8.5 Environmental factors

Different factors related to the physical environment have been found to be associated with physical activity behaviour (Humpel et al., 2002). The available infrastructure and physical environment act as facilitators for different aspects of a healthy lifestyle.

An individual's motivation to engage in physical activity or mobility should be accompanied by the facilities that are accessible and available. This could simply mean the availability of footpaths which can serve as cues to actions for individuals to practise a healthy lifestyle and lead to them developing habitual behaviour patterns (Owen et al., 2004). Facilitating an environment conducive to healthy living requires commitment at the level of policymaking. Therefore, the physical environment should be prepared in such a way as to enhance the practising of sport, with even walking requiring a facilitated environment in terms of pavements, cycle paths and traffic and road safety. Physical activity has an impact on the tackling of stroke and CVDs, and environmental factors such as unsafe roads due to fast traffic, busy roads and poor street safety features can limit cycling and walking (Seguin et al., 2014). The maintenance of walking behaviour associated with better pedestrian environments includes well-connected streets and access to walking trails (Sugiyama et al., 2015).

2.2.8.6 Religious factors

In recent years, the association between health and religion has been discussed in the literature across religions (Ahmad et al., 2008, Kovess-Masfety et al., 2016, Park, 2012, Levin et al., 2011, Levin, 2010). The association between health and religion has shown positive and negative aspects, with more research reporting the positive aspects of the relationship (Levin, 2010). More studies were found to explore the impact of religion on mental health than physical health. In a systematic review by Koenig (2012), he reported the difference in quality among studies that discuss religious and spirituality involvement on health (Koenig, 2012). The Koenig systematic review showed the influence of religion and spirituality on health. A positive significant influence was found between religion and health behaviours such as smoking cessation, physical mobility and consumption of healthy food whereas weight control showed a negative influence among people who practice religion (Koenig, 2012). He argued that ethnicity needs to be considered when reporting the relationship between health and religion (Koenig, 2012). In contrast, however, the relationship between health decision-making and individual religious beliefs has been less explored. Plenty of evidence has shown attending church to have a positive influence on physical and mental health (Benjamins et al., 2006); however, such a relation is not clearly explained by health psychology theories. Padela and Curlin (2013) discussed how less

attention has been paid in health research to the impact of specific religious practice on health outcomes and the role of religion in shaping some of the health behaviours of individuals in minority communities (Padela and Curlin, 2013). Moreover, they argued that the assumption that health-related beliefs, social experience and cultures can be aggregated by studying people's race, ethnicity and socio-economic status within groups or categories is not true (Padela and Curlin, 2013). The impact of religious beliefs on individual health decisions requires conceptualisation with the social cognitive model of health behaviours (Creel, 2007). Creel (2007) suggested that religious beliefs can impact an individual's cost/benefit analysis, value perceptions, perceived behavioural control and social influence (Creel, 2007). Despite the existence of evidence demonstrating the influence of religion on individuals' understanding of disease and illness, health-related behaviours and adherence to medical recommendations (Padela and Curlin, 2013), this is an area that has been relatively less explored by health psychology theory. Understanding and utilising personal feelings of religious affiliation with health can lead to the development of certain attitudes towards health practice (Ahmad et al., 2008). Health guidance and education may be discussed during religious activities such as church services or Friday sermon for Muslims, in addition to in various different ways within other religions. Health improvement guidelines exist in different forms across different religions (Trepanowski and Bloomer, 2010). Therefore, the use of the power of religion and religious beliefs should be utilised to influence healthy behaviours and to contribute to the building of long-lasting adherence to a healthy lifestyle.

2.2.9 Adherence to a healthy lifestyle does matter.

The making of healthy decisions and maintaining adherence to a healthy lifestyle modification is multifactorial. The decision to practise a healthy lifestyle should be adopted at an early age to prevent the development of disease risk factors. In fact, the preventive approach must be targeted across broader populations. Reducing the mortality and morbidity of cardiovascular events can be achieved through widespread adoption of a healthy lifestyle among populations (Chiuve et al., 2011). Noncompliance with a healthy or therapeutic lifestyle can impact upon quality of life (Serour et al., 2007). Reducing the burden of both NCDs and stroke requires adherence to healthy decisions and lifestyle modification over the long term, and primary and

secondary health prevention programmes are challenged by adherence to lifestyle changes.

The management of chronic illness has become an international problem in line with the increase in the size of the ageing population globally that is living with chronic illness (Bookey - Bassett et al., 2017). In addition, advances in health care for children have led to an increase in the prevalence of children, youth and young adults living with chronic illness (Maslow et al., 2011). Making sense of the experiences of individuals living with chronic illness is important to understand the impact of the experience in their life. Chronic illness can have a disabling impact on individuals either physically, emotionally, spiritually and socially or economically (Armstrong, 2014). Looking at the trajectory of chronic illness shows that an individual goes through stages of physical, social, psychological and spiritual decline leading up to death (Murray et al., 2017). Depending on the nature of the chronic illness through which a person progresses, such a reduction in health varies from being intermittent or gradual in nature to rapid functional deterioration (Murray et al., 2017). Murray et al. (2017) suggested that early holistic supportive (palliative) care be initiated, starting from the diagnosis of the chronic illness. Such an approach can project any decline in health based on the trajectory of each disease and thereby facilitate later-life decisions (Murray et al., 2017). Although it is important to consider the trajectory of disease on individuals with chronic illness, of greater importance is the impact of the disease trajectory on those individuals' living conditions. For example, an increased risk of poorer education and vocational outcomes was reported among young adults living with a chronic illness (Maslow et al., 2011). As the prevalence of chronic illness is growing, greater consideration needs to be given by health and political policymakers to the social determinants that influence the health of individuals with a chronic illness. Collaboration among multiple health care providers, clients and their caregivers across settings and community sectors is suggested (Bookey - Bassett et al., 2017). However, a broader collaborative approach is also needed to build communities that promote health rather than diseases (Bauer et al., 2014).

Effective communication and therapeutic trust relationships between patients and health professionals have been shown to maximise adherence to lifestyle changes

(Martin et al., 2005). Diabetes is one example of a chronic illness that involves self-management behaviours and requires a patient-centred collaborative approach (Delamater, 2006). A good patient-physician therapeutic relationship, including patient involvement and participatory decision-making, can motivate adherence to a therapeutic and healthy lifestyle. Awareness of a patient's social and cultural beliefs and values is very important to maintaining this effective patient-physician relationship. An effective therapeutic patient-physician relationship should consider the cultural and social factors that affect patients' health (Martin et al., 2005).

2.3 Part Two

The Sultanate of Oman

2.3.1 The Demography of Oman

The Sultanate of Oman is located in the south-east Arabian Peninsula. Oman shares borders with the Republic of Yemen, the Kingdom of Saudi Arabia and the United Arab Emirates. It is the third largest country in the Arabian Peninsula and lies at the crossroads of three continents and four seas (Al-Barwani and Albeely, 2007). A total of 3000 km of Oman's coastline lies on the Sea of Oman, Indian Ocean and the Arabian Gulf (Kwarteng et al., 2016). Since the Strait of Hormuz lies within its territorial seas, this gives Oman a unique place in both the region and the world since it is the waterway used by oil tankers to access the other Gulf countries on their way to and from the rest of the world (Al-Barwani and Albeely, 2007).

Most regions of Oman are characterised by a hot climate and low annual rainfall. The average temperature in northern Oman from May to September is between 32°C and 48°C, while from October to April the temperature cools to between 26°C and 36°C (Kwarteng et al., 2009). The coastal regions are hot and humid in the summer, with high temperatures of around 46°C and more than 90% humidity (Kwarteng et al., 2009). These climatic conditions pose a great challenge to the practising of sports and exercises in the open field. Hot weather is assumed to be a risk factor for obesity among Arab Muslim women, along with other factors (Al-Lawati and Jousilahti, 2004). As can be expected, this impacts on the healthy lifestyle decisions for Omanis. Reasonably, the country's climate raises car ownership, which in turn leads to decreased physical mobility and an increase in the prevalence of obesity (Al-Lawati and Jousilahti, 2004).

With awareness about healthy lifestyles, many people tend to select a specific time of the day to go walking, typically before sunrise or after sunset, at times when the temperature is lower than during the rest of the day. A few others join the expensive and limited number of gym facilities as an alternative. However, the climate continues to pose a challenge for others, especially for patients with critical health conditions as it may lead to a worsening of their health conditions. The hot climate and high humidity make it difficult for healthier individuals to walk even a short distance during the daytime.

2.3.2 The Impact of Modern development in Oman

The year 1970 was a remarkable year in the history of modern Oman. His Majesty Sultan Qaboos is recognised by the majority of the population as an inspiring leader and more than just a governor for the ordinary Omani people. He successfully moved the country towards modernity and development. The use of Oman's natural resources of oil and gas led to a fast track of development that involved all of the country's community and governmental sectors in the process. But the main forces were directed towards human development. Strategies were planned to educate the people of Oman using modern styles of education rather than solely traditional Islamic teaching. Schools were built in most of Willayat province and possibly most of the villages. Today, Oman is proud of its educational system, and development has also extended to its health care system. Oman has been recognised internationally for its primary health care provision, eradication of childhood disease and reduction of infant mortality rates (Al-Barwani and Albeely, 2007). Notably, it has achieved an increase in life expectancy at birth (Riyami et al., 2012). The country's health development plans have been through different phases over the past 47 years. The first phase between 1976 and 1990 was aimed at building health infrastructure (Alshishtawy, 2010). In later phases, health development plans focused on the decentralisation of health resources, primary care interventions, early disease prevention and community involvement (Alshishtawy, 2010). All of this contributed greatly to improving living standards, with the United Nations Development Programme deeming Oman the world's most improved country of the past 40 years in terms of human development (Elliott et al., 2013).

However, the influential impact of these changes can also be observed in changes in behavioural, social and lifestyle patterns in society (Kamran et al., 2007). The demographic, economic and social changes experienced by the country have brought new epidemiological trends that challenge the health care system in Oman (Alshishtawy, 2010). The modern developments have imposed health risks that are different to those formerly seen within Omani society. The types of hard manual work typically undertaken in the past, such as sailing, fishing and agriculture, provided a measure of natural protection against cardiovascular problems (Serour et al., 2007). Omani lifestyles nowadays are characterised by less physical activity and unhealthier diets that are high in fast foods, refined sugar and saturated fat (Elliott et al., 2013, Al Shafae et al., 2006).

The country's rapid socio-economic development is assumed to have contributed to the increasing prevalence of NCDs (Al-Bahlani and Mabry, 2014) such as diabetes (Elliott et al., 2013) and obesity (Al-Lawati and Jousilahti, 2004). There is expected to be an increase in demand for health care by 2020, with 21% of health care expenditure expected to go towards the treatment of CVDs alone (Riyami et al., 2012). In addition, sociocultural factors play an important part in influencing people's behaviour and beliefs with regard to a variety of health issues. Omani people are well known for their traditional social interaction of sharing meals with neighbours and their hospitality of offering dates and local sweets to visitors (Elliott et al., 2013). In some areas, it is considered offensive if a visitor refuses hospitality. Another factor to consider is the hot weather as it discourages Omanis from exercising or practising sport. In fact, the epidemiological transition from communicable to noncommunicable diseases over the course of the last decade, as already described in the context of other countries, is also evident in Oman.

2.3.3 The Family in Omani Culture

The family is a central unit within the life of each individual. It is the basic source of socialisation. Individuals from their early childhood have an influence within the family and also are influenced by their family, which impacts their thinking and behaviours. The Omani family is proud of its Arabic and Islamic model of family traditions. Tribal identity and loyalty, male dominance, a strict code of conduct and

social support are the main characteristics of the traditional Arabic and Islamic family (Al-Barwani and Albeely, 2007).

The geography of Oman has historically exercised a strong influence on the development and lifestyle of its people (Al-Barwani and Albeely, 2007). As traditional Arab tribal organisations served as the basis of Omani society, all members of a tribe were obligated to one another. The Sheikh who led the tribe was normally selected from an elite family within the tribe (Al-Barwani and Albeely, 2007). The role of the Sheikh was to resolve disputes within the tribe and solve possible conflicts with outsiders. Although such a medium provided social support, it also served to influence some of the family's choices as they needed acceptance from other members of the tribe or from the Sheikh himself (Al-Barwani and Albeely, 2007). The role of both the family and tribal structures are viewed as extremely influential in shaping personal values and behaviours (Al Busaidy and Borthwick, 2012). However, from the 1970 renaissance onwards, when his Majesty Sultan Qaboos came to rule the country, the Omani lifestyle changed dramatically. There was reduced reliance on tribal support as regulations and laws become the main sources of managing the protocols of the relationships between members of the community. Tribal relations continue to exist but are not as intensive as they once were, which left close family members as the main decision makers within the Omani family. Since Oman was formerly a highly collective society with a strong sense of belonging to both Islamic and Arabic traditions, modern living has led to a slight impact within the society in terms of moving people towards family collectivism rather than community collectivism. This has led to individual plans and goals becoming narrowed to relatives and friends with respect to close-by neighbours. The modern changes in life have also impacted the structure and composition of the Arab Muslim family, which is known traditionally as a tied social unit with two parents and a large number of children (Al-Barwani and Albeely, 2007). There has also been the impact of women being able to study and work, since education and the level of opportunities for women to work were encouraged after the 1970 renaissance. A good example of the changes to Omani society can be seen within the context of family decision-making. Men were formerly the main decision makers within the Omani family, but the women within the family have now started to share the making of decisions with the males. Despite this, the males

continue to be the main decision makers regarding issues related to overall family matters, specifically those associated with children. Therefore, decision-making within the Omani family is carried out by the father and shared by the mother. It is also possible that other family members such as an older son, grandparents and cousin will be included in the decision-making (Al-Barwani and Albeely, 2007).

Obedience and loyalty to the family requires family members to play a central role in the decision-making of its members (Al-Mandhari et al., 2009), with health decision-making seemingly not far from this perspective. The extent of an individual's medical adherence is often the function of a range of social and cultural beliefs (Al-Mandhari et al., 2009). Seeking family advice regarding health issues seems to be an expected habit within the Omani family. This has an impact on the individuals seeking health care or even more healthy behaviours, with females more likely to seek advice from family members when making health care choices (Al-Mandhari et al., 2009). Al-Mandhari et al. (2009) reported that family opinions influencing a person's behaviours can hinder cost-effective delivery of health treatment (Al-Mandhari et al., 2009).

As a Muslim family, the Omani family is obligated to take central responsibility for an ill family member as part of its social obligations and duty (Al Busaidy and Borthwick, 2012). Families with patients with a chronic health illness, for example, stroke, are faced with a great challenge. Stroke as a sudden event causes stress and disrupts the family situation and life routine. It can also leave the family with the burden of a long-term caregiving process. Previously, this would not have been a matter of such challenge, but since both males and females tend to work nowadays, it places a new burden on the role and structure of the Omani family. Between the obligation to care for loved ones and working responsibilities, the families of patients with a chronic medical illness will need more support and guidance in relation to care provision.

2.3.4 The status of NCDs, CVDs and stroke in Oman

This study was conducted in the Sultanate of Oman. Oman is ranked by the World Bank and WHO as a high-income country. NCDs are considered to be the leading cause of death in Oman, and deaths due to NCDs are expected to increase by 15% globally between 2012 and 2020 (Al-Bahlani and Mabry, 2014). In Oman,

communicable diseases have fallen from 43.2% of total Out Patient Department (OPD) cases in 1996 to 33.5% in 2012. However, NCDs rose from 42.5% to 45.25% over the same period (MOH, 2012). The earlier Oman health improvement plans focused on the eradication of infectious diseases and improvements to child and maternal health. However, the shift in the burden of diseases from communicable to noncommunicable diseases has led to health improvements being needed to tackle the increases in mortality and morbidity rates attributed to NCDs and CVDs.

Moreover, the WHO reported that the mortality rate of cardiovascular disease in Oman was 33% in 2012 (WHO, 2014). The prevalence rates of obesity, diabetes and hypertension appear to be among the highest in the world within the GCC countries of Oman, Bahrain, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates. It has been found that cardiovascular disease and diabetes were the leading causes of mortality in these countries (Al-Bahlani and Mabry, 2014). Reducing both the burden and risk of NCDs requires lifestyle modification. The WHO's campaign for NCDs, which comprises nine targets for reducing NCDs by 25% by 2025, made a visit to Oman in 2016. The task force made a joint mission with the Omani Government to tackle NCDs. The WHO website reports that NCDs are the cause of 68% of total deaths and that 18% of these deaths occur amongst people between the ages of 30 to 70 in Oman (WHO, 2016). In addition, risk factors for NCDs were another area of concern. Forty per cent of Omani adults have been deemed to be physically inactive, one in seven Omani men uses tobacco, more than 40% are hypertensive and 12% have been diagnosed with diabetes, as reported on the WHO website (WHO, 2016). Behavioural risk in both Oman and other Arab countries has been reported, which was concluded due to them having younger populations with the incidence and risks of NCDs and CVDs (Rahim et al., 2014).

Oman was shown to have the eighth highest rate of diabetes amongst adults in 2010 (Elliott et al., 2013). The increasing prevalence of NCDs has been driven by many risk factors. After a legislative review aimed at preventing NCDs in Oman, Al-Bahlani and Mabry (2014) concluded that urgent action was needed to address the increasing prevalence of NCDs in Oman and other GCC countries, in addition to a strengthening of the regulatory framework to prevent a further increase in NCDs.

The human and economic burden of NCDs can impact a country's developmental changes. The burden of stroke, CVDs and NCDs is known to impact Omani patients and their families. With one of the youngest populations in the world, NCDs can reduce the labour supply and labour output for the future (Rahim et al., 2014). As a growing nation, Omanis may face different challenges when seeking to tackle stroke or CVDs in general. Besides the physical and psychological challenges posed, financial challenges can have a strong impact on people with NCDs, who tend to spend less working hours than healthy individuals (Rahim et al., 2014). This impacts upon the incomes earned by the patients and their families, especially given that individuals in early or middle adulthood have recently started to be affected by NCDs and CVDs. Therefore, political commitment at the highest national level is crucial for the implementation of a phased response to the noncommunicable disease crisis in the Arab world, including in Oman (Rahim et al., 2014). The success of prevention will need the involvement of several ministries and the public, and prevention needs to become part of health reform in the Arab world (Mokdad et al., 2014). Policy changes and governmental legislation are required to support the prevention of NCDs.

2.3.5 Health from the Islamic perspective

With the increasing Muslim population in America and Europe (UK), social scientists over the last decade have shown an increased interest in understanding Islamic culture, religion and health (Haque, 2004). Today, Islam is one of the fastest-growing religions in the world. Worldwide, there are about 1.6 billion Muslims, representing more than 23% of the global population (Shirazi et al., 2015). In the UK, the Muslim population has grown rapidly to reach a size of 2.7 million people (Iqbal et al., 2016). This increased number of Muslims and Muslim immigrants in Europe has attracted English scholars to explore Islamic principles and the beliefs of Muslims. Multiculturalism in Europe and the West is facing the challenge of finding a way to merge western culture and the western history of modernity with the most diverse cultures (Amara and Henry, 2010). The perceived understanding that the immigrants will merge into their new cultures and develop new beliefs is at odds with the fact that Muslims in particular consider religion to be a way of life as opposed to just a set of spiritual beliefs (Shirazi et al., 2015, Koenig, 2015). This has been reflected by more research scholars in the West acknowledging the role of religious beliefs and practice in the construction of

immigrants' identities (Amara and Henry, 2010). A study by Amara and Henry (2010) discussed the impact of religious beliefs on sport for Muslims living in two cities in the UK. The Muslims' non-engagement with modern sport reflected their relative lack of integration into European societies and cultures (Amara and Henry, 2010). They suggested that encouraging Muslims to practise sport in the West needs to include sporting facilities that are suitable for gender segregation, which is something that is at odds with social inclusion and might be contested by the ideology of western liberalism (Amara and Henry, 2010).

It is important to understand that Muslims consider Islam not only as a religion but also as a way of living their life. The three Islamic sources of laws or Sharia are The Quran (the Holy Islamic book), Hadith (Prophet Mohammed's (S.A.W) words) and the Al Ijtihad. These three sources provide Muslims with almost all life perspectives, laws and regulations, starting from the embryonic and up to the death stage. This section details the Islamic perspectives of human psychology and health promotion.

2.3.5.1 Human psychology in Islam

The understanding of human psychology is as old as the Islamic culture itself (Ashy, 1999). The Quran as the Islamic holy book discusses issues related to the self, mind, the purpose of life, motivation, emotion, social problems including poverty and justice and other similar issues (Ashy, 1999). As a religion, Islam stresses the importance of logical thinking and breaks away from the old traditional thinking of blind acceptance (Ashy, 1999). The historical background of early Muslim scholars in the realm of natural and social sciences formed the basis for their unique contributions under the umbrella of Islamic philosophy (Haque, 2004, Ashy, 1999). Today, such issues are rarely discussed by either Muslim or non-Muslims scholars.

The Quran itself uses several methods that require a certain level of philosophical and psychological understanding on the part of the listener in terms of whether to argue for or against the message (Ashy, 1999). In fact, Muslims have been attracted to the field of philosophy for a number of reasons, including the Qur'anic verses that urge man to think about existence and nature. Added to this, Prophet Mohammed emphasised the value of knowledge (Haque, 2004). In Islamic health traditions, diseases were divided into spiritual (diseases that are severe like schizophrenia), functional (diseases

manifested in an imbalance of temperament), structural (diseases affect the size, number or form of organs) and superficial (diseases of the skin or hair) (Ashy, 1999). The significance of Muslim scholars' contributions over centuries can be seen in the fact that the Occident inherited Islamic discoveries and thought in this area to a greater degree than it did Greek thought (Haque, 2004). Haque (2004) illustrates many examples of Muslim scholars and their contributions to human psychology whose work can be considered to be the origins of the thoughts and ideas upon which many of the psychological theories and practices prevalent today are based (Haque, 2004).

Scholars have been interested in exploring human psychology from the Islamic perspective. Living in a global world with multiculturalism and diversity of thinking underlines the importance of exploring the Islamic perspective on human nature (Haque, 2004). This is especially true in the light of the increase in the size of Muslim populations in countries that take a different dimension in terms of their understanding of human psychology. Islam is a way of living and thinking, not only a religion, that provides psychological stability at times of grief and sorrow. It challenges its followers and others to think about different life perspectives in relation to health and other fields, with Quranic verses encouraging man to think about existence and the Prophet emphasising the value of knowledge (Haque, 2004). This was clearly the reason why earlier Muslim scholars were able to initiate many of the primary ideas and thoughts of recent sciences. Today, Muslim psychologists are challenged by the secularisation of social sciences that led to the development of western theories (Voas and Fleischmann, 2012, Haque, 2004). Today, many of the concepts inherent in western psychology are atheistic in their philosophy and approach, which is something that presents a great dilemma for Muslim psychologists unless human behaviours are examined from an Islamic framework (Haque, 2004). Part of understanding human psychology is to understand humans' beliefs across many aspects of life. Underplaying or a lack of emphasis on the role of religion in human life and psychology is a matter of concern, especially among Muslims. Although the connections and relations between religion and mental and physical health are well established in the western literature (Levin, 2010, Kim and Koenig, 2007), the gap in presenting such a relation is not clear in health psychology theories and could even be missing from many of the commonly used theories. This has presented a major challenge for this study's

researcher in terms of analysing the Health Belief Model constructs without considering that religious beliefs can have a strong influence on individuals' overall health beliefs. Individuals' susceptibility to a risk of developing diseases is related to the belief that their future and health is under the control of God. The relationship between health and religion can also be seen in other religions, not only among Muslims (Kimani et al., 2016, Karvinen and Carr, 2014).

It seems that the topic of religious perspectives in psychological theories has not been sufficiently discussed by either Muslim or non-Muslim researchers as it requires a deeper level of research and understanding in terms of how it can be applied to the Islamic meaning or for individuals who consider religious beliefs in their life. The reasons might be related to an individual's educational background that is based on secular education or to the absence of an education based on Islamic philosophy and psychology. Haque (2004) suggested that for Muslim psychologists to adopt human behaviour is to adhere to the Islamic perspective of human nature, and to do so they need to distinguish between the Muslim core beliefs which are based on Islam rather than the secularisation philosophy (Haque, 2004). Ager and Ager (2016) argued as to whether secularism is a feasible strategy to manage plurality in the context of a multicultural community or international globalisation (Ager and Ager, 2016). An understanding of human beliefs, attitudes and perceptions is important to understand human behaviours, and religious beliefs are often the core reason for individuals' behaviours. It is important to understand and consider the Islamic perspective when such psychological theories are applied among Muslims or in Muslim communities. Western-based psychology theories need to be modified to explicitly identify the role of religion in health and illness. In the West, the place of religion has been affected by the rise of the nation state as the centre of societal rationalisation and as a symbolic focus for the construction of collective identity. This in turn has led to the nation state taking over the role once held by religion (Koenig, 2015).

2.3.5.2 Islamic perspective on health promotion

Health and health promotion are issues that are discussed in the Quran and Sunnah. For many Muslim scientists, the practice of religion is considered helpful for health promotion (Ashy, 1999). From the early years of Islam, the provision of care for the sick was considered to be an important matter. Muslims are made aware of the

importance of maintaining their physical and psychological health and are encouraged to be both physically and mentally healthy in order to build a strong society. Interestingly, De Leeuw and Hussein (1999) argued that the Quranic text includes much, if not everything, that is contained within the WHO Ottawa Charter vision on health promotion (De Leeuw and Hussein, 1999). Muslims believe that health is a gift from God that needs to be cared for (Yosef, 2008). As such, maintaining health is the responsibility of each Muslim.

2.3.6 Healthy lifestyle in Islam

The Islamic knowledge sources provide guidance, encouragement and support for practising a healthy lifestyle. Although many of these are also now encouraged as part of western health promotion ideas and strategies, they are not explicitly linked to religion, and likewise, neither does the WHO involve religious ideas and institutions as principle co-architects of its health improvement programmes and the SDGs (Karam and Marshall, 2016). De Leeuw and Hussein (1999) concluded that the interculturalism of western health systems, specifically in the area of health promotion, needs to recognise that the Islamic perspective of health promotion includes many of the notions contained with the end-of-millennium health promotions (De Leeuw and Hussein, 1999). Yet what is most important is that persuasive health messages targeted at Muslim populations should reflect an understanding of and use Islamic health perspectives and their impact on health behaviours. Persuasive health care messages for Muslims should contain deeper insights that demonstrate the connections between health and religion. Health promotion messages will sound strong when they include support from Islamic sources and practices. The following are some Islamic practices that can be used to promote a healthy lifestyle among Muslims. In addition, there are many Qur'anic citations that can also be used as persuasive health messages for promoting healthy lifestyles.

2.3.6.1 Prohibition of alcohol

Many Islamic laws, such as the prohibition of alcohol, are based on the maintenance of both physical and mental health. Alcohol addiction is viewed as a waste of the money, time and effort of individuals who could otherwise be active members of their communities. In the early days of Islam, many Arabs and people living in and around Mecca were used to alcohol. As restrictions on alcohol were gradually introduced,

there was a level of alcohol withdrawal among people. The Quran directs that it is forbidden to pray and drink. Muslims pray five times a day, therefore imbibing alcohol would render this impossible. Later, alcohol was totally forbidden. Prohibiting alcohol is seen as a way of preventing self-harm. Consequently, the physical harm that can result from alcohol and drug use, such as liver disease and neurological disorders, can be prevented (Yosef, 2008). This therefore indicates that health is a serious matter in Islam.

2.3.6.2 Physical mobility

Physical exercise or mobility was modelled by Prophet Mohammed, who used to walk fast all the time and worked in the field with his hands (Yosef, 2008). It is understood that praying five times a day provides psychological stability and helps to maintain the structure and discipline of life of an individual (Ashy, 1999). In fact, the physical movement involved in Islamic prayer is a form of physical activity as most of the body muscles are moved in regular patterns five times a day. From an Islamic perspective, this can be considered as an activity of daily living that promotes both psychological stability and physical activity. In addition, Islam focuses on child-related health benefits. Parents are encouraged to teach their children swimming, archery and horse riding (Yosef, 2008). These kinds of sports reinforce the mental and physical importance of physical activities for children's health. Developing the habit of adherence to sport from an early age is encouraged.

2.3.6.3 Fasting and diet

Fasting rituals are practised in different religions, including among White Jews and Greek Orthodox Christians (Kul et al., 2014, Trepanowski and Bloomer, 2010). In Islam, fasting is compulsory during Ramadan for mature, mentally competent and healthy individuals. Ramadan is one of the Muslim holy months and is the ninth lunar month in the Islamic calendar. Islamic fasting requires that a person refrains from drinking and eating from dawn to sunset, which means during the daytime. At night, it is permitted to eat and drink. Besides the religious goals of fasting, it can also have a protective effect on health (Rouhani and Azadbakht, 2014). Although some of the literature argues that fasting is detrimental to health, such as the adverse impact of fasting during early pregnancy on infant development in the long term (Almond and Mazumder, 2011, van Ewijk, 2011), another study has reported no serious adverse

effects on offspring (Rouhani and Azadbakht, 2014). Moreover, two recent meta-analyses and reviews have reported that Islamic fasting has an effective influence on body weight and some biochemical parameters, such as lipids profile, in comparison to pre-Ramadan results (Kul et al., 2014, Rouhani and Azadbakht, 2014). Fasting showed no adverse effects on either the immune system, respiratory, cardiovascular, hematologic profile or endocrine, neuropsychiatric and renal functions (Rouhani and Azadbakht, 2014, Alkandari et al., 2012). Furthermore, it is important to reinforce that fasting in Islam is mandated only for healthy individuals with the exception of children, travellers, unhealthy individuals and pregnant and lactating women if there is a danger to themselves or their child. Those groups are allowed to postpone their fasting to another time after Ramadan. In addition, if fasting affects the health condition of individuals with chronic illness, with their physician's recommendation they are not mandated to fast. Health is valued highly in Islam; as such, fasting is meant to improve health rather than cause harm.

Levels of physical activity have been reported as being lower among adult Muslims during Ramadan (Alkandari et al., 2012). Findings such as fewer steps taken per day and limited night-time activity due to more prayers and engagement in social activities have been argued to be the reasons for this reduced physical activity (Alkandari et al., 2012). Since Ramadan is a holy month, Muslims are encouraged to engage in more religious prayers such as Taraweeh prayer and late-night prayer. Taraweeh prayers are widely practised during Ramadan, although they are not mandatory. The name Taraweeh comes from the Arabic word for relax, and it is believed that moderate exercise can help the body to relax after a full day of fasting (Mohktar and Ibrahim, 2008). A study measuring body composition by single-frequency bioelectrical impedance analysis concluded that Taraweeh prayer improved body composition (Mohktar and Ibrahim, 2008). Therefore, assessing the impact of fasting on physical activity should not be limited to the practising of sports but should also consider the physical practising of Muslim prayers.

Preventive health plans can further use the month of Ramadan to motivate Muslims to adopt a healthy lifestyle. A moderation of eating habits should be encouraged following Ramadan. Awareness of weight loss and dieting has attracted the attention

of many Muslims, especially among youth and young adults. The approach of utilising the Islamic fasting period for weight control in Muslim society has been reported (Khan and Khattak, 2002). Yet although many Muslims do plan to start dieting during Ramadan, studies have reported that any weight lost during Ramadan tends to be regained post Ramadan (Rouhani and Azadbakht, 2014). In addition, smoking is forbidden during fasting, which motivates many smokers to quit smoking by reducing the number of cigarettes they smoke in the daytime during the 30-day period. Therefore, health promotion and prevention plans should focus on encouraging such health habits among healthy individuals. It is very important to maintain an emphasis on adherence to reducing the number of cigarettes smoked or on continuing with weight loss after Ramadan has ended.

Moreover, instructions around diets, such as balance and moderation in eating, are encouraged for Muslims. Food should be consumed as part of a varied and balanced diet (Tarighat-Esfanjani and Namazi, 2016). In the Quran, all food is regarded as good, with the exception of that which is haram or forbidden, such as pork, alcohol, blood, carrion and other meats that are not slaughtered according to Islamic methods. Fruits and vegetables are mentioned in many Qur'anic verses (Tarighat-Esfanjani and Namazi, 2016). The Quran states that the consumption of high-quality halal food, or Tayyeb, is good (Tarighat-Esfanjani and Namazi, 2016). Tayyeb, as part of halal food, is food that is not stale, unhygienic or that has been improperly prepared, is harmful or an intoxicant (Arif and Ahmad, 2011). Arif and Ahmed (2011) argued that maintaining health is based on the condition of the stomach, which in turn is dependent on the type of food or content consumed (Arif and Ahmad, 2011). Therefore, a healthy diet is to be halal and Tayyeb, or good, from the Islamic perspective. Health promotions can use these concepts to emphasise the importance of consuming good-quality food that contains a proportion of fruit and vegetables and halal meat at a varied and balanced level.

In conclusion, health promotion from the Islamic perspective can be considered as a comprehensive approach to a healthy lifestyle. Health promotion and health-related behaviours are illustrated in many Quranic citations and in the words of the Prophet (Aboul-Enein, 2016). One example of health promotion is the recommendation in the

Quran for infants to be breastfed up to the age of 30 months (Laird et al., 2007). This recommendation is aimed at promoting the health of both the mother and child. Breastfeeding is encouraged as a way of providing natural immunity for the child and to space natural births for mothers.

Despite the Islamic reinforcement of healthy living, behaviour-related diseases have been reported among Muslims communities. A recent study explored the perspective of health promotion among at-risk urban UK South Asian communities in which the majority of participants were Muslim. The study showed that physical activity was positively perceived as being beneficial to health. However, the link between this benefit and the prevention of diseases was not well recognised (Cross-Bardell et al., 2015).

This reflects the gap between health promotion theories, practice and individuals' religious beliefs. Understanding the extent of religion's impact on health promotion and long-term adherence with healthy lifestyle changes is required for both Muslims and non-Muslims who acknowledge their religious beliefs. With an increased interest in understanding social and cultural factors, the move towards looking at the impact of religions on individuals' health becomes evident (Ahmad et al., 2008). Health improvement should address all aspects of personal life, although the religious support for health promotion is growing, such as the WHO's recommendation for Islamic countries to provide booklets that contain Quranic verses connected to mental health messages (Aboul-Enein, 2016). Besides the use of faith-based intervention in mental health, the use of this intervention has also been suggested in relation to tobacco and HIV/AIDS in Africa, for example (Olivier et al., 2015, Garrusi and Nakhaee, 2012). However, Jabbour and Fouad (2004) argued that the use of a religious-based intervention to control the use of tobacco undertaken by the WHO's Eastern Mediterranean Regional Office should not be exempted from evidence-based scrutiny before being adopted by the WHO. The ethical risk might include the public linking poor health outcomes to non-adherence to religious teaching (Jabbour and Fouad, 2004). The rationale of the effectiveness or alternative use of religion as a strategy for health improvement has not been thoroughly considered within the WHO (Jabbour and Fouad, 2004). The SDGs 2015, however, called for a collaborative approach

among all community sectors, but strategies need to be put in place. There is collaboration between the WHO and faith-based foundations aimed at bringing an end to poverty as part of the SDGs (Cochrane, 2016). Despite the contribution that faith-based health providers make in respect of bringing an end to poverty and improving health care in low- and middle-income countries, they have been less involved within the health and public policies sector (Morgan, 2015). Recently, the religion and sustainable development conference in 2015 discussed the sharing of the universal values of equality, peace and freedom (Cochrane, 2016). These efforts hope to reduce social and health inequalities.

Although these considerations are understandable, health improvement should be built on a base of health and social equality. It is important to consider individuals' beliefs about health without underestimating the role of religious beliefs in shaping their decisions with regard to health practice. Religion (Islam, Christianity, Judaism, Hinduism, Buddhism) encourages health and health improvement practices with variety of perspectives (Garrusi and Nakhaee, 2012). Today, there is plenty of evidence within the literature that confirms the influence of religion and culture on individual decisions about health. This necessitates that national and international organisations, including the WHO, consider health promotional strategies using evidence-based studies to support the role of culture and religion in health intervention. Such strategies and plans of actions should be aligned with health and social equality.

2.4 In Summary

The first part of this chapter explored the international burden of NCDs, CVDs and stroke on patients and their families and on health care systems. The chapter also discussed health improvement strategies to reduce the risk of stroke at the primary and secondary levels. Individual, social, financial and political factors have been shown to influence individuals' decisions with regard to health. Health inequalities underpinned by the social determinants of health require an emergent plan of actions that should include all community sectors such as policymakers, health care providers, community leaders, religious leaders and patients' representatives.

The second part of this literature review explicitly outlined the role of Islam as a religion on Muslims' lives. But it is also necessary to consider the role played by all

religions. The health beliefs of people acknowledging religion, whether they are Muslims or non-Muslims, should be considered in relation to health promotion.

Chapter 3 The Study Method and Methodology

3.1 Introduction

This chapter discusses the development of this study's research methods and methodology, including the research paradigm. Realist social constructionism has been employed as the philosophical stance. This stance was advocated by Elder-Vass, who claimed there is a compatibility between critical realism and social constructionism (Elder-Vass, 2012a). This chapter also discusses the Health Belief Model (HBM) as the underpinning theoretical conceptual framework of this study. Following this, the chapter illustrates the logical reasoning, convergent mixed methods design, ethical considerations and approval, recruitment and sampling used in the study. Finally, the methods that were employed to answer the research questions are discussed, including the data collection methods and data analysis.

3.2 Reflection from the researcher's journey

I came to this research study from a postpositivist background; my research to date has been quantitative in design and I had positioned myself as an objective outsider in the research process. During the course of my research studies, I have moved in my thinking, understanding and in my philosophical stance, from a strong postpositivist position to understanding social constructionism and, finally, to exploring realist social constructionism as advocated by Elder-Vass (2012). Understanding, criticising and finding applicability of these stances to the research questions, developing the research assumptions about reality and the process of knowing this reality was a difficult process for me and involved a new way of thinking about the world. While the process was complex, it developed my conceptual understanding of human relations to the social world in a more conceptual and theoretical way. I explored theoretical perspectives that were completely new to me and which challenged my underlying assumptions and beliefs of knowledge and 'being' in the world. To start with, my research assumptions were based on and built upon observation of and interaction with patients in clinical settings and the experience of stroke as a disease that influences people's life from the perspective of their family and friends. My personal interest in this topic is to understand the role of risk recognition and the influence of risk

perceptions on individuals' choices with regard to the adoption of a healthy lifestyle. I wanted to explore whether risk recognition and perceptions of risk influence individuals' health decision-making. In addition, I was keen to explore individuals' ability to make changes and the motivators, barriers or obstacles that influenced individual health choices within the Omani context.

Therefore, I began with what I know: a postpositivist approach to explore 'at-risk' individuals' attitudes and beliefs about their risk of stroke. I looked at designing my research study to mainly target individuals with chronic illnesses, including diabetes, hypertension and heart disease. To do so, I selected the HBM as the underpinning theoretical framework as this model focuses on individuals' beliefs and attitudes towards their health problems and decisions. The model is well known and is commonly used in health in social science. Based on an individualist approach, the HBM conceptually considers the strong role of agency in decision-making. Individuals are viewed as the ones who are in control of their health decisions and as being responsible for making their own choices. The model takes the view that individuals are strongly empowered to make healthy decisions and to practise a healthy lifestyle, especially in the case of individuals with chronic illness, as they need to make lifelong modifications.

However, during the early stages of my research and reading, I was introduced to sociological theories of health and well-being, and these enabled me to develop my conceptual understanding about the role of structure in influencing individuals' health-related behaviours. The sociological theories strongly present arguments regarding the importance of structure in informing individuals' health choices. It was important for me to explore those perspectives as part of my study. By conducting my study in Oman, it became essential to explore other factors that may influence individuals' decisions concerning their health actions. It was expected within a collective society such as Omani society that individuals' choices and decisions about health would be influenced by many factors other than the individual factor alone. Consequently, I decided to explore these factors through the individuals' own meaning and experiences. To this end, qualitative semi-structured interviews were introduced to the study to

explore the factors that influenced the individual participants' beliefs and attitudes about their health and risk of stroke within the Omani society.

This study aims to explore meaning from the individuals' perspectives and their beliefs about their risk related to their chronic illness. Diseases or illnesses are an objective reality that influence an individual's life. In addition to this, there are other structural realities, such as the weather and infrastructural resources, but it is mainly the norms and culture within Omani society as a social reality that influence individual decisions on health-related behaviours. On the other hand, understanding people's own meanings and experiences allows reality to be recognised from their own perspective and how these are socially constructed. An example of this is the individuals' interpretation of their religious beliefs in the context of their perceptions of health. This was constructed from the participants' understanding of their susceptibility to stroke risk. To understand the participants' meanings and experiences, I understood that it was appropriate to select an interpretive approach to merge and develop meaning from the findings from both the quantitative and qualitative data. The way to answer my research questions and assumptions is by exploring and interpreting people's meanings, understanding and perception of their risk of having a stroke, the factors enabling them to improve their health and the barriers that challenge them. This was supported by me being an insider to the Omani society, which helped me to interpret the participants' meanings.

Social reality and ontology have been a matter of debate among critical realist and social constructionist researchers. However, this study conceptually supports the notion that reality exists in the social world and awaits to be discovered through socially constructed meaning. Until recently, social constructionism and critical realism were theoretically conceptualised and incompatible, but Elder-Vass (2012) developed the approach and termed it realist social constructionism. This approach considers that both the social structure and individuals interact together to form the causal efficacy of a social phenomenon. Norms, values and cultural beliefs exert a strong influence in Omani society. This social reality was supported by the study's findings and interpretations that showed the influence of both agency and structure on individuals' health decision-making among the study participants. The realist social

constructionism approach advocates that individual agents, other material objects and the social structure that includes organisations and norms all come together and interact to form the causal influence on individuals' decisions and actions.

3.3 Philosophical stances

Crotty (1998) stated that a research methodology involves the making of assumptions that ask about reality and the understanding of human knowledge that is subsequently attained by the research project (Crotty, 1998). The methodology of any research study is determined by the research questions followed by the theoretical structure or framework (Plowright, 2011, Crotty, 1998). Each research paradigm can be underpinned by ontological and epistemological assumptions that guide the research methodologies (Scotland, 2012). Epistemology as the theory of knowledge (Crotty, 1998) and ontology as the nature of reality (Creswell, 2011) are the two leading concepts that identify the basis of any research methodology. It is about the knowing and ways of knowing the reality and truth. Historically, the nature of knowledge developed through three eras; the pre-modern (dualism, idealism and rationalism), modern (positivism) and postmodern (constructivism) (Raskin, 2002). The two basic philosophies of science are naturalist and constructionist (Loseke, 2017).

From the naturalist perspective, the social world is not viewed any differently from the physical world (Loseke, 2017). Postpositivists are interested in revealing specific functional relationships between operationalised variables and predictable outcomes (Cupchik, 2001). In social science, the techniques used by postpositivists are not inherently scientific, and quantitative data analysts provide explanations and interpretations for their results and findings by making interpretation and narrative conclusions that are very similar to those found in the interpretivist approach (Onwuegbuzie and Leech, 2005). On the other hand, postpositivists view reality as being objective and external to the researcher (Mack, 2010). They interpret numbers and statistics to capture meaning and understanding of social phenomena. In social constructionism, truth or meaning comes into existence from humans' engagement in and interpretation of the world (Crotty, 1998). The constructionist approach views reality as existing independently of humans and as capable of being measured by human senses (Loseke, 2017). Social constructionism does not believe in objective

reality; rather it believes there are multiple realities that are socially constructed. Within social constructionism, individuals' behaviours are influenced by their socially constructed beliefs and attitudes about health or illness. In this sense, individual behaviour is largely a consequence of traits or motivations that are inherited or learned (Burr and Dick, 2017). Social constructionism argues that there is no single truth to be revealed through the adoption of an objective stance to the world and that realities are constructed through language, discourse and other symbolic systems (Burr and Dick, 2017). However, strong social constructionism has been critiqued for its denial of the key aspects of person, individual subjectivity, sense of self, emotion and other bodily experiences (Burr and Dick, 2017). Recent years have seen a noticeable move towards engaging human subjectivity among social constructionists (Burr and Dick, 2017)

The understanding of health and illness has long been widely accepted as being underpinned by biomedicine, which adopts natural science, but this understanding has become elaborated to accept the role played by psychological and social factors, such as personality type and sociocultural factors, on influencing susceptibility to disease (Burr, 2015). Health and health-related behaviours are affected by the ways in which individuals perceive disease to be caused and health to be manifested, in addition to the extent to which health is determined by forces within individuals' own control, forces outside individuals' control or both (Blaxter, 2010). Both individual and social structural factors influence the health status of individuals (Bennett and Murphy, 1997). There are individuals' interpretations which lead to variations in health behaviours (Blaxter, 2010), and understanding these interpretations requires in-depth thoughts that go beyond the illness process to include the process, systems and categories of experiences in which individuals are involved as part of their everyday life experience that affects their perceptions, intentions and understanding (Blaxter, 2010).

3.3.1 Realist Social Constructionism:

The past decades have seen a debate about social ontology and realism vs relativism. Originally founded in the 1970s based on a philosophy by Roy Bhaskar, critical realism presented its approach by providing an alternative ontology to that of purely extreme social construction and purely extreme postpositivism (Brown, 2014). Critical realists accept that the social world is not independent or separate from people and that

social reality can be socially constructed. From a critical realist approach, an individual is a social being who interacts within a social environment and constructs meaning from social interaction. This meaning may be hidden and may provide a raw material from which we are able to structure our understanding of the world (Burr, 2015). Although there is continuing debate regarding the compatibility between critical realism and moderate social constructionism (Al-Amoudi and Willmott, 2011, Elder-Vass, 2012a, Nightingale and Cromby, 2002), there are many critical realists attempting to advocate for social ontology (Elder-Vass, 2012b). The compatibility is acceptable in terms of an approach that views social reality as existing, but independently of the observer, and it is taken to be socially constructed (Burr, 2015).

Elder-Vass (2012) advocated for the compatibility between critical realism and moderate constructionism as social construction is a real causal process that depends on the materiality of the world and requires analysis and identification (Elder-Vass, 2012a). He termed it a realist social constructionism approach (Elder-Vass, 2012a). This view adopts moderate social constructionism that allows the reality of some things (both material and social) as existing and having a causal role independently of human thought and language (Burr, 2015). Elder-Vass (2012) argued that norm circles have the causal power to increase the tendency of people to conform to a norm in which social structure does not exist independently of human agency and where people participate and jointly produce and influence collective outcomes (Elder-Vass, 2012a). Individuals make conscious decisions that are indirect or partial causes of their behaviours, and decisions are made based on conscious reflection that leads to a change in disposition and a tendency to behave in particular ways (Elder-Vass, 2010). Both human individuals and their social structure have the causal efficacy of behaviours and decisions, with the two interacting continuously (Elder-Vass, 2010). Elder-Vass (2010) viewed social structure as the causal power that influences social groups and normative social institutions as the emergent causal power of norm circles (Elder-Vass, 2010). However, he argued that the normative institutions contribute or partially determine the behaviours but that this also requires the members of social groups to endorse and reinforce certain behaviours that further determine those behaviours (Elder-Vass, 2010). This is the mechanism by which these concepts interact to influence individuals' behaviours and represent the role of agency within

the social structure. In addition, Elder-Vass argued that individuals' dispositions and beliefs are all emergent properties of human beings as a whole, including biological and social causes (Elder-Vass, 2010).

This study develops its conceptual assumptions based on a realist social constructionism approach to understanding social phenomena. Individuals develop their beliefs about health and illness from past or previous experiences and they unconsciously acquire dispositions to behave in a specific way or to decide on certain actions (Elder-Vass, 2010). For instance, 'at-risk' patients may develop a fear of stroke from the previous experience of a family member or a friend who has had a stroke. This experience will influence their future health decisions concerning their approach to stroke prevention. From this perspective, both agency and structure are responsible for health and health-related behaviours. A person knows what he or she knows about health, illnesses or diseases from their social world. Individuals develop their interpretations and decisions about health actions and behaviours through social interactions. At the individual level, we make conscious decisions about health, but those decisions are only indirect or partial causes of our behaviours (Elder-Vass, 2010). Decisions about health are also influenced by individuals' consciously or unconsciously acquired beliefs and dispositions to act in a certain way based on their previous experiences (Elder-Vass, 2010). This in turn influences individuals' personal attitudes about disease and illness that are formed from their social interactions, with their personal experience contributing to an intellectual knowing about disease and illness.

Furthermore, there are the norm circles that can influence individuals' decisions and behaviours. Practically, this refers to a group of people who share a commitment to endorse and enforce certain behaviours or norms (Elder-Vass, 2012b). Three types of norm circles were explained by Elder-Vass (Elder-Vass, 2012a). A proximal norm circle refers to an individual's ability to develop a disposition to a certain behaviour when such a behaviour is endorsed or reinforced by other people in the local social environment (Elder-Vass, 2012a). An imagined norm circle comprises a set of people that an individual believes can endorse or enforce the behaviours or the norm (Elder-Vass, 2012a). In an actual norm circle, the enforcement or endorsement of a behaviour

or norm is effected by a set of people (Elder-Vass, 2012a). Elder-Vass (2012) argued that these three norm circles complement one another and that the actual norm circle determines when the endorsement or enforcement of behaviour is likely to occur. It is informed or mediated by individual proximal or imagined norm circles, and these norms produce a set of individual beliefs and dispositions regarding appropriate behaviour (Elder-Vass, 2012a).

Although this established range of social actions may exert an influence on individuals' selection of specific actions or behaviours, the individuals retain the capacity to make choices from the range of conflicting normative pressures that confront the choice of selecting one action over others (Elder-Vass, 2012a). An individual may have many dispositions, both normative or otherwise (such as technology, politic or economic), and those dispositions interact to form individual decisions or reactions in a particular context (Elder-Vass, 2012a). In addition, individuals in the norm circles believe themselves to be causally effective and an important part of the decision-making in relation to certain behaviours by endorsing and reinforcing good behaviours, or the opposite (Elder-Vass, 2010).

Besides norm circles, organisations within the social environment, such as governmental and religious institutions, or even the medical establishment, are part of the social structure that influences individuals' actions and behaviours. The role of structure in influencing individuals' behaviours is formed by two types of social structure; organisations and norm circles (Elder-Vass, 2012b). Overall, there are interacting powers that include social structure, individual agents and other material objects that form multiple interacting forces to produce emergent causal powers that influence individuals' actions or behaviours (Elder-Vass, 2012b). Therefore, the use of a realist social constructionism approach in this study was helpful in developing a conceptual understanding of the social world with an interpretative epistemology. The interpretive approach is suited to making sense of the meaning of language, discourse and culture from a critical realist perspective (Elder-Vass, 2012b). Language, discourse and culture are viewed as products of interacting causal powers and may also themselves be causal forces (Elder-Vass, 2012b). However, Margaret Archer suggested that these norm circles can be strengthened by a history or biography that

determines the beginning of any analysis of a particular episode of cultural interaction (Archer and Elder-Vass, 2012).

3.3.2 Ontology

As the pattern of disease shifts from infectious to non-communicable diseases, acute to chronic and from curing to caring, people are encouraged to maintain their own health status (Blaxter, 2010). This shift highlights the role of individual lifestyle approaches in disease causation (Naidoo and Wills, 2016). As disease prevention is the expected outcome or interpretation of health promotion (Naidoo and Wills, 2016), the basic aims are to help individuals to avoid recurrence and introduce healthy changes to enhance their quality of life when living with chronic conditions (Naidoo and Wills, 2016). One's responsibility for health, or agency, can be considered as an individual's processing of past experience but also as them being oriented towards the present and the future, whereby an individual critically evaluates and chooses their course of action (Cockerham, 2005). At the national and community levels, health interventions aim to provide social support focused on legislation or taxation, while at an individual level they provide cues to the types of healthy behaviour that individuals are encouraged to adopt in relation to their health-enhancing behaviours (Bennett and Murphy, 1997). Individuals thus consider the cues to action that are available in their social environments. For instance, experiential learning or learning from the experiences of others can act as good cues for the practising of preventive health behaviours. Within the Omani collective society, one way in which individuals develop their knowledge is through experiential learning, which subsequently influences their health decisions. This learning is informed by norm circles that influence individuals who are acting and interacting within this social structure and are not separate from it. For example, the preference for walking after sunset or before sunrise is endorsed and enforced by members of the community due to the high temperatures during the daytime. Such a practice thus becomes more acceptable among people, and they encourage each other to walk at times when the temperature is cooler.

Agency and structural power play a complementary role in influencing the health of individuals. The argument about the role of agency and structure in shaping health

outcomes has been an ongoing debate among health promotion researchers (Bandura, 2004, Cockerham, 2005). The impact of structural factors on health choices and decision-making is discussed as part of the sociological model. Access to health care, the availability of health facilities and the cost of adopting a healthy lifestyle are among the many important determinants of health. The social structure also plays an important role in determining behaviours, either directly or indirectly. A social structure comprises the patterns of institutions and relations that result from the actions of individuals who are endowed with capabilities and competencies that enable them to produce or act in an organised way (Elder-Vass, 2010). In any society, there are sets of norms and behaviours that are either acceptable or not acceptable by the members of the group. Health-related behaviours such as smoking can thus be reinforced or rendered unacceptable by members of the group and peer effects.

In this study, chronic illnesses or diseases are perceived as a disease reality. Individuals' beliefs and attitudes about a disease are developed through interaction with the social environment. Knowledge about the understanding of disease, risk prevention, treatment and lifestyle changes are attained through social interaction and are socially constructed. This forms the multiple realities from the critical realist perspective. Besides this, there are many material and social realities that are considered, including social norms, culture, religion and other structural factors that include the hot climate. One example from the norms and cultural factors is the hospitality found within Omani culture. In Omani culture a guest has to accept Omani sweets (*halwa*) or dates that are typically offered with Omani coffee. This norm is endorsed and enforced by members of Omani society, and individuals in this culture feel compelled to offer or accept the hospitality. This also includes individuals with diabetes, who feel the social force to accept the sweet or coffee so as not to offend their host. The experience of having diabetes or other diseases, however, leads individuals to consider their healthy choices. As diabetes becomes an epidemic within Omani society, individuals are becoming more understanding if their guest refuses their offer of sweets. Although there are certain beliefs and dispositions that develop from the social interactions and respect for cultural norms and values, behaviours and actions remain partially determined by the social structure. Part of this is due to the fact that the people within the norm circles can be motivators towards healthy practice within the group or community. People

need to recognise the power of their choice among different opportunities and properties. The role of individuals can be extended to become motivators for each other and to advocate for healthy behaviours within the norm circles. Therefore, this study uses a realist social constructionism approach to examine the social reality that exists. This reality may at times be hidden or unrecognisable, but that does not mean it does not exist.

3.3.3 Epistemology

The behavioural change model of health promotion motivates people to adopt healthy behaviours as the key to improving health (Naidoo and Wills, 2016). A focus on people's healthy lifestyle can minimise the structural barriers (Naidoo and Wills, 2016) and maximise individuals' control over health with the aim of stronger adherence. People's beliefs and attitudes about their susceptibility to threat and disease risk and their motivators, barriers and intentions with regard to risk can reflect their understanding and meaning of healthy living and behaviours. Interpretivism requires the researcher to grasp the subjective meaning of the social action (Bryman, 2016).

Therefore, interpretative approaches are used to gain a deeper understanding of the individual experience by concentrating on unveiling otherwise hidden meaning in their accounts of the experience (Matua and Van Der Wal, 2015). As a researcher, I share the same culture, religion and social background as the research participants, therefore positioning me as an 'insider' to the research. In research studies that involve human interaction, the researcher and research participants become part of the co-construction of the research (Cuthill, 2015). This is helpful in understanding the individual and sociocultural perspectives of the participants' meaning and experiences. Although it not possible for the results from an interpretive approach to be generalised, they are however informed by individuals' assumptions about a phenomenon, and the data can inform the researcher about the meaning instead of the researcher's own preconceptions (Mack, 2010). In addition, Al-Amoudi and Willmott (2011) suggested that epistemological relativism is a central component of critical realism and constructionism (Al-Amoudi and Willmott, 2011). This can be considered a strength as it increases the trustworthiness, sensitivity and reflexivity of the research construction.

3.4 Theoretical framework

The HBM is the best-known theoretical model that emphasises the function of beliefs and attitudes in decision-making (Naidoo and Wills, 2016). Therefore, the HBM was chosen at the outset of this study to explore individuals' perceptions of their health behaviours and to explore the motivators, barriers and intentions with regard to improving their healthy lifestyle. Acknowledging the social and structural limitations of the HBM, this study aimed to explore the individuals' understanding and meaning of health behaviours with the expectation that the influence of social and structural factors can be better explained through individual experiences and explanations. Living in a collective society such as Oman does influence individuals' experience and decision-making. In addition, besides structural challenges, Omanis are influenced by strong social and cultural forces that cannot be easily changed or would need more time to change. Individual psychological and cognitive factors can also have a stronger impact on health behaviours. As will be seen in the Results chapter, an example can be found in the study participants' perceptions of the benefit of sport for their health status; they were motivated to walk even though the weather was challenging, but they chose an appropriate time of day, such as before sunrise or after sunset, at which to walk or practise sport. This showed that individuals' perceptions, motivations and intentions are important determinants of healthy behaviours.

Besides the WHO's definition of health, there are also many other interpretive meanings of health (Blaxter, 2010, Naidoo and Wills, 2016). The meaning or perception of health differs from one person to another. Health behaviour is expected to be enacted in response to each individual's meaning of his or her own health status. People react towards their health based on their beliefs and attitudes gained through social interactions. Those individual beliefs are influenced by many factors, including personal, social or structural factors. From the social psychology perspective, health behaviours are determined by individual attitudes, and those attitudes are in turn influenced by beliefs, intentions and motivations (Naidoo and Wills, 2016). Recognising an individual's beliefs and attitudes is integral to understanding how he or she appraises healthy behaviours and copes with the challenges they face (Downie et al., 1996). Individuals' behaviours are also determined by their own attitude to those behaviours (Naidoo and Wills, 2016). People's attitudes are made up of three

components: cognitive (beliefs), affective (feelings) and conative (action) (Downie et al., 1996, Blaxter, 2010). Although these components are interrelated, the fact that a person has a certain attitude does not necessarily mean they will think, feel or act in the same way (Downie et al., 1996). More attention is given to the importance of people's attitudes about themselves, including their abilities and capabilities, thereby having a strong association with health-enhancing behaviours (Downie et al., 1996). Studies seeking to understand the actions of people in relation to illness have found that adherence to treatment, for example, is related to self-regulation or control (Blaxter, 2010). Individuals' attitudes to perceived susceptibility or vulnerability are thus related to their uptake of preventive action or behaviours (Downie et al., 1996). HBM is possibly the best-known model highlighting the function of beliefs in decision-making (Naidoo and Wills, 2016). The concept of perceived vulnerability is an integral part of the HBM, which suggests that the perception of being susceptible to a disease and perceptions of the relative costs and benefits of preventive behaviours are related to the likelihood that an individual will engage in such healthy behaviours (Downie et al., 1996).

Today, people's health behaviours and lifestyles are considered to be the main causes of many modern diseases (Naidoo and Wills, 2016). The shift in the pattern of illness to chronic diseases has raised the cost of health and distressed individuals and communities (Sarafino, 2008). People's responses to health and illness are not only dependent on physiological factors but also include psychological and social factors (Sarafino, 2008). There are structural factors such as health inequalities that are a consequence of social injustice which influence individuals' lifestyle in respect of health-related behaviours. Modifications to lifestyle through everyday patterns of behaviour can reduce the risk factors of chronic diseases (Sarafino, 2008). People who practise healthy behaviours have been found to reduce their risk of illness and early death (Sarafino, 2008). Understanding the reasons for people's behaviours and their role in maintaining and promoting their health can contribute to understanding how people make decisions about their health which in turn leads to the planning of health promotion interventions based on self-empowerment (Naidoo and Wills, 2016). Behavioural risk factors such as smoking cigarettes and eating an unhealthy diet are

associated with the five leading causes of death, including heart disease, cancer and stroke (Sarafino, 2008).

There are many factors that hinder people from practising healthy behaviours or lifestyles, including less immediate pleasure, social pressure or habitual behaviours (Sarafino, 2008). Importantly, cognitive factors influence individuals' decisions of whether or not to practise healthy behaviours (Norman and Conner, 1996, Conner and Norman, 2005). Factors such as knowledge and perceptions of risk are essential for individuals to make informed choices concerning healthy lifestyles (Norman and Conner, 1996). Social cognitive factors including beliefs, attitudes and knowledge are central concepts to models of the determinants of health behaviours (Norman and Conner, 1996, Conner and Norman, 2005). The individualistic approach in the social cognitive model focuses on the individual's cognition or thoughts as a process to intervene between observable stimuli and responses in specific real-world situations (Norman and Conner, 1996). Personal perception and self-regulation are the two sides of social cognition that focus on how social cognition relates to health behaviours (Norman and Conner, 1996). For individuals to make good health decisions, their motivation that involves incentives and expectations in order to choose between goals and implied actions and volition are important elements in them changing their behaviours (Norman and Conner, 1996). In addition, their intentions to plan and implement the required actions in changing lifestyle form another step towards the adoption of healthy behaviours. Social cognition models such as the HBM are based on individuals' cognition in order to predict future health-related behaviours and their outcomes (Norman and Conner, 1996). The social cognition models provide a basic understanding of the determinants of behaviours and behavioural change with an emphasis on the rationality of human behaviours (Norman and Conner, 1996). Although these models have been criticised for their emphasis on rationality, since human behaviour is not always rational in nature, in secondary prevention, individuals' understanding and attitudes about health and illness develop and change over time as their cognitive factors and experience of their present illness come to influence their decisions related to their future health.

This study is interested in exploring the individual participants' perceptions and attitudes about their lifestyle behaviours and the factors that motivate and demotivate them to make healthy decisions about their lifestyle. Social cognition models assume that individuals' behaviours are best understood in terms of their perceptions of the social environment (Conner and Norman, 2005). Cognition involves the way in which individuals perceive, learn, remember, think, interpret, believe and problem-solve (Sarafino, 2008).

Both the HBM and the Theory of Planned Behaviour (TPB) provide valid explanations for the parts of the process that determine how people practise health-related behaviours (Sarafino, 2008). The TPB focuses on the intention that is determined by a person's attitude towards the behaviours, with greater concern placed on subjective norms (Abraham et al., 2011). It also argues that intention is the best predictor of what people will do, which has been criticised as people do not always do what they intend to do and there is only a moderate relationship between behaviours and intentions (Sarafino, 2002). In addition, it lacks the element of the assessment of health threat that is inherent in the HBM (Norman and Conner, 1996). In addition, self-efficacy models such as Bandura's earlier model of self-efficacy, make more central the focus on the determinants of health behaviours. This type of model advocates action-outcomes and expectations based on self-efficacy and intention (Norman and Conner, 1996) but lacks an explicit consideration of social influences on behaviour (Norman and Conner, 1996). Rosenstock (1988) suggested that the HBM be extended to include the self-efficacy model.

After exploring the above cognitive theories, a consideration of the assessment of health threat, risk recognition and the influence of social environment on behaviours was deemed essential to answer the research questions of this study to consider the assessment of health threat, risk recognition and the influence of social environment on behaviours. This study aimed to explore at-risk individuals where risk recognition was expected to influence their health decisions. Moreover, the influence of collective societal and social environment was assumed to influence the individual beliefs and perceptions toward their own health and healthy lifestyle. For these reasons, the HBM was selected as the theoretical underpinning model for the study.

Although structural, social and environmental factors are important determinants of health behaviours, individual skills, abilities, motivators and understanding also play an important role in enhancing healthy behaviours. Individuals need to manipulate the challenges around them in order to develop opportunities within their environment. Strategies that rely on governments to make changes or where the blame is placed on society for the difficulty of changing social factors can take a long time and may not enable individuals to make changes to their lifestyle. Social cognition approaches are effective in the self-management of health habits that keep people healthy throughout their lifespan (Bandura, 2004). Self-empowerment to make healthy decisions is vital to the management of chronic illnesses such as diabetes, hypertension and heart diseases.

3.4.1 Health Belief Model

The HBM is an expectancy-value theory that focuses on the thread of perception and behavioural evaluation (Buglar et al., 2010b). The four main concepts of the model are perceived susceptibility, perceived seriousness, perceived benefits and perceived barriers. A subsequent re-conceptualisation of the HBM has seen the health motivation concept added to the model by Becker (Champion, 1984). Other concepts have also been added to the model, such as cues to action and self-efficacy in the extended version of the model (Abraham and Sheeran, 2007). In fact, the HBM is considered to be one of the most commonly used frameworks for explaining an individual's process for engaging (or not) in certain behaviours based on their personal beliefs or perceptions (Davis et al., 2013). Many studies have used the HBM to assess behaviours related to disease (Davis et al., 2013).

The HBM is used as a theoretical framework for explaining and understanding individuals' responses to health-related matters. The model was originally developed as part of a study to assess patients' participation in screening programmes (Cockburn et al., 1987) and mainly aimed to explain why people refuse x-ray examinations for tuberculosis screening and other preventive services (Anderson et al., 2011). The HBM is considered to be one of the frequently used frameworks for developing health interventions aimed at improving patients' adherence to medical recommendations, and there is empirical support for the HBM in predicting health beliefs (Anderson et

al., 2011). The HBM considers beliefs about certain behaviours to be essential indicators for those behaviours. Theories that focus on the beliefs behind behaviours are more likely to predict behaviours than those that focus on illness (Jones et al., 2014b). Carpenter (2010) argues that benefits and barriers appear to predict behaviours better with the purpose of preventing a negative health outcome instead of determining if a subject will comply with a treatment programme.

The HBM has been effective in raising awareness of colorectal cancer prevention, predicting testicular self-examination and predicting breast self-examination (Anderson et al., 2011). However, few studies have been conducted to investigate the HBM's ability to predict health-promoting behaviours regarding stroke prevention (Anderson et al., 2011). There is a need for HBM-based interventions on stroke prevention and control behaviours to be investigated (Anderson et al., 2011). The implementation of the HBM in the context of stroke has many advantages. The well-known properties of the model are detailed in the literature, thereby facilitating the interpretation of results in new contexts (Sullivan et al., 2008). The HBM is predicated on the basis that knowledge of risk does not necessarily influence behaviours and that in assessing and understanding when and how people modify their stroke risk it is important to explore other factors (Sullivan and Waugh, 2007). In addition, the HBM can effectively motivate care seeking for stroke risk (Anderson et al., 2011). Understanding an individual's health beliefs about their medical condition and the potential risk-reduction strategies offers insight into their motivation to engage or not engage in healthy behaviours and is an important factor to consider when developing interventions aimed at behavioural change (Tovar et al., 2010).

Anderson (2011) suggested that the HBM could be used as a motivator for health care behaviours to reduce stroke risks as part of lower-cost motivational interventions. Perceived susceptibility to illness involves assessing an individual's beliefs regarding their vulnerability to getting an illness or condition such as a stroke. The perceived severity of the illness relates to their perceptions regarding the potential threat posed by a stroke. A cost-benefit ratio is thus used to examine the perceived barriers versus the perceived benefits of seeking assistance from a physician to modify their stroke risk. Then, self-efficacy describes the degree to which an individual feels that he or

she can successfully follow advice or a prescribed action to lower their risk (Anderson et al., 2011).

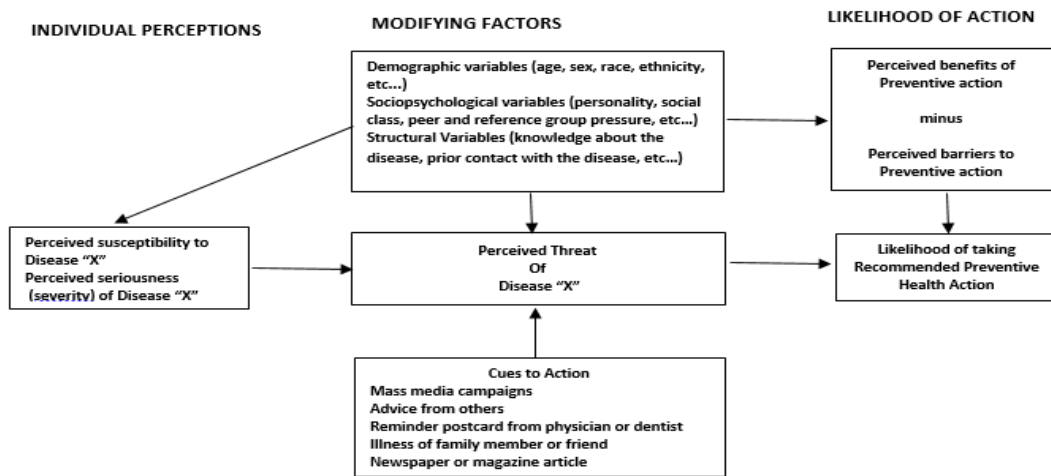


Figure 3:1 the HBM and Personal Health Behaviour (Becker, 1974)

In this study, the HBM was utilised to explore patients' perceptions of their susceptibility to stroke and the seriousness of their risk of having a stroke in the future. The concept of perceived benefits and barriers can enrich the study with the factors that facilitate or restrict the patients' adoption of healthy lifestyles by taking into consideration the patients' beliefs about the value of adopting a healthy lifestyle and the obstacles they face. The influence of individuals' surroundings on the adoption of risk-reduction behaviour was also explored. There are cues to action that comprise a diverse range of triggers, including individuals' perceptions of symptoms, social influences and health education campaigns (Abraham and Sheeran, 2007). Moreover, the adoption of a healthy lifestyle is empowered by one's ability to adopt the change. Self-efficacy involves an individual's willingness to modify their lifestyle behaviours.

The HBM, as an expectancy-value theory, focuses on individuals' beliefs regarding an event, with these being evaluated as either negative or positive. When a patient experiences a health problem, his or her perception of the severity of the consequences of that problem, the perceived benefits of healthy behaviours and their potential cost are seen as the core elements that guide the existence of healthy behaviours (Abraham and Sheeran, 2007).

Basically, the model is geared towards reducing or avoiding a disease condition and aims to explain and predict healthy behaviours. The model assumes that individuals will act if they feel their personal health is threatened and if they perceive the benefit of the health-promoting activity to exceed that of their unhealthy behaviours. This assumption is congruent with the model's focus on health promotion and disease prevention (Rawlett, 2011).

The HBM assumes that an individual is more likely to engage in preventive health behaviours when they perceive themselves to be susceptible to a certain disease or illness (perceived susceptibility) and consider the potential serious consequences of the perceived condition (perceived severity). Individuals may believe that a certain course of action will produce a positive outcome (perceived benefit) or that the obstacles and barriers outweigh the benefit (perceived barriers) (Charkazi et al., 2013)

This study looks at the individual participants' perceptions with regard to reducing their risk of stroke and their individual perceptions of whether or not the risk of a stroke is a threat. The threat perception included the two key concepts of perceived susceptibility to illness or health problems and the anticipated severity of the consequences of illness (Abraham and Sheeran, 2007). Such perception drives changes in behaviour by considering the associated costs and benefits. In fact, behavioural evaluation is concerned with the benefits or efficiency of a recommended health behaviour and the barriers to enacting that behaviour (Abraham and Sheeran, 2007).

The model considers the modifying factors that influence individuals' perception of the risks and their perceptions that lead to action or a change in their behaviour to reduce those risks. Age, knowledge, education and socio-economic factors are some examples of these modifying factors.

In a review of leading health behaviour theories, Conner and Norman (2005) recognised knowledge as a component of several theories. In the HBM, knowledge is identified as a modifying factor. Knowledge is conceptualised as one of several factors that can influence beliefs or upon which beliefs and attitudes about health may be based (Sullivan and Katajamaki, 2009). Knowledge about stroke does not always change people's behaviour, however, nor do people necessarily take the appropriate

action when a stroke does occur (Sullivan and Katajamaki, 2009). Broadly, beliefs are better predictors of intention to improve health than knowledge (Sullivan and Katajamaki, 2009). Therefore, it is important to consider the influence of knowledge and beliefs on changing behaviours.

Besides knowledge and beliefs, cues to actions can initiate health behaviours when appropriate beliefs are held. These cues to action involve a diverse range of triggers, including individuals' perceptions of symptoms, social influence and health education campaigns (Abraham and Sheeran, 2007). Additionally, self-efficacy is the confidence in one's ability to perform a healthy behaviour to reduce the risk of stroke. Self-efficacy has improved the predictive efficacy of the HBM (Buglar et al., 2010b). The HBM constructs are as follows:

3.4.1.1 Perceived threat (Perceived susceptibility and perceived severity)

Perceived susceptibility refers to individuals' beliefs regarding the possibility of them getting a disease or a condition (Champion and Skinner, 2008). If the perceived risk is great, then the likelihood of engaging in health-promoting behaviour may increase (Adams et al., 2014). The perceived seriousness of contracting an illness and the consequences of leaving it untreated, whether these are the medical consequences (death, disability or pain) and/or social consequences (the impact of the condition on work, family life and social relationships), combine to make up the perceived severity (Champion and Skinner, 2008). This relates to an individual's belief regarding the negative effects that contracting a disease would have on his or her overall existence (Adams et al., 2014). The HBM assumes that individuals who report a greater perception of severity to a certain disease should also report a greater adherence to preventive health behaviour (Jones et al., 2014b). The stronger an individual's perception of the severity of the negative health outcome, the stronger will be their motivation to act in such a way as to avoid that outcome (Carpenter, 2010).

3.4.1.2 Perceived barriers versus perceived benefits

Perceived barriers refer to an individual's beliefs that their participation in health-promoting behaviour is restricted due to psychosocial, physical or financial factors (Adams et al., 2014). These barriers can act as obstacles to them undertaking the recommended health actions and involve them carrying out a cost-benefit analysis of

the health action (Champion and Skinner, 2008). Perceived barriers seem to predict behaviour better when the goal is the prevention of a negative health outcome (Carpenter, 2010).

Perceived benefits refer to personal beliefs regarding the benefits of various available actions for reducing the disease threat (Champion and Skinner, 2008). When individuals perceive the action as potentially beneficial in reducing the threat, they can then be expected to recommend the health actions (Champion and Skinner, 2008). Literally, it is the person's opinion of the value or usefulness of a new behaviour in decreasing the risk of developing a disease (Hayden, 2009). Individuals will be more likely to adopt a preventive health behaviour when they value the benefits of it in reducing the chance of getting the disease (Hayden, 2009). Perceived benefits play an important role in the adoption of secondary screening prevention behaviours (Hayden, 2009). Although they may find some forms of screening to be uncomfortable or painful, for example, screening for colon cancer, individuals value the benefits of such screening (Hayden, 2009).

3.4.1.3 Cues to action

The HBM suggests that individual behaviour is influenced by cues to action. Cues to action include many examples of factors that might influence personal experience, including the events, people or things that influence people to change their behaviours (Hayden, 2009). Examples of cues to action include but are not exclusive to the illness of a family member, media reports, mass media campaigns, advice from others, including that of a physician (Hayden, 2009), and medical symptoms (Champion and Skinner, 2008). Family illness or experiences of health issues are considered by the HBM to be cues to action. Having a family history of cancer was seen to be related to high levels of cancer-related threat or anxiety among women with a family history of breast cancer (Norman and Brain, 2005).

3.4.1.4 Self-efficacy

Self-efficacy refers to the confidence in one's ability to perform a new health behaviour (Orji et al., 2012). If an individual does not believe in his or her own ability, then that individual will likely not pursue the course of action (Adams et al., 2014). Self-efficacy was a later addition to the original HBM variables, Rosenstock et al.

(1988) illustrated that for behavioural change to succeed, an individual must have an incentive to take action by feeling the threat of their current behaviour and believe that such an action can be beneficial by resulting in a valued outcome at an acceptable cost and to feel he or she is competent to perform that change (Rosenstock et al., 1988). Self-efficacy has predicted a range of health behaviours including oral self-care, breast self-examination (Champion, 1984) and the self-efficacy of women with osteoporosis to perform exercise (Hayden, 2009).

3.4.1.5 Other modifying factors

There are other modifying factors that can influence the performance of health behaviours, such as demographic, psychological characteristics (personality and peer pressure) (Conner, 2015), socio-economic status and other social support. In addition to these factors, structural variables such as knowledge about and previous contact with the disease may also influence individuals' perceptions and indirectly influence their health-related behaviours (Champion and Skinner, 2008).

3.5 Inductive and deductive logic reasoning

In this study, both inductive and deductive logic were employed. These two approaches aimed to integrate data from both the qualitative and quantitative results. The integration of different approaches in the research methodology can be successful when the paradigms are reconciled (Plowright, 2011). Both empiricism and rationalism can provide reliable foundations of knowledge, which for the rationalist are successful ways of reconciling a paradigm (Plowright, 2011). Both empiricism and rationalism tend to provide a reliable foundation of knowledge, and for rationalists the foundation of true beliefs is driven by reason and logic, whereas empiricists consider data to be the foundation of true beliefs (Plowright, 2011).

Deductive logic is commonly used in social research (Loseke, 2017). The deductive research approach commences by reviewing the existing knowledge about the subject and generating hunches from the previous knowledge in order to generate new knowledge (Loseke, 2017). It is usually used to explore a theory or conceptual framework. In contrast, inductive reasoning is used to generate a theory from observations, and this theory is the outcome of the research (Bryman, 2016). Bryman (2016) suggests that deductive and inductive strategies are better thought of as

tendencies rather than as elements that can be separated (Bryman, 2016). Teddlie and Tashakkori (2009) argue that a mixed methods research design uses both inductive and deductive logic, which they termed the inductive-deductive cycle (Teddlie and Tashakkori, 2009). In such a cycle, the researcher can start with either the theories, the conceptual framework or the observations, and regardless of where they start, a research project passes through the inductive-deductive cycle at least once (Teddlie and Tashakkori, 2009). Besides the inductive-deductive research cycle, the use of both inductive and deductive logic in mixed methods as part of a distinct sequence has been illustrated as a chain of reasoning, or the research wheel (Teddlie and Tashakkori, 2009) as figure 3:2 shows.

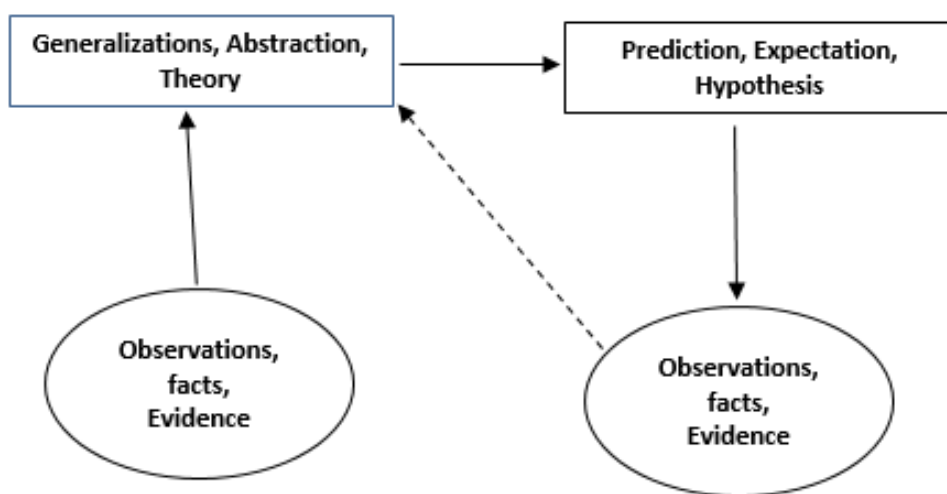


Figure 3:2 The Inductive-Deductive Research Cycle (cycle of Scientific Methodology) (Teddlie and Tashakkori, 2009)

Also, Bryman (2016) argued that the illustration of a deductive process needs to be inductive in nature as the findings feed back into the stock of theory and the research findings are associated with a certain domain of inquiry (Bryman, 2016). Bryman (2016) illustrated that as deduction entails an element of induction, then so the inductive approach is also likely to contain a degree of deduction. Ali and Birley (1999) integrated the inductive and deductive approaches in their study (Ali and Birley, 1999).

Therefore, this study integrates inductive and deductive logic at different stages; in the questionnaire development process, for example, the deductive or conceptual theory-driven approach was used. However, in developing the thematic codes, the inductive

approach was used to generate the themes. Finally, the study suggests modifying and extending the HBM.

3.6 The Research Design: Complementary convergent Parallel Mixed Methods Design

Mixed methods research is employed to answer the research questions of this study. Mixed methods research gathers the strengths of both qualitative and quantitative methodologies by combining the two approaches into a single research study to increase the breadth and depth of understanding (Wisdom et al., 2012). The use of a mixed methods design first arose in response to the limitations presented by the use of only a quantitative or qualitative method (Doyle et al., 2009). There is a philosophical rationale that allows and guides mixed methods researchers to use a variety of approaches to answer research questions that cannot be addressed using a singular method. It is suggested that mixed methods is the third generation of research methodology. Mixed methods research claims to bridge the gap between the quantitative and qualitative positions (Doyle et al., 2009). The use of a quantitative approach is helpful in gathering a wide range of information from a large number of participants, whereby the study participants are drawn from naturally occurring groups with some intervention and disruption to ongoing activities. In contrast, the qualitative approach provides the ability to study participants' values and beliefs (Bryman, 2012). The intention is for this study to benefit from the process of combining the use of these two methodologies in a single study. Bryman (2016) summarised that the interest of both the qualitative and quantitative types of research lies in studying people's behaviours and the rationale that lies behind certain behaviours; however, they investigate these areas in different ways (Bryman, 2016). Quantitative research, for example, aims to study the meaning of behaviours in the form of a Likert-type attitudes scale, while qualitative research focuses on interpreting behaviours in terms of norms, values and culture in target setting (Bryman, 2016).

Mixed methods is common in health services research (HSR) (O'Cathain et al., 2008). Traditionally, health services researchers in the UK have used quantitative methodology, while over the last decade they have increasingly welcomed the qualitative approach. Recently, there has been increased interest in mixed methods

research in the fields of social and educational research in both the UK and North America (O'Cathain et al., 2007). About 18% of primary health service research studies in the UK have used a mixed methods design (O'Cathain et al., 2007). This method is also considered to be one of the most effective ways of describing patients' subjective perceptions in relation to disease (Zickmund et al., 2013). The use of mixed methods research design in health care is significant. It can strengthen the research methodologies by developing, completing and validating each other. Although there have been a few mixed methods studies, there remains a lack of studies examining the stroke experience using a mixed methods approach (Clarke, 2009).

In this study a convergent mixed methods research design explored awareness of stroke and its risk factors among 'at-risk' Omani patients, with the use of the quantitative approach aimed at strengthening the generalizability of the study. The generalizability of quantitative data is very important for policy development and for persuading the leaders in any system, particularly in Oman. Also, the use of quantitative research is helpful in gathering a wide range of information from a large number of participants (Plowright, 2011). In addition, it has been suggested that the HBM can be easily operationalised with the use of a self-reporting questionnaire (Abraham and Sheeran, 2007). The general understanding that quantitative research is driven by a theory-testing approach underestimates the exploration and interpretation of findings in survey data analysis that can offer opportunities for the generation of theories and concepts similar to the use of testing and generation of concepts and theories in a qualitative approach (Bryman, 2016). The use of quantitative survey questions that ask about attitudes means that the researcher is interested in meaning but that attitudes are categorised based on the design of the questionnaire. In addition, qualitative research rarely demonstrates any validation of qualitative interpretation, thereby potentially influencing the meaning carried in qualitative research (Bryman, 2016). As a result, quantitative results can be used to validate qualitative findings.

On the other hand, qualitative data were necessary to investigate the participants' perceptions and experiences in this study. Semi-structured interviews were conducted in order to determine the participants' perceptions of health threat and beliefs about behaviour in an open-ended manner (Sheeran and Abraham, 1995). Most HBM

research uses regression and factor analysis, but such a positivist approach limits the interpretive and exploratory utility of the model. The use of both qualitative and quantitative research tends to be associated with dominant epistemological and ontological positions (Bryman, 2016). This study was based on a realist social constructionism approach that combined critical realism and social constructionism (Elder-Vass, 2012a). From a critical realist perspective reality exists and needs to be discovered through the social construction of language, discourse and culture. This approach advocates for the role of agency and structure in examining the social phenomenon. The quantitative approach is based on the role of agency and the qualitative approach is based on the role of the structural social construction of reality. Therefore, a mixed methods design was selected in this study. In a classic mixed methods design, one type of data gives greater depth, while another type provides greater breadth (Teddlie and Tashakkori, 2009). One of the aims of a mixed methods design is that one set of data results can strengthen and enable inferences to be made regarding the findings obtained from the other data set (Teddlie and Tashakkori, 2009). In other words, this design serves to enhance the trustworthiness of the results against each other.

I come from a background of quantitative approach where numbers play an important role in influencing policymakers' decision-making. It is a background where research outcomes are used to make changes to existing policies and to develop new policies. Numbers and the generalization of results therefore have a strong influence on decision-making. However, the need to understand human beliefs, attitudes and health behaviours indicates the importance of the interpretative approach in research. Understanding the human meanings behind each experience in the everyday is important for social science research. In fact, theory building in an interpretative approach is used to generate description, insights and explanations of events that reveal the system interpretations, meaning and structuring and organising processes (Gioia and Pitre, 1990). Both qualitative and quantitative methods are important to answer the research questions and to identify the nature of knowledge. Importantly, qualitative approaches reflect the meaning of the life experience from the voice of those individuals who are living with such a social phenomenon. Beside this, the quantitative method ensures generalizability of the results. A combination of both of these methods

is able to strengthen the research results and outcomes. Different methods have different steps or processes but all research ultimately aims to identify knowledge and to answer its research questions.

The three basic mixed methods designs are convergent design, explanatory sequential design and exploratory sequential design (Creswell, 2015). While the two types of sequential mixed methods design involve two phases of data collection, one of the methods emerges from or is dependent on the previous method (Teddlie and Tashakkori, 2009). Creswell (2011) argued that a common convergent mixed methods approach involves collecting the qualitative and quantitative strands within the same phase, prioritising the methods equally and keeping the strands independent during analysis and then merging the results during the overall interpretation phase (Creswell, 2011). The timing of the data collection is important in identifying the type of mixed methods to use in studies. Researchers collect qualitative and quantitative data in parallel, which mean at the same time or the same phase, and this is referred to as the convergent method. Teddlie (2009) referred to the collection of qualitative and quantitative data in this parallel manner as a parallel mixed methods or concurrent design (Teddlie and Tashakkori, 2009). A convergent parallel mixed methods design can be an efficient design as both types of data are collected during one phase of the results during the same period of time (Creswell, 2011).

The types of data analysis for this study were integrated with each other. Mostly, the data were analysed separately and then merged (Fetters et al., 2013), whereby the researcher then attempted to combine the findings from the qualitative and quantitative data (O'Cathain et al., 2010). There are three types of triangulation. One type is convergence, in which the findings from each method are listed and compared and the findings are agreed. The second type is complementary, whereby the data from each method is used to supplement the method's findings. The third type is discrepancy or dissonance, with the findings in this type of integration appearing to contradict each other (O'Cathain et al., 2010). A complementary convergent parallel mixed methods approach was employed in this study. Creswell (2011) illustrated that a complementary mixed methods design aims to seek elaboration, enhancement, illustration and clarification of the results obtained using one method with the results obtained from

the other method (Creswell, 2011). He elaborated that one of the purposes of a convergent mixed methods design is to obtain different but complementary results for the same topic (Creswell, 2011). Therefore, a convergent mixed methods design was selected. For the purpose of this study as figure 3:3 shows, a complementary triangulation was used to combine the findings of the data obtained from the questionnaires and the semi-structured interviews that were analysed separately. The themes from the qualitative analysis helped to explain and add depth to the conclusions drawn from the quantitative analysis. Then, the results from both of the strands were merged.



Figure 3:3 Procedural diagrams for basic mixed methods design (Creswell, 2015)

Furthermore, the quantitative and qualitative strands both carried equal status in this study. Despite there being a larger sample size for the quantitative method, the analysis and interpretations that were drawn using the qualitative method were more explanatory. Therefore, there was an equal dominant status of both the quantitative and qualitative methods in this study.

3.7 Ethical Approval

This study obtained ethical approval from the University of Edinburgh, Nursing Studies Ethics Research Panel Ref: NURS008. The application was submitted for level 2/3 and reviewed independently. After this approval, the study obtained ethical approval from the Committee of Research and Ethical Review and Approve Committee at the Ministry of Health in Oman, REF: MH/DGP/PROPOSAL_APPROVED/24/2015.

The methods of data collection selected should cause no harm to the individual study participants. This study aimed to ensure the confidentiality of the patients' identity and records. The identities and records of individuals should be kept confidential (Bryman,

2012). The individual patient questionnaires and consent were anonymised with a similar number. The consent forms were stored securely and will be destroyed upon the completion and reporting of the study. In the qualitative analysis, pseudonyms were used in place of the names of the participants, in order to maintain confidentiality and anonymity (Bryman, 2012).

The main source language of the questionnaire, consent form and information sheet is English; however, Arabic is the dominant language in Oman. These documents were therefore translated into Arabic using forward and backward translation, with attention being paid to the accuracy of the translation and the meaning. Two of the researcher's academic colleagues, who are Omani Arabic speakers and nursing tutors who teach in English, were asked for assistance to ensure the accuracy of the forward and back translations. This approach to translation has been employed in many studies, including in a study conducted in Jordan about the awareness of stroke in the general population that involved the two-step translation of a questionnaire from English into Arabic utilising forward and back translation (Madae'en et al., 2013).

The participants were asked to voluntarily participate in the study. An information sheet was provided to the participants and this was explained if necessary. The information sheet contained all of the necessary information to ensure that the participants were informed about the purpose and nature of the study, their role, the benefits and risk and that they were able to withdraw their participation at any point without any penalties. Then, the participants were asked to sign an informed consent. For a research study to be ethical and legal, it is important to obtain informed consent from all of the participants. Literacy and language are important factors for the comprehension of informed consent (Alaei et al., 2013). Any patients who refused to sign the informed consent were excluded from the study.

In this study consideration is needed with regard to the possibility of including illiterate patients. For the purpose of this study, a person who is unable to read and write a short, simple statement related to her/his everyday life was deemed an illiterate person (Nielsen and Jørgensen, 2013). A study that dealt with illiterate patients presented information in both oral and written formats and this allowed informed consent to be obtained from all of its participants (Nielsen and Jørgensen, 2013). The oral consent

provided adequate understanding of the risks, benefits and different aspects of the research (Nielsen and Jørgensen, 2013).

In this study, the consent was explained orally to the illiterate patients and at least one witness for each participant was asked to sign the form wherever possible. This witness could be a member of staff or a patient's attender. In addition, when a witness was not available, some of the patients who were not able to sign were asked to put a thumb stamp in the place of a signature. The illiterate participants were helped either by the researcher, their attender or a trained staff member to complete an Arabic version of the questionnaire. In other studies using questionnaires, illiterate participants have also been helped by the researchers to fill in the questionnaire (Verastegui, 2006). Although this approach is considered to be a structured interview, these patients are considered to be important for this study's purposes, and excluding them could bias the results.

The consent forms, digital recordings of the interviews and the questionnaires are stored with the researcher, with the memory stick that is password protected. The consent forms are stored separately from the questionnaires and the digital audio recordings of the interviews. Only the researcher and supervisors have access to the raw data of the study.

3.8 Sampling and recruitment

This study was conducted in South Sharqiya Governorate in the Sultanate of Oman. The Omani Ministry of Health annual statistics 2012 indicate that South Sharqiya Governorate has the highest rate of diseases of the circulatory system as the leading cause of inpatient morbidity in comparison to the other governorates in Oman. Also, diseases of the circulatory system were considered as the first leading cause of morbidity in females and the second leading cause for males (MOH, 2012). The target population of this study is patients with diabetes, hypertension or heart disease in South Sharqiya. Data collection was conducted at secondary-level institutions in South Sharqiya. The purpose of selecting secondary-level institutions is that these institutions receive patient referrals from different health centres for diagnosis and treatment by specialists; for example, patients with diabetes are referred to the Diabetic Centre for counselling and follow-up. The Medicine and Cardiac Clinics at X hospital receive patients with hypertension and heart disease who are referred from other health

institutions. As a secondary-level health care setting, this increases the reach of the project to include patients from a range of different areas across South Sharqiya Governorate. This variety of patient demographics served to increase the generalizability of the results across the region. In addition to this, conducting the study in secondary institutions aims to include patients who are at greater risk of a stroke. In fact, this is the only cardiac clinic in the region and patients with uncontrolled diabetes and hypertension are referred here for counselling and follow-up, thus helping the researcher to reach patients at higher risk.

Furthermore, the selection of primary-level institutions as places for data collection requires further work and was deemed unfeasible for an individual project such as this study.

3.8.1 Quantitative approach:

3.8.1.1 Recruitment

Stratified random sampling can help in ensuring representation of the population in terms of different strata (Bryman, 2012). Random selection was achieved by approaching the participants on the first come, first served basis that is practised in all the clinics. For this study, disproportionate allocation for between strata analysis was used to compare the strata to each other, which meant that sufficient numbers of participants had to be selected for each category (Daniel, 2012). The purpose of this was to allow a fair comparison between the strata and to ensure the representativeness of each individual stratum. There were three strata based on medical diagnoses (diabetic, hypertensive and heart disease). The patients with diabetes were selected from the Diabetic Centre. The hypertensive and heart disease patients were recruited from the Medicine and Cardiac Clinics at X Hospital.

3.8.1.2 Sample size

Population size: to obtain an accurate population size for the targeted clinical area, the researcher contacted the statistician at X Hospital and another statistician at the Directorate General of Health Service in South Sharqiya in order to estimate the potential population size. The table below identifies the total population and sampling methods used.

Sample size: a power calculation was used to calculate the sample size, and an online survey sample size calculator accessible on a creative survey system website (SurveyMonkey) was utilised to calculate the sample size. The sample was calculated at a 95% confidence level and a margin of error of 5%. The estimated sample size was 381 patients with diabetes, hypertension or heart disease as table 3:1 shows.

Medical condition	Population		Disproportionate stratified sample using equal allocation	
	Frequency	Percentage	Frequency	Percentage
Diabetes	34,584	88.09%	127	33.33%
Hypertension	1,986	5.06%	127	33.33%
Heart disease	2,686	6.85%	127	33.33%
Total	39,256	100%	381	100%

Table 3-1 The proposed sample size

This was the proposed sample size and allocation. Within the period of the study, the researcher obtained a total of 344 questionnaires from all three of the clinics. A total of 214 questionnaires were collected from the Medicine and Cardiac Clinics at X hospital, with a further 130 questionnaires collected from the Diabetic Centre. Whilst this total fell slightly short of the planned level of recruitment, it still gave sufficient power (margin of error increased to 5.25% at 95% confidence level) for the study.

3.8.1.3 Sampling strategy:

Although random selection using patient lists was proposed in this study, the pilot study showed that the use of first come, first served to select patients was an appropriate approach due to the workflow of the clinics, and it achieved an approximately random selection of the sample. The allocation and selection of possible participants who have convenient accessibility as they meet the inclusion criteria and are willing to participate is known as a convenience sample (Robinson, 2014). This form of sampling has a limited generalizability but it can provide generalizability to the local population (Robinson, 2014). Therefore, the generalizability to the study

population was obtained through first come, first served and approaching patients who met the inclusion criteria to ask if they would voluntarily participate in the study. In fact, social research is mostly based on convenience sampling (Bryman, 2016).

3.8.2 Qualitative approach:

The data were collected through face-to-face interviews with ten participants. The number of interviews was determined by the practical time availability of the researcher to complete the study within the time frame allocated and the need to gain in-depth data to answer the research questions. Crouch and McKenzie (2006) suggest that a sample size smaller than twenty maximises the qualitative researcher's ability to interact closely with their participants in interview-based studies and hence produce fine-grained data (Bryman, 2012). In this study, a purposive sample was used to select patients who were relevant to the research questions (Bryman, 2004) and who wanted to contribute to the study. The purposive criteria included a medical diagnosis of diabetes, hypertension or heart disease. In addition, the participants needed to agree to be recorded on audiotape during the interview.

3.8.3 Inclusion criteria:

The criteria for inclusion were patients aged 30 and above who attended the Medicine or Cardiac Clinics at X Hospital or the X Diabetic Centre and who had been diagnosed with one or more of the following conditions: hypertension, diabetes or heart disease. First, hypertension is considered to be the greatest risk factor for all stroke types. The incidence of stroke among patients with a history of hypertension is very high (O'Donnell et al., 2010). The recurrence of stroke can be reduced by controlling blood pressure level (Towfighi et al., 2014). It is estimated that a 35 to 44% reduction in the incidence of stroke can be achieved by lowering blood pressure (Endres et al., 2011). Second, diabetes mellitus (DM) is considered to be a worldwide cause of disability and a strong risk factor for stroke. Patients with type I DM have a markedly increased risk of stroke compared to those without diabetes and have an estimated likelihood of suffering a stroke 10 to 15 years earlier than non-diabetic patients (Hägg et al., 2014). Finally, heart diseases represent a risk factor for stroke, specifically for ischaemic stroke (IS). Approximately 25% of all ISs are due to a cardiac embolism. In addition, patients with chronic heart failure (CHF) are at a two- to threefold increased risk of stroke in comparison to patients without CHF (Endres et al., 2011).

The illiterate participants were aided to complete the questionnaire by either their attendee, a staff member or the researcher. They were asked to put their thumb stamp instead of their signature, and this was supported with the signature of their attendee as a witness. There were some participants who preferred to simply sign or make a symbol for a signature as this was what they were used to doing on official documents elsewhere.

3.8.4 Exclusion criteria:

The following people were excluded: patients who lacked mental capacity, fragile patients and patients who were not well enough to complete the questionnaire or sign the informed consent, in addition to others who did not fit the inclusion criteria.

3.9 Preparation and introducing the study

After ethical approval had been obtained from both the School of Health in Social Science, the University of Edinburgh and the Ministry of Health in Oman, the researcher contacted and met with the Head of Regional Research and the head of the ethical committee to introduce the study and its aims and objectives. A pack that included the study proposal and ethical approval was prepared and reviewed by the Head of Regional Research. The study was also introduced to the X hospital executive as the head of the hospital research and ethical committee. The heads of the clinics and nursing staff were oriented about the study and its aims and the process of data collection. In addition, their role in facilitating and supporting the process was explained, including helping the researcher to identify those cases that met the inclusion criteria, providing a space for the participants to complete the questionnaire or in which to conduct the interviews (which was hard to manage without the staff support). In addition, the cardiac nurse was trained to introduce the study and invited patients to complete the questionnaires. The same was done at the Diabetic Centre, and the head of the centre and the staff involved were aware of the process. In fact, they were very welcoming and helpful in facilitating the clinical setting.

3.10 Pilot study

A pilot study was conducted to ensure the feasibility of the study. This enabled the researcher to refine the research instrument by helping them to identify which questions were understood and which led to confusion among the participants (Bryman,

2012). In this study, the pilot study aimed to help ensure the questionnaires were well functioning. In addition, it enabled verification of the flow of the data collection methods in the clinical setting. Also, by piloting the interviews, the researcher gained practical experience with patients and grew in confidence. Although the proposed plan for the pilot was to gather three participants for the interviews from three sample categories, in actual fact two interviews were conducted in the pilot in order to better understand the relevance of the questions and for the researcher to better understand the qualitative data collection. A total of nine questionnaires were collected, three from each stratum.

The pilot study was very helpful for the researcher to ensure the feasibility and flow of data collection. It was also a learning experience to practise interviews with the patients and to gain a better understanding of and insight into the patients' attitudes and understanding of the topic. In addition, the pilot helped the researcher to make a few modifications to the sample selection as the proposed plan had been to gather all of the hypertensive and cardiac cases from the Medicine Clinic, but it was discovered that the two clinics separated in 2014. Therefore, the hypertensive cases were selected from the Medicine Clinic and the heart cases were gathered from the Cardiac Clinic.

Moreover, the researcher made a number of slight modifications to the questionnaire, including rearranging some of the questions. A question regarding susceptibility to a stroke in the future had initially been placed at the beginning of the health belief attitude questions, but this seemed to make the patients stressed or uncomfortable, so the order of the questions was changed as a result of the pilot. In addition, a few changes were also added to some of the terminologies used to ensure clarity.

3.11 Data collection methods:

Quantitative and qualitative methods were implemented in this study. Survey questionnaires were selected for the quantitative method, and semi-structured interviews were conducted for the qualitative method. In fact, both the quantitative and qualitative approaches can be used to understand theory and practice (Bryman, 2016). This section discusses the methods that were implemented in this study.

3.11.1 The quantitative method, self-administered questionnaires:

The self-administrated questionnaires were selected as the quantitative approach for this study. Although the use of self-administered questionnaires such as online, postal and telephone questionnaires is less time-consuming and can be used to approach participants in different geographical locations (Bryman, 2016), they can also prove costly for the individual researcher. The use of face-to-face self-administrated questionnaires in the clinical setting was thus deemed more practical for the purpose of this study. The use of self-administered questionnaires aimed to ensure the absence of any interviewer effects or interviewer variability in the interviews (Bryman, 2016) since the questionnaires were given to the participants to answer by themselves. Moreover, the distribution of the questionnaires during the waiting time was designed to ensure the respondents answered them in their convenience time. Also, the collection of the questionnaires in a clinical setting in the presence of the researcher aimed to emphasise that the participants had answered the questionnaires by themselves, even if they had needed the help that was provided to complete them. The disadvantage of online or postal self-administrated questionnaires is that there is no one present to help the respondents if they have any problems or doubts with regard to the questionnaire (Bryman, 2016). In this study, the researcher distributed and collected the questionnaires from the participants. This ensured that the participants met the inclusion criteria and meant that any questions or doubts about the study or questionnaire could be answered. Moreover, it was possible to achieve a higher response rate as the elderly or illiterate participants were helped by the researcher or their helper. These categories of participants were important because they had mostly been diagnosed with more than one medical condition as the study aimed as far as possible to include the opinions of participants who were at 'higher risk' of having a stroke. The help offered consisted of reading the questionnaire for those participants who were unable to read. Although this theoretically may have affected the response, the researcher communicated to the helper to only read the questions to the participants as they were written in the questionnaire. But in some cases, the helper had to read the questionnaire in the participant's spoken dialect rather than the written Arabic to ensure their understanding. Although every effort was made to reduce any influence on participants responses when reading the questionnaire to illiterate participants, this

method might have carried some accidental bias that might have influenced the participants' responses. Nonetheless, the inclusion of these participants was valuable to the study as they had a higher risk to stroke.

The use of questionnaires was aimed at the collection of a larger number of participants in as short a time as possible. As this was an individual project, it was time-consuming to collect this number of questionnaires. The researcher was collecting an average of 4 to 5 questionnaires per day due to different factors, including the researcher having to ensure that the participants met the inclusion criteria, which meant they did not have a history of stroke and that they were able to comprehend the questions. Also, the researcher explained the purpose of the study and provided the participants with an information sheet to read. Following this, a consent form was provided. The questionnaires were then given to the participants to complete.

To comply with data protection and confidentiality, the same code was recorded on the questionnaires as that on the consent forms. Then, the consent forms were separated from the questionnaires, with only the researcher and supervisors having access to the raw data.

3.11.1.1 The development of the questionnaire:

The use of the questionnaire in this study aimed to eliminate the interview effects and enable it to be distributed to large numbers of participants (Bryman, 2012). This was deemed to be safer and easier for both the researcher and the respondents (Neuman, 2014). Questionnaires typically contain closed-ended questions that are completed by the respondents themselves. Closed-ended questions are preferred because it is easy to process the answers and compare the responses (Bryman, 2012). Closed-ended questions encourage a structured and fixed response (Neuman, 2014). Furthermore, the HBM can be easily operationalised with the use of a self-reported questionnaire (Abraham and Sheeran, 2007).

The questionnaire consisted of three parts or sections. The first section of the questionnaire asked about the demographic data; age, gender, education level, marital status, working condition, financial level, home location and medical condition. Patients' demographic characteristics do have an influence on their health choices and decisions; for example, some studies have reported gender differences in health

knowledge among women and men (Madsen et al., 2015), and the risk of developing a stroke for a diabetic patient is significantly higher for women than for men (Peters et al., 2014). Moreover, age is one of the inclusion criteria in the study, with an estimated 18% of Omanis aged 30 to 70 dying from NCDs (WHO, 2014). Education level has also been found to influence healthy decisions. A previous study found that young Omani patients who were at risk were more knowledgeable about stroke than elderly patients (Al Shafae et al., 2006). In addition, socio-economic factors were found to be significant health determinants (Molema et al., 2016, Sen et al., 2014). Social factors such as family support and financial income both enhance and motivate a person to practise a healthy lifestyle. Therefore, it was important to gather data on demographic variables in order to explore the influence of these factors on the participants' decisions to adopt a healthy lifestyle.

The second section of the questionnaire aimed to assess the study participants' knowledge of stroke, which refers to the ability of the participants to identify stroke risk factors and signs and symptoms. Furthermore, it assessed the participants' awareness of the appropriate action to take when a stroke condition was suspected, and this was used to identify whether the Omani participants were aware of the appropriate action to take when a suspected case or the signs and symptoms of stroke were identified. Also, this section assessed the resources of health knowledge in general and specifically from where the participants acquired their knowledge of stroke. This section was adopted from the Stroke Recognition Questionnaire (SRQ) (Ennen and Beamon, 2012). The SRQ is a self-administrated questionnaire that is used to assess knowledge of stroke symptoms and risk factors (Murray et al., 2012). In a study by Ennen and Beamon (2012), the content validity index (CVI) for the items on the symptoms list was found to be 0.90, and for the risk factors items list it was 1.00. In addition, the entire content validity was 0.95 (Ennen and Beamon, 2012). This study adopted ten items for stroke risk factors and ten items for stroke signs and symptoms; the SRQ had 40 items split into 20 items for each. As the study also had other variables to explore it was more practical to reduce the number of items from the SRQ that were included in this study. Moreover, this section of the questionnaire aimed to explore knowledge of stroke risk factors and signs and symptoms and the appropriate response or action to take following a case of suspected stroke and the sources of research

knowledge. The influence of stroke knowledge on the participants' healthy decisions and lifestyle practice was explored.

The third part of the questionnaire aimed to assess the participants' health beliefs and attitudes to behavioural change. A Likert scale was used for a set of statements. A Likert scale is a series of statements that focus on a specific issue and is the technique most commonly used for investigating attitude (Bryman, 2016). It measures the intensity of feeling about the areas in question or statements by requiring participants to indicate their level of agreement. The use of this type of multi-indicator measure helps individuals to classify their responses (Bryman, 2012). A mix of negative and positive statements was used in this questionnaire, and a change or switch in direction, such as using a combination of negative and positive statements, aimed to avoid the production of a set response (Neuman, 2014). Moreover, it is suggested to alternate the phrasing of statements between a positive and negative tone in order to recognise those respondents who exhibit a set response, which is relied on in a consistent way but which may not be relevant to the concept being measured (Bryman, 2012).

This section assessed the participants' perceptions of their susceptibility to stroke and its threat, their health beliefs and the behavioural changes they intended to adopt to reduce their risk of having a stroke. The items or statements in this part were adopted from a range of different literature, such as (Madae'en et al., 2013, Shiplett, 2007, Goodman, 2012, Ennen and Beamon, 2012, Becker, 1974, Sullivan and Waugh, 2007). It is suggested that a generalized health belief scale is not ideal because such a scale needs to be tailored to a specific disease and the health behaviours relevant to that condition (Tovar et al., 2010). Therefore, the researcher in this study developed this part about the health beliefs by adapting items from previous studies' questionnaires that explored their participants' health beliefs and behavioural changes using the HBM. A total of 25 statements were modified to be suitable for the purposes of this study and to be applicable to the Omani setting. Each construct of the HBM was addressed with three to five statements: perceived susceptibility (4 statements), perceived severity (3 statements), perceived benefits (5 statements), perceived barriers (5 statements), cues to action (4 statements) and self-efficacy (4 statements).

3.11.1.2 Reliability and validity of the questionnaire:

Validity and reliability refer to the objectivity and the credibility of the research (Perakyla, 2016). In this study, the use of multiple indicators of one variable aimed to improve the reliability of the measure. In fact, the use of multiple indicators for one construct is better than using only one (Neuman, 2014). Reliability was maintained by adopting items or questions from the questionnaires of previously published studies that used the HBM as their theoretical framework. This ensured that the questionnaire measured what it was designed to measure. This method of replicating and building from the measures used in previous studies helps to improve the reliability of the measures (Neuman, 2014). Moreover, the English version of the questionnaire was distributed to two PhD students to ensure the reliability of the questionnaire with the research questions and concepts. After translation of the questionnaire into Arabic, the questionnaire was circulated to bilingual (Arabic-English) academic colleagues to ensure appropriate translation from English to Arabic was carried out. Furthermore, a pilot study was conducted prior to the start of the study, which, besides ensuring feasibility, helped to ensure content validity that the measure assessed the study questions and represented different concepts and definitions from the conceptual perspective.

Moreover, to ensure face or content validity during the development of this questionnaire, Rattray and Jones (2007) suggested that items to be generated from a number of sources including consultation with experts (colleagues), proposed respondents and review of associated literature (Rattray and Jones, 2007). Therefore, after adopting the items from SRQ for section two of the questionnaire and the use of different resources to adopt the items for section three about health beliefs, a consultation was carried out with colleagues to assess the content validity in relation to the original research questions and the concepts that the questionnaire was intended to measure. This was important as it is vital in item generation to revisit the research questions frequently to ensure that the questionnaire items reflect the underlying theoretical domains that the study intends to assess (Rattray and Jones, 2007).

3.11.2 The qualitative method, semi-structured interview:

Semi-structured interviews were conducted for the qualitative approach element of this study. The semi-structured interviews contained open-ended questions, thereby

allowing for the collection of spontaneous and in-depth responses. The interviews facilitated in-depth descriptions which enabled the researcher to elicit the participants' experiences in detail (Baumbusch, 2010). Moreover, the semi-structured interview is a powerful tool to capture the meanings that people assign to their lived experience (Rabionet, 2011). In open-ended questions, respondents are able to answer on their own terms. This is beneficial for this study in enabling it to explore new areas in which the researcher's knowledge may be limited or where they may not recognise the importance of such knowledge (Bryman, 2012). The Omani participants' perceptions and knowledge of stroke that were gathered from the semi-structured interviews enriched the research data with additional information from their perspective and added in-depth meaning about their perceptions of their risk of having a stroke and the ways in which they react to this risk. In addition, they enabled an exploration of the meaning of stroke, diabetes and hypertension from the perspective of the patients and their approach to prevention and treatment.

To prepare for the interviews, an interview guide was developed which was piloted using two interviews in the clinical setting in which the questionnaire was also piloted. The use of an interview guide is suggested for many purposes (Charmaz, 2014). It helps the researcher to gain a better grasp of how and when to ask questions in the conversation, develop greater confidence and enhance the flow of the storytelling (Charmaz, 2014). Moreover, it enables an avoidance of wrong questions that fail to explore pivotal issues and permits the conversation to be directed towards the questions that have been designed with the aim of answering the research questions. Therefore, the interview guide questions were designed to answer the research questions and concepts. The questions aimed to assess the participants' experience of chronic illness and the changes they planned to make to their lifestyles following their illness. In addition, the participants' knowledge of stroke and its risks and symptoms was enquired about. Furthermore, it included their perception of their risk of having a stroke and the future changes they planned to make to improve their health. The interview questions contained similar concepts to those in the study questionnaire. In mixed methods research, it is important when designing the instrument for each component to consider the point of integration of the qualitative and quantitative data

(Curry, 2015). It is suggested that an emergent approach in convergent mixed methods should be developed earlier in the design stage (Curry, 2015).

When the interview guide was designed, the questions were categorised into three sets or types, as suggested by Charmaz (2014). The first set contains the initial questions that help to initiate a conversation with the interviewee (Charmaz, 2014). This section of the interview guide included questions about the participants' history of chronic illness, the changes that the participants had adopted in their life, the resources they used to support them in being healthy following the diagnosis of their chronic illness, the challenges they faced and the role of the health care provider in their healthy decisions. Second were intermediate questions that covered the tougher issues and which attempted to elicit the participants' views of their experience (Charmaz, 2014). This part included questions about stroke, its meaning, signs and symptoms, risk factors, the participants' relationship with stroke risk, their susceptibility to a stroke and their responses to a suspected stroke event. This stage was very difficult to discuss, especially when talking to the participants about how stroke related to them and their susceptibility to stroke. It was also tough even for the questionnaire participants, as talking about stroke as a disease that causes disability or death and considering their personal risk or susceptibility to a stroke was troublesome and fear-arousing. It is different when you know about a disease and when you think and consider your susceptibility and personal risk of a frightening disease. Finally, the ending questions help to bring the interview rhythm to a normal conversational level prior to the end of the interview (Charmaz, 2014). The questions in this section were focused on the participants' intentions to improve their healthy lifestyles in a bid to prevent stroke events. Also, a series of probing questions were prepared to ensure the flow of the story and to encourage the participants to further explore the issues. However, it is important to consider the interview guide as a flexible tool which guides the interview but does not limit the interview questioning (Charmaz, 2014).

As a novice researcher, qualitative interviewing was certainly challenging. However, practising or rehearsing the interview prior to the actual interview was helpful from the perspective of enabling the researcher to both build interviewing skills and to gain confidence. The questions were adapted, amended and refined to ensure they were

acceptable to the participants and that they were capable of eliciting rich data. When the questionnaire was piloted, two interviews were conducted in the clinical setting to ensure greater confidence and feasibility of the interview process.

3.11.2.1 Creditability in qualitative research:

While there are different and contested approaches to ensuring quality in qualitative research, (Bryman, 2016, Flick, 2009) assert that creditability, transferability and dependability ensure the trustworthiness of the qualitative research. Validity and reliability refer to the accuracy of the findings and the consistency across different researchers and projects (Creswell, 2014). Validity has typically received more attention in qualitative research than reliability (Flick, 2009). The direction of reliability is reformulated in the direction of checking the dependability of the data and the procedures (Flick, 2009). To ensure dependability, an auditing approach can be adopted through a system of peer audit or review (Flick, 2009, Bryman, 2016). In this study, the translations and transcriptions of the transcripts from Arabic to English were checked by peer review, whereby a colleague PhD student reviewed the anonymous transcripts. Three transcripts were reviewed and rechecked out of the ten interviews. One was completely checked, while the first 15 minutes of the other two interviews were checked and reviewed to ensure appropriate translations and transcriptions. In addition, my supervisor reviewed a sample of the transcripts and the coding process to ensure that the results were grounded in data.

Transferability is another method to increase the creditability of qualitative research (Bryman, 2016). It involves the intensive study of the individuals or the culture by providing a rich and thick description of the culture. This study contains a rich description of the Omani society and culture. Being an Omani who lived in and was raised in this part of Oman, I was able to add my reflexive interpretation of the study results (Creswell, 2014) in relation to the Omani context, culture and social factors. This reflexivity helped me to emphasise the importance of deep reflection, political consciousness, cultural awareness and ownership of one's perspective (Patton, 2015). Furthermore, reflexivity is part of the interpretation process and making sense of data and results (Patton, 2015). In addition to having the same background and culture as the participants, the researcher has also been involved in clinical teaching for nursing students in the clinical setting included in this study. As such, there is an intensive

orientation to the participants' setting and culture. Moreover, the researcher kept a personal research diary throughout the research process for personal reflection.

Furthermore, the researcher spent a long time on the process of collecting questionnaires, which permitted greater study of the setting's culture. In fact, prolonged engagement in the field improves the creditability of qualitative research (Flick, 2009), although Creswell (2014) illustrated a potential risk to the validity of qualitative and quantitative data due to an unequal sample size in a convergent mixed methods design. It can be argued that the small sample size in this study provided an extensive information from this sample, and that the concepts and variables included in this study were approximately similar in both quantitative and qualitative findings (Creswell, 2014). In fact, qualitative and quantitative data can be fruitfully combined to provide complementary explanations of the same phenomenon (Patton, 2015).

3.12 Data Analysis:

Mixed methods research involves the analysis of qualitative and quantitative data (Curry, 2015). In an interpretative approach, the aim is to understand how individuals make meaning of their social world (Hesse-Biber, 2010). The interpretative analysis focuses on considering the ontological and epistemological standpoints that the research brings to the social enquiry (Hesse-Biber, 2010). An interpretive approach was selected in alignment with the realist social constructionism approach that sees language, discourse and culture as a product of interacting causal forces and opens up the prospect of seeing social construction as a real causal process (Elder-Vass, 2012b). From an interpretative perspective, the quantitative results provided support and were supplementary to the primary qualitative methodology in terms of understanding the broader meaning of the objectives and people's contextual experience (Hesse-Biber, 2010). In this study, the interpretative approach was used to understand, illustrate and explain the meaning of the collected data. This section discusses the strategies of quantitative and qualitative analysis.

3.12.1 Quantitative data analysis:

Quantitative data analysis in this study involved the use of a statistical approach with numeric data to produce descriptive statistics and measures of the association between the variables. The behavioural sciences are mostly interested in determining whether

two or more subject variables are related (Kieiss and Green, 2010). Subject variables are the characteristics or attributes of a subject such as their age, gender, education or income and the ways in which these may relate to other variables (Kieiss and Green, 2010). The level of measurement and study questions are vital to determine the appropriate tests or analysis to be applied in this study. Therefore, descriptive statistics and chi-squared were used in the quantitative analysis of this study. Descriptive analysis was used to summarise, describe and explain the quantitative data set (Kieiss and Green, 2010, Ha and Ha, 2012). It was also used to reduce the raw data for presentation (numerical and visual) (Dietz and Kalof, 2009). In this study, demographic data, the RQS data and health beliefs constructs data were grouped and summarised separately. This strategy provided a meaningful explanation of the results and a better summarization of each category (Kieiss and Green, 2010). Frequency distributions provided an overall pattern in the distribution of the respondents for a variable and the measures of central tendency (Fielding, 2006).

In addition, chi-squared analysis was used to assess the association between two variables. Chi-squared analysis is a statistical approach to look for an association between the frequencies of responses to two independent variables. Significant associations are identified as having a P values of 0.05 or less, rejecting the null hypothesis that there is no association (Field, 2013). For example, chi-squared analysis showed significant associations between participant's belief that they would have a stroke sometime in their lives and factors that they perceived could reduce their risk. If the participant believes he or she will develop stroke in the future then the possibility of adopting a preventive measures could be higher if he or she perceives their benefit.

Both descriptive and chi-squared analyses were used to assess the levels of knowledge, awareness of risk and interrelationships between these areas. The Statistical Package for Social Sciences (SPSS) software program (ver 22) was used to analyse the quantitative data.

3.12.2 Qualitative data analysis:

Qualitative data analysis involves the analysis of textual data through a systematic and iterative process to generate conceptual categories or recurrent themes to describe

social phenomena (Curry, 2015). There are different strategies or methods of qualitative analysis including interpretative phenomenology, grounded theory and thematic analysis (Bryman, 2016, Braun and Clarke, 2013). In this study, thematic analysis was used to analyse the semi-structured interview data. Thematic analysis is described as an interpretive process in which data are reviewed to develop patterns to describe a phenomenon (Smith and Firth, 2011). It involves a process of identifying, analysing and reporting themes or patterns that exist within the data which allow the researcher to identify the common threads that spread across the entire interview (Vaismoradi et al., 2013). Thematic analysis was first developed by Gerald Holton in the 1970s (Braun and Clarke, 2013). Earlier, a thematic approach was used by researchers in different strategies (Braun and Clarke, 2013). Recently, thematic analysis has been identified as an independent descriptive qualitative approach. Guidelines on thematic analysis, including the framework analysis approach, were developed in the 1980s at the National Centre of Social Research in the UK (Spencer et al., 2014b), and in 2006 Braun and Clarke published their approach to thematic analysis (Braun and Clarke, 2006). This approach can be used without the need to generate theory (Smith and Firth, 2011) and can be applied across a range of theoretical and epistemological approaches (Braun and Clarke, 2006). Thematic analysis has been found to be accessible and theoretically more flexible than other methods of qualitative analysis (Braun and Clarke, 2006, Ward et al., 2013). This makes it more direct and straightforward for me as a novice researcher to develop qualitative analysis skills. In addition, thematic analysis can employ an essentialist or realist method that reports the experiences, meaning and the reality of participants, or it can use a constructionist method to assess the effects of a range of discourses operating in the society on events, realities, meaning and experience (Braun and Clarke, 2006). Thematic analysis is suggested for critical realists as it sits between essentialism and constructionism (Braun and Clarke, 2006). In this study, thematic analysis guided the researcher during the process of developing the themes from descriptive to interpretative themes (Braun and Clarke, 2006), which facilitated the interpretative approach to analysis.

In this study, the framework analysis approach to thematic analysis was used to analyse the qualitative data (Spencer et al., 2014b). This work builds upon and extends the earlier work of Braun and Clarke. The framework analysis was found to be flexible,

systematic and rigorous, offering clarity and transparency (Ward et al., 2013, Pedersen et al., 2017). Such an approach offered the use of a theoretically driven framework to structure and explore the data. It enables the development of prior themes drawn from the model as well as the emergent concepts (Satherley et al., 2017). As a novice researcher, the use of a framework approach to thematic analysis helped me to perform the data management and qualitative analysis in a clear and structured way. Such a process provided a clear direction on the development of the codes or themes and the refinement that was conducted at the later stages. In addition, the use of the NVivo package facilitated the framework analysis steps in the development of the initial codes or subthemes and the modification of the themes, and it is believed that the framework method is operationalised within the NVivo program (Pedersen et al., 2017). While this approach is criticised as being very structured when qualitative analysis should be flexible (Ward et al., 2013), it allowed me to structure my analysis in such a way that it was manageable. The backward and forward process of refinement of the themes helped to ensure flexibility. The steps are linear and clear but the recursive process involves moving back and forth between the different phases (Braun et al., 2015). In fact, the framework analysis method is similar to Braun and Clarke's (2006) approach to thematic analysis in its main steps or process; however, it adds an additional step of summary and data display (Spencer et al., 2014b).

The thematic framework qualitative analysis involves five steps of data management and analysis; familiarisation, constructing an initial thematic framework, indexing and coding, reviewing data extracts and summary and data display (Spencer et al., 2014a). In this study, the first step of becoming familiar with and immersed in the data began when the researcher conducted the interviews. The interviews were then translated and transcribed from Arabic into English which ensured greater familiarisation with the data and the development of awareness about the key ideas and initial themes that were included in the data (Srivastava and Thomson, 2009). Translation is an interpretative act (Van Nes et al., 2010) that facilitates the familiarisation process. The process of listening to the interview tapes and reading through the transcripts aimed to ensure that the meanings and experiences of the participants were transmitted into the English language. Translation could be problematic when there was a difference between the researcher's and the study participants' language as meaning could be lost when using

a translator other than the researcher (Van Nes et al., 2010). In this study, the researcher speaks Arabic and English, with the translation and transcription being carried out by the researcher herself. The message communicated in the participants' language has to be interpreted by the translator (the researcher in this study) and transferred into the target language in such a way that the receiver of the message understands the meaning (Van Nes et al., 2010). The challenges in the interpretation and presentation of the meaning would still be present even if the transcripts were written in the Arabic language as the participants had an Arabic dialect that differs from the purely written form of the Arabic language. Therefore, the researcher found it more practical to translate and transcribe the interviews directly into English. Moreover, it was more practical for the student's supervisors to go through the transcripts and review the coding process. However, to ensure no meaning was lost during the translation and transcription, a native Arabic-speaking colleague reviewed three interviews that were selected at random as part of a checking process. The comments following the checking process revealed that the translations and transcriptions contained the same meanings as the Arabic interviews.

In addition, repeated reading and re-reading of the transcripts was performed to ensure immersion with the data. During this process, the researcher began to notice patterns in the data and was able to start thinking about the assumption of the ideas articulated in the data (Braun et al., 2015, Spencer et al., 2014b). Sections of the transcripts were labelled and marked to indicate the presence of possible themes or topics of interest for the research questions and study purposes.

Then, an initial framework or a list of possible themes was constructed. This was formed from the prior issues, key ideas, emerging themes and concepts after familiarisation with the data (Srivastava and Thomson, 2009). The analytical ideas inevitably developed in line with better familiarisation with the data (Braun et al., 2015). The framework was a mixture of the emergent themes derived from the research questions or aims and those contained in the topic guided for exploration in the interviews (Spencer et al., 2014b). In this study, the researcher had to make certain decisions that informed the direction of the analysis. Both inductive and deductive approaches were used to analyse the data. Inductive approaches were used in the early

stage of developing the initial framework or codes during the familiarisation process. The themes were more descriptive and grounded in the data. Moreover, this stage involved decisions about the semantic or latent type of themes. At the early stages of analysis, the themes were descriptive rather than abstract and remained grounded in the data (Spencer et al., 2014a). Therefore, at this stage, the themes were semantic and grounded in the data as the thematic framework was subsequently refined during the different stages of analysis. This helped to identify the patterns of perceptions among the participants with regard to their healthy lifestyle and their risk perceptions of stroke. The more grounded in the data, the more the themes reflected the participants' meaning and experiences (Braun et al., 2015).

After developing the initial thematic framework, the researcher identified portions of the data that related to a particular theme and those themes were subsequently arranged and coded into headings and subheadings (Srivastava and Thomson, 2009). In this step, the data were indexed, coded and annotated to the thematic framework. Ritchie et al. (2003) identified the process of labelling a theme or concept to a particular section of data which related to that theme or category as indexing. They also stated that coding refers to the process of capturing dimensions that have already been more precisely defined and labelled which are not appropriate for this early stage (Ritchie et al., 2003). Coding and indexing were carried out by line-by-line reading through the transcripts. Some of the coded data were in the form of a paragraph, sentence or a few words.

The transcripts were loaded into the NVivo program. This helped the researcher to organise and sort the codes or themes into a hierarchical arrangement to better visualise the themes and subthemes. It also facilitated easy access to the coded and annotated data under each theme and made it possible to identify the sources of this data. The program was a feasible tool for use as opposed to the manual techniques, in the sense that it is possible to save the transcripts, themes, subthemes and notices in the same project or file for frequent use. In fact, the Computer Assisted Qualitative Data Analysis System (CAQDAS) enabled both data coding and the retrieval of the coded data (Braun and Clarke, 2013). Nonetheless, the analysis itself was conducted by the researcher. Although there is a debate around the potential for such a program to be misused as a shortcut strategy to speed up the analysis process, hyperlinking back to

the verbatim text or other function in the program enables the wider coding context to be included (Spencer et al., 2014b). Overall, the analysis process was carried out by the researcher to ensure coherence. After the coding and themes development, the researcher revised the transcripts to ensure that no particular issues had been missed.

During the process, the thematic framework was refined and developed based on the data. This process of coding and indexing necessitated the addition or reorganisation of certain themes or subthemes. Furthermore, after coding, the framework was refined by reviewing the coded data again. This aimed to identify the coherence of the data extracts and to assess the sections that had not been coded to see if any important themes were missing from the framework (Spencer et al., 2014a). During the stage of refining the codes or themes, deductive approaches were considered to be driven by the HBM constructs and concepts. The revision of the theory involves a movement from deductive to inductive (Bryman, 2016). The findings were interrelated back into the stock of theory and existing knowledge as the researcher's view of the theory had changed as a result of the analysis of the collected data, wherein new theoretical ideas had been developed (Bryman, 2016).

Refining the thematic framework involves making a judgement about the meaning, relevance and importance of the issues and developing an implicit connection between ideas (Srivastava and Thomson, 2009). At this stage, the thematic analysis was driven by the researcher's theoretical or analytical interest in the area. The realist social constructionism approach combines the role of both agent and structure to have an emergent causal influence on the social phenomenon (Elder-Vass, 2012b). Therefore, exploration of the data is based on the perspective of both the individual agent's perspective and structural influence. This form of thematic analysis has the ability to provide a rich description of the overall data. The quantitative findings illustrate the individualistic factors that influence the risk perception based on the constructs of the HBM, while the qualitative findings illustrate both the individual and structural factors. Refinement of the themes to illustrate the individual and structural factors that influence the participants' knowledge, perceptions, actions and intentions with regard to their health and to reducing their risk of stroke was conducted at this stage. The themes were refined to be more interpretative and theoretically driven (Braun et al.,

2015). Part of the analysis involves relating the data results to the theoretical model (Bazeley, 2013). This was done by interpreting the similarities between the themes and the HBM constructs and theoretical concepts, with the differences also being noted. After the findings were shaped, an extension of the HBM was proposed from the results of the qualitative data. The process of qualitative data analysis is iterative: following analysis, the researcher returned to the transcripts to ensure that no themes had been missed and that the findings made sense within the narrative of the data as a whole.

Finally, the summary and display of the data were carried out by developing a framework matrix by using a spreadsheet for each theme. The reported matrix included the themes, subthemes and the concepts that were derived from the HBM's conceptual constructs.

3.13 Integration of quantitative and qualitative analysis:

After the quantitative and qualitative data had been analysed, the results were integrated. The decision regarding data integration was taken during the research proposal and study design stage. In the convergent mixed methods design adopted, the data analysis plan was developed as part of the research proposal and was considered from the start in designing the instrument of each component (Curry, 2015). It was also theoretically driven from the constructs of the HBM as the underpinning theoretical model. Although this was planned, the equivalences between the quantitative and qualitative results or findings played an important role in facilitating the integration process. This was important since in an emergent approach, interdependence across components is essential for integration (Curry, 2015).

After the quantitative and qualitative analysis interpretation, the integration of the findings proceeded by identifying the complementary, convergence and divergence among the data results. This was guided by the concepts driven by the theoretical framework and the HBM concepts. Under each concept, the textual narrative was reported alongside the related results from the quantitative findings. The quantitative and qualitative findings were then merged according to a priori developed domains and woven together to characterise each domain (Curry, 2015). This strategy of

integration is identified as a narrative weaving approach in which the quantitative and qualitative data are represented together within the thematic or conceptual categories within a single manuscript (Curry, 2015).

This integration of the results is reported in the Results chapter of this study. The quantitative and qualitative results are reported in a narrative weaving approach followed by interpretative and descriptive paragraphs to provide the meaning of the results. In the Discussion chapter, the study results are further interpreted by weaving them with the existing literature (Braun et al., 2015, Spencer et al., 2014b). The implicit explanation and interpretation of the results were drawn from both the analytical concepts in the data and the HBM constructs by forming links to the existing knowledge or theory.

Following the interpretation of the results, the contribution to knowledge is highlighted in the last chapter. The implications for the practice of facilitating the patients' decision to adopt a healthy lifestyle or healthy choices are discussed in relation to the Omani context. These implications may also be applied to other countries with a similar social structure and culture. Like other studies, this study also has some limitations that are discussed to ensure greater transparency.

3.14 In summary

Using a realist social constructionism framework, this convergent mixed methods study aims to explore the individual and structural factors that influence the individual participants' knowledge, perceptions, actions and intentions with regard to health and a healthy lifestyle. The HBM is used as an underpinning theoretical framework to assess the factors that influence the individuals' decisions about health. Using an interpretative approach to data analysis aimed to understand and explain the meaning of the participants' experiences in relation to healthy living. Therefore, descriptive and thematic analysis were the facilitated methods used to provide a rich explanation of such experiences. Integration of both the quantitative and qualitative findings using a narrative weaving approach was helpful to demonstrate the convergent method. The analysis process went through backward-forward deductive-inductive circles to end with a suggestion to extend the HBM.

Chapter 4 Results

4.1 Introduction

This study has explored the knowledge and perceptions of stroke risk among patients in the Sultanate of Oman. The purposes of the study were achieved using a convergent mixed methods design. This study's research questions explored four areas: *1) knowledge about stroke risk factors and signs and symptoms; 2) patients' perceptions of their risk of stroke; 3) the factors that can reduce their risk of stroke; and 4) their intention to adopt a healthy lifestyle.* In this chapter, five main concepts that emerged from the qualitative and quantitative data are explored. These areas are **Knowledge, Perceptions, Actions, Motivations Vs Barriers and Intentions**. These areas will be used to answer the focus of the study's research questions. Therefore, a narrative weaving approach is used to integrate both the quantitative and qualitative findings.

First, this chapter presents the study's demographic data. Then, the qualitative themes are described. Finally, the main concepts that emerged from the quantitative and qualitative data are reported.

4.2 Demographic data

4.2.1 Data from interviews

Interviews were conducted in three clinical settings in cardio and medicine Out-Patient Department (OPD) in a regional hospital and a selected wilayah diabetic centre after collecting questionnaires from each clinical setting. A total of 10 interviews were conducted for the purpose of this study; the participants were 3 females and 7 males. The participants' educational level ranged from no formal education to college education. The participants' marital status was recorded; all of the participants were married with the exception of one, who was widowed. Also, the participants' working conditions were gathered, which varied between three working conditions: working, housewife and retired. The participants' household monthly incomes were considered. These ranged from less than 500 Omani Rials (O.R) to 1000–1500 O.R (where 500 O.R is approximately equal to 1000 GBP). The participants were selected based on having a history of one or more of three medical conditions: heart disease, hypertension or diabetes (see table 4.1).

code	Age	Sex	Education level	Marital status	Household Monthly income	Working status	Medical diagnoses	Place of interview
01	45	Female	Primary education	Married	Less than 500 O.R (<1000GBP)	Housewife	Heart disease (mitral valve prolapse)	Cardiac clinic
02	35	Female	College education	Married	1000-1500 O.R (2000 -3000GBP)	Working	Heart disease (dilated cardiomyopathy)	Cardiac clinic
03	55	Male	Primary education	Married	500-1000 O.R (1000 -2000GBP)	Working	Heart disease (chronic ischaemic heart disease)	Cardiac clinic
04	56	Male	No formal education can read and write	Married	Less than 500 O.R (<1000GBP)	Retired	Heart disease (chronic ischaemic heart disease)	Cardio clinic
05	56	Male	Elementary education	Married	500-1000 O.R (1000 -2000GBP)	Retired	Heart disease (Acute MI, Ischaemic Heart Disease)	Cardio clinic
07	70	Female	No formal education	Widow	Less than 500 O.R (<1000GBP)	House wife	Hypertension	Medicine clinic
011	41	Male	Secondary education	Married	500-1000 O.R (1000 -2000GBP)	Working	Diabetes	Diabetic centre
012	45	Male	Secondary education	Married	More than 1000 O.R (>2000GBP)	Working	Diabetes	Diabetic centre
014	46	Male	Elementary education	Married	Less than 500 O.R (<1000GBP)	Retired	Diabetes and hypertension	Diabetic centre
017	62	Male	No formal education can write and read	Married	Less than 500 O.R (<1000GBP)	Retired	Diabetes and hyperlipidaemia	Diabetic centre

Table 4-1 The Interview Participants' Details (GBP equivalents are shown for reference).

4.2.2 Demographic data from questionnaires

The sample for the quantitative study aimed to survey Omani patients with a history of hypertension, diabetes or heart disease who attended the regional hospital (medicine and cardiac clinics) and selected wilayah diabetic centres. In total, 344 questionnaires were collected. The ages of the participants were distributed almost equally (*Table 4-2*). The largest group of study participants (27.3%) were aged between 40 and 49 years old, while 22.4% of the participants were aged 60 and above. Out of the 344 participants, 53.8% of the study sample were female and 46.2% were male, indicating that the female participants slightly outnumbered the male participants.

Age group	Male n	Female n	Total n
30–39	30	55	85
40–49	40	54	94
50–59	48	40	88
60 and above	41	36	77
Total	159	185	344

Table 4-2 Age and Sex Distribution of the respondents to the survey questionnaire.

Most of the study participants were educated beyond primary level (54.7%). The remaining 45.3% were educated to primary education or below. With respect to their marital status, 75.6% of the participants were married, 18.9% were divorced or widowed and only 5.5% were single.

A total of 65.7% of the participants had a monthly household income of less than 500 O.R. The income range from 500 O.R to less than 1500 O.R was 28%, while only 6.3% of the participants had a monthly income of 1500 O.R or above. This may be related to the fact that only 11.9% of the participants had completed a college education and were thus earning a higher income. Housekeeping was the major working status of the study participants, accounting for 44.2% of the total participants, and this may be due to the higher number of female than male participants. In comparison, the participants

who worked accounted for 36% of the sample, while a further 15.1% of the participants were retired. Most of the participants live in the main city, accounting for 71.2% of the total study sample, with the remaining 28.7% from other wilayahs.

Sixteen per cent of the study participants had been diagnosed with just hypertension, 12.8% with heart disease only and 19.8% with diabetes only. The remaining 51.3% had more than one diagnosis. One hundred and nineteen participants (34.6%) had more than one stroke risk factor, while 16.3% of the participants had been diagnosed with both hypertension and diabetes (see *Table 4-3*)

History of disease	Participants (n)	Participants (%)
Hypertension only	55	16
Diabetes only	68	19.8
Heart diseases only	44	12.8
Hypertension and diabetes	56	16.3
Hypertension, diabetes and heart disease	26	7.6
Hypertension and heart disease	28	8.1
Diabetes and heart disease	9	2.6
Hypertension, diabetes, heart disease or others	57	16.7
Missing	1	.3
Total	344	100

Table 4-3 Distribution of the Participants into Disease Groups

4.3 Themes from the qualitative data analysis

A thematic analysis approach was selected to analyse the qualitative data, guided by the framework analysis approach (Lewis and Ritchie, 2003). The four major themes and their subthemes were identified from this study analysis (see *Table 4-4*, *Table 4-5*). These were as follows: 1) the control is not only in my hands; 2) slow responses to stroke event; 3) perceptions of stroke risk; and 4) my motivator. The themes were linked to the concepts derived from the research questions. These concepts were as follows: knowledge about stroke (theme 2), perceptions of stroke risk (theme 3) and factors or barriers to adopting a healthy lifestyle (themes 1 & 4). These themes and

subthemes were included or chosen because they were strongly representative of the research questions or appeared to be novel and add new knowledge.

Major themes	Theme 1	Theme 2
	1. The control is not only in my hands	2. Slow responses to stroke event
Concepts	Factors or barriers to adopting a healthy lifestyle	Knowledge about stroke
Subthemes	1.1. Physical control 1.1.1. dependent on car 1.1.2. difficulty with diet 1.1.3. medication 1.1.4. no time 1.1.5. sickness 1.1.6. unstable or moving places 1.1.7. weather 1.2. Psychological control 1.2.1. feel of getting old 1.2.2. get used or addicted to drugs 1.2.3. hide disease 1.2.4. my worries 1.2.5. psychological stress 1.3. Social control 1.3.1. Traditions 1.3.2. no accompany 1.3.3. the effects of family and friends' experience with diseases 1.4. Spiritual effects 1.4.1. health in Allah's hands	2.1 knowledge 2.1.1 I don't know or know little about stroke 2.1.2 knowing or hearing from others about stroke 2.1.3 listening to untrusted messages 2.2 Resources availability 2.2.1 equipment availability 2.2.2 the health team is not prepared 2.3 ask my family or someone to take me to the hospital

Table 4-4 The Study Themes (1)

Major themes	Theme 3	Theme 4
	3 Perception of stroke risk	4 My Motivator
Concepts	Perception of stroke risk related to own risk Intention to reduce their risk of stroke	Factors or motivators to adopting a healthy lifestyle
Subthemes	<p><i>3.1 because of my risk I can develop stroke</i></p> <p><i>3.2 I have risk but may not develop stroke</i></p> <p><i>3.3 Stroke is not related to me and I will not have it</i></p> <p><i>3.4 I can reduce my risk of stroke</i></p> <p>3.4.1 doing diet control</p> <p>3.4.2 doing sport</p> <p>3.4.3 following treatment</p> <p>3.4.4 feeling optimistic about improving my health</p> <p>3.4.5 I have made and can make more changes to my lifestyle</p>	<p>4.1 fear as motivator</p> <p>4.1.1 fear from stroke</p> <p>4.1.2 fear of complication</p> <p>4.1.3 fear of sickness</p> <p>4.1.4 Fear of pain as motivator</p> <p>4.2 my responsibility toward health as motivator</p> <p>4.2.1 I am my own doctor</p> <p>4.2.2 my children and family wants me</p> <p>4.3 my family can contribute to improving my lifestyle</p> <p>4.4 doctor's advices had encouraged me</p>

Table 4-5 The Study Themes (2)

4.4 Knowledge

Knowledge and health-related behaviours have been explored extensively within health social research. Although knowledge is important to initiate the adoption of health-related behaviours, there are also other factors that influence changes in behaviour. Knowledge certainly plays a fundamental role in guiding individuals'

behaviours to the desired healthy changes, but the source of this knowledge is an important issue. In real life, it is not only an individual's educational background that serves as a source of knowledge about a subject, there are also other sources of learning; for example, an individual develops his or her knowledge and learning through personal life experiences such as having family members with a history of a disease, in addition to a friend, neighbour, a person known in the community or a famous celebrity. This means that knowledge is developed through social interaction and it also includes knowledge that is acquired during early childhood.

In this study, both the quantitative and qualitative participants revealed a certain level of knowledge. It was surprising that a greater knowledge of stroke risks and signs and symptoms was reported by the participants since the researcher's initial assumption had been for there to be a lack of knowledge due to the absence of a stroke educational programme. The quantitative participants showed higher levels of knowledge about the risk factors of stroke and its signs and symptoms. The qualitative participants disclosed knowledge about stroke when probing was used to explore their experience of having or knowing a family member, friends or neighbours with stroke. In fact, the knowledge gained about stroke was assumed to develop from the personal experience of knowing or hearing about stroke from others, mainly family members, friends or neighbours.

This section discusses the knowledge of stroke risk factors and its signs and symptoms. In addition, the sources of acquired knowledge about strokes will be illustrated.

4.4.1 Knowledge of stroke risk factors

The data analysed from the questionnaires revealed that a high proportion of the respondents demonstrated a good level of knowledge about the risk factors for stroke. Out of the 341 participants, 96.2% considered hypertension as a major risk factor for stroke. Also, diabetes was classified as a major risk factor for stroke, with 82.5% (n=337).¹ Only 62% (n=334) of the participants were aware that being overweight can increase the risk of a stroke. This raises the concern that 38% were not aware of this. In addition, having a history of heart attack was considered as a leading risk factor for

¹ n = the number of responses for each question as the response rate varies across the questions.

stroke by 79.8% (n=336) of the participants. A total of 85.5% (n=339) of the Omani patients were aware that smoking cigarettes could increase their risk of a stroke. In fact, cigarette smoking was recognised as a greater risk factor for stroke than diabetes (82.5%) or heart attack (79.8%).

On the other hand, the participants were aware that iron deficiency (65.8%, n=322) and having low amounts of calcium in their diet (64.0%, n=322) were not risk factors for stroke. Additionally, 85.7% (n=329) of the study participants disagreed that travelling to a foreign country can lead to a stroke. Conversely, 60.6% (n=330) of the Omani patients agreed that living close to a power plant was a risk factor for stroke, with 68.4% (n=335) also believing that exposure to sunlight to be a risk factor. Surprisingly, exposure to too much sunlight was considered higher than overweight (see Table 4-6).

Risk factors for stroke	# of Respondents Answered Yes	% Yes	# of Respondents Answered NO	% NO	Total (N)
High blood pressure	328	96.2	13	3.8	341
Iron deficiency	110	34.2	212	65.8	322
Diabetes	278	82.5	59	17.5	337
Travel to foreign countries	47	14.3	282	85.7	329
More than 20 pounds overweight	207	62.0	127	38.0	334
Low levels of calcium in diet	116	36.0	206	64.0	322
History of having had a heart attack	268	79.8	68	20.2	336
Smoking cigarettes	290	85.5	49	14.5	339
Living close to a power plant	200	60.6	130	39.4	330
Exposure to too much sunlight	229	68.4	106	31.6	335

Table 4-6 Knowledge about stroke risk factors

Moreover, using the sum of the total scores from the Stroke Recognition Questionnaire (SRQ), 83.3% (n=305) of the study participants scored 6 or over for the stroke risk factors. The mean score was 6.96 out of 10 for stroke risk factors, as the figure below shows. The common scores were in the range of 6–8 out of 10. See (Figure 4:1 Total Risk Factors).

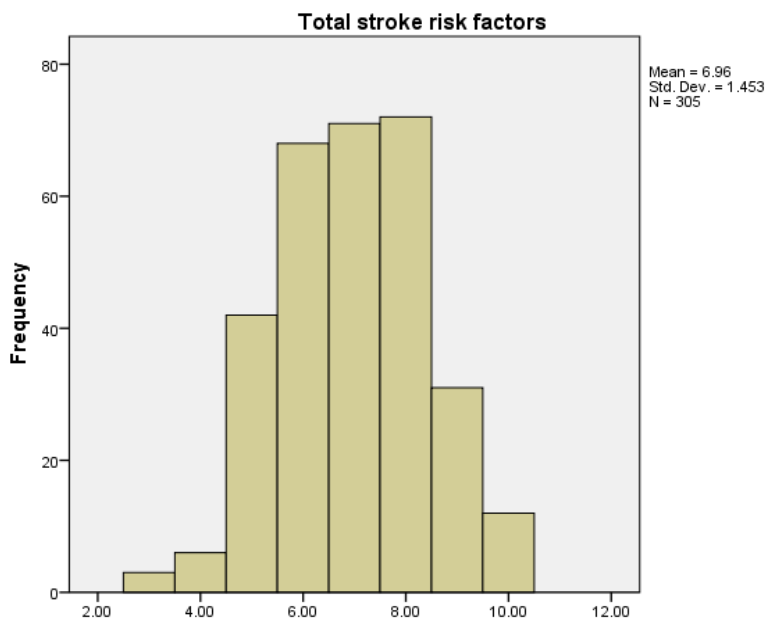


Figure 4:1 Total Risk Factors

These data were supported by the results derived from the qualitative result. In the first instance, the participants responded for not knowing or knowing only a little about stroke.

“I don’t know much about it only little.” P011.

“I don’t know about it really.” P03.

With some probing, they demonstrated their knowledge of stroke and of stroke risks or signs and symptoms that was mainly developed from the experiences of others, whether this was a family member, friends or neighbours. Hypertension was revealed to be most well-known risk factor for stroke. In addition, diabetes, heart disease and high cholesterol were identified as risk factors for stroke.

“I have my aunt, she has hypertension. The reason was hypertension.” P012

“I don’t know what the cause is. but they said because of increase in hypertension or more cholesterol. This disease starts with these.” P03

“If hypertension is more it will affect the brain and if sugar is more the same thing.” P014

Additionally, not following treatment as prescribed, essentially medication, was considered as a risk factor for having a stroke as the participants reflected knowing this from others’ experiences of having a stroke.

“There is one person, he had hypertension and didn’t take his medication, in the morning he was sick not talking. They took him to the hospital, they said he had a stroke.” P03

4.4.2 Knowledge about stroke signs and symptoms

The majority of the participants considered having weakness on one side of the body as an indicator of having a stroke. In fact, 89.1% (n=341) reported weakness on one side of the body to be both a sign and a symptom of stroke. Also, the study participants classified having trouble walking as a significant sign and symptom of stroke (83.6%, n=342). Moreover, the study results indicated that having numbness on one side of the face (86.1%, n=338) and having a sudden severe headache (91.2%, n=340) were classified as major signs and symptoms of having a stroke. Slurred or garbled speech was noted by 80.8% (n=338) of the study participants as an indication of having a stroke. Cough (67.5%, n=332), fever (51.8%, n=330) and heartburn (69.9%, n=326) were excluded by the study participants as signs and symptoms of a stroke; see (Table 4-7).

In contrast, the study participants also considered chest pain (65.6%, n=331) to be a sign and symptom of a stroke, and this raises a concern that they were unable to distinguish the difference between the signs and symptoms of a stroke as a form of brain attack and a heart attack.

Stroke signs and symptoms	# of Respondents Answered Yes	Percentage of Yes	# of Respondents Answered No	Percentage of No	Total (n)
Weakness on one side of body	304	89.1	37	10.9	341
Diarrhoea	67	20.3	263	79.7	330
Trouble walking	286	83.6	56	16.4	342
Chest pain	217	65.6	114	34.4	331
Numbness on one side of face	291	86.1	47	13.9	338
Heartburn	98	30.1	228	69.9	326
Sudden severe headache	310	91.2	30	8.8	340
Fever	159	48.2	171	51.8	330
Slurred or garbled speech	273	80.8	65	19.2	338
Cough	108	32.5	224	67.5	332

Table 4-7 Knowledge of Stroke Risk factors

When using the sum of the total scores for the Stroke Recognition Questionnaire (SRQ), 84.2% (n=311) of the study participants scored 6 and above for the signs and symptoms of stroke. The mean score of total knowledge about signs and symptoms was 7.37 out of 10, as *Figure 4:2* shows. The results of the total mean score for both stroke risk factors and signs and symptoms indicate that stroke knowledge was high among the study participants.

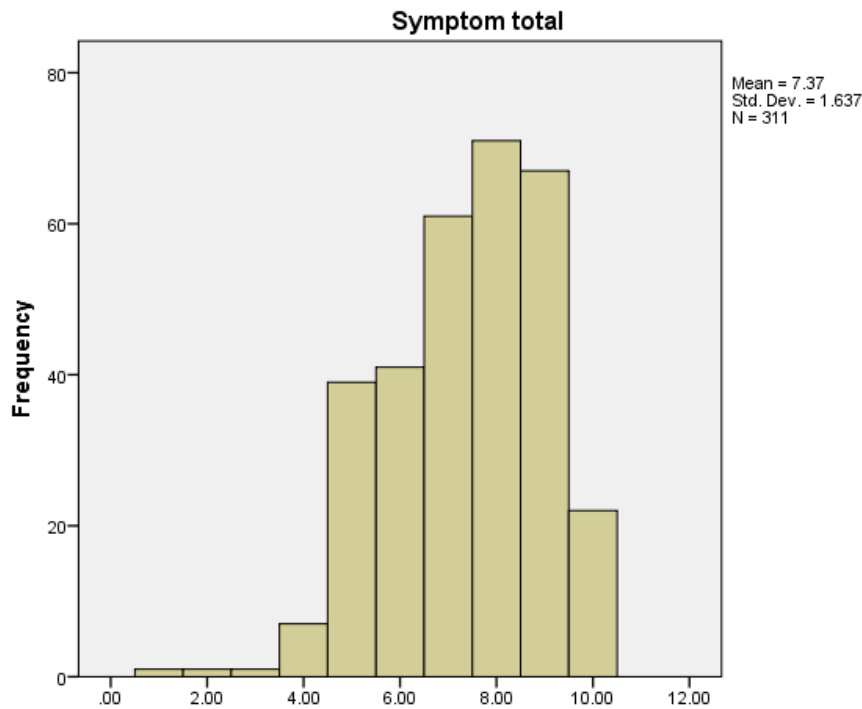


Figure 4:2 Symptoms Total

As the qualitative results confirmed the quantitative results, paralysis was classified by the interview participants as a common sign and symptom of stroke, with knowledge that the paralysis affects one or other side of the body also being apparent.

“paralysis to one side that is it, it calls paralysis nothing else.” P04

Stroke was reported as being a life-threatening or lifelong disability.

“he will be either paralysed or he will go with it or he will live like that condition.” P07

In addition, not being able to talk was also recognised by the interview participants. The below citation outlines the assumption made by the participant of the feeling of a stroke patient because of their inability to talk.

“the change will be different; some will have one side of body paralysis; some will not be able to talk. He will see you but will not be able to talk and will be crying if he knew you or because of his condition. He cannot answer you or his condition he might feel in himself that he become in this condition.” P017

Also, loss of consciousness and facial palsy were considered to be signs and symptoms of a stroke. Change in facial features, eye movement and breathing were reported.

“first, he loses his consciousness, his eye you feel and his breath will be weak a little. His face feature will be different.” P05

4.4.3 Knowledge gained by knowing or hearing about stroke from others

The study results showed that the Omani patients had a certain level of knowledge about stroke risks and the signs and symptoms of stroke in general. But the qualitative results revealed that the knowledge gained regarding stroke risk factors and its signs and symptoms were some of the commonly known facts about stroke that were formed or developed from the participants’ personal experiences of having family members or friends who had suffered a stroke. In comparison, the quantitative results reflected that the health team was the main source of information for the study participants. A total of 41.7% of the study participants relied on a health team to provide them with either general health information or specific information about stroke. In this context, health team means any health care professionals, whether referring to doctors, nurses or paramedics, in any health setting. Health brochures, the internet and TV were regarded as being of similar importance in terms of providing health information. Conflicting with these interview participants, only 9.8% of the participants relied on their family and friends to provide them with information. (See *Figure 4:3*)

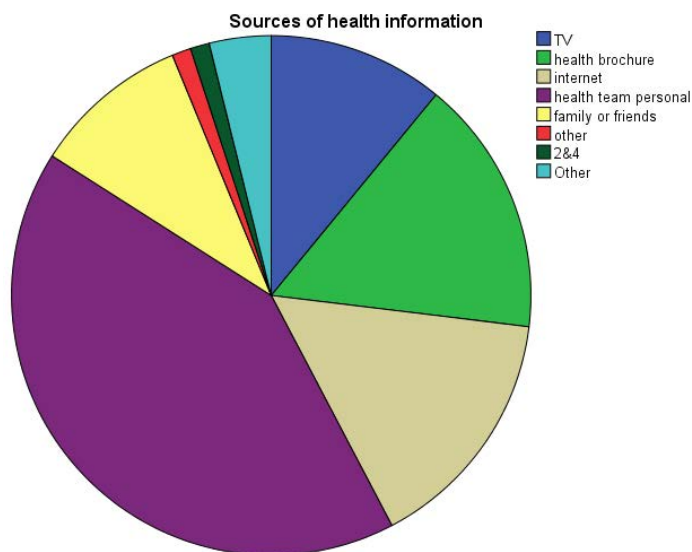


Figure 4:3 Sources of Health Information

This can be related to the way in which the question was formed in the questionnaire. The question asked about the main sources of information about health in general and in specific about stroke; this therefore may have been taken by the questionnaire participants as referring to the health team as their main source of health information in general and not specifically for information on stroke only. This assumption is supported by the 69.4% of the study participants who reported that nobody had explained their risk of stroke to them. This finding is also apparent in the qualitative results.

“Nobody advised me. No.” P001

Some of the participants reported a lack of awareness about stroke risk and wanted to be more aware of stroke, as the following extract shows from the theme *slow responses to stroke event subtheme resources availability, sub-subtheme health team is not prepared*.

“we ask for awareness.” P012

The participants related this to a lack of training and speciality about stroke management and preventive health strategies to reduce the risk of a stroke.

“at least a training course will prepare them for cases higher like stroke.” P011

Overall, although the participants reported a high level of knowledge about stroke risk and its signs and symptoms, they also reported that no one from a health team had explained their risk of stroke to them. This led to a discussion on whether knowledge about the subject is sufficient to identify and be aware of an individual’s risk of stroke.

4.5 Perceptions

The anticipated health-related behaviours are driven by the individuals’ health perceptions about the risk of diseases in relation to their own health status. Individuals’ perceptions of a certain threat are shaped by factors that include knowledge, their recognition of being at risk and the impact of this risk on their health. In this study, the influence of religion and belief in Allah’s will was found to be an influential factor in forming the individuals’ perceptions about their risk of stroke.

Uncertainties were obvious among the participants with regard to their susceptibility of having a stroke in the future. The belief in Allah's will had an influential effect on the individuals' overall perceptions of their susceptibility to stroke risk. Beneath this, the perceptions of having a stroke were recognised, yet denying the risk of stroke was also reported.

This section will discuss the participants' perceptions of their vulnerability to a stroke. Allah's will, responsibility towards health and the belief that stroke can be prevented were found to influence individuals' health perceptions about their susceptibility of having a stroke.

Finally, this section will discuss some of the participants who denied their risk of stroke or of having a stroke.

4.5.1 Susceptibility of having a stroke

Susceptibility of having a stroke was found to be influenced by religious beliefs (Allah's will), the benefits of preventive health-related behaviours and individuals' commitments and responsibilities towards their health. The participants viewed these factors as reducing their susceptibility to having a stroke.

4.5.1.1 Allah's will

The participants were uncertain about their susceptibility of having a stroke. A total of 42% of the questionnaire participants reported neutral responses regarding their belief that they would have a stroke at some point in their lives. These uncertainties about having a stroke in the future were related to the religious beliefs that the future is something known only by God.

"I cannot say or determine." P003

This uncertainty was assumed to be influenced by the participants' beliefs that *Health is in Allah's hands*. The religious belief is based on the perception that future predictions are in Allah's hands and that the future is known only by Allah. The belief that they would have a stroke at some point in their lives was viewed as being at odds with Muslim beliefs of destiny and that good or bad come from Allah, as the following extracts show:

“It is all from Allah. It is all predestination.” P004

*“future you don’t know, it is Allah know, now you don’t know what will happen to you.”
P014*

“well... it is a prescience, a prescience.” P005

Religious beliefs were found to influence the participants’ health beliefs about the susceptibility of having a stroke. The participants believe that only Allah knows the future and that predicting the future is beyond their control. From the field notes, the questionnaire participants were urged to answer the questions regarding their susceptibility to a stroke in the future, with their arguments based on their belief that having a stroke in the future is something that lies in Allah’s hands. It is important that these beliefs are considered when discussing the risk of stroke with at-risk patients.

Although the participants shared the same culture and background, it is the individuals’ perceptions of their vulnerability and susceptibility to future risk that varies, whether this is for other individual factors or the individuals’ perception of religious beliefs related to health.

(Religious beliefs to be discussed further in this chapter)

4.5.2 Recognising the risk of having stroke

Although the results showed that the participants considered developing a disease in the future as something that is related to Allah’s will, some of the participants were able to recognise their susceptibility to having a stroke. Although 66.2% (n=340) of the participants recognised themselves as having one or two risk factors of stroke, 42.8% (n=339) of the study participants identified themselves as being more likely to have a stroke than the average person, with 24.3% (n=338) of the participants believing they would have a stroke at some point in their lives.

Apparently, stroke risk recognition was related to medical diagnosis (refer to *Table 4-8*). The participants correlated their medical conditions as risk factors for stroke. In fact, *the* participants identified themselves as being at risk of having a stroke because of their health conditions, as shown by the following extracts:

“there is relation, diabetes is the relation. It might be increased or reduced and make me fall down.” P011

“I'm exposed to everything, if you have diabetes and hypertension and stress. I'm exposed to it too.” P014

4.5.3 Susceptibility vs risk

A total of 68.9% (n=341) of the participants reported stroke as a cause of mortality, 92% (n=339) identified that stroke can have serious consequences on their quality of life and 84.2% (n=342) of the participants believed that a stroke would change their lifestyle. These results indicate that the participants view stroke as a disease that might lead to disability. The recognition of being at risk was higher than the susceptibility of having a stroke at some point in their lives or even being more vulnerable than an individual with no risk, as *Table 4-8* shows. This can again be related to the belief that developing disease complications is something that is in Allah’s will, although the participants’ hopes and prayers may influence their risk recognition, as the qualitative results indicate. Otherwise, there is the possibility that the voluntary participation in this study led to the inclusion of participants who might consider themselves to be healthy and who have less risk if they practise preventive health behaviours. Therefore, the risk recognition was low among the participants.

The Statement/supported by	Participants’ responses to agree and strongly agree
I am more likely to have a stroke than the average person	42.8%
I believe I will have a stroke at some point in my life	24.3%
A diagnosis of stroke would change my lifestyle	84.2%
I have one or two risk factors for stroke	66.2%
Stroke can have a serious consequence on my quality of life	92%

Table 4-8 Participants’ Responses to Statements about their Belief of Stroke risk

4.5.4 Individuals' health commitments and responsibilities

The belief that health is a gift from Allah forms part of the beliefs of Muslims. Health is thus considered as an individual's responsibility in conjunction with 'Allah's will'. In fact, Islam encourages Muslims to take care of their health and this responsibility mandates an individual to be committed to taking care of his or her health. Health is viewed as an individual's responsibility, as the following extracts demonstrate.

"for myself my life I'm committed. It is a responsibility." P011

"yes., I'm my own doctor and person is a doctor for himself." P012

"of course, for sure, this is a must. I have to care for my health and be committed."
P005

In addition, making health decisions is an individual act as a person can decide whether health-related behaviours are good or harmful things for them. Maintaining health was viewed as an individual decision carried by the individual person himself, as demonstrated by the following extracts.

"for example, the doctor gives me advice but he doesn't know if I do it or not. It is my health, I take care of it, the things I do inshAllah for better." P002

"no one... only by myself, a person by himself, what he sees harmful to him he should stay away from it, and what is good he should follow it." P007

Other reasons that motivated healthy decisions were living longer, living without diseases and responsibilities to children and family.

"I have to maintain my health if I want to live longer." P005

"because I'm responsible towards my family. It is a responsibility." P012

The feeling of being committed and responsible for their health is assumed to influence the individuals' perceptions of having a stroke. When a person is committed to caring for his health, this motivates them to make healthier lifestyle choices that reduce their susceptibility to having a stroke. Taking care of their health and adopting healthy behaviours created the impression that a person feels less at risk of having a stroke.

4.5.5 Preventive health-related behaviours/prevention

The belief that a stroke can be prevented was one of the factors that influenced the individuals' perceptions of their susceptibility to stroke. Over ninety per cent of the study participants (91.8%, n=342) agreed or strongly agreed that stroke is a disease that can be prevented if certain actions are taken (see *Figure 4:4*). Significant associations were found between the participants' belief that they would have a stroke at some point in their lives and factors that they perceived could reduce their risk; for example, regular exercise could reduce their risk of stroke ($\chi^2(8)=16.8$, $p<0.05$), low salt in their diet could reduce stroke risk ($\chi^2(4)=11.36$, $p<0.05$) or keeping up with medical check-ups could help to detect a risk of stroke ($\chi^2(4)=9.56$, $p<0.05$). A diet low in sugar and the cost of healthy food were not significantly associated.

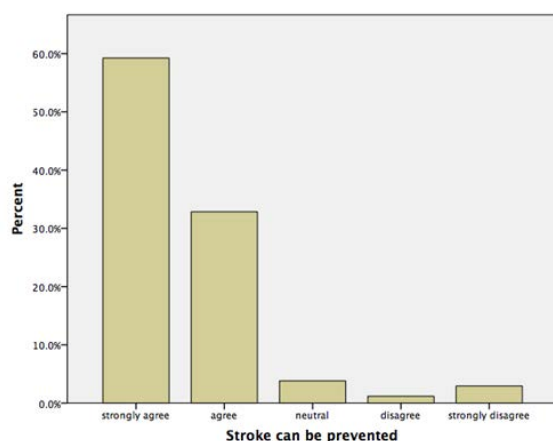


Figure 4:4 Stroke can be prevented

The interviews took this further, giving specific illustrations of preventive health behaviours that could reduce the participants' susceptibility to having a stroke in the future. In fact, the participants believed that modifying their healthy behaviours by practising sport and following a good diet would be suitable for preventing them from having a stroke in the future. The practising of sport is believed to reduce the risk, as the following extract shows.

"I'm exposed, I'm exposed. The only way to avoid it is by doing sport." P011

In addition, a lack of commitment or non-adherence to medication or diet can increase the risk. However, the individuals did not see themselves as being at risk so long as they were committed to preventive health behaviours, as the following extracts show.

“I don’t think, maybe my aunt but my brother and brother-in-law were not committed, they take medication but are not committed to diet.” P012

“with these, I can see myself might avoid a stroke. But if I stop sport and other things this might make me exposed at any time. Unless you practise sport and move your body and you have resistant, this might avoid stroke.” P014

The benefits of preventive health behaviours such as following medication or a treatment regimen were recognised. These were valued as strategies to prevent or reduce the risk of a stroke.

“I think if I will not continue with my treatment, I didn’t take it, I may expose myself to having a stroke. That is it.” P002

The individuals’ perceived susceptibility to a stroke was influenced by whether or not they perceived themselves as being at risk. Although the participants shared the same culture and religion, they reported variations in their risk perceptions. Risk perceptions were identified when the participants believed that their medical condition was a risk factor for them having a stroke and when they felt committed and responsible for their health. In particular, there was a perception that their susceptibility to stroke was related to an unknown future destination that was found to be known or controlled only by God.

4.5.6 Denying the risk of stroke

A denial or inability to recognise the risk of having a stroke was reported among some of the participants. In terms of having risk factors for stroke, 39.2% (n=339) of the participants were unable to recognise themselves as being at risk of having a stroke, with 23.5% (n=340) of the participants reporting not having one or two risk factors. While some of the participants’ susceptibility to stroke was an issue, 32.5% (n=338) of the participants assumed they would not have a stroke at some point in their lives,

and only 24.3% (n=338) of the participants believed they would have a stroke at some point in their lives.

This uncertainty about risk recognition was due to the individuals' perceptions that they were following healthy practice and also their religious beliefs that by expressing their hope and prayers to Allah, they would not get the disease. Again this demonstrates the influence of 'Allah's will' in their views. Therefore, praying and hopes were perceived as potentially keeping them from a stroke.

"I'm personally excluding it. Allah not to say, inshAllah." P005

"no... no, I pray for everyone to be healthy." P007

Denial is associated with the individuals' perception of the religious belief that health is in God's control and that prayer can prevent the risk of diseases.

Overall, this section has revealed the factors that influence the individuals' decisions about health. The recognition and risk perceptions of stroke have been shown to influence the individuals' health decisions. When individuals feel they are committed, responsible and following treatment, they feel in control or able to manage their risk. However, this might reduce the risk perceptions and recognition, thereby making a person feel less vulnerable to stroke risk. In addition, the perceived understanding of religious beliefs did influence the participants' perceptions of stroke risk. Denying the risk and praying to God to reduce the risk was reported. On the other hand, some of the participants considered that a person should be committed and responsible for their health and leave the results and future to God. Here there is a shared sense of control over health in terms of the individuals taking action in the present, such as following preventive health behaviours, and of what happens later being dependent on both the outcome of their commitment and God's will.

4.6 Actions (Late responses to stroke event)

An urgent response is required following a stroke event. However, the speed of response is dependent on many factors, such as knowledge of stroke signs and symptoms, time restriction of stroke treatment (not the focus of this study), the

availability of emergency services and a rapid diagnosis of stroke after arrival at hospital.

In this study, the results revealed late responses to suspected stroke events among the study participants. However, the participants acknowledged the importance of going directly to hospital when a stroke event was suspected. Late responses are assumed to be developed among the participants due to structural issues related to the absence of an activated mobile or an emergency ambulance service. In addition, awareness among the public and patients at risk about the need for an urgent response following a stroke event should be addressed by the health care provider. This section discusses the participants' expected responses following a stroke event.

4.6.1 Going directly to hospital

Going directly to hospital was recognised as an urgent response following a stroke event by the study participants. The participants were aware that if someone has a stroke, they require urgent medical care. A majority, 90.3%, of the participants indicated that going to hospital was their urgent action if they suspected a stroke event. In contrast, calling an ambulance was considered less urgent than going to hospital, being reported by only 7.6% of the participants. Although this is an ideal response, in reality there are no emergency services for medical cases in Oman. Under the theme *slow responses to stroke event* and the subtheme *ask my family or someone to take me to the hospital*, going directly to the hospital was considered as an urgent response to a stroke event. The following extracts indicate the urgency of going directly to a health care institution when a stroke is suspected.

“go only direct to hospital.” P011

“he didn't go direct to the doctor, if he will be late he might get stroke.” P05

4.6.2 Urgency matters

However, a concern was raised with regard to the urgency of going to hospital. Asking a family member, friend or neighbour to take a person with a suspected case of stroke to hospital directly is an issue of concern regarding the availability of having a family member or friends at the time of the stroke event. Although only 7.6% of the participants highlighted calling an ambulance, the reality is that in Oman there is no

activated medical mobile ambulance system unless there has been an accident. Therefore, the immediate action and response that is expected following a stroke event is to ask or wait for a family member to take the victim to a hospital or nearby health care institution.

“I ask my children to take me directly to hospital.” P05

The urgency of receiving medical support following a stroke event was recognised, but the concern is the speed with which they are able to reach a hospital or health care institution if they have to find or wait for someone such as their children or neighbours to take them to a nearby health facility. The participants recognised the urgency of going to hospital, but this type of response is a late response which might lead to a delay in diagnosing and treating the stroke. The stroke victim will not benefit from any time-restricted treatment. Another concern, the emergency status following a stroke event, was recognised, in that the health care institution has better expertise and equipment. Instead of reporting the urgency of receiving treatment, one of the participants reported that the hospital had expertise and availability of medical care, with the following extract providing an example of their understanding of the reason for the emergency.

“the hospital has expert doctors and instruments.” P014

4.7 Motivations vs barriers

When the individuals perceived their risk of stroke, they considered the healthy actions. However, there are motivators and barriers that have strong impacts on individuals' health decisions. Such factors are important to facilitate the environment for the adoption of a healthy lifestyle. As motivators enhance the adoption of health-related behaviours, so barriers discourage the following of healthy behaviours. An individual might have a high perception of the importance of a healthy behaviour, but there may be barriers that restrict their decision to perform a healthy practice. The process of weighing up the costs versus benefits of adopting the healthy behaviours is an important matter when seeking to implement health-related decisions.

In this section, the motivators and barriers that influence the individuals' health decisions are reported. In addition, this study highlights the influence of religious beliefs on individuals' health decision-making.

4.7.1 Motivators

Motivations enable individuals to make a healthy decision in consideration of weighing up the costs and benefits of these behaviours. In this study, having the support of family and friends was viewed as a motivator for practising a healthy lifestyle. Another motivator reported was fear. Fear of developing sickness, complications and stroke motivated the participants' to practise healthy living. Acknowledging the perceived benefits of the preventive health behaviours was reported by the participants.

4.7.1.1 Family and friends' support

In a community with strong family bonds and social relations, family support for healthy behaviours affected the individuals' health decisions. The support of family to be healthy was identified strongly in this study. The majority of the questionnaire participants reported having support from their families to be healthy (92.3%, n=340).

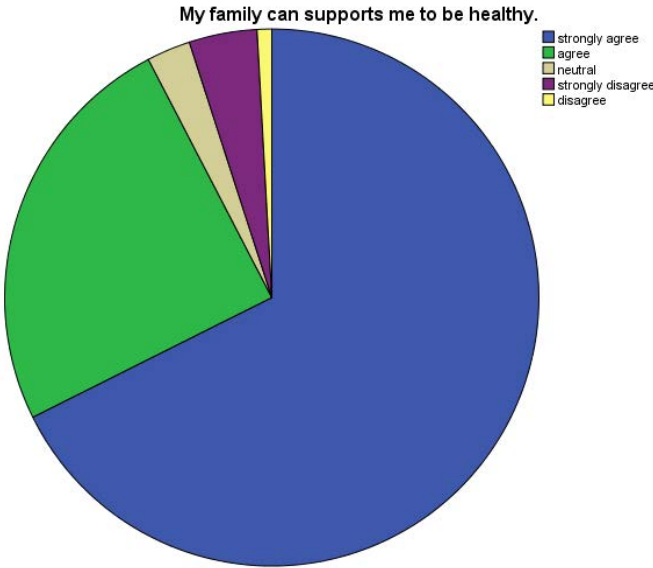


Figure 4:5 Family support for healthy living

The support of family and friends is explained in the qualitative results. It was reported by the study participants as being one of the major contributors that can support individuals to be healthy. Giving health advice, preparing food, providing

accompaniment for walking and paying for medical supplies were the forms of family support that appeared from this study's results.

4.7.1.1.1 Providing health advice

In Omani society, it is part of the family role is to negotiate, provide advice and share decisions among the members, with such an act demonstrating care among family members. Providing health advice was seen as being very pleasurable by the participants, who feel they are taken care of. Giving health advice is identified in the following extract from *theme 4, my motivator, and subtheme 4.3, my family can contribute to improving my lifestyle*.

“My sisters used to tell me to reduce your weight and do sport. My sons also the elder one and the one after him. They told me: mam do sport, reduce your weight and eat well.” P001

4.7.1.1.2 Preparing healthy food

The family play the role of an important facilitator for the participants when deciding about healthy living. In a culture where women are responsible for the housework, women played a major role in the cooking of a healthy diet. In particular, the role of the wife was apparent in providing support and in preparing healthy food for the participants to help them become healthier.

“the madam (his wife). We told her this matter and she took care of food and the needed.” P003

The role of the wife is extended to provide advice about other healthy practice, as the following extract shows. The learning about health and healthy practice was gained through another member of the family's personal experience of illness.

“by regular diet and following up....by walking, she is advising me always. She is in my head. She went through an experience in her family.” P011

4.7.1.1.3 Accompanying women when walking

The Omani society is very preservative. A woman walking on the street alone faces a certain level of restriction. Therefore, a family member is needed to accompany them when out walking. Although it might be deemed acceptable for a female to walk alone on the street in some areas or in certain specific circumstances, for cultural reasons, it

is unacceptable for them to walk alone, especially after sunset or darkness. Other members of the family can act as support for women to perform exercise or walk on the street. The following extract shows one participant reporting the role of the husband in providing motivation for walking.

“in walking also, he was taking me to walk and he was walking with me. Really, he was useful for me.” P002

4.7.1.1.4 Other forms of support

The role of the family in providing financial support when paying for medical supplies was also identified. This extract shows a form of financial support that can be provided to support the participants.

“he should have a blood pressure monitor at home, he can ask his son or daughter to get it for them.” P007

The role of family members in the making of health decisions is very important in the Omani community. The family share advice and decisions and facilitate the environment for the participants to become healthier.

4.7.1.2 Fear as a motivator

Fear influences the individuals' perceptions of their risk of having a stroke. The fear of stroke, fear of complication and fear of sickness were identified as motivators for healthy living. These worries and concerns motivate the adoption of preventive health behaviours. This fear entices the individuals to engage in healthy practice when they recognise their risk of having a stroke. In addition, fear can be a known risk or it may be in the form of a fear of complications, even if the risk of stroke is unknown; either way, this motivates an individual to make better choices.

4.7.1.2.1 Fear of stroke

Fear of stroke as a known disease of death and disability was reported. A total of 68.9% (n=341) of the study participants reported that stroke can lead to death. Moreover, 92% (n=339) of the study participants considered stroke to have a serious impact on their quality of life. Fear of having a stroke and the consequences of stroke events, either of dying or developing a disability, were apparent, as the following extract reflects that death provides another meaning of stroke.

“death... stroke means death. Hahaha. Someone get stroke how he will be.” P002

The fear of a stroke was assumed to be a motivator for the participants to consider the importance of stroke prevention, as the following examples show:

“aha, if you don’t take medication you feel afraid.” P004

“kept in my mind this disease is dangerous. For a person who has diabetes or hypertension I advise him he must take his medication.” P003

As a disease of disability, the fear of being dependent on family members or caregivers following a stroke event was reported. A total of 66% of the questionnaire participants identified their fear that a stroke would make them dependent on others. This fear motivated the participants to take healthy decisions for the purpose of becoming more independent and to reduce the burden on their families.

4.7.1.2.2 Fear of complications

The fear of developing complications from cardiovascular or other diseases was identified by the study participants. The participants reported their fear of developing complications related to their illness. The fear of developing kidney problems was more evident than the fear of developing stroke among those participants who were diabetic, as the following extracts show.

“I told you about the kidney most of my worries...” P012

“Some people had diabetes and not taking medication, will get kidney failure.” P003

Some of the participants elaborated their worries of developing future complications and seeing a deterioration in their health status, as the following extract explains:

“diseases and sickness might be worse and multiply.” P014

4.7.1.2.3 Fear of sickness

A fear of sickness was reported as a motivator for some of the participants. They considered being sick at this stage as an encouragement to care for and maintain their health. Being sick and the fear of becoming sicker motivated the participants to engage in healthy practice. They felt vulnerable and tried to improve their current health status, as the extract below shows:

“the sickness gives you encouragement, if you are sick and tired it will encourage you because you will be exposed to everything.” P014

The participants’ fear of disease or complications was found to enhance their adherence to a treatment regime. Some of the participants reported that sickness motivated them. A person will become more cautious and more concerned when they are sick than when they are healthy, as the following example shows.

“right, but when you are healthy you don’t think about. When you are fine don’t look behind. But when you see yourself sick this is the problem.” P017

4.7.1.2.4 Considering the doctor’s advice

Encouraging results regarding their health status supported by advice from the health team motivated the participants to continue following health instructions. The study participants reported that the health team had encouraged and provided them with advice that improved their health status. Better health results were assumed to motivate the participants to follow health instructions. The satisfaction about positive health results by following the doctor’s advice motivated the participants to adhere to their treatment, as the following extracts show:

“from advice, through advice that they gave me, that was useful for me. But, I feel my status become stable much better than before.” P002

“I encourage myself by something the doctor tells me.” P003

4.7.1.3 Perceived benefit of sport, diet and adhering to medication and medical check-ups

The benefits of adopting of healthy lifestyle behaviours were acknowledged in this study. The study participants reported the benefits of preventive health behaviours. Healthy living was assumed to have an influence on the prevention of diseases and their complications. The study participants valued the benefit of playing sport, dieting and adhering to their medication and medical check-ups in terms of these things enabling them to maintain their health status and mitigating their health risk.

4.7.1.3.1 Perceived benefit of sport

The benefits of sport and exercise were valued by the participants. A concern in this area, however, relates to the limited variety that is available, with only walking being

common. The study participants reported the benefits of practising sports, particularly walking, in terms of reducing their risk of having a stroke, as the following extracts explain:

“I see walking is better. Walking helps improve blood flow.” P007

“walking is important to burn sugar.” P005

Moreover, 80.6% of the questionnaire participants identified that regular exercise was able to reduce their risk of stroke. The qualitative results reported that most of the participants practised walking. The limited availability or absence of other varieties of sports led to a focus on walking as the main sports practice. Walking was found to be common, but there was a need to consider the climate in Oman, where the temperature can exceed 45°C in the summer. Surprisingly, only 24.7% of the study participants reported that the climate was not encouraging for them to practice exercise. This is because 88% (n=341) of the participants revealed their intention to walk either before sunrise or after sunset, when the temperature was slightly less intense than during the daytime. This demonstrated that when individuals value their health actions, then the power of self-efficacy can motivate them to overcome any barriers in their way. In this instance, the benefits of walking were perceived to overcome the impact of the climate. A person can thus facilitate the environment for better results.

Another consideration might be that the data were collected during the winter in Oman, which is reflected in the participants' belief that they were not able to walk in cold weather, as the following extract explains:

“now the weather is cold, I cannot walk in cold. Before I used to walk.” P004

Considering the temperature, the presence of a closed or weather-protected place for performing sports, either a gym or covered playground, is an issue that can motivate or demotivate an individual to do exercise when the weather is extreme. The presence of a closed place or gym facility was reported by only 45.9% (n=342) of the study participants, with 47% of them reporting no closed places or gym in their neighbourhood. This reflects the uncertainty about the availability of a gym in the local neighbourhood. As walking was more common among the participants, this indicates

that even when the participants reported the availability of a gym, this did not necessarily mean they used it.

This raised concerns about the participants' awareness of utilising the available gym facilities during summer when the temperature was very high. In addition, women can use gym facilities as an alternative to reduce the social burden of requiring someone to accompany them when walking on the street (see social barrier). Moreover, the cost of using a gym was something to be addressed since no free gym facilities were provided.

4.7.1.3.2 Perceived benefit of diet

The study participants identified that the benefits of diet control or dieting could reduce their risk of stroke. Diet control as a preventive health behaviour was valued for the benefit of reducing the risk of stroke. The study participants believed that adopting or having low levels of sugar (76.9%, n=338) and salt (76.1%, n=343) in their diet could reduce their risk of stroke. Oils, sugary foods, salt and fats were perceived as risks for getting diseases, as the following extracts show:

“avoid these foods affect a person like oils and fats, these what is getting us disease. We avoid it now.” P003

“avoid fats, sweet, salt, people tell you it has salt is good, no. They have to make for themselves a diet programme.” P005

The participants acknowledged that diet alone was not enough to sustain their health. Diet must be combined with sport, as shown in the extract below. Moreover, insulin as a treatment needs to be combined with diet and sport. The participants expressed a preference for the adoption of preventive health behaviours that can be combined with a healthy lifestyle.

“if you do sport without diet, this is a problem. If you take insulin without diet, this is also a problem.” P011

Furthermore, the perceived value and benefit of a healthy diet outweighed the cost of pursuing a healthy diet in terms of the financial implications, with 52.3% (n=342) of the study participants reporting that healthy food does not cost them too much money,

and only 11.1% considering the cost to be intermediate. However, a concern was raised as 36.6% of the participants believed that healthy food could be costly. It is thus important to consider socio-economic factors, since the purchasing of a healthy diet is dependent on the participants' financial status.

Although the participants valued the benefit of a controlled diet, there was frustration about strict dieting instructions, which the participants tended to find overwhelming. The participants described the challenges that faced them in the early stages of following diet control. Dieting was viewed as causing hunger and influencing the nutritional status, as shown in the following extracts.

“They end with not letting you eat nothing. They kill you from hunger.” P017

“in the beginning, there was some difficulty in diet. When I started to reduce the amount of food, there were some effects on my nutrition status.” P014

The need to prepare the individuals for the consequences of adopting preventive health behaviours can aid in the adoption of the behaviours in the long term. The short or long-term consequences need to be explained to facilitate their adherence to preventive health behaviours. Although the participants valued the benefit of dieting, the costs of a healthy diet and long-term adherence should also be considered. This weighing up of the costs and benefits of preventive health behaviours influences the making of healthy decisions.

4.7.1.3.3 Benefits of adherence to medication and medical check-ups

Another preventive health behaviour that was perceived as providing the ability to tackle stroke was adherence to medication and the following up of treatment. The importance of adherence to medication to reduce the risk of stroke was identified by 90% of the questionnaire participants. The participants valued the benefit of adhering to medication to control their current diseases, such as diabetes, or for hypertensive patients to follow their medication to control and reduce further complications, as the following extract shows:

“who have diabetes to continue their treatment. And who have hypertension to take his medication.” P003

Additionally, medical check-ups and follow-ups were identified as helping to detect stroke risk. A total of 97.9% of the study participants believed that the following of regular medical check-ups could help detect their risk of stroke. Medical check-ups were seen as important to follow the progress of medical conditions and identify further risk.

Overall, the study results demonstrated the benefits of those preventive health behaviours that were acknowledged to reduce the risk of stroke. Although the participants were motivated with regard to adopting preventive health behaviours, a number of barriers were identified that influenced the individuals' health decisions regarding the adoption of lifestyle behaviours.

4.7.2 Barriers

Lifestyle changes are the cornerstone of healthy living. The taking of such decisions requires the presence of motivating factors to encourage them. However, there are certain barriers that may influence individuals' motivations and consequently lead to unhealthy choices. An individual will weigh up the costs and benefits of certain healthy actions and consider the balance between barriers and motivators and how this might influence his or her life. It is important to consider the current and long-term costs and benefits of preventive health behaviours since the benefits can be measured over the long term.

In this study, the qualitative results presented the barriers to modifying or adopting a healthy lifestyle among the study participants. Physical, psychological and social barriers were identified.

4.7.2.1 Physical barriers

The participants reported physical barriers. The physical barriers identified in this study consisted of both bodily physical limitations and materialistic physical barriers such as modern lifestyle changes. This section explores these barriers.

4.7.2.1.1 Bodily physical limitations due to sickness

Sometimes it is not enough to merely have the motivation to perform physical activity; an individual also needs to be physically fit enough to practise physical activities. In this study, the participants reported some physical barriers to them practising sports,

such as back pain, post-operative restriction for eye surgeries, sports injury, inflammation and knee pain. Although the participants valued the benefit of playing sports and walking in reducing their risk of stroke, physical barriers like back pain or knee pain for older patients were an obstacle to them practising sport. The following extract reveals one participant's intention or desire to perform physical activity, but their knee pain served as a barrier to their intention.

“stopping me, I want to do sport but my knee stops me. I like to walk around but because of my knee.” P001

Post-operative restrictions or sports injuries were another reason given for stopping exercise and leading to physical inactivity. Although these can be considered as a temporary barrier, there is then a need for an individual to be re-motivated to continue with their preventive health behaviours following such a life event. A life event can influence an individual's adherence to preventive health behaviours.

“I want to walk but recently I had eye surgery and they advised me not to go in sun or wind.” P007

“no, now I got an injury. My sport is less.” P011

Knee or joint pain caused by chronic illness, however, is often a permanent barrier that can lead to physical inactivity among 'at-risk' patients, especially older patients with restricted joint movement.

“I had inflammation in my joints. The inflammation causes pain, especially when I pray or sit down, I feel stiffness in my joints.” P017

Another physical barrier was health-related consequences or side effects. Patients with heart disease or hypertension can develop side effects such as palpitations. The participants reported that their health condition or chronic illness impacted upon their ability to perform physical activity. A health-related consequence stopped the participants from being physically active.

“nothing stopping me, the healthy life is telling you to walk, but I cannot walk. The disease by itself is stopping you. The disease is the barrier that doesn’t allow you to practise a healthy lifestyle.” P002

Even with these barriers, some of the participants valued the benefits of physical activity. Therefore, walking was performed when there was an improvement in their health condition. In the following extract, one participant describes how the technique of having a five-minute rest when walking helped with maintaining adherence to physical activity.

“But this is the problem, if I walk both my legs will be tired here (pointed to his back) I will sit five to ten minutes then I will walk again.” P003

4.7.2.1.2 Modern lifestyle

There have been tremendous changes to people’s lifestyle in Oman over the last 47 years, which have influenced the individuals’ traditional lifestyle. The change from a traditional lifestyle to a sedentary lifestyle has influenced the individuals’ level of physical activity. A *dependence on using cars* to travel even short distances was reported, as the following extract explains. The individuals have become dependent on the use of a car to perform their daily activities and this can be assumed to be related to the extremely hot climatic conditions and sedentary lifestyle.

“But now there are cars in front of the door. It takes us from to doors and we get used to it.” P007

In addition, changes in lifestyle included changes to work habits or systems. Time limits were recognised as a physical barrier to practising sports. One of the participants elaborated on lack of time due to *working hour limits*, with the working of shift duties restricting the time available for sports. Moreover, working hours can also impact medical follow-ups. As the following extracts explain, working night shifts can demotivate the worker to be committed to a medical appointment.

“If I don’t have time I don’t walk.” P005

“my working system, now you see I just came at six o’clock and I have to relax and should go back by ten at night. I just came for my appointment. I can’t miss it.” P012

Enhancing the public messages about sports requires an understanding of the challenges that may prevent individuals from practising sports. Health promotions should address people's physical limitations imposed by disease and educate patients on the appropriate type and timing of sport or exercise for them to take. Added to this should be gradual steps to the adoption of healthy behaviour techniques based on the medical condition in question. In addition, sedentary lifestyle behaviours have changed Omani lifestyle habits. The use of cars has diminished individuals' levels of physical activity. Those deemed 'at risk' should be aware of the alternative time, techniques and facilities to be physically active, if available.

4.7.2.2 Psychological barriers

4.7.2.2.1 Psychological stress and chronic illness

Psychological stress was identified as a psychological barrier that influences an individual from being healthy or having control of his or her health status. Psychological stress has been reported to increase blood sugar and can lead to the development of diseases, as the following extract explains:

“there are some psychological stress and circumstances, these circumstances happen and it makes stress and pressure and increases the blood sugar, these are the things that cause problems for people from it they will develop diseases.” P014

Obsessing over and overthinking the diseases aroused such psychological stress and led to physical illness. Thinking too much about a disease and becoming obsessed about having it were reported as causing psychological stress for some of the participants, as the example below shows:

“because if a person sits and thinks about the disease, this will be the reason his case will be worse. So, better to not think about the disease, he is better to forget he has this disease. Just continue his treatment and forget and he will see how he will be.” P002

Stigmatisation and embarrassment about having a chronic illness was also reported. The extract below shows how weight loss can be a stigma of diabetes and contribute to a feeling of embarrassment among patients with chronic illness. Therefore, an individual may hide his or her disease from friends because of this feeling of embarrassment.

“yes, I hide my sickness; many of my friends, they don’t know about it. I feel embarrassed, too much embarrassed, not a little. Even they noticed and told me that your weight went down, do you have diabetes?” P017

In addition, *worries about children, health improvement and disease complications* were identified.

There are also responsibilities for children and the impact of having a parent with a chronic illness. This worry was assumed to have either a negative or positive influence. Thinking about the children while ignoring or paying less attention to one’s own health can influence the health decisions taken.

“Nothing that worries me only thing related to me children. I’m afraid only about them.” P001

Uncertainty and worries about the impact of preventive health behaviours on health outcomes were reported. The participants were uncertain about risk-related diseases and making no health improvement, as the following extracts show. These worries were assumed to influence the intention to adopt healthy behaviours.

“But will have worries about what you don’t know what will happen to you. I had seen many people who complain of diabetes are exposed to many diseases, many things like heart attack or many other things.” P017

“The worry that there will not be any improvement.” P002

Also, the psychological fear of becoming a drug addict as a result of long-term adherence was reported as a psychological barrier that influences the individuals’ adherence to a treatment regime.

“I don’t want to get addicted to it.” P007

Frustration is expected to result from the making of only slow progress with health outcomes. Individuals need to be psychologically prepared to consider their health progress over the long term. Therefore, the participants reported that a person should not give up immediately and that they should adhere to long-term lifestyle modifications, as the following extract shows.

“He shouldn’t give up to the disease, either diabetes or hypertension, he shouldn’t give up himself.” P005

In addition, frustration was found to be higher when a person needed to adopt preventive health behaviours at an older age and when they had witnessed the death of many family members and friends because of the diseases, as outlined in the following extract.

“We get old, the disease is getting more, we are tired and the death of family members’ brothers and sisters. All the things are getting together.” P007

The diagnosis of having a chronic illness influences the individuals’ psychological health status. Assessing their psychological status when newly diagnosed with a chronic illness such as diabetes, hypertension and heart disease must be considered. The stress caused by diagnoses of chronic illness and worries about future complications needs to be assessed.

4.7.2.3 Social barriers

Early in the socialisation process, an individual learns and develops early concepts from his social environment, including health, health concepts and the health behaviours and habits adopted from the health experiences of others such as family members, friends, neighbours and the wider community. *Social traditions* in any given society influence the health behaviours of the individuals in that group. Then, any new behaviours are either accepted or rejected by the other members of that group, with the members then endorsing and enforcing the behaviours that are acceptable to the group. There may be challenges to making changes in health behaviours as the group needs to become aware of the need for and the importance and significance of these changes in order to endorse and enforce the new behaviours.

Social traditions are very important within Omani society. Traditions are deeply entwined in the lives of the people, starting with food and food preparation. *Traditional foods* and social visiting were identified as social barriers to the maintenance of a healthy diet routine. Traditional Omani foods are known to the participants as being too high in oil, fat, salt and sugar, with the following extract explaining how a traditional breakfast would consist of bread topped with sugar and margarine.

“It got mix, you know here our breakfast, is that [khabiz regeg(bread) and skar(sugar)] bread with oils and I don’t know what.” P011

Although the quantitative results showed that 75.6% (n=344) of the participants considered themselves to limit the amount of sweet foods in their household, this might be because they considered themselves to be healthy or they had introduced healthy changes into their diet.

Also, part of the social traditions is the responsibility to visit cousins and other close family members, with the strengthening of family ties being something that is encouraged by religion. In religion this is called ‘selat alarham’ or kinship. In Islam, individuals must visit the members of their family, especially first cousins and especially during Eid celebrations, during Ramadan or every Friday, if possible. Such an important practice that influences the social well-being of individuals has been developed and elaborated by individuals in the community so that the social visiting includes neighbours and members of the community. This traditional visiting seems to influence the routine of sport or diet. Some of the participants reported that the social responsibilities of visiting family and attending social events restricted the amount of time they had available to practise sport and also as a barrier to following a healthy diet, as shown in the following extracts.

“it is time if we have the time or arrange it. We are Omani community, we should go to visit our family and... I’m living with my mother and older son. So I have to visit my brothers. So this takes my time.” P012

“I attended many social events but as I was telling you I was avoiding these things.” P05

The tradition of caring for the elderly and for parents made them dependent on their children or other members of the family. Sometimes the family might be overprotective, especially in the case of elderly people, encouraging them to relax and not tire themselves out. The following extract shows how caring can have a negative impact on healthy lifestyle practice.

“The opposite they are telling me not to move, they said, “you are tired and have back pain”. They even get angry at me. Even going to the kitchen they will fight with me. They do everything for me, they cook and clean.” P007

4.8 Social networking of health advice

The community social structure influences the individuals' health and healthy decisions. The visiting of sick members of the social group aids in the sharing of health knowledge and serves as a way to gain advice from someone with experience of living with the condition. The health-related experiences of family members, friends, neighbours or members of the community are shared during visits and social gatherings. In this setting, an individual is able to develop insights and thoughts about health and health-related behaviours. This kind of social networking of health advice was reported as a motivator to follow a healthy lifestyle. The learning and sharing of knowledge about diseases and their prevention were communicated among the individuals of the social group, which in turn influenced their individual decisions about health. The following extract demonstrates a consideration of preventive health behaviours when seeing or hearing the experiences of others.

“From what I do see. I heard things from people a fellow got this because of that. Why not I heard about these things and I should avoid by myself. And keep myself away from troubles.” P007

Such experiential learning serves to illustrate what can happen when, in some cases, the participants share untrusted health messages. Some of the messages contain advice such as helping suspected stroke cases by lifting their legs, as the following extract shows.

“I will go to the hospital. But first I will try to help him by keeping his leg up so the blood will flow to the head and I will take him to hospital.” P017

Uncertainty regarding the health advice and knowledge communicated were reported. The following extracts show that the participants have doubts regarding the correctness of the health advice they have either heard or received.

“No this message from India, a doctor from India. I heard they tried it, I don’t know if it is correct.” P011

“I heard that if you got it you have to cough, I’m not sure it might be for heart attack not stroke or may be rumours.” P012

The sharing of health advice among lay people is risky and can have a strong impact on individuals’ behaviours or decisions with or without a doctor’s advice. Some of the adopted behaviours had influential effects on the individuals’ health, such as the giving of advice regarding certain medications. The following extract shows how the advice from diabetic friends helped the individual to change some of the medications they were taking.

“Some of my friends who have diabetes, in the change of some medication.” P012

Moreover, the peer effects of acquired unhealthy habits were also reported. The following extract shows the influence of a group of friends who share the same interest in health behaviours. The participant explained that he had tried to quit smoking but that being among smokers was not helpful.

“The coterie of friends is bad. The problem was being with friends and all in the same car. Try and try. You know the youth.” P011

With respect to individuals’ strong social bonds and encouraging social interaction, health promotion interventions should be in alignment with and use those concepts and social practice to efficiently communicate their health messages. Health educators can utilise this area to help spread health messages. Public health care messages should be transparent in stating that health care is provided based on individual needs. Social health messages need to be assessed to ensure they are in line with public health care objectives.

4.9 Religious beliefs

‘Health in Allah’s hand’ is a short and concise phrase which reflects the participants’ belief in the relationship between health and religion. The concept of health in Allah’s hand appeared throughout this study’s qualitative analysis. Health is believed to be a blessing from Allah. *Health viewed as a gift from Allah.*

"Thanks Allah things are good." P003

4.9.1 Predestination and susceptibility to develop disease

Some of the individuals believed in health and illness as a form of predestination from Allah, as the following extracts show:

"It is all from Allah. It is all predestination." P004

"well... it is a prescience a prescience." P005

"If Allah writes for a person a life he will continue, these are all a reason operation and sickness." P005

Future expectations regarding the development of further diseases or complications based on the participants' beliefs were in Allah's hands.

"Five to ten years everything in Allah's hands." P012

"Future you don't know, it is Allah know, now you don't know what will happen to you." P014

The sharing of their hopes and prayers with Allah was found to reduce the chances of having a stroke, as the following extracts demonstrate the participants' reliance on Allah as a means of preventing them from having a stroke.

"But, I'm putting a hope. I'm holding in Allah and inshAllah it will go." P002

"inshAllah Allah keep it away from me. If it comes that is from Allah." P007

"I depend on Allah. I'm not afraid of death or anything. If I die thanks Allah. If Allah cures me thanks Allah. Everything in Allah's hands." P003

Islam as a religion motivates and encouraged health and health promotional practice. Individuals are encouraged to care for and be responsible for their own health. However, there is a misconception about the concept of predestination, in which everything that happens to a person is written by Allah and that the future is known only by Allah and individual power of health.

It is important to distinguish between Islamic concepts such as predestination and prescience and the individuals' perception of this concept. While Islam encourages health and healthy practice, predestination and prescience do not conflict with health-promoting behaviours. But it was assumed that the participants were unable to recognise their disease-related risk and reflected this susceptibility of developing the stroke to Allah's will. Another assumption is that a reluctance to take responsibility for their own health or else relying on Allah's will to save them led some of the participants to underestimate their own role in making health changes. Moreover, the fear of stroke can drive some individuals to deny their risk of stroke.

However, some of the other participants believed the responsibility for health necessitated health care practice and health-maintaining behaviours. The following extract shows the power that the individual has over their health, while the future destination is left to Allah.

"It all from Allah but these maintaining things give you a longer life, and longer life is something from Allah, no doubt about. But if you maintain it you live longer". P005

Preventive health behaviours have been found to reduce the risk of diseases. Therefore, adopting a healthy lifestyle is part of the individual's role, with the remainder left to Allah, as the following extract shows:

"try to avoid risk and mainly it is all about sports practice sport and then all in Allah's hands." P014

This study's qualitative results show the influence of religious beliefs on individual health beliefs. In fact, religious beliefs served as influential factors that guided the individuals' health beliefs. The disease was viewed as a gift from Allah (God), and the person held responsibility for his or her health. Allah's will was viewed as the influential motivator to having better health, while the roles of hope and prayer were also evident in helping to prevent the participants from having a stroke.

Therefore, it is important for health promotion to consider the individuals' religious beliefs about certain health issues. Religious leaders can be strong health educators when it comes to raising public awareness of health issues.

4.10 Intentions

Knowledge, perceptions and intentions are three interrelated concepts that lead to the modification of behaviours. They enhance individual self-efficacy to adopt healthy behaviours. Intentions usually develop after consideration of perceptions and weighing up the costs and benefits.

In this study, intention is identified as participants stating their intentions to make future changes. However, whether or not the intended behaviours translation into real actions was not measured. The participants identified their intentions to modify their healthy lifestyle. Intentions to walk after sunset or before sunrise were reported by 88% of the study participants. The participants valued the role of sports and walking in reducing their risk of stroke. Also, the intention to practise sport was reported by the participants, with the following example demonstrating the participants planning to continue the daily performing of physical activity.

“Continuing with sport daily.” P011

Moreover, an intention to follow a healthy diet was apparent among the participants. The participants displayed an intention to follow a healthy diet, with 93.5% of the study participants reporting that they would follow one. The following extract outlines the value of following a healthy diet.

“Avoid those foods that affect a person, like oils and fats, these are what cause us to get disease. We avoid them now.” 003

Adhering to medication was also recognised as a preventive measure. A majority of the participants (98.8%, n=340) revealed their intentions to follow medication based on their doctor’s prescription. The example below shows the intention to adhere to medication, walking and dieting as being important to reduce the risk.

“Nothing in specific as I told you medication with walking and food.” P002

In addition, 92.9% of the study participants identified intentions to perform actions at the present time to reduce their risk of stroke. In general, the participants showed their intentions to modify the healthy behaviours to reduce their risk of stroke. These

intentions will enhance the adoption of a healthy lifestyle, and health care providers can utilise this when providing health education.

4.11 Summary

Individuals' perceptions and knowledge of the risk of stroke have been assessed. Surprisingly, the participants showed a high level of knowledge of stroke risk factors and signs and symptoms. This knowledge is assumed to have been developed from the social sharing of knowledge and experiential learning. In addition, the individuals' susceptibility to stroke was found to be influenced by their perceptions of religious beliefs. Their risk perceptions were affected by their perceptions of self-efficacy and their individual level of control over their health. The less individuals feel they are in control of their health, the less motivated they are to take health-related actions. When an individual considers they have control over their health and they leave the future to Allah, the more they will be motivated to adopt a healthy lifestyle. In considering that control rests with Allah alone, the individuals become reluctant to take actions related to their health.

Motivators and barriers were identified, and a weighing up of the costs and benefits of healthy behaviours was apparent; for example, the benefits of dieting were evidential. Despite there being complaints about the restrictions imposed on them by a rigid diet, the participants displayed intentions to follow a healthy diet. This study's results show that both the individuals and the social structure play an influential role in individual health decision-making.

Chapter 5 Discussion

5.1 Introduction

This study has assessed the participants' knowledge and perceptions of stroke. The participants' knowledge was gained through the sharing of knowledge about stroke with others. This sharing of knowledge was the result of a family member, friend or neighbour having had a stroke. Learning from others' experience of stroke raised awareness among close relatives, friends and close community members. The risk of stroke was perceived as a threat. The threat perceptions included two key concepts: the perceived susceptibility to illness or health problems, and the anticipated severity of the consequences of illness (Abraham and Sheeran, 2007). Such perceptions drive changes in behaviour through a consideration of costs and benefits. In fact, the evaluation of behaviours involves the benefits or efficiency of a recommended health behaviour and the barriers that exist to enacting such a behaviour (Abraham and Sheeran, 2007).

The Health Belief Model (HBM) is an expectancy-value theory that focuses on the beliefs and attitudes of individuals which are evaluated as either a negative or positive influence on their behaviour with regard to the making of health decisions. The theory looks at the perceived threat of the consequences of a problem, the perceived benefits of healthy behaviours and the potential cost of these healthy behaviours and other modifying factors, which collectively with other factors are assumed to result in individuals either taking or not taking healthy actions. The HBM was developed to address health behaviour problems in regard to different health concerns (Orji et al., 2012). The model has been widely used in health care research, mostly in western countries, but it has also been used in different contexts. Therefore, it was selected to be the underpinning theoretical model for the purposes of this study.

The figure below demonstrates how this study's findings are consistent with the HBM's conceptual meaning of the association between individuals' beliefs and risk perceptions and their making of health decisions. The data obtained are broadly consistent with the HBM concepts and variables, which makes the concepts of the HBM applicable to individuals in different contexts, including that of Oman. In fact, the basic concepts that influence individuals' perceptions of health-related behaviours

are mostly similar in different societies. Similar to other studies, stroke risk perceptions were found to vary for different reasons. In this study, stroke was perceived as a cause of death and disability, which was a perception gained through experiential learning. It considered the severity of stroke to have motivated individuals towards the adoption of healthy living while also keeping in mind that perceived susceptibility or recognising the individual risk of being vulnerable to stroke might influence the overall threat perceptions of the disease. Interestingly, in this study, susceptibility to stroke was found to be influenced by the individuals' religious beliefs.

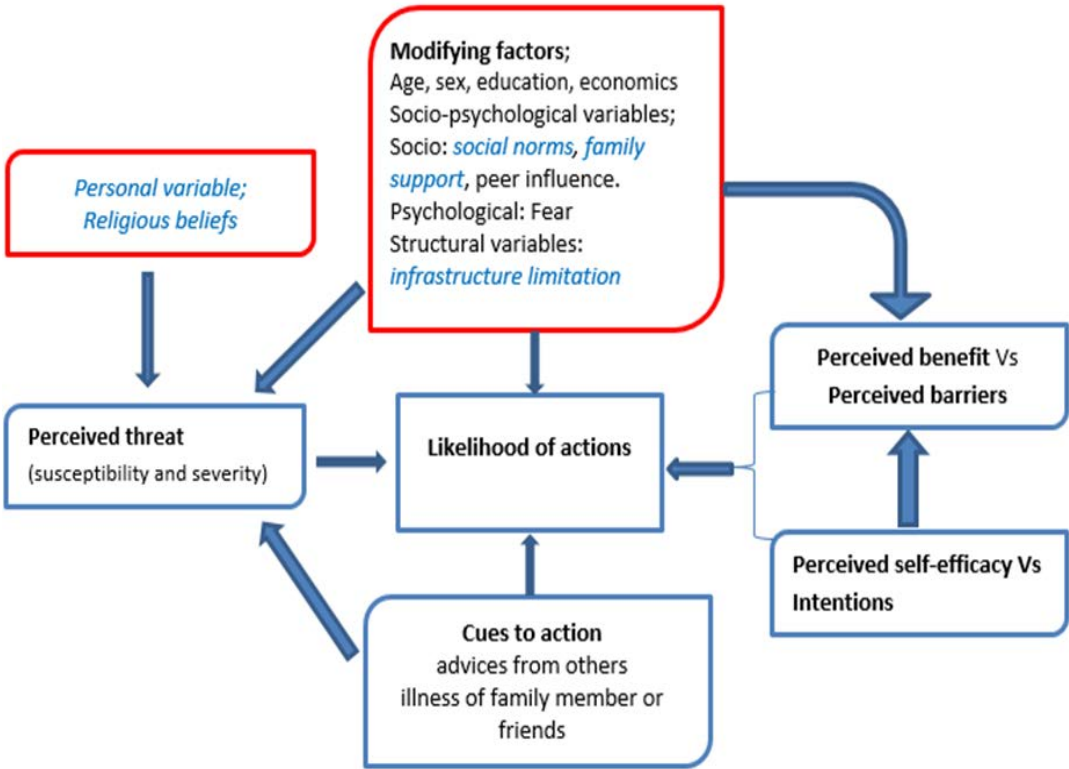


Figure 5:1 The suggested HBM

One of the major findings to have emerged from this study relates to the modifying factors; in particular, social norms and family support. The social norms include the social sharing of knowledge which, together with family support, act as significant contributors to the adoption of healthy behaviours within Omani society. In addition, the structural variables in this study were found to be significant, with a lack of awareness regarding the appropriate emergency responses to take following a stroke

being an important factor. The absence of medical emergency services can lead to a delay in responding to suspected stroke events.

Moreover, supporting the previous findings for the connectivity between health and religion, this study has extended our understanding of the importance of religious beliefs on individuals' risk perceptions of certain health problems. Despite the success of the HBM in informing and predicting a range of behaviours with health outcomes, previous research has revealed the HBM's determinants to be insufficient as predictors of behaviour (Orji et al., 2012). This study highly recommends extending the HBM to consider the influence of religious beliefs and family support on the adoption of preventive health behaviours. In addition, this can promote the use of the HBM to suitably fit in different communities and societies.

Overall, figure 5:1 illustrates the study suggestion to extend the HBM. The model recommends incorporating individual religious beliefs as a personal variable that directly influences the perceived threat or the individual perception of risk. Moreover, the perception of risk or threat perception is influenced by two major variables. First, the modifying factors such as social norms, family support, fear, and infrastructure. The second influencer is the cues from those surrounding the individual, including those cues from the illness of a family member, friend, or neighbour. In addition, the individual self-efficacy and intention to perform the healthy actions have an impact on the cost-analysis of perceived benefits vs perceived barriers. These variables impact the individual likelihood of adopting the healthy actions.

This chapter discusses the HBM constructs that are shown within the Omani society with an emphasis on the significance of the social and religious variables for risk perceptions. Extending the HBM to fit the broader contextual setting is suggested.

5.2 The HBM constructs within the Omani society

The HBM has been used in many contexts. However, to the researcher's knowledge, the model has not been used within Omani society for the purpose of assessing stroke perceptions. This study confirms that susceptibility to and the severity of the disease influence the individuals' perceptions of the risk of having a stroke in the future. Moreover, their perceived threat is interconnected with their religious beliefs that

health and illness are in control of Allah, especially in terms of their expectation of either having or being susceptible to a stroke in the future.

On the other hand, the individuals' high self-efficacy was found to overcome the environmental barriers presented by the hot climate in Oman, which may hinder their tolerance to performing exercise, for example. It seems that this high self-efficacy was motivated by the fear of stroke as a disease that causes death and disability. The role of family support in being healthy was a motivating factor to practising healthy living. This section details the constructs of the HBM within the Omani society.

5.2.1 Perceived threat (Perceived susceptibility and perceived severity)

The combination of susceptibility and severity is known as the perceived threat (Champion and Skinner, 2008). Conceptualising susceptibility and severity is a strength of the HBM over other models that theorise threat as a perceived risk alone (Champion and Skinner, 2008). If the perceived risk is great, then the likelihood of engaging in health-promoting behaviour may increase (Adams et al., 2014). The seriousness of contracting an illness or the consequences of leaving it untreated in relation to both its medical consequences (death, disability or pain) and social consequences (the effects of the condition on work, family life and social relations) had the effect of raising the threat perceptions (Champion and Skinner, 2008). It is an individual's belief regarding the negative effect of contracting a disease that will impact upon his or her overall existence (Adams et al., 2014). The HBM assumes that individuals who report a greater perception of severity regarding a particular disease should report a greater adherence to preventive health behaviour (Jones et al., 2014b). The stronger an individual's perception of the severity of the negative health outcome, the more they will be motivated to act to avoid that outcome (Carpenter, 2010).

The stroke survivors' perceptions of their susceptibility to a stroke and the seriousness of it as a condition were predictive of some healthy behavioural changes (Sullivan and Waugh, 2007). Their beliefs with regard to the possibility of having a stroke and the severity of the consequences were suggested as being responsible in such a way that encourages people to further reduce their stroke risk (Sullivan and Waugh, 2007).

In this Omani study, the participants' perceptions of having a stroke varied, with their perceptions influenced by many factors. Fear of the consequences of a stroke encouraged the participants to follow a healthy lifestyle in line with their own knowledge. A total of 92% of the study participants identified that a stroke can have serious consequences on their quality of life, with 68.9% reporting that it had the potential to lead to death. This fear was assumed to develop as the participants acquired knowledge of stroke from the experiences of others such as family members, friends or neighbours. Although the participants reported health care teams as being the main sources of health information in general, 69.4% of the study participants reported that nobody had explained their risk of stroke to them, which in turn meant that no specific health education regarding stroke and its risks was delivered to the study participants. In addition, it is necessary to consider that other factors such as health messages in general are anticipated to raise awareness of a healthy lifestyle and preventive health behaviours. Therefore, the study participants perceived their health behaviours to be part of a positive healthy lifestyle.

The participants' perceptions of stroke as a disease capable of causing death and disability were raised from their reflections on the experiences of others. As a result of this reflection, healthy behaviours were adopted. The fear of stroke had increased the perceptions of susceptibility and led to it becoming a motivating factor for healthy living, and this was reflected in the qualitative results. In fact, the perception of susceptibility to and severity of a condition was regarded as a motivating factor by itself (Roden, 2004). While variations in the participants' level of susceptibility to stroke were reported, among the participants who were aware of their risk, they perceived the risk of stroke as being related to their current medical condition. A total of 66.2% (n=340) of the participants recognised themselves as having one or two risk factors for stroke. Having medical conditions raised their sense of the severity of stroke risk related to their health. A lower perception of general health increased the self-perception of increased stroke risks, and this led to recognition of the significance of individual risk factors (Kraywinkel et al., 2007). Mainly, the HBM predicts that people will take action to prevent illness if they regard themselves as being susceptible to a disease (Jones et al., 2015). Health conditions/diagnoses were considered as risk factors for having a stroke. However, only 42.8% (n=339) of the study participants

identified themselves as being more likely to develop a stroke than the average person, with 24.3% (n=338) of the participants believing they would suffer a stroke at some point in their lives. These responses are strongly assumed to validate that the individuals' risk perceptions and threat about a disease are influenced by their religious beliefs since they perceive any future diseases or risk to be in God's control. Although the risk of having a stroke related to having one or more risk factors was recognised, the susceptibility to a stroke in the future was regarded as being in God's control. Therefore, the overall risk perceptions or threat of stroke were found to be influenced by religious beliefs such as 'health is in Allah's hand' (Allah is God in Arabic) (Will be discussed later in this chapter).

5.2.2 Perceived benefits versus Perceived barriers

Individuals' perceptions of the balance between the cost and benefits of certain preventive health behaviours determine the value of them adopting those behaviours. Barriers versus benefits, weighing the cost-benefit analysis of the health action influence the health-related decision (Champion and Skinner, 2008). When the perceived barriers outweigh the perceived benefits of the behaviours, then it is less likely that behaviours will be followed. In addition, when an individual perceives the action to be potentially beneficial in terms of reducing the threat, they can be expected to recommend the health actions (Champion and Skinner, 2008).

Perceived barriers seem to predict behaviour better when the goal is the prevention of a negative health outcome (Carpenter, 2010). Individuals will be more likely to adopt a preventive health behaviour when they value the benefits of it in terms of it reducing their likelihood of getting the disease (Hayden, 2009). The perceived benefits play an important role in the adoption of secondary screening prevention behaviours (Hayden, 2009). Although some of the screening may cause a measure of discomfort or be painful, such as in the case of screening for colon cancer, individuals have been found to value the benefits of such screening (Hayden, 2009).

5.2.2.1 The perceived benefits of preventive health behaviours

In this study, the *perceived benefits of sport, dieting and following treatment regimens* were found to be beneficial in terms of improving the participants' general health and reducing their perceived risk of stroke. Sullivan et al. (2008) found that the major HBM

contributor to exercise intentions was the perceived benefit of undertaking exercise to reduce stroke risk (Sullivan et al., 2008). Healthy living was valued to prevent diseases in general. Healthy diet is assumed to mean a healthy lifestyle for the participants. This study found that *regular exercise* was perceived to reduce the risk of stroke among 80.6% (n=340) of the study participants, which illustrates the importance of sport in facilitating a healthy lifestyle. Although the understanding and practice of a healthy lifestyle or healthy living may have differed from one individual to another in this study, there were intentions to follow a healthy lifestyle. This can be understood from the 88% (n=431) of the participants who expressed their intention to walk before and after sunset as a way of overcoming the hot climate.

Healthy dieting or eating was valued as significant to maintain healthy living. Low sugar (76.9%, n=338) and low salt (76.1%, n=343) were valued to reduce the risk of stroke among the participants. Also, healthy food was viewed as cheap by 52.3% (n=342) of the participants. However, there were also concerns raised, with 36.6% of the participants considering healthy food to be costly, which may have influenced their cost–benefit analysis of diet control. In contrast, a positive qualitative finding showed that the participants valued the importance of diet control when it was reconciled with medication, treatment therapy or sport.

Following treatment or medication regimes was assumed to be the most beneficial for participants due to their experience of witnessing a family member’s or friend’s noncompliance with a medication regime being the reason for their stroke. A total of 90% (n=342) of the study participants believed that their medication was capable of reducing their risk of stroke. Adherence to medication and its preventive role was perceived as being beneficial. In a previous study that assessed risk perception among older South Asian people in the UK with type 2 diabetes, the participants perceived the severity of their diabetes to depend on whether or not they were on insulin and the number of tablets that they took (Macaden and Clarke, 2006).

5.2.2.2 The perceived barriers of physical, psychological and social factors

On the other hand, physical barriers, psychological barriers and social barriers were identified in this study. *Physical illness* such as knee or back pain and sports injuries

were perceived as barriers to undertaking sport or walking. Cost–benefit analyses of engaging in sport were noted. Some of the participants valued the benefits of playing a sport, while there were also physical barriers such as joint pain that had led to them either stopping altogether or reducing the intensity with which they performed exercise. For example, lower back pain was found to challenge individuals’ confidence to perform usual daily activities (Al-Obaidi et al., 2012). In this study, joint and back pain were found to influence the efficacy with which the participants were able to perform physical exercise. In addition, disease signs and symptoms such as palpitations also influenced their ability to engage in physical activity. Nonetheless, sport and physical activity were perceived to be beneficial even with the presence of barriers, as the benefit of sport exceeded the barriers. The participants reported high self-efficacy to perform sport even with pain or illness. Strategies such as taking pain medication or walking slowly and taking rests, for example, were employed to reduce the intensity of pain and to reduce the palpitations experienced by those patients with heart disease. Moreover, high self-confidence was noted as the participants were highly motivated to practise sport or walking, which was surprising given the hot climate as the expectation was for them to have less motivation for this reason. This reflects the way in which individuals are motivated to make healthy decisions when they value or recognise the benefits of the preventive health behaviours, which was supported by their high self-efficacy to overcome the obstacles.

Worries about developing a chronic illness or being obsessive about their illness, psychological stress and a fear of becoming addicted to drugs were identified among the psychological barriers. There were high levels of concern about their diseases; obsessiveness and anxiety regarding chronic illness were noted as a barrier to the participants’ psychological stability. Chronic illnesses can mostly be treated with lifelong drugs, although two of the interview participants reported a fear of becoming addicted to or developing a dependence on the drugs as a perceived barrier to adherence to a medication regime. *The fear of drug dependence* has been shown to result in people taking less than their prescribed doses (Pound et al., 2005). This was also reported by two of the interview participants, who in reducing the number of prescribed tablets that they took perceived that they would reduce their dependency on drug use. Since they also perceived the benefit of the medication, they took this action

as opposed to ceasing taking the medication altogether as they were aware that this latter course of action may put them at increased risk of further complications. Moreover, the participants' attempts to live a normal life despite the demands of a serious disease might be influenced by their doubt regarding the efficacy of medications, particularly if such medication had previously failed to deliver any improvement in their condition (Dimatteo et al., 2007). But the benefit of adhering to the medication regime was found to overcome the fear of dependency as the experience of others not following their treatment generated an anticipation of the development of stroke. Therefore, the participants were motivated to adhere to their medication as a means of avoiding having a stroke.

Social factors affect an individual's decisions, especially in a society like Oman. After 1970, the rapid development and modernity of lifestyles have influenced Omani society. Rapid socio-economic development has resulted in an increased prevalence of behavioural risk factors like increased caloric intake, higher salt intake and greater levels of physical inactivity (Al-Bahlani and Mabry, 2014). *Omani traditions* also include food that is mostly cooked with oil, which discourages diet control, and this could in fact be worse if the types of consumption associated with modern life and fast food are also considered. Nonetheless, 75.6% (344) of the study's participants reported having a limited amount of sugar in their household food, although only one of the interviewed participants reported that Omani traditional foods are known to use much oil in their cooking.

A major *tradition* or *norm* within Omani culture is the social visiting and attending of social events that was seen as a burden in terms of the participants' time as they were not able to allocate sufficient time to sport, for example, alongside these commitments. Family visiting is very important in the Omani culture, especially for a new family that consists of a husband and wife and their children. As this new family unit separates from their extended family, they are socially obligated to visit their parents' home on at least a daily basis if it is the eldest son, or on a weekly basis otherwise. Many of the new nuclear family will plan one of the weekend days for the whole family to visit their grandparents' home; for example, either the whole of Friday or the period after lunchtime. Moreover, the family have to attend social events for marriages, births and

deaths, alongside other social events. With a small population where people tend to have a large social network of relatives and friends, they are obligated to interact with each other on different occasions. These imposed social responsibilities set Oman apart from western countries in terms of this unique sociality. Further social pressure is generated by a range of other factors, including women going to work, which only began after 1970, and children attending school and being required to complete their homework. We can add to this that Omani sociality reinforces an unhealthy way of eating as visitors are traditionally offered dates and local Omani sweets. Although these habits form a symbol of Omani hospitality, this type of social culture in Oman imposes difficulties for people living with diabetes, for example (Elliott et al., 2013). Hospitality that is characterised by providing food constitutes a centre of social interactions, and the refusal of food that is offered can be perceived as offensive; as such, Omani hospitality exacerbates unhealthy nutritional habits among members of the society (Klautzer et al., 2014). Such a cultural practice largely hinders individuals from following a controlled diet, especially if a person is committed to a large number of social events or gatherings.

Moreover, *the modern lifestyle such as the use of a car*, is considered to be a barrier that hinders physical mobility. The frequency and dependence on the use of a car as opposed to walking was perceived as a barrier to practising sport. The use of cars is preferable to walking as an impact of the hot climate, especially in the summer and during the daytime. Although people have become more aware of the importance of sport, *the hot climate in Oman* forces them to use the car most of the time. To overcome this barrier, the appropriate timing of sport or walking seems to be a practical solution. Added to this, Omani social traditions or norms were found to be a barrier for women. For two of the female participants, *walking alone to practise sport* or walking in general seemed to be particularly challenging. This can be assumed to be because the social norms within the society view a woman walking alone on the street to be unacceptable; consequently, women look to be accompanied when they walk on the street. An earlier Omani study reported that cultural and social restrictions make it unacceptable for women to walk or exercise alone without the company of a close family member (Al-Lawati and Jousilahti, 2004). Omani women face a greater level of challenges to practising sport compared to men. Walking was the most reported type

of sport in this study, which is assumed to be because of the small number of gym facilities in the neighbourhood. The cost of accessing these facilities also poses another challenge. To practise other types of sport, women *need a private place that is close*, such as a gym or indoor playground. The social norms of Omani culture influence women's chances of practising other types of sport in open fields, thus making walking the predominant type of sport. In fact, the lack of places in which women can exercise was found to be a barrier that led to decreased physical activity among midlife women in the GCC countries (Al-Zadjali et al., 2014).

Additionally, the social factors within Omani society can also be demotivating when it comes to health behaviours. A good example of this is peer pressure, with one of the interviewed participants in the study illustrating the role of peer pressure to take up smoking again after he had quit for a period of time. Peer effects or peer pressure can thus be another form of social influence. Although this was reported by one participant, the influence of society was also seen to be an influence on the individuals' behaviours and health decisions.

This study confirms that an individual's ability to make a health decision is a result of weighing the value of the cost of that behaviour with its associated benefit. The balance between the barriers versus the benefits of sport, eating and medication were driven by the individuals' self-efficacy to adopt healthy behaviours. The Omani participants valued the benefit of sport, for example, walking; therefore, they adopted walking as a form of sport for the purpose of promoting and maintaining their health. In a bid to minimise the cost of walking in a hot climate, they chose appropriate times of the day to ensure they were still able to do the exercise as part of healthy living.

5.2.3 Fear as a motivator

Fear has been identified as an internal emotional reaction composed of psychological and physiological dimensions that may be stimulated when a serious and personally relevant threat is perceived (Witte, 1996). Fear has been utilised differently in the HBM studies, and it is not considered as a separate variable in the model. In some studies fear was viewed as a barrier to the performance of healthy behaviour; for example, fear associated with illness prevention in the form of a reluctance to exercise based on a fear that exercise may precipitate a stroke (Sullivan et al., 2008), a fear of

radiation associated with mammography (Champion and Skinner, 2008), fear of the consequences and a fear of disease itself (Becker and Maiman, 1975). Champion and Skinner (2008) found that fear was significantly predicted by perceived risk, benefits and self-efficacy and that the relationships between HBM constructs and fear might be useful predictors (Champion and Skinner, 2008). Additionally, they suggested that the inclusion of an emotional construct like fear might help to explain the relationships among the HBM constructs (Champion and Skinner, 2008). Also, other researchers have suggested the importance of adding fear to the HBM as a separate variable (Witte, 1996) or developing a new model that has been adapted from the HBM and other fear models (Jahanlou et al., 2013). They commented that perceived threat was utilised to design the intervention while failing to distinguish between perceived threat and fear arousal (Jahanlou et al., 2013).

Fear of stroke as a disease of death and disability was reported in this Omani study. A total of 92% (n=339) of the participants considered stroke to have a potentially serious impact on their quality of life. In addition, this was reflected when the participants were first being approached to answer the questionnaire or to sit for the interview. Hesitation and fear were observed by the researcher and recorded in the field notes. In addition, when the participants were asked about stroke, their immediate response was that they did not know about it. However, through probing and sharing the experiences of others, whether those of a member of the family, friends or neighbours, the participants began to share their thoughts and knowledge of stroke. Experiential knowledge induced fear of having a stroke. Fear was perceived by the participants as a motivator to look after their health after knowing about or experiencing a stroke with family members, friends, neighbours or members of the community.

The fear of consequences, death or disability and having to know or hear about someone who had had a stroke had a positive influence on the participants in terms of them protecting themselves from having a stroke. They considered others' experiences or suffering from a stroke as a reason to care for their health. Noncompliance with a treatment regimen was viewed as a factor in the development of a stroke based on the experience of others. The fear of having a stroke, or even of further complications, motivated the participants to follow treatment and adhere to their medication regimes

in the hope that this might reduce their risk of having a stroke as, according to their knowledge or experience, others had suffered a stroke due to noncompliance with treatment regimes. This motivated the participants to value the benefit of the preventive health behaviours as preventive strategies to reduce their risk of a stroke.

As a known disease that causes death or disability, stroke was considered under the shade of fear. This fear can be utilised to motivate individuals towards reducing their risk of stroke and has been dominant in the social marketing of public health risks (Fairchild et al., 2015). The generation of appropriate levels of worry about a major disease affecting the population for the purpose of improving public health is a strategy employing fear that has been used as an educational approach (Fairchild et al., 2015). The greater the fear the greater the degree of persuasion to motivate behavioural change (Fairchild et al., 2015). The use of fear as a possible motivator for effectively communicating national and global needs and the urgency of tackling the NCDs epidemic has been suggested (Fairchild et al., 2015).

Although the use of fear within communication messages is a popular persuasive strategy, arguments that it is counterproductive have also been raised (Witte, 1996). These have included issues such as how a short-term exposure to fear messages can only create high intentions as a result of shock advertisements which in the long term may actually turn out to have a poor influence on behavioural change (Fairchild et al., 2015). The use of the fire in brain image in the 'Act Fast' television advertisement campaign in the UK was criticised as portraying stroke only as a threat without highlighting any associated self-efficacy messages (Dombrowski et al., 2013). But if persuasion to adopt health-changing behaviours is incorporated with high self-efficacy messages, then this may influence long-term behavioural change (Fairchild et al., 2015). While a piece of communication that focuses on a threat as a style conveys the susceptibility and severity of that threat, one with a focus on self-efficacy emphasises one's ability to enact a potential response to neglect or reduce the threat (Peters et al., 2013b). Fear appeal strategies have been proven to be effective with regard to attitudes, intentions and behaviours when they are combined with high-efficacy messages (Witte and Allen, 2000, Tannenbaum et al., 2015).

A meta-analysis study concluded the effectiveness of fear appeal on influencing attitudes, intentions and behaviours with no circumstances identified whereby this strategy either backfired or led to undesired outcomes (Tannenbaum et al., 2015). However, Peters et al. (2013) argued that a high self-efficacy threatening communication would be needed to have no effect or backfire if it were to be used in place of simple messages that contain a recommendation to quit smoking or simply to call a phone number. Therefore, a pilot study can be carried out to ensure such communication is effective and to ensure that the intervention enhances responses and self-efficacy (Peters et al., 2013b). To tackle the impact of NCDs, especially diabetes and cardiovascular diseases, health care providers can benefit from utilising fear appeal strategies with high self-efficacy messages to ensure there are changes in behaviour.

5.2.4 Modifying factors

The modifying factors are used to assist in understanding individuals' choice of action (Adams et al., 2014). They are categorised into three groups; demographic factors, socio-psychological factors and structural factors (Adams et al., 2014). These factors are viewed as indirectly influencing the adoption of the health-related behaviour (Champion and Skinner, 2008). In this study, understanding the sociocultural factors and the background of individuals is important to identify the modifying factors that can influence the individuals' choices and decision-making with regard to a healthy lifestyle.

5.2.4.1 Social norms and traditions

The social norms and tradition showed strong influence on the Omani health lifestyle behaviours in this study. However, the influence of social traditions or norms was not identified clearly under the socio-psychological variable since modifying factors including social class, personality and peer and reference group pressure are listed instead (Becker, 1974). An individual can be stimulated to take appropriate health actions through various forms of social pressure (Becker and Maiman, 1975). Sullivan et al. (2004) illustrated that perceptions of the importance of health behaviour or social norms for others were found to lead to engagement in preventive behaviours (Sullivan et al., 2004). Therefore, they proposed a model for predicting participants in premature counselling programmes that particularly used the HBM constructs and introduced

social norms as a separate construct (Sullivan et al., 2004). In this study, social norms and traditions were treated as a factor that influences healthy behaviours. A female needing to be accompanied when walking on the street was considered to be a social norm that influences the ability to walk and exercise in the street. Traditionally, women and girls within Omani society have had limited freedom of movement (Al-Barwani and Albeely, 2007). However, with women now increasingly going to work, this limitation has become less strict, but social norms continue to force restrictions on women from different perspectives. As part of social effects, peer pressure was reported to affect the individual decision to quit smoking, as reported by one of the interviewed participants. Social factors like peer pressure and social groups were identified as producing beliefs or acting directly on the person as a consequence of the socialisation process or the feeling of belonging to a social group (Douglass, 1971). Globalisation has impacted on the lives of Omani people and its impacts have transformed the traditional understanding of family roles (Al-Barwani and Albeely, 2007), yet strong cultural beliefs and values remain and these influence the individual adoption of a healthy lifestyle. However, there were some factors within the traditions or social norms that could be considered as having a negative impact on behaviours. There were also other factors among the social norms that might be utilised to motivate preventive health behaviours, such as the support a person receives from their family and social surroundings. Strong social interactions influenced the individuals' health decisions; for example, social visiting provided an environment for unhealthy eating, but it also provided knowledge about the diseases and this facilitated knowledge gains through experiential learning. When visiting the sick, a person knowing about and experiencing the disease becomes more expressive and meaningful in comparison to theoretical health education about disease risk or the signs and symptoms. Within this social setting, individuals accept the advice of others, especially that of the elderly. Asking about someone's health can be considered as showing respect and care for the sick person.

5.2.4.2 Family support

While the HBM acknowledges the illness of family members or friends as a cue to action, in a society like Oman that values the role of the family strongly, this element can be extended beyond just being or giving cues to anticipate actions. Family support

is significant in terms of providing support and motivating individuals towards taking healthy decisions. The role of the family also runs deeper than just providing cues; the family provides advice, prepares food, and accompanies individuals when going for a walk and other forms of supports. In addition, having strong family support to become healthy motivated and facilitated the participants' healthy living. In this study, family support was perceived as beneficial for providing and encouraging healthy living, such as in the role of the wife in cooking and preparing healthy food, the husband or another member of the family providing company for a walk and providing other forms of support. In fact, the family dynamic was found to be involved in the dietary practice that needed to be modified when caring for those with diabetes (Macaden and Clarke, 2006). Moreover, family situation and cultural background are believed to play a role in individuals' health (Lim et al., 2009). The Omani family stands proud of its originality as a Muslim family. The Muslim family plays a role in providing a secure and healthy environment for its members and helps them to guard against passions of whims and desires and to channel these into wholesome and meaningful pursuits (Al-Barwani and Albeely, 2007). Family members are involved in medical decision-making, such as a parent playing an important role in modelling positive health behaviours related to their adolescents' health risk behaviours (Laird et al., 2007). This demonstrates that individuals considered the family interference or sharing of health decisions with regard to their own health issues because of respect or social norms like listening to the opinions of others, but it remained the individual person who decided, for example, whether or not to take their medication. However, this approach might be different from the individualism approach seen in western societies, although this does not mean that individuals cannot take individual decisions with regard to eating a healthy diet, for instance. An interesting argument about the influence of medical individualism concerns Chinese medical informed consent that requires a patient himself to sign as being incompatible with the characteristics of the Chinese familism approach (Bian, 2015). Within Chinese culture, the Chinese way of life is essentially family based and family oriented (Bian, 2015). This argument is based on the notion that the role of the family in health care decisions must be considered. In this study, the participants had strong self-efficacy to maintain their health and considered family

as a strong supporter of them to do so. Patients' families can provide a strong support to health behaviours in many different ways.

There is a plethora of evidence in the literature outlining the value of the role of family support for patients to adopt preventive healthy behaviours; for example, strong family support was found to be a predictor of adherence to a self-care regime for young diabetic people (Gillibrand and Stevenson, 2006). In this study, the participants had a strong family bond and support. Support and encouragement took different forms. In this study, providing health advice, the wife cooking healthy food, being accompanied when walking and financial support were identified as the main types of family support within the Omani community. Within the Omani family, gender role within the family was considered as complementary and not based on the division of labour (Al-Barwani and Albeely, 2007). Al-Barwani and Albeely (2007) explained that women normally do all the housework and men are responsible for all work related to the outside. However, they elaborated that tasks can be carried out by either sex; for instance, cooking is seen as women's work only as it relates to domestic use, yet when it comes to larger feasts and collective occasions, men are the cooks (Al-Barwani and Albeely, 2007). Moreover, family support was found to have better outcomes when associated with chronic disease management (Ochieng, 2015). The role of family members can be extended to facilitate the recognition of stroke signs and symptoms. As well, it can quicken the response following stroke events. In fact, family support has been found to increase adherence to self-care regimes among diabetic young people (Gillibrand and Stevenson, 2006). Therefore, family members can be prepared to accommodate any changes in the health status of patients. Educating family members has been suggested in many studies where the role of family members is significant (Uzark et al., 1988, Belln et al., 1999). Also, when patients fail to identify symptoms a family member or friend can prompt care-seeking decisions (Mc Sharry et al., 2014). In an Omani study that assessed the role of relatives' advice on the seeking of health care behaviours, the advice of family members was found to be a strong promoter for care seeking in Oman (Al-Mandhari et al., 2009).

Earlier, Becker et al. (1978) assessed the compliance of mothers' adherence to a drug regimen prescribed for their asthmatic children (Becker et al., 1978). Although their

study used the HBM, the role of the family, particularly that of the mother in managing the health of their child, was not emphasised as a social determinant that influences health. Mothers were perceived to have overall control of the health of their children. If the HBM considers the influence of socialisation processes like group or peer pressure on individual healthy decisions, then the role of family also needs to be strongly addressed under social-psychological variables as a modifying factor that influences individuals' decisions to act.

5.2.5 Knowledge about disease and treatment (structural variables)

In the HBM, knowledge is identified as a modifying factor. Knowledge is conceptualised as one of several factors that can influence beliefs or upon which beliefs and attitudes about health may be based (Sullivan and Katajamaki, 2009). Having knowledge of stroke does not always change people's behaviours, nor do they always take appropriate action when stroke happens (Sullivan and Katajamaki, 2009). Broadly, beliefs are better predictors of intention to improve health than knowledge (Sullivan and Katajamaki, 2009). Therefore, it is important to consider the influence of knowledge and beliefs on changing behaviours.

The HBM assumes that an individual can develop perceptions of the seriousness of a disease based on medical information or knowledge besides estimating the effects and difficulties of the disease in his or her life (Hayden, 2009). Identifying the risk of having a stroke based on the history of a medical condition like hypertension, diabetes or heart disease was apparent. Their perceived susceptibility to a stroke is raised when participants are aware that their medical condition is a risk factor for stroke. A previous study found that patients at high risk of a stroke and heart attack had a poorer knowledge of the symptoms and risk factors of stroke (Lambert et al., 2013, Sundseth et al., 2014, Travis et al., 2003). However, other studies have reported that individuals at higher risk of stroke were more likely to correctly identify stroke risk factors than individuals with a lower risk (Lambert et al., 2013).

In this study, the participants were able to recognise the major commonly known risk factors for stroke, along with its signs and symptoms. Mean scores of 7.37 out of 10 for stroke signs and symptoms and 6.96 out of 10 for stroke risk factors revealed a

high level of knowledge among the study participants. In the Ennen and Beamon (2012) study that assessed stroke knowledge among women, they considered their participants' ability to identify seven or more out of 10 for both stroke risk factors and signs and symptoms as having high recognition of stroke knowledge (Ennen and Beamon, 2012). The overall mean score of stroke knowledge was 14.35 out of 20 in this study. This indicated a high level of stroke knowledge, which was surprising as this study had predicted a lack of knowledge of stroke. This knowledge was assumed to be acquired through the experience of having a family or friends with a history of stroke. This emerged from the qualitative results, supported by the quantitative results, whereby 69.4% of the participants reported that nobody had explained their risk of stroke to them. This was similar to the finding from a previous Omani study by Al Shafae (2006) that the main sources of stroke knowledge were life experience and personal acquaintances, as community, relatives and friends were the common sources of knowledge (Al Shafae et al., 2006). Moreover, the social tidiness and sharing of talks had facilitated the increase of knowledge about this disease. Stroke was known to the Omani participants as a disease of death and disability, with 68.9% (n=341) reporting that it can lead to death. This fear of the disease was assumed to generate an awareness and search for knowledge about stroke. In addition, visiting the sick and experiential learning in the social setting influenced the knowledge level of the participants. A further assumption may be that following a social visit, a person can read about the disease from the Internet or discuss it with their own doctor since the quantitative questionnaire result showed that the health team is the main source of general health knowledge.

5.2.5.1 The role of experiential learning in building cognitive knowledge and changing attitudes

It was surprising to report a high level of knowledge about stroke among the study participants, especially when considering the absence of any structural health education programme about stroke and its risk factors in the clinical setting where the data were collected. Broadly anticipating that other factors might have impacted the participants' learning, this study found support for the idea that experiential learning had an influence in the building of cognitive knowledge about stroke. Besides, it raised individuals' attitudes and insights about adopting preventive health behaviours. In a

quasi-experimental study to compare the effect of experiential learning on attitude and willingness to engage in insulin therapy in patients with type 2 diabetes, the study found that intervention based on experiential learning theory resulted in more improvement in this aspect for the intervention group than for the control group (Zhang et al., 2016).

In this study, the participants' knowledge about stroke and its causes, signs and symptoms was basically gained through family or friends' experience with stroke. Being part of a strong social bond society, knowledge was developed through living, sharing experiences and information about stroke. This took place within the context of a culture where visiting the sick is important to provide social support for relatives, friends and even nearby community members. Visiting the sick person is encouraged not only by the Omani culture but also by religion. In this atmosphere, people tend to share knowledge and ask about health and illness issues. Asking about someone's illness is considered as showing care and interest in their health. This is compatible with another Omani study that reported the major source of stroke knowledge to be through life experience and personal acquaintances (Al Shafae et al., 2006).

Patients' experiential learning considers that learning is acquired through life experience. Knowledge by acquaintance is considered as a type of experiential knowledge (Caron-Flinterman et al., 2005). Learning by experience can either be by personal experience of health and illness or through the experiences of others such as family members, friends, neighbours or members of the community. It seems that the concepts of experiential knowledge or learning share similar standpoints to the HBM cues to actions as personal learning can be influenced by internal or external cues. Cues to action include many examples of factors that might influence personal experience, like events, people or things that influence a person to change his or her behaviours (Hayden, 2009). Examples of cues to action include but are not exclusive to the illness of a family member, media reports, mass media campaigns, advice from others, including from a physician (Hayden, 2009), and medical symptoms (Champion and Skinner, 2008). The illness of a family member with stroke is considered in the HBM to be a cue to action for family members or friends to motivate them towards the adoption of preventive health behaviours. A good example of this is the way in

which high levels of cancer-related threat or anxiety among women are related to a family history of breast cancer (Norman and Brain, 2005). The HBM suggests that cues to action strongly influence healthy decision-making.

In this study, internal and external cues were identified. Internal cues such as physical illness and external cues like family and friends' experiences of stroke were reported. The living experience had an impact on the individuals' health knowledge, beliefs and attitudes. Stroke as a sudden disease that affects the whole family and friends is a traumatic experience that can inspire individuals and others in their surroundings to consider health promotion plans and decisions. Although experiential learning in Omani society can be extended to friends, neighbours and other members of the community, the cue of having a family member with a history of stroke influenced the participants' perceived susceptibility to a stroke. Parental stroke may serve as a clinically useful risk marker of an individual's propensity for stroke (Seshadri et al., 2010, Chung et al., 2016). Cues from the experiences of family and friends were identified by this study's participants as a way of learning and knowledge building about stroke risk and its associated preventive health behaviours.

The social and religious influence of visiting the sick has an influence on raising health knowledge about stroke. People tend to ask about neighbours and friends within an environment that is characterised by a natural sharing of information, such as when people meet at social gatherings in the nearby small informal *majlas* (a hall to gather) of a sheikh or a formal community leader. In this atmosphere, there is a hearing and knowing about people's health, discussion of how and why it happens and the social sharing of knowledge. The accuracy of this information is a matter of concern. Therefore, the development of health awareness programmes should adopt both the individual and public approaches to fulfilling their purposes. The public approach will ensure that the public receive the appropriate health messages. Thereafter, the sharing of knowledge to the larger population will be ensured.

Experiential knowledge and the social sharing of knowledge fit better with social networking or social media ideas. Patients, their family members and all community members are able to assess these sources of knowledge. The Ministry of Health in

Oman can provide further supervision to ensure confidentiality and the validity of this circulated information.

5.2.5.2 Lack of awareness about emergency responses following stroke events.

The HBM has been criticised as it focuses on individual factors in terms of health interventions rather than also considering environmental factors (Roden, 2004). Janz and Becker (1984) argued that other forces not related to health can influence individuals' health actions, such as economic and environmental factors, and that these can prevent individuals from undertaking a preferred course of action (Janz and Becker, 1984). The model neglects the fact that environmental conditions can facilitate the desired course of action (Mechanic, 1976). The structural variables within the HBM were considered as mediating factors that indirectly influence behaviours (Cockburn et al., 1987). Structural variables were illustrated by Becker et al. (1977) as perceptions of the regimen in terms of safety, complexity, cost, accessibility, duration and difficulty (Becker et al., 1977). It seems that structural variables are assumed to take into account disease treatment and its availability.

Stroke can be successfully treated when patients receive treatment within 4.5 hours of the onset of symptoms (Lambert et al., 2013). In addition, for individuals who experience an acute cardiovascular event, treatment is available but is highly dependent on time, which also requires rapid recognition and action. Previous research has suggested that patients' lack of awareness of the symptoms associated with these events is the reason for the majority of time delays between symptom onset and the initiation of treatment (Lambert et al., 2013). Going directly to hospital was the top-priority action following suspected stroke events, with 90.3% of the questionnaire's participants reporting their reaction following a suspected stroke event as going to hospital. However, this result does indicate the presence of some delay in responding to stroke events. This delay in response can be assumed to be related to the lack of knowledge regarding anti-thrombolytic therapy within 4.5 hours of a stroke event among this study's participants. Due to the study's limitations, however, knowledge about anti-thrombolytic therapy was not assessed in this study, and future research on this topic is suggested. One of the interviewed participants reported the presence of expertise and equipment to help patients as the reason to go directly to hospital.

However, the participants acknowledged a delay in the response of going directly to hospital as being due to the availability of a family member to take them. This might affect the time between the onset of a stroke event and the initiation of treatment. Therefore, accessibility or delay in receiving treatment can be considered as a structural variable in this study. It is expected that the participants were unable to recognise the importance of emergency responses following a stroke due to there being a lack of knowledge about stroke treatment communicated to the public. In actual fact, however, an infrastructure limitation in relation to the lack of ambulance services for medical emergencies in Oman is the major contributor to the delay in responses. The availability of environmental resources to initiate and motivate individuals to take actions is considered as a strong critique of the HBM (Mechanic, 1976). This is an understandable criticism of the model, but the importance of developing the ambulance service is a critical issue for health care providers.

Health care providers are required to increase public awareness about emergency response following a stroke. An urgent action for a health care provider is reducing the time taken to receive treatment following a stroke. As such, it is important for the close family members of 'at-risk' patients to be prepared physically and psychologically for a stroke event. Along with the patients, family members can plan who and how to be available or to be reachable following the occurrence of a stroke event. A plan of response following a suspected stroke event should be made and circulated among close family members and also to the patient. Also, psychological preparation can ensure that patients and family members are aware of the potential signs and symptoms, the urgent need to get treatment within a restricted time and the fact that rehabilitation can reduce any subsequent disability depending on the type of stroke. In a study assessing patients' recognition of transient ischaemic attack, the role of family and friends was one of the driving forces in care-seeking decisions (Mc Sharry et al., 2014). To this end, the health care provider should educate the family members of patients who are at risk of a stroke about the disease, treatment and emergency status following a stroke event.

5.2.6 Self-efficacy

If an individual does not believe in his or her own ability, then that individual will not likely pursue an appropriate course of action (Adams et al., 2014). Self-efficacy was added later to the original HBM variables. Rosenstock et al. illustrated that for a behavioural change to succeed, an individual must have an incentive to take action by feeling the threat of their current behaviour and believe that such an action can be beneficial (Rosenstock et al., 1988). A person with self-efficacy can value the outcome of their behaviours at acceptable cost and feel that he or she is competent to perform the required change (Rosenstock et al., 1988). The concept of self-efficacy is drawn from Bandura's Social Learning Theory. Patients with a chronic illness and lifelong modifications are required to have a good level of confidence to feel competent to implement lifelong changes to their lifestyles (Rosenstock et al., 1988). Self-efficacy has predicted a range of health behaviours, including oral self-care (Buglar et al., 2010a), breast self-examination (Champion, 1984) and self-efficacy to perform exercise by women with osteoporosis (Hayden, 2009).

In this study, the participants articulated their desire to make changes to their lifestyle to reduce their risk of stroke. The participants viewed the decision to follow preventive health behaviours as a personal decision. Self-efficacy directed individuals to practise walking in a country with hot weather at most times of the year. A strong desire to practise a healthy lifestyle was noted, as 88% of the study participants reported their intention to walk, and they adopted appropriate times to walk, as in before sunrise or after sunset, as a way of working with the hot climate in Oman. This high self-efficacy supports the suggestion that health interventions designed to promote healthy behaviour changes among those at risk of stroke should concentrate on maximising self-efficacy and the perceived benefits of exercise, for example (Sullivan et al., 2008). Norman and Conner (2005) commented that individuals with high self-efficacy recognise their ability to overcome the obstacles and focus on the opportunities rather than the constraints (Norman and Brain, 2005).

The relatedness between self-efficacy and God's control over health can be presented as a continuum. At one end of the continuum are individuals with a high internal locus of control, the middle contains individuals who view themselves as a collaborative

partner, while the other end has individuals who rely completely on God's control, as indicated in the below figure. Previous studies have argued that individuals' self-confidence with regard to health control was influenced by the extent to which individuals view where they stand on the continuum (Karvinen and Carr, 2014, Kinney et al., 2002). Individuals with high God's control over health were found to be less likely to believe that poor health behaviours could contribute to increasing their risk of chronic disease (Karvinen and Carr, 2014). Karvinen and Carr (2014) reported that participants who indicated a high internal locus of control were more likely to believe that poor health behaviours could contribute to an increased risk of chronic diseases (Karvinen and Carr, 2014).

From the Muslim perspective, Islamic law (sharia) does not prevent personal choice (Gambling and Karim, 1986). It is an individual's choice as to whether or not they practise a healthy lifestyle, although Islam as a religion values human health and motivates individuals to be healthy. Although there are specific rules related to health issues such as a prohibition on the drinking of alcohol, these are an assertion towards motivating individuals to pursue healthy life choices and many other examples. In previous studies, health and illness were interpreted from the Islamic perspective as being directly, at least in part, by God's will (Padela and Curlin, 2013). Individuals were found to play a secondary but complementary role in their health (Padela and Curlin, 2013). Although this may be the participants' understanding of the relationship between health and illness, it should be supported by religious sources to be concluded. It can be assumed that most Muslims, and in particular the participants in this study, will fall within the realm of collaborative control in terms of health promotion and disease prevention (see *Figure 5:2*). In this study, the individuals who were motivated to value or recognise the benefit of preventive health behaviours were considered to adopt collaborative control. This means that a person carries out those actions that should lead them to be healthy and leaves the future and further health development to Allah. However, the less motivated individuals believe that health is controlled by Allah. This is assumed to be because they are reluctant to change or have low self-efficacy.

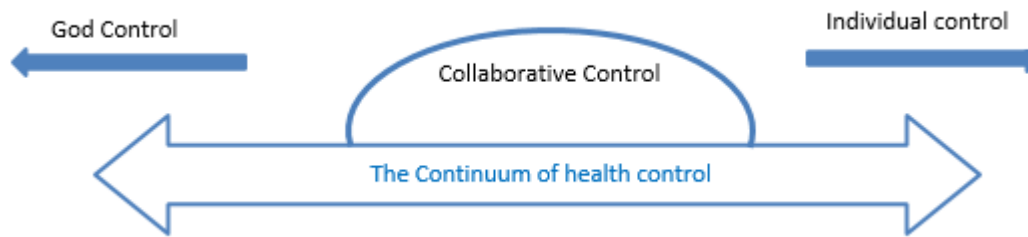


Figure 5:2 The Continuum of Health Control

5.3 The influence of religious beliefs on individual perceptions of disease risk

The influence of religious beliefs on health has been proven with regard to many health care issues. However, rarely have studies considered religion as a variable in HBM studies, and the influence of religion has not been sufficiently explored by the HBM.

In this section, the influence of religious beliefs on health as a major finding from this study will be discussed. Then, the way in which religion has been considered by HBM studies will be explored. Finally, the importance of considering an extension to the HBM will be discussed.

5.3.1 Religion and health connectivity

The impact of religion on health care is well established. Religious beliefs can influence individuals' attitudes and behaviours in relation to health care. It is worth considering this relation as an increasing number of individuals are actively participating in their religion (Creel, 2007). Observations of the influences of religion and health on an individual's actions can increase the ways in which to comfort the sick and teach the well about health care (Kirn, 1991). The literature confirms that the more religious a person, the less likely they are to use drugs or cigarettes (Hye-Cheon and Harold, 2007). The role of religion was found to have a positive role in life satisfaction, emotional coping and support (Ochieng, 2015). The influence of religion on preventive health behaviours has been explored in relation to many health care issues; for example, the influence of religion on AIDS prevention in Africa (Trinitapoli, 2012) and on mental health (Hess et al., 2014). An old American study assessed the nature of women's (including Catholic and Jewish women) beliefs about breast cancer and self-examinations, concluding that beliefs alone cannot lead to behaviour and that

other factors such as embarrassment or religious upbringing influenced individuals' health beliefs and practice (Stillman, 1977). A further study conducted in the US examined the relationship between religious involvement, religious beliefs and mammography usage. It found religious attendance to be significantly associated with mammogram use (Benjamins et al., 2006). Thus, the potential for religious beliefs to influence different health practices, with either positive or negative effects, should be considered. A recent study concluded the evidence and association between the God Locus of Health Control (GLHC) and certain health behaviours and beliefs, in addition to being in partial support of other behaviours (Karvinen and Carr, 2014).

Religion plays a major role in every aspect of Muslims' lives (Al-Yousefi, 2012). Not surprisingly, in a Muslim country like Oman, this study reported evidence of connectivity between health and religion. Muslim health beliefs are influenced by three sources of religious health guidance: The Quran (the Muslim Holy Book), The Hadiths and Sunnah (the actions and sayings of the Prophet Mohammed, SAW) and Ijtihad (law of deductive logic) (Walton, 2014). These are considered to be essential knowledge that may provide guidance with regard to general health care beliefs in order to understand the factors influencing Muslims' health beliefs (Walton, 2014). Certain health beliefs that target 'risky behaviours' have been identified within the religious beliefs of Muslims living in the US (Walton, 2014). Walton (2014) discussed many examples of the types of behaviours that affect health, including drinking alcohol and the intake of harmful drugs, suggesting that Islamic law has an indirect influence on behaviours like the use of tobacco and drugs in Muslim communities. Additionally, other Islamic rules that influence Muslims' health beliefs are also discussed in the literature (Walton, 2014, Al-Yousefi, 2012). Surprisingly, most of the studies that have explored the role of religion on health and its influences were conducted among populations that are predominantly non-Muslim (Al-Yousefi, 2012). Moreover, the patients' religious beliefs were not discussed by their health care providers. A study conducted in Saudi Arabia with the aim of assessing Muslim physicians' beliefs regarding discussing their patients' religious beliefs in clinical practice revealed that religious issues were not discussed by physicians, despite the majority of the study participants considering that the influence of religion on health was generally positive (Al-Yousefi, 2012). This can be assumed to be as a result of the western approach to

medicine and the recruitment of physicians from different backgrounds to compensate for the shortfall in their number.

In this study, although the participants ‘thank Allah’ for their health, health was found to be considered a gift from Allah and a person is held responsible for caring for their health in reward. Responsibilities towards one’s own health were identified. The belief that ‘Health in Allah’s hand’ can be viewed as positively encouraging individuals to maintain their gifted health and as an indication of the responsibility that they carry in this regard. In a previous study, thoughts about the influence of religion were positive as the participants developed a positive state of mind (Al-Yousefi, 2012). It was clear from the data that risk perception mainly regarding susceptibility was influenced by the religious belief of ‘health in Allah’s Hands’. Kirn (1991) suggested that religion could influence individuals’ perceptions in relation to their susceptibility to and the seriousness of a disease (Kirn, 1991). On the other hand, individuals might misunderstand or unintentionally use ‘health in Allah’s hand’ to avoid discussing or thinking about their susceptibility to illness or disease. A significant correlation between avoidance of religious discussions and the belief that a patient is using religion as an excuse or reason to avoid taking responsibility for his/her own health has been noted (Al-Yousefi, 2012). Moreover, some of the participants considered that the use of hope and prayer might keep them from having a stroke in line with the importance of caring for their health. The power of prayer in healing diseases has been recognised in the previous literature (Ochieng, 2015). Yet, despite this, religious beliefs have also been found to hinder early diagnosis and individuals’ compliance with diabetes treatment (Ochieng, 2015). For some of the participants, discussing future expectations and their susceptibility to a stroke was regarded as being in contradiction to the religious belief that the future is known only by Allah. However, future planning and the maintenance of health are encouraged in the Islamic faith. Religious and health care leaders need to discuss the influence of the concepts of the issues of risk perception and religious beliefs with regard to future expectations on individuals’ overall health.

This imposes the need to address religious beliefs and their influence on patients’ health beliefs in both Islamic countries and in countries where Muslims make up a

considerable portion of the population. Medical institutions are obligated to improve the capacity of medical personnel to appropriately address religious issues. In this regard, Al-Yousefi (2012) suggested the training of clinical religious advisors as a promising solution (Al-Yousefi, 2012). In fact, a consideration of religion on individuals' health beliefs remains widely separated from health care in many countries. This may be because some of the physicians who practise medicine in Oman, for example, were recruited from different backgrounds and religions. There is a need for greater attention to religious needs and beliefs to increase the level of religious involvement in medical care (Al-Yousefi, 2012). This may also have been influenced by the study of western medicine, whereby religion is considered more as providing spiritual support than as a way of life.

In contrast, Muslims consider Islam more as a way of life than merely a religion; it affects their perceptions and beliefs. Islam is among the fastest-growing religions in the world and the Muslim population in the UK has grown over the last decade. The 2011 census reported that Muslims made up 4.8% of the population in England and Wales, reaching a total of 2.71 million (Sundas, 2015). There were 77,000 Muslims in Scotland and 3,800 Muslims in Northern Ireland (Sundas, 2015). In the US, statistics show there are 10 million Muslims, including African Americans and immigrants (Rarick et al., 2012). These Muslims are of different ethnicities and from different backgrounds. Thus, health improvement should be planned based on individuals' beliefs regarding health and the factors that influence their personal beliefs. The literature reveals that religious beliefs influence the health of religious individuals from a different faith. Religion is an influential force in today's society (Hye-Cheon and Harold, 2007). The Cambridge Handbook of Psychology, Health and Medicine (2007) reports evidence of a relationship between less heart disease and lower cardiovascular mortality among the more religiously involved participants (Hye-Cheon and Harold, 2007). Health care professionals need to address the influence of religious beliefs on health care behaviours when interacting with individuals of faith. Today, with increased numbers of people practising their religion in the world, the HBM needs to be effective in terms of its ability to assess the influence of religion on health behaviours. It is important to consider the influence of religion as a variable that

influences personal health beliefs and behaviours. Therefore, the HBM needs to consider religious beliefs as a variable that influences individual health beliefs.

5.3.2 The HBM and Religious beliefs

There is currently a shift underway in lifestyle-related health problems, from the treatment (health care-centric) to the prevention and promotion (patient-centric) of healthy behaviour around the world (Orji et al., 2012). Thus, it is important to consider the understanding of individual beliefs as a whole, and the HBM aims to identify the factors that influence individuals' choices in health care decisions, particularly with regard to the preventive approach. The model should consider different perspectives on individual beliefs. In the HBM, a modifying factor describes the characteristics and experiences of individuals that have an impact on their health care choices; for example, pertinent demographic data, socio-psychologic variables and others. There are also specific factors such as age, education, family health experiences and contact with a disease and its influence on individuals' health care choices. Religious beliefs and activities have also been included as modifying factors (Kirn, 1991) or as a demographic variable in the HBM (Sullivan et al., 2004, G/Selassie et al., 2013). Moreover, religion has been viewed as a cultural factor by some researchers (Lim et al., 2009, Ochieng, 2015).

Another viewpoint is that the Champion's Health Belief Model scale has been translated and found to be applicable in three countries: Turkey, Iran and Malaysia (Yilmaz and Sayin, 2014, Parsa et al., 2008, Taymoori and Berry, 2009). Although these countries have high Muslim populations, religious beliefs were not discussed. In the Iranian study, religion was mentioned for the reason of switching the terms 'boyfriend' or 'partner' to husband. The Malaysian study included religion within its demographic data. In fact, mammography is a procedure that involves the exposing of a private part of the body; in this regard, religious beliefs might have had an influence on a woman's acceptance of the test being performed. In real practice, females might refuse or feel hesitant to participate in the test in the presence of male technicians with the consideration that health education about the significance of mammography might have reduced this attitude. In this instrument Champion considered religion as demographic data, thereby dismissing the influence of religious beliefs on individuals'

health beliefs. On the other hand, in a study conducted in a non-Muslim society, African American women were found to be at high risk of breast cancer due to a lack of adherence to clinical breast examination and mammography recommendations (Kinney et al., 2002). Kinney (2002) highlighted that a high level of belief in God as the source of control over one's health was negatively associated with breast cancer screening behaviours (Kinney et al., 2002).

Muslims' general preventive health behaviours are affected by their religious beliefs. A higher proportion of Muslims compared to people of other religions are inclined to adopt preventive health behaviours to avoid falling sick (Quah, 1985). Quah, in 1985, studied the role of the HBM on preventive health behaviours in contexts different to the western community, particularly in Singapore, with three different ethnic groups. He found that the original HBM needed to be extended by including ethnicity, gender and religious affiliation in order for it to be fit for use among the Singaporean community (Quah, 1985). Specifically assessing the Malay group, he found that none of the HBM constructs were significantly related to abstaining from alcoholic drinks. He elaborated that religious and health beliefs are closely related among the Malays (Quah, 1985). Religion was found to have an important influence on the Malay pattern of preventive health behaviours (Quah, 1985). The HBM was then later developed and extended by many researchers to include ethnicity, age and gender.

The essential influence of religion on the health beliefs of Muslims and other religious individuals needs to be considered as a separate categorical variable of modifying factors and not as a subcategory under sociocultural variables or as demographic data. It has been suggested that the HBM be extended to consider the influence of religion on individual behaviours related to the issue of health (Quah, 1985).

5.4 Extending the HBM

The original HBM has been extended from the time it was first developed in the 1950s. Although many studies have concluded that the HBM variables provide a satisfactory explanation for the majority of the findings in the area of preventive health behaviour, the model has been extended to reflect different health issues and individual needs over the past decades. For example, in 1988 Rosenstock et al. (1988) included self-efficacy in the model, with many later studies confirming self-efficacy to be a useful predictor

(Abraham and Sheeran, 2007). Rosenstock et al. (1988) valued the importance of including the HBM components as part of any comprehensive effort to understand and influence behaviours for preventive actions (Rosenstock et al., 1988). A behaviour is anticipated to extend from an individual's expectation of the value of the outcomes of that given action (Becker and Maiman, 1975). Many health care interventions or programmes are planned based on individual preventive behaviours that are assumed to be influenced by individual perceptions and beliefs. Considering these perceptions and beliefs, we must study all of the variables that might influence the adoption of preventive actions, including religion.

5.4.1 Religious beliefs as part of health beliefs

A belief is about accepting that something is true and behaving in line with this acceptance. Personal beliefs are shaped by knowledge (that are taught by parents, peers, academics or others), personal life experience, social norms and faith. The HBM is divided into three categories: individual perceptions, the likelihood of action and modifying factors (Kim, 1991), with individual religious beliefs forming part of individual perceptions. Religion is viewed as an important part of the understanding of life events, decision-making and maintaining emotional equilibrium (Kim, 1991). It influences health decisions and religious beliefs can influence attitudes and behaviours concerning health care (Kim, 1991).

Holistic care addresses the physical, psychological, social and spiritual dimensions of the patient (Rashidi and Rajaram, 2001). The concept of health in the West is slowly evolving from disease-free biological functioning into a broader and more holistic approach (Owens and Sami, 2015). To deliver a holistic care approach to Muslims or individuals who acknowledge their religious faith, it is important to take into account the religious beliefs and practices that integrate the spiritual, emotional and physical aspects of the self (Rashidi and Rajaram, 2001).

The issue of religion and its connection to health is not new in the field of health care. There is much evidence within the literature of the influence of religion on many areas of health care, including mental health and AIDS (Hye-Cheon and Harold, 2007). Recent research has encouraged the exploration of the health–religion connection (Hye-Cheon and Harold, 2007). Across religions, the concept of self-efficacy or the

confidence of having control over one's own health may vary, but the influence of religiosity on health outcomes is evidential. Earlier, in 1983, a study in the US found that complete reliance on God with respect to health might lead to decreased screening and treatment-seeking behaviours (Davidhizar, 1983). Regardless of any negative or positive outcomes of religious beliefs on health, the influence of God's perceived control over health has been found to exist across religions, with variations based on religious perspective. In addition, similarities between different religions in the belief that a cure for illness comes from God is not surprising since Islam shares similar foundational values with Judeo-Christianity (Ypinazar and Margolis, 2006). However, others might use the belief that God controls health to justify a reluctance to make efforts to improve their health status. Therefore, the influence of religious beliefs on health might vary based on individuals' beliefs or understanding of this issue.

A sample of American adult religious service attendance showed religious attendance to be related to lower rates of death from cardiovascular diseases, while another study reported a positive relationship between religious attendance and lower stroke incidence (Hye-Cheon and Harold, 2007). Although the impact of religion on health was found to influence the adoption of preventive health behaviours, the preventive health psychology theories have failed to incorporate a thorough consideration of this influence. Many of the Western studies undertaken to examine the connection between health and religion compared attendance at religious services and health outcomes, but this is insufficient to understand the influence of religious beliefs on the making of health decisions. This limits the understanding of the role of religion in shaping the health behaviours of individuals from a Muslim or minority community and how it can lead to health disparities (Padela and Curlin, 2013). Other Islamic studies, meanwhile, have focused on educating health professionals in the beliefs of Muslims (Rashidi and Rajaram, 2001). In addition, the theories and conceptual frameworks that were used to understand religious beliefs identified the religious beliefs of these individuals but did not address the ways in which these beliefs have a positive or negative influence. In fact, many of the HBM studies undertaken have focused on the predictability of the variables more than on giving and illustrating a conceptual understanding of their results.

5.4.2 Connecting religious beliefs within the HBM

5.4.2.1 Critique of the HBM

The HBM has been extended since it was first developed; for example, self-efficacy and motivation were added later. Despite this, plus the fact that the HBM is commonly used in health social research (Jones et al., 2014a), many criticisms have been made of the model. One of the major critiques of the HBM is the lack of operational functioning of its constructs. An operational definition explains the links between the constructs to develop a concrete meaning (Davidhizar, 1983). In a recent review study on the effectiveness of HBM-based intervention programmes in improving adherence, a lack of consistency was found among the HBM studies looked at, with the different HBM studies selecting different instruments, definitions of the constructs, the condition of items for taking preventive action and the operational functioning of the model (Jones et al., 2014a). This might limit the comparisons between different HBM studies and further work is needed to refine the operational definitions of the model's constructs (Davidhizar, 1983). Due to the model's limitations, many researchers intend to either add a scale to support their understanding or to develop, refine and extend the HBM (Roden, 2004, Gillibrand and Stevenson, 2006). The extended HBM (EHBM) (Roden, 2004), sociocultural HBM (SHBM) (Sayegh and Knight, 2013), cultural HBM (Lim et al., 2009) and many other modifications have already been made to the original HBM.

This might be a strength, however, as the flexibility within the model serves as an open door for researchers to explore and develop a greater understanding of the model. In addition, the use of the model from the 1950s to now might be because it continues to stimulate researchers' interest in understanding and explaining preventive health behaviours. It provides flexibility to understand the relationships and the causal pathways of the model. As human life and experiences continue to change and develop, having a flexible model may guide a better understanding of the different factors that influence human behaviours over time and make researchers open their minds to explorations. In fact, researchers from a variety of disciplines continue to use the model to expand knowledge about preventive health behaviours (Rawlett, 2011). Moreover, the HBM retains the same original core concepts today to provide researchers and clinicians with a means for systematic evaluation, although the

subjective nature of the measurements are a noted weakness of the theory (Rawlett, 2011). Therefore, further understanding is needed to shape how the constructs within the model work. In addition, the model has been criticised for focusing on individuals' approaches to health improvement and for failing to consider the wider structural environmental factors that can demotivate their desire for health actions (Roden, 2004, Janz and Becker, 1984, Mechanic, 1976). Despite criticisms and limitations, however, the HBM continues to be one of the commonly used models in health social sciences.

5.4.2.2 Integrating religious beliefs to the HBM

The sense of personal control over health has been shown to have a positive outcome in individuals with physical illness. Individuals practising religious activities have also shown positive health improvement. It has been suggested that social cognitive theories like the HBM and other models of health behaviour need to change in order to explore the association between and to understand why God's control may be associated with health behaviours (Karvinen and Carr, 2014). A thorough understanding of the influence of individuals' perceptions of 'God's control' on their health behaviour is critical (Karvinen and Carr, 2014). Adding the Multidimensional Health Locus of Control (MHLC), Wallston et al. (1999) developed the God Locus of Health Control (GLHC) to assess the extent of the belief that God exerts control over one's current disease state (Wallston et al., 1999). Wallston et al. (1999) suggested the importance of assessing beliefs about God's control over health when seeking to understand the adoption of health-related behaviours by individuals with chronic illness (Wallston et al., 1999). However, a tool that consisted of six questions was used as the GLHC reflected the opinions of individuals with either high God's control or with not. However, the view of life as a gift from God and the individuals' responsibility regarding it was not considered. Moreover, the individuals' perceptions of health prevention were not discussed. The tool basically assessed the depth of individuals' belief that God was in control of their health, but not how these beliefs influenced the health perceptions and health beliefs leading either to a change in behaviour or a reluctance to change.

The findings of this study show that religious beliefs influence individuals' perceptions of susceptibility to a stroke in the future. In particular, 'health in Allah's hand' as a qualitative finding of this study reveals the connectivity between religious beliefs and

individuals' health beliefs. While the individuals' risk perceptions of having a stroke in the future were influenced by their perceptions of God's control over health, their health promotion behaviours were driven by their sense of responsibility towards health. Yet religious beliefs are not a construct or variable that influences preventive health behaviours or individual decisions about health within the HBM. In a study conducted among Latina and Asian American breast cancer survivors, the researcher employed the cultural HBM to understand the influence of health behaviours among this group. To do so, the researcher used a combination of the HBM and the contextual model of Health-Related Quality of Life (HRQOL) as a framework to examine the sociocultural factors, and this was done due to the limitations of the HBM in these areas (Lim et al., 2009). One of the study's findings was the power of others, mainly of God's will, that emerged from the data. The researcher suggested a better understanding of health beliefs and assessing the applicability of the HBM integrated with cultural factors for other ethnic minority populations (Lim et al., 2009). Although there is a distinction between culture and religious beliefs, the researcher was able to identify that God's will influenced health using a combination of the two frameworks, but religious beliefs were not explicitly added to the original constructs of the HBM. The basic idea of the HBM is that value and expectancy beliefs guide behaviour (Champion and Skinner, 2008). Champion and Skinner (2008) elaborated that people will engage in a health behaviour if they consider that doing so may reduce a threat that he/she is facing which may have serious consequences if it were to transpire (Champion and Skinner, 2008). The finding of this and other studies that a feeling of threat is impacted by the religious beliefs of God's will, with this also being reflected in different religions, serves to indicate that the HBM is missing a major factor that influences personal decisions about health. Moreover, religion can be conceptualised within social cognitive models of health behaviour because religious beliefs and practices often influence cost-benefit analyses, value perception, perceived behavioural control and social influence (Creel, 2007). Religious beliefs thus play a role in influencing individuals' perceptions of health.

Although the HBM by Becker and Maiman acknowledges the illness of family members or friends as a cue to action (Becker and Maiman, 1975), the influence of social traditions or norms was not identified clearly under the socio-psychological

variable as a modifying factor; instead, social class, personality, peer and reference group pressure are listed. However, Sullivan et al. (2004) illustrated that perceptions of the importance of others towards health behaviour and social norms led to engagement in preventive health behaviours (Sullivan et al., 2004). They proposed a model for predicting engagement in premature counselling programmes that particularly used the HBM constructs and introduced social norms as separate constructs (Sullivan et al., 2004). Considering the Omani context, this study suggests adding social norms and traditions as a modifying factor to be considered as an external variable. Although these variables can influence health behaviours as external variables in the HBM, religious beliefs are personal and internal factors by nature and are fundamental to health behaviours. The association between religiosity and health behaviours is feasible when health behaviours are perceived as a valuable component of personal religious beliefs (Creel, 2007). Therefore, this study suggests refining the HBM by including religious beliefs under the individual perception. This refinement can be used to aid understanding of the role played by personal religious beliefs on influencing individuals' perceptions of their personal susceptibility to and the seriousness of disease, since the basis of the HBM is that an individual needs to value their susceptibility to and the seriousness of their risk of developing disease. Understanding the risk perceptions of disease directly influences individuals' beliefs that God's will affects their future health.

5.5 Summary

Individuals' knowledge and perceptions of a certain disease can influence their decision-making and the actions they take to practise a healthy lifestyle. The study's participants recognised knowledge about the major risk factors, signs and symptoms. Stroke was viewed by the participants as a cause of death and disability. In fact, the fear of a stroke as a disease that can lead to disability and death motivated the participants to practise preventive health behaviours. Fear as a factor motivating an individual to seek preventive health behaviours was noticed in the qualitative data. The role of the family was also found to have a part to play in supporting and encouraging a healthy lifestyle. The role of the family in Omani society also extends to providing and facilitating healthy preventive behaviours. Developing knowledge and sharing the learning experience with others, whether this is family members, friends or neighbours,

was identified as the main source of knowledge about stroke. With strong beliefs in God's control over health, the participants demonstrated a strong self-efficacy to practise healthy living as they identified their future intentions to practise preventive health behaviours.

Although all of these findings confirm the HBM variables, the influence of religious beliefs on individuals' susceptibility to a stroke in the future adds a new understanding of the influence of religious beliefs on individuals' health beliefs, especially with regard to risk perceptions within the Omani context. Individuals' risk perceptions of their susceptibility to a stroke in the future were linked to Muslims' religious beliefs that the future and health are in God's control. Therefore, it is essential for the HBM to include both religious beliefs, due to their influential role in affecting individuals' personal risk perceptions, and the role of the family as modifying factors rather than as cues to action.

Chapter 6 Implications for Theory, Practice and Research

6.1 Introduction

This chapter outlines the study's implications for theory and its wider contribution to knowledge. In addition, suggestions and implications for practice are discussed. Furthermore, a number of future research recommendations are proposed. Finally, the study limitations are disclosed.

6.2 Implications for Theory

Further to the discussion about the significance of extending the Health Belief Model (HBM) in the previous chapter, there are implications for theory suggested by this study. Many previous studies have demonstrated the influence of religious beliefs on individuals' health beliefs, but less has been done in terms of integrating these beliefs within the HBM in particular. Researchers have used different tools or incorporated the HBM with other models to clarify the influence and connectivity between religion and health. However, this study has revealed that individuals' religious beliefs directly influence their perceptions of disease risk. This perceived risk (threat) is a combination of the individuals' severity and susceptibility to a disease. In this study, the individuals' susceptibility to stroke has been shown to be influenced by their religious beliefs. The belief that their future health is known or rests in God's hands shows the extent of their perception of God's control over their health. In all religions, health and health-related behaviours are a core issue and have been encouraged. However, the argument is that it is the individuals' perceptions toward religious advice that influences their beliefs. This means that someone could rely on their religious beliefs and not take care of their health because they believe that the control of their health is in God's hands, while the reality is that right now (in the present) it is the responsibility of the individual to decide about their current health practice and to lead a healthy life. Even if someone who is practising a healthy lifestyle develops an illness later in life, that does not mean that others do not need to take care of their own health. In Islam, for example, every person has the choice and responsibility to not put his/her life at risk and harm (Al-Zadjali et al., 2014). A study by Al-Zadjali et al. (2014) showed that women misunderstand the religious concepts and become careless regarding their weight gain

management, whereas Islam encourages preventive health behaviours (Al-Zadjali et al., 2014). Additionally, self-efficacy that identifies individuals' competence to adopt or live a healthy lifestyle is motivated by the Islamic perspective of living a healthy lifestyle and maintaining their own overall health. Responsibility for health motivates individuals to care for and maintain their own health.

Therefore, the study suggests the addition to the model of religious beliefs as a personal variable and for this to be incorporated within the individual perceptions. If an individual considers that their health is in God's control, then no health effort or action will be taken and they will have a lower perception of the risks. But if an individual believes they can take part in some form of collaboration or have a certain degree of control over their health, then health actions will be considered and the recognition of risk perceptions with the association of other factors can increase the threat of the disease. In extreme cases, for individuals who believe they have complete control over their health, their risk perceptions are assumed to be influenced by other factors that have been proven by the HBM.

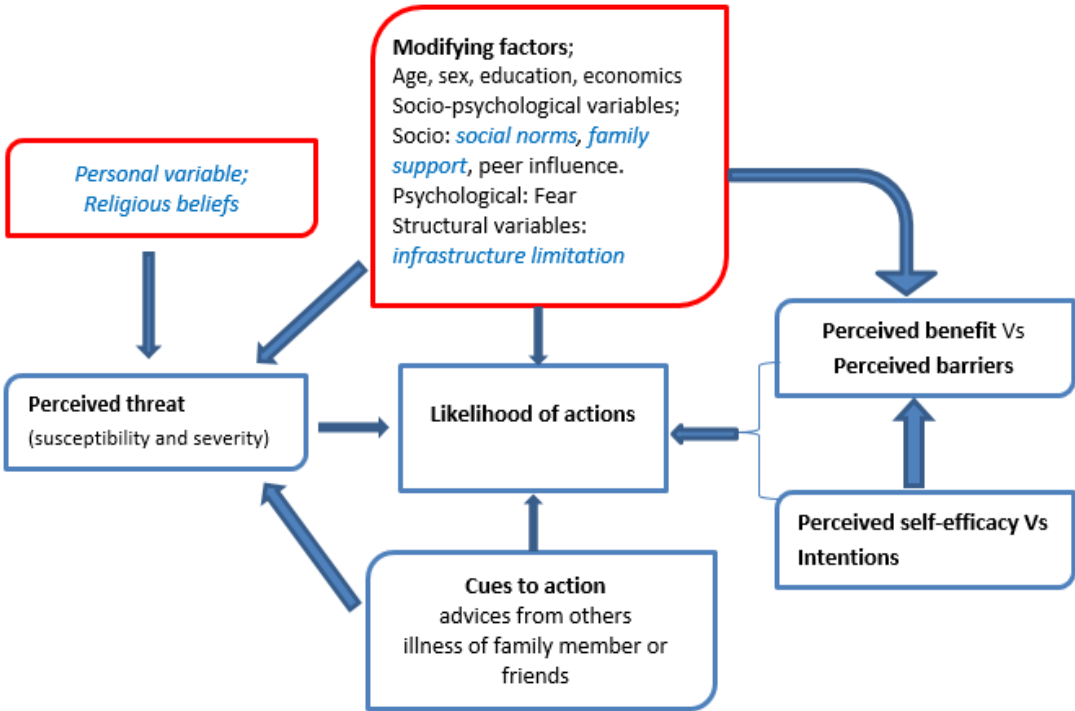


Figure 6:1 the suggested HBM

Moreover, the study suggests that modifying factors like family support and social norms have a stronger influence on individuals' health beliefs within Omani society.

As both Arabs and Muslims, Omani families are proud of their strong family relations and have a strong respect for social norms. Each individual is part of either a nuclear or extended family. The Omani family is generally characterised as an extended family, whereby any family problems and crises are normally managed and resolved both within and by the whole family (Al-Barwani and Albeely, 2007). The Omani family provides strong support for its individual members in almost all aspects of life. Support for the sick or ill is determined not only by cultural traditions but also by the Islamic practice of visiting, caring for and supporting the sick person. To this can be added the fact that the family members are responsible for caring for and nursing the sick person within the family. Aside from their respect for heritage and tradition, the sharing of decision-making among family members demonstrates a respect for the values and principles of the family. Such familial values exist within all societies and are respected by all cultures. However, there may be differences between the Western individualism approach to decision-making and the collective family sharing of decision-making. Although the impact of education and modern regulations, such as autonomy in making decisions, has led to individuals becoming independent decision makers, many of the decisions made by individuals continue to be shared and discussed within the Omani family. This study shows that family support can act as a strong motivator for health. It is suggested that these factors are included in the HBM when it is adopted in societies that have strong family and social bonds.

6.3 Contribution to knowledge

The integration of religious beliefs as an individual variable rather than as a demographic or even cultural variable is the major contribution to knowledge of this study. Although many studies have discussed the role of religion and health beliefs, they have tended to treat them more as cultural elements; this study, however, has shown that even among the same culture and religion individuals have different perceptions of their risk of having a stroke and that these are underpinned by the individuals' religious belief that the control of their health rests in God's hands.

To the knowledge of the researcher, this is the first study to have used a mixed methods design to assess the knowledge and perceptions of stroke among 'at-risk' patients in Oman. Therefore, it considers the building of research knowledge within the Omani

health care system in the area of stroke awareness promotion. Moreover, although the HBM has been used in other health-related studies, this may be the first time it has been applied in a study of stroke risk perceptions in Oman, to the best knowledge of the researcher. As such, it adds depth to the influence of individual beliefs on the making of health-related decisions within Omani society. Underpinned by the HBM as a theoretical framework, the study explored realist social constructionism as it combined the role of agency and structure in the study of health-related behaviour and combined qualitative and quantitative methodologies within its convergent mixed methods design to facilitate the aim of the study, which is to explore health and risks and risk perceptions in a collective society such as Oman.

6.4 Implications for practice

Health policies should move towards prevention rather than be curative. Policy changes and system-level interventions at different levels of health care decision-making could effectively reduce people's risk of stroke and the overall burden (Ovbiagele et al., 2013). The development of a programme that encourages a healthy lifestyle for the purpose of disease prevention is suggested. In particular, prevention is a promising area for policy development, changes and systems intervention and is supported by successful examples (Ovbiagele et al., 2013).

This study offers suggestions for health care policymakers in the area of health promotion and prevention. Although these implications might sound as if they apply only to the local Omani community, they may be considered by health care policymakers as being applicable among multicultural societies and the wider Muslim communities. As Islamic values and beliefs are shared among Muslims around the world, the implication for practice related to individual religious beliefs can be utilised to motivate healthy lifestyle behaviours. In particular, the implications for practice such as the use of a clinical religious adviser and the use of Friday sermons or khutbah can be applicable to other contexts including other Arabs and Muslim countries. This also can be extended to the countries with multi-faith and multicultural societies. The United Kingdom and the United States of America, for example, have a considerable population of Muslims where the use of these approaches could help to motivate individuals to make healthy decisions.

In this section, two implications for practice are discussed. The first implication sits at the individual level and targets ‘at-risk’ individuals. This is in contrast to the public approach that aims to raise awareness of stroke and preventive health behaviours among the public in Omani society. Part of preventive health intervention involves ensuring there is an appropriate response to a medical emergency; there is thus an urgent need to develop medical ambulance services in Oman to respond to suspected stroke events and enable the affected individuals to receive urgent medical attention.

6.4.1 The individual-level approach

This individual approach targets both those individuals deemed ‘at risk’ of having a stroke and their families. The aim of this first approach is to provide a preventive health plan that is sensitive to an individual’s health beliefs. Assessment of an individual’s health beliefs is initially suggested upon their registration at a health care institution. Based on the needs of the individual, a religious clinical adviser can help to correct any misconceptions related to the role of religion in health. Also in this approach, the use of expert patients and their families is suggested to motivate individuals to engage in preventive health behaviours since this study has shown that experiential learning from others is effective in respect of making decisions about health.

6.4.1.1 The individual approach to health intervention based on ‘at-risk’ health beliefs

This approach should focus on assessing the individual-level risk and perceptions of stroke risk. The individual approach can suggest a plan of strategies to reduce the risk of stroke based on the level of individual risk. It is important that the action plan identifies the individual stroke risk factors, measures and advice for ‘at-risk’ patients to reduce their stroke risk. Such an approach could include an action plan for each individual who is newly diagnosed or identified with a risk factor for stroke, to lower their risk of having a stroke (Hosseini, 2015). This study suggests that an assessment of individual health beliefs should be incorporated into the initial physical assessment and registration at health care institutions so that a health care plan can be developed in consideration of these aspects. For example, advising a Muslim lady with a low socio-economic status to swim in a free public pool goes against the religious gender segregation. When the individual health beliefs to be assessed it need to consider the individual and sociocultural factors that influence each individual’s beliefs. Individual

health improvement plans can then be developed based on these factors. This forms the basic approach to improving patient education by taking into account their health beliefs (Sullivan and Katajamaki, 2009). Considering the individual's health beliefs is important. In the area of stroke prevention, structuring an effective programme by considering the role of health beliefs regarding prevention is suggested (Sullivan and Katajamaki, 2009). In addition, this type of individual plan can help to tailor adherence to the long-term lifestyle modifications required for patients with chronic illnesses.

In addition, this approach should be extended to include the individual patients' families. This study has demonstrated the role of the family in encouraging healthy living for 'at-risk' individuals. The family is a significant source of support for the study's participants; as such, the nomination of family members, which may be one to three persons depending on the individual family situation, is suggested. These family members can contribute to two major aspects of individual care. The first aspect can be *motivation towards healthy living*, whereby the family members can help the affected individual to maintain a healthy lifestyle. A wife, for example, may help to ensure there is healthy cooking. Husbands or other members of the family can provide support for walking, monitor the patient's adherence to their medication, especially for the elderly, and also provide other forms of support. The second aspect concerns the *first agent to respond following stroke events*. In the absence of an ambulance service in Oman for medical emergencies, family members are often the first people available to save a patient's life following a stroke event. Alongside educating the patient, it is important to consider educating the nominated family members about the risk of stroke and the different strategies available to reduce the risk of stroke. Mainly, the family members should be educated and prepared to implement the appropriate responses following a suspected stroke event. The family can thus act as a lifesaving agent. Usually, patients will be accompanied to the clinical setting by a family member, and those family members can be included in any health education that the patient receives. In addition, public health messages can be used to improve the health knowledge and actions following a suspected stroke event. Therefore, it is an urgent recommendation for the Omani Ministry of Health to educate 'at-risk' patients and their family members in the correct way to respond following a stroke event by ensuring they recognise the warning signs and symptoms and know the appropriate emergency responses to take.

Awareness of the impact of a time delay in the administering of anti-thrombolytic treatment should be spread to ensure care is sought quickly following a stroke event.

This study suggests a form of the HBM that can be used to develop a preventive programme especially for at-risk patients within Omani society who have a stroke. The HBM intervention programmes for adherence have shown improvements in adherence (Jones et al., 2014a). Regardless of its limitations, the HBM has continued to be used in the design of health care programmes, especially with regard to the use of the model's basic ideas to assess preventive programmes in their early development. It is important that health awareness or education programmes adopt the individual approach and especially that they consider 'at-risk' patients. In a study assessing the impact of the 'Act Fast' campaign in the UK, the majority of the participants reported no impact of the campaign on their stroke recognition and responses (Dombrowski et al., 2013). It seems that awareness of stroke recognition alone is not enough to make an impact on modifying individuals' risk behaviours. Therefore, more needs to be done at the individual level to motivate the adoption of preventive healthy behaviours. The beliefs, attitudes, efficacies and intentions to modify risky behaviours of patients who are 'at risk' need to be considered. Health promotion plans are obligated to deeply understand the needs of 'at-risk' patients because the lifelong adoption of such behaviours requires more than simply recognising the risk. Consequently, the individual approach can provide health education based on an understanding of individuals' beliefs, attitudes, efficacies and intentions.

6.4.1.2 Clinical Religious Adviser

The issue of the connection between religion and health should be addressed to assess individuals' beliefs about their susceptibility to illness. Health professionals should acknowledge the effect of religion in all aspects of Muslim patients' lives, and religious beliefs cannot be separated when delivering medical care (Alqahtani, 2015). Al-Yousefi (2012) suggested that Saudi medical institutions need to improve the capacity of medical personnel to appropriately address religious issues, with the training of clinical religious advisers being proposed as a solution (Al-Yousefi, 2012). Such an intervention could also be adopted by Omani health institutions as the two countries share similarities in a number of different aspects. Religious advisers have been proven by the World Mental Health Survey to play an important role in mental

health care, but it has also been suggested that they should undertake appropriate training and collaboration in formal mental health care systems (Kovess-Masfety et al., 2016). To the best of the researcher's knowledge, the use of religious advisers does not exist in the Omani health care system. Therefore, this study suggests the establishment of clinical religious advisers to integrate religious and health beliefs with the aim of achieving health promotion plans.

There are certain health beliefs that consider the risky behaviours which have been identified in Islam, such as drinking alcohol and the intake of harmful drugs (Walton, 2014). The three major sources of Islamic law – the Quran, Sunnah and Ijtihad – are considered to contain the necessary knowledge for all Muslims to attain guidance on general health care beliefs and medical ethics (Walton, 2014). In accordance with this, Prophet Mohammed (SAW) Medicine (AlTaib AlNabwi) is a type of medicine practice by Prophet Mohammed. It is a notable example of complementary medicine that is practised by most Muslims; others might call it alternative medicine. An Omani study that assessed the attitudes and beliefs of individuals to seeking help for emotional distress among Omani women and Omani general practitioners found that a belief in fate helped the participants to accept difficult situations that cannot be changed and to carry on with life as a way of maintaining psychological stability (Zakiya, 2010). Reading from the Quran was advised to accompany the medical treatment, and faith was found to be helpful as a set of beliefs and as a practice (Zakiya, 2010). Such principles can be used to motivate patients and even the wider public about the concept of healthy living. Clinical religious advisers can be utilised to assess individual religious and health beliefs, raise awareness among individuals of the value of health in their religion and motivate them for healthy living. These clinical religious advisers can motivate and convince patients to practise a healthy lifestyle supported by examples from the Quran, Sunnah and Ijtihad.

Although having a clinical religious adviser might seem challenging in terms of developing a new speciality in clinical areas, it is something that can be coordinated between the Omani Ministry of Health and the Omani Ministry of Endowments and Religious Affairs, especially the College of Sharia Science, to develop a trial conjunctional education programme. This type of educational training or programme

would aim to acquire a group of residency trainees with the necessary religious knowledge and communication skills to be able to perform the role of clinical religious adviser. Moreover, cultural concepts can be introduced in such a programme to clearly distinguish the differences between religion and social traditions that influence individuals' health. Zakiya (2010) suggested that residency training programmes in specialisms such as family, community medicine and psychiatry could emphasise the cultural and religious concepts related to health beliefs that affect patients' attitudes towards health issues (Zakiya, 2010). Many of the religious health practices in Muslims' lives are learned during childhood from their parents, or even at school within Islamic teaching. However, such a training programme could also prepare the residency to make a connection between the religious guidance regarding different health issues that influence patients' health decision-making.

6.4.1.3 Patients as expert educators

Besides the health education conducted by health professionals, the use of expert patients or patients with experience is suggested for sharing worries and motivating others to adopt healthy behaviours. The nature of living with chronic illnesses enriches patients' experiences. Other patients can thus learn from their experiences in terms of healthy ways that may fit them better. Although patients' needs can differ from one to another, the support of knowing someone who faces similar challenges and the sharing of knowledge can motivate individuals to maintain their health. Therefore, this study recommends that the Health Directorate General of Health Affairs in each region of Oman develops patient stroke support groups. Such support groups can consist of patients who have had a stroke or patients with stroke risk factors and their families in supporting others or newly diagnosed patients. Groups can hold monthly meetings for discussion and include a health professional volunteer to facilitate. Also, a list of contacts of the support committee can be disseminated to local health institutions to contact expert patients to talk, educate and discuss with other patients when needed. Such a group can be funded and supported through community-based initiatives.

6.4.1.3.1 The concept of expert patients and families

Social networks or social media can facilitate the ideas of expert patients and families. Patients and their families with success stories of living with chronic illnesses can be invited to join such a network. The applicability of patient-centeredness has the

greatest importance for chronic or long-term illness (Blomqvist et al., 2010). It is important to consider the views, attitudes and learning experiences that develop from living with a chronic illness. Patients with a chronic illness can provide rich experiential learning for those who have been newly diagnosed with such diseases. Experiential knowledge develops either consciously or unconsciously when the individual's experience is converted into a personal insight that enables that person to cope or understand (Morrow et al., 2013).

In the UK, for example, an Expert Patients Programme (EPP) was started in 2001 to enhance NHS patients' self-management capacities (Taylor and Bury, 2007). This type of programme demonstrated the significance of self-efficacy concepts in improving public health (Taylor and Bury, 2007). In addition, the EPP that is based on the self-management of chronic diseases and adapted for access via the internet has been shown to improve health behaviours (Cordier, 2014). To the knowledge of the researcher, there is no such programme in Oman. It would be useful to develop the current social sharing of health knowledge among Omanis that is based on lay knowledge into experiential knowledge under the supervision of the Ministry of Health media centre. In addition, it would be valuable to attract a health professional to voluntarily join the network or social media to ensure the quality of the information provided.

6.4.2 The public approach

The public strategy can be targeted at raising public awareness of stroke and preventive health behaviours. This approach would require a larger population and be aimed at raising awareness within the Omani community of stroke and healthy lifestyle behaviours in a bid to lower the risk and impacts of stroke and NCDs. The role of religious teaching is very important to motivate people for healthy living, and this study suggests the use of Friday sermons for communicating public health messages. Within the public approach, this study suggests the reinforcement of preventive health behaviours from early life among school-age students. Furthermore, the use of online and internet social networking for health promotion communication is advocated among all age groups. Understanding that the cost of such a strategy may not benefit

individuals on a low income, policy changes are needed in order to offer a solution, with incentive support provided for individuals and families on low incomes.

6.4.2.1 Use the power of Friday Sermons or Khutba

The role of religious advisers has been confirmed in seeking help in the area of mental health (Kovess-Masfety et al., 2016, John and Williams, 2013). In the Muslim world, the role of the imam (religious leader) has been used to provide religious guidance in different aspects of the lives of Muslims. Religious leaders have played significant roles in the area of public health, specifically in the area of health promotion (Underwood and Kamhawi, 2014). The role of religious leaders in the area of health promotion has been noted in different Muslim countries including Indonesia, Bangladesh, Iran, Egypt and Afghanistan (Underwood and Kamhawi, 2014). A study conducted in the United States on the role of imams in American Muslims' health revealed that they can play a role in framing concepts of health and disease, and in particular in encouraging the continuation of healthy lifestyles outside the health care system (Padela et al., 2011). Padela et al. (2011) discussed how the role of the imam in health care can be shaped into four roles: encouraging healthy behaviours through scripture-based messages in sermons, performing religious rituals around life events and illness, advocating for Muslim patients and delivering cultural sensitivity training in hospitals and assisting in health care decisions for Muslim patients (Padela et al., 2011). Underwood and Kamhawi (2014) tested the congregants of Jordanian religious leaders who were trained to preach at Friday Khutba about family planning and gender equity, with the study finding that the trained religious leaders were more effective in message dissemination and the mosque-goers were more likely to report taking relevant actions (Underwood and Kamhawi, 2014). Friday Khutba is an integral component of Friday prayer, which is a major Muslim prayer which Muslims are encouraged to leave their work and close their shops to attend. The Khutba is a speech that involves religious guidance in different aspects of life and is attended by large numbers of Muslims. An Omani family will typically discuss the messages covered in the Khutba during their Friday lunch. This practice can thus help to ensure that large members of the community receive public health messages. In situations such as this, religious leaders are able to discuss stroke prevention and spread the concept of a healthy lifestyle to the public. Therefore, this study strongly suggests using the power

of the Khutba to spread health messages to the public. The collaboration between the Omani Ministry of Health and the Omani Ministry of Endowments and Religious Affairs to provide training on health topics for imams is important to ensure the desired messages are disseminated. Prioritising health issues, ensuring support from Islamic sources and the adoption of effective methods of communication to convince people of the health messages are important issues to be considered when planning such a training programme. Also, those religious leaders can provide counselling when needed, especially for those individuals suffering from conditions that cannot be influenced by behavioural changes. This type of counselling might help them to let go of the internal control that is consistent with their religious beliefs (Hayward et al., 2016).

6.4.2.2 Expanding the role of school health programmes

The concept of building knowledge of a healthy lifestyle from an early age within the Omani community is also suggested as a potential way of tackling diabetes, hypertension and heart disease. Targeting risk factors for stroke at an early age can be accomplished by educating school-age students about stroke and the required preventive behaviours. The development of a sense of healthy living should be adopted by all age groups; for example, school health programmes in Oman are encouraged to raise awareness of the need to adopt a healthy lifestyle from an early age and its consequences in later life. Therefore, such a programme can incorporate stroke awareness as one of its educational topics. In a collaboration between the youth in each region, school sports teachers and school health programmes, a Youth Sport for Life competition between schools is suggested, with a strong involvement of girls in these programmes. Sadly, the utilisation of youth sports complexes fell in 2016 in comparison to 2015 (statistics, 2016). School health programmes can therefore make use of the sports complexes that are available in most Omani cities to motivate Omanis to combat their risk of stroke and live a healthier life from an early age.

6.4.2.3 The role of social media and networking

This study has revealed social networking among neighbours, friends and others in society to be effective in influencing learning about health. With advances in technology and people becoming ever more frequent users of social media such as

Twitter and Instagram, in addition to the internet, this study suggests a different approach that can be used to incorporate social networking within Omani society.

6.4.2.3.1 The use of social networks and mass media

Advances in new technology have helped to ensure ease of access to health information. The use of social media and online social networking for the purposes of health education have proven their effectiveness as advanced forms of the social sharing of knowledge. The use of social networking and social media has increased globally, including for health-related issues, and they provide a medium that can be used by the public, patients and health professionals alike (Moorhead et al., 2013). These sources of media facilitate the social sharing of knowledge among the public and provide a social place for communications and interactions to take place (Yan et al., 2016). Health information is made available with one click, thereby saving effort, time and cost for both patients and health care systems. Although there are benefits to the use of social media, there is also a need for it to be monitored for quality, reliability, confidentiality and privacy (Moorhead et al., 2013). Worldwide, searching for health topics using internet search engines was nearly 4.5% (Yan et al., 2016). Online communities can thus become social spaces where people can exchange information and provide support for each other (Yan et al., 2016). The sharing of health knowledge through social media has been found to be less expensive and informal (Sibbald and Kothari, 2015), which can reduce the burden on health care providers. Yet these forms of social networking also require certain user guidelines for quality purposes. On the other hand, however, social networking within a society may not have guidelines as everyone shares experiences based on trial and error. In addition, the safe use of the knowledge shared should be a matter of concern. As the Omani government moves towards E-Government and making services available online, online social networking and the use of social media might have a role to play in shaping the sharing of health knowledge under the guidance and supervision of health professionals. The 2.9 million internet users in Oman (Observer, 2015) serve as an indicator that the use of social media and online social networking can be an easy and relatively inexpensive method for health care providers and has the ability to attain a broad reach within the Omani population.

Although the effectiveness of using social media for the sharing of health knowledge may appear beneficial, consideration also needs to be given to those who are ‘at risk’, particularly the uneducated, ageing or those who are unable to access the internet (Rasura et al., 2013). Besides, the cost of mass media campaigns requires a sustained level of funding and this can act as a barrier (Rasura et al., 2013). Those patients ‘at risk’ of having a stroke used to be the elderly with a history of diabetes, hypertension and heart disease. Many of these patients are expected to be uneducated or to have received only a minimal level of education, as in this study 48% of the participants were above 50 years old. Besides, the cost of the internet can be perceived as quite expensive for retired people and patients on a low income. In this study, 65.7% of the participants had monthly incomes of under 500 O.R, which is considered a low monthly income in Oman. Therefore, the use of two educational approaches is suggested. The ‘at risk’ individual educational approach will be of benefit in individualising care, focusing on personal needs and identifying personal risks. In addition, it may be directed mainly to benefit the uneducated, ageing and those who are unable to access the internet for different reasons within society. The social media networking approach can be directed to ‘at-risk’ patients, the families of ‘at-risk’ patients, youth and the public. This approach can thus be used to spread the knowledge among a larger section of the population. Family members can act as the transmitters of knowledge acquired from social media networking to patients who are unable to access the internet.

6.4.2.3.2 Health online forum

The Ministry of Health website is well designed and substantial efforts have been made to improve it. This study suggests the development of a website or a link within the MOH to enhance interaction through social networks or social media under the supervision and control of the MOH media centre. The control by the MOH media centre would be to ensure confidentiality and the quality and reliability of the information provided. This website could act as a knowledge source and should include a social forum where individuals are able to discuss, ask and answer questions and post comments about stroke, the risks, treatment and rehabilitation. Such a forum could provide both knowledge and psychological support for patients and their families, directing them to where and how to look for help. Although such an approach

may not be of much benefit to the uneducated, elderly or those on a low income, it can benefit their relatives and family members who can then spread the intended health knowledge.

6.4.2.3.3 Health advertisements

Moreover, the role of the mass media in sending public awareness messages is evident in terms of providing the ability to rapidly convey health messages in a cost-effective manner. The Omani Ministry of Health has a media centre that can collaborate with the Omani Ministry of Information to raise awareness among the public by using the mass media in forms such as advertisements about stroke on the television or radio, while the internet and social media are suggested for spreading awareness of the early prevention of stroke risk among young adults and teenagers. It is also suggested that the appeal of health fear with high self-efficacy messages be utilised to increase awareness of the burden of stroke on individuals, their families and health care services. Fear can be employed to motivate individuals to reduce their risk, with the high self-efficacy messages inspiring individuals that the risk of stroke can be reduced and/or that its impacts can be minimised. These messages can be supported with phrases from the Quran or other Islamic sources that can provide psychological stability and reassurance about the importance of health promotions.

6.4.2.4 Stroke prevention campaign

A new national campaign to boost physical activity began in Oman in December 2016 under the theme 'Health Starts with a Step'. The campaign aimed to raise awareness among the general public, women and college- and school-age children of physical mobility, the facilities available and to increase the number of people engaging in physical activities. A promising outcome is expected from this campaign as a step towards improving the healthy lifestyles of Omani people. The campaign uses social media like Twitter, Facebook and Instagram. Health information is disseminated through different images and flyers on those media sites. In addition, many famous social media sites were invited to join in, to attract their followers to join the campaign and to help raise awareness of the importance of engaging in physical activities.

The concept of experiential learning and successful health stories can add a depth and significant experience for individuals to persuade and motivate them to practise

physical activities as part of such a health campaign. Therefore, it is suggested that public health messages be emphasised for patients or individuals who are challenged by their illness to find successful healthy ways to overcome the challenges they face. The development of a stroke prevention campaign is suggested as a means of raising awareness of the type of healthy lifestyle required to combat stroke and its risks. Patients and their families who have either a history of stroke or who are at risk of a stroke can join such a campaign to share their knowledge and experience about stroke and its prevention. It could also include health advice and support from professionals in terms of maintaining the quality of the shared knowledge.

Furthermore, such a campaign can provide financial incentives for individuals on a low income to support their access to online health information and sports facilities.

6.4.2.4.1 Fund support for gym facilities for patients with stroke risk factors

In Oman, many community-based initiatives have aimed to provide sustainable socio-economic development through the actual participation of local communities with cooperation and liaising with civil sectors to facilitate a healthy lifestyle. Some examples of these initiatives have included healthy cities or healthy lifestyle projects. In many willayates in Oman, healthy walks/walking paths have been built to encourage physical mobility and exercise. Although these walking paths help to facilitate the environment to provide places for people to walk or exercise, they are believed to be used by many people at appropriate times. With high self-efficacy to practise walking, it is suggested that all streets are designed with sidewalks, especially sub-streets. In addition, walkways can be built in cooler areas; for example, close to the sea or in open fields, where temperatures are less intense

In addition, a survey published on the website of Omani community-based initiatives reported an absence of supportive environments in which women are able to do physical activities, in addition to a need for gym facilities in the Omani Women Association to encourage women with health conditions like obesity, diabetes and hypertension to go to the gym (Alhosni, 2007). Another study also highlighted that exercise facilities tend to be costly where they are available (Al-Lawati and Jousilahti, 2004). In support of these studies' suggestions, this study suggests that community-based initiatives prioritise the needs of each group in the community, such as healthy

walks serving men more than women. Women in particular have a need for private nearby places to engage in exercise. Although there is a gym facility in the willayate where this study was conducted, it is not free to attend and is not easily accessible to all women in the willayate. Therefore, it is suggested that more gym facilities be established for men and women separately, with respect given to cultural and social norms. Financial support to use these gym facilities and other private gym facilities controlled by community-based initiatives and funds can be provided for patients with medical conditions like diabetes, hypertension, cardiovascular disease and obesity. The building of gym facilities at reasonable prices can attract women and men at different ages to join and can provide sustainable economic income.

Additionally, the Ministry of Sport Affairs in Oman provides gym and physical fitness facilities in most of its youth complexes in different willayates in Oman for a reasonable price. However, women have fewer or no opportunities to use such facilities. Therefore, it is suggested that access to such facilities be extended to include women or that alternative days or times of the day are planned for the different genders to use the gym facilities.

6.4.3 Developing ambulance services in Oman

For individuals who do experience an acute cardiovascular event, treatment is available but is highly dependent on time and requires rapid recognition and action. Previous research has suggested that patients' lack of awareness of the symptoms associated with these events results in the majority of time delays between symptom onset and the initiation of treatment (Lambert et al., 2013). The early administration of an antithrombotic agent following an ischaemic stroke can improve the outcomes (Lees et al., 2010). The transportation of stroke patients by ambulance is recommended (Minnerup et al., 2014). The greatest benefits of treatment come when efforts are taken to shortening time to initiate the treatment beyond 4.5 hours (Lees et al., 2010, Emberson et al., 2014). The importance of upgrading and developing ambulance services in Oman is a critical issue for health care providers. Ambulance service has been found to be independently associated with more rapid arrival at hospital (Minnerup et al., 2014). This therefore reduces the time gap between the occurrence of stroke events and the initiation of treatment. It also reduces the amount of time

between hospital admission and brain imaging, thus permitting more rapid identification of a stroke and increasing the frequency of thrombolysis therapy (Minnerup et al., 2014).

The current Emergency Ambulance Services (EMS) in Oman was introduced in 2004 (Al-Shaqsi, 2010). The EMS is run by the Royal Omani Police Ambulance Division by Royal Decree 99/75 (Al-Shaqsi, 2009). It is designed to respond to trauma cases resulting from endemic Road Traffic Crashes (RTCs) (Al-Shaqsi, 2010). Al-Shaqsi argued that medical emergencies require a different approach to classical trauma cases (Al-Shaqsi, 2010). His main argument concerns the training of the technicians who provide emergency care for patients as this is provided by Emergency Medical Technicians, while there is also a need to have emergency practitioners who can provide rapid field and cardiac arrest interventions (Al-Shaqsi, 2010). This study strongly supports the establishment of an ambulance service in Oman as one of its major recommendations for the Omani health care system. The ambulance services in Oman need to be obligated to respond to all cases of medical emergencies and suspected medical emergencies. The main argument here is that having an ambulance service for cases of trauma like RTCs or fires is not enough and that these services urgently need to be extended to cover all cases of medical emergencies and suspected emergencies. An ambulance service can reduce delay to the initiation of anti-thrombolytic therapy following stroke events. The present lack of such a service is a factor that contributes to delays in patients receiving treatment for all life-threatening health conditions in Oman. It is worth urgently considering as a means of reducing the burden of NCDs, not only stroke, on the patients, their families and in particular to reduce the burden on the health care system in Oman.

6.5 Recommendations for future research

The influence of religion on health has been extensively studied. However, the mechanism of this influence and the impact of religious beliefs on health decisions needs to be further explored through health and social sciences theories. Although the impact of religion on health and illness is important for the development of culturally sensitive and appropriate health care systems (Ypinazar and Margolis, 2006), the preventive health psychology theories have largely omitted this influence. Therefore,

this study suggests further research studies in this area. The proposed HBM in this study is suggested to be adopted by health intervention programmes in Muslim countries. Also, it may be adopted in other countries with populations that acknowledge their religious faith. Researchers can utilise the HBM constructs to assess and understand individuals' perceptions of their disease risk. It is expected that further research studies may be able to identify additional understanding of the influence of individuals' religious beliefs on their health beliefs and decisions related to their care. There is a growing body of literature that proves the connection between religion and health. However, many of these studies have focused on the impact of generalized religiosity and have been limited in their ability to explain the way(s) in which religion shapes health behaviours (Padela and Curlin, 2013). The focus on connecting religion and health has mostly been reported by relating positive or negative health to church attendance or the practice of religion. The preventive health psychology theories thus need to further identify the depth of these relationships. Intensive research is suggested to investigate the kind of influence that religion has on the health beliefs that affect the health decisions of individuals. In addition, researchers in this area can suggest recommendations to direct individuals' health beliefs in accordance with their religious faith to facilitate better health improvements.

Moreover, this study has highlighted the absence of appropriate emergency responses following suspected stroke events. Going directly to hospital by asking a family member or friends to take patients as soon as possible is the type of urgent response required following a suspected stroke event. This was assumed to be due to the absence of an ambulance service in Oman. Although this study did not assess knowledge about anti-thrombolytic treatment, one of the interviewed participants considered the importance of going directly to hospital because of the availability of expertise and equipment. This leads to the assumption that there might be a lack of knowledge about anti-thrombolytic treatment among 'at-risk' patients and their families who are the first agents to attempt to save those patients' lives. Therefore, a future study is suggested to assess the knowledge of anti-thrombolytic therapy among this targeted group.

6.6 Study limitations

Limitations are always areas for improvement and future suggestions. In the interpretivist approach, knowledge is relative to particular circumstances, culturally centred, and can be subjective (Levers, 2013). The representation of reality is based on the interpretation of individuals (Levers, 2013). Therefore, using the interpretivist approach, the researcher acknowledges that the results of the study are relative to the study participants' experience and meaning as interpreted from the view of the researcher. This needs to be carefully translated into other societies and even within Muslim societies as Omani society continues to hold strong family and social bonds where people talk and share knowledge and information about different aspects of life. Although this unique society does share many similarities with close-by societies, there are also many areas of difference in comparison to other Arab and Muslim societies around the world. Therefore, the generalizability of the interpretive study is limited.

Moreover, voluntary participation which relies on participants/patients who view themselves as healthy and practising a healthy lifestyle might impact the participants' responses and lead to more positive responses to healthy lifestyle questions. With the limitation of using a clinically based study, the participants' commitments might affect the validity of their answers, although most of the data were collected during the participants' waiting time. In addition, every effort was made to reduce bias when reading the questionnaires to those participants in their accent to facilitate appropriate understanding, but this study may contain a degree of accidental bias that may have influenced the participants' answers. It was however important for the aims of the study to include participants of different ages who were at risk.

6.7 In summary

This study contributes to knowledge by extending the HBM to include perceptions of religious beliefs as an individual factor. Also, the study suggests the adoption of both individual and community-based approaches to health promotion. Preventive health behaviours should be developed and adopted from an early age so that children and young adults grow up with less risk of developing NCDs. Health interventions should address individuals' physical, psychological, social and cultural needs; accordingly,

health teaching and interventions must be developed. Furthermore, the enforcement and endorsement of health messages through the use of religious leaders is also suggested. Additionally, the promotion of public health is encouraged through an easing of social and cultural limitations so that individuals may be motivated to practise a healthy lifestyle.

Conclusion of the thesis

Health is a human right. The tackling of NCDs and CVDs presents more of a challenge than the control of infectious diseases. The main challenge in tackling NCDs and CVDs relates to changing people's lifestyles and health-related behaviours. The adoption of a healthy lifestyle requires lifelong adherence to preventive health behaviours. Such a process demands multisector collaboration, which in turn necessitates changes in health improvement strategies. Furthermore, it requires the emergence of individual, social, financial and legislative strategies at both the national and international level to facilitate individuals' ability to adopt a healthy lifestyle.

Disability following stroke increases the burden on patients, their families and the community in general. Primary and secondary preventive stroke interventions can reduce the mortality rate attributed to stroke. However, the morbidity of stroke and stroke risks such as diabetes, hypertension and heart diseases are increasing, even among younger ages. These factors are the highest cause of morbidity in Oman. In response, serious actions are required to tackle these risks and to promote the adoption of risk-preventive behaviours. This requires the collaboration of individuals, governments and communities to lessen the impacts of social determinants of health in order to allow individuals to make healthy choices. These social determinants of health play a role in the health decision-making of individuals.

This study, conducted in Sultanate of Oman, aimed to explore the 'at-risk' individuals' knowledge, perceptions, actions and intentions to reduce their risk of stroke. Further, the study explored the factors that influence the participants' health decision-making. The HBM was the theoretical framework used to assess the different factors that influence the individuals to make healthy decisions. This was underpinned by realist social constructionism that combined the role of agency and structure. An individual's beliefs and perceptions about health knowledge, disease risk and health decision-making is developed from their social environment. A convergent mixed methods design was selected to explore both the individual and structural factors

operationalised by an interpretative approach that was used to understand and explain the meaning of the participants' experiences.

The study has shown that the individuals developed their beliefs and decisions through experiential learning. The sharing of the experiences of stroke of family members, friends or neighbours influences the individual's decisions about preventive health behaviours. In addition, an individual's susceptibility to stroke influences how they perceive control over their health as being either individual or something that is in Allah's control. The study confirmed that individuals and the social environment, including health institutions, share a responsibility for health. The social structure and institutions influence the beliefs and dispositions of individuals in their decisions related to healthy living.

Therefore, the study suggests extending the HBM to incorporate the role of individuals' perceived religious beliefs. In addition, the study recommends individual- and community-level health interventions to tackle NCDs, CVDs and stroke.

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Appendix

Appendix 1: The ethical approval from school



Ref: NURS008

Salwa Alalawi
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SCHOOL OF HEALTH IN SOCIAL SCIENCE

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25 May 15

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Dear Salwa

APPLICATION FOR LEVEL 2/3 APPROVAL

PROJECT TITLE: KNOWLEDGE, PERCEPTION AND INTENTION TO MODIFY BEHAVIOURS TO REDUCE STROKE RISK AMONG AT-RISK PATIENTS IN SULTANATE OF OMAN

Thank you for submitting the above research project for review by the Section of Nursing Studies Ethics Research Panel.




I can confirm that the submission has been independently reviewed and was approved on 22 May 2015.

Should there be any change to the research protocol, it is important that you alert us to this as this may necessitate further review.

Yours sincerely


pp. Kath Melia
Professor of Nursing Studies

Appendix 2: The ethical approval from MOH, Oman

<i>Sultanate of Oman</i> <i>Ministry of Health</i> <i>Directorate General of Planning</i> <i>and Studies</i>		سلطنة عمان وزارة الصحة المركز العام للتخطيط والدراسات
Ref. :	MH/DGP/R&S/PROPOSAL_APPROVED/24/2015	الرقم :
Date :	18.08.2015	التاريخ :
		الموافق :
<p>Ms. Salwa Al Alawi Principal Investigator</p>		
<p>Study Title: " Knowledge, perception and intention to modify behaviors to reduce the risk of having a stroke among at-risk patients in Sultanate of Oman."</p>		
<p>After compliments</p>		
<p>We are pleased to inform you that your research proposal " Knowledge, perception and intention to modify behaviors to reduce the risk of having a stroke among at-risk patients in Sultanate of Oman." has been approved by Research and Ethical Review & Approve Committee, Ministry of Health.</p>		
Regards,		
<p>Dr. Ahmed Mohamed Al Qasbi Director General of Planning and Studies Chairman, Research and Ethical Review and Approve Committee Ministry of Health, Sultanate of Oman.</p>		
<p>Cc Day file</p>		

Appendix 3: The permission to use Stroke Recognition questionnaire (SRQ)

RE: Request to use SRQ© (2)
PM

Jan 14 at 6:54

Kathleen Ennen
Dear Ms. Alalawi,

Yes, you have my permission to use the Stroke Recognition Questionnaire (SRQ©) for your dissertation research project. Please find attached a copy of the SRQ.

In addition you are granted permission to adapt the SRQ© to your specific research project and population target needs.

The **scoring for the SRQ©** is as follows: one point for each correctly identified answer (whether the actual signs/symptoms and risk factors or the distractors for each).

So, the total possible knowledge score is 40, or 20 for each major scale, or 10 if you are just looking at a participant's ability to identify stroke signs/symptoms or stroke risk factors in the individual scales for each.

I wish you the very best. Please send me a copy of your completed work at my email below if you would...thank you!

Dr. Kathleen A. Ennen
kennen@ec.rr.com

Appendix 4: The questionnaire in English

Code#

The Questionnaire

This questionnaire is exploring your knowledge, perception, and behaviours toward stroke risk. It is divided in three parts. Please, read instructions followed for each part before you answer the questions.

Part A: Demographic data:

This part ask about your demographic data. Please tick the appropriate box indicating your answers to each question:

1. Age:

1) 30-39 2) 40-49

3) 50-59 4) 60 and above

2. Gender:

1) Male 2) Female

3. Educational level:

1) Not educated 2) No formal education can Read and write

3) Primary education 4) Preparatory education

5) Secondary education 6) University education

7) Other: (Please specify) _____

4. Current Marital status:

1) Single 2) Married

3) Divorced 4) Widow

5. Medical diagnosis:

Please tick the box the indicate your medical diagnosis (You can select more than one choice)

1) Hypertension 2) Diabetes Mellitus

3) Heart Disease

4) Other: (please specify) _____

6. Your monthly income is between (in Omani Rial):

1) Less than 500 2) 500 – less than 1000

3) 1000- less than 1500 4) 1500 and above

Part B: knowledge about stroke:

This part is asking your knowledge about stroke.

7. Which of the following are risk factors of stroke? Please, put a tick to Yes if you think it is a risk factor of stroke or to No if you think it is not a risk factor of stroke.

	Yes	No
a) High blood pressure.		
b) Iron deficiency.		
c) Diabetes.		
d) Travel to foreign countries.		
e) More than 20 pounds overweight.		
f) Low levels of calcium in diet.		
g) History of having had a heart attack.		
h) Smoking cigarettes.		
i) Living close to a power plant.		
j) Exposure to too much sunlight.		

8. Which of the following are symptoms of stroke? Please, put a tick to Yes if you think it is a symptom of stroke or to No if you think it is not a symptom of stroke.

	Yes	No
a) Weakness on one side of body.		
b) Diarrhea.		
c) Trouble walking.		
d) Chest pain.		
e) Numbness on one side of face.		
f) Heartburn.		
g) Sudden severe headache.		
h) Fever.		
i) Slurred or garbled speech.		
j) Cough.		

9. What is your appropriate response if any of the warning signs and symptoms of stroke showed in you or someone else at your present? *(Please, circle one answer)*
- Call ambulance
 - Go direct to the hospital
 - Wait for your appointment to report it
10. Which of the following is your main source of health information in general and in specific about stroke? *(Please, circle one answer)*
- TV
 - Health brochure
 - Internet
 - Health team professional
 - Family or friends
 - Other (specify)_____

Part C: health beliefs and behaviours:

The following are questions about your perception to stroke risk and your intention to reduce your risk to stroke if applicable. After reading each statement, *tick in the box that indicate your level of agreement: strongly agree, agree, neutral, disagree, and strongly disagree.*

Questions	Strongly agree 1	Agree 2	Neutral 3	Disagree 4	Strongly disagree 5
<i>Perceived susceptibility</i>					
11. I am more likely to develop stroke than average person is.					
12. I believe I will get stroke sometimes in my life.					
13. A diagnosis of stroke can change my lifestyle.					
14. I have one or two risk factor(s) for stroke.					
<i>Perceived severity</i>					
15. Stroke can be prevented.					
16. Stroke can have a serious consequence on my quality of life.					

Questions	Strongly agree 1	Agree 2	Neutral 3	Disagree 4	Strongly disagree 5
17. Stroke cannot lead to death.					
<i>Perceived benefits</i>					
18. My medications can reduce my risk to stroke.					
19. Regular exercise cannot reduce my risk for stroke.					
20. Low salt diet cannot reduce stroke risk.					
21. Low sugar can reduce stroke risk.					
22. Following my medical check-up can help to detect my risk to stroke.					
<i>Perceived barriers</i>					
23. The weather is not encouraging for exercise.					
24. There are closed places to perform exercises in my neighbourhood.					
25. My household food contain limited amount of sweet.					
26. Healthy food cost too much.					
27. It is easy for me to access the clinic.					
<i>cues to action:</i>					
28. I have a friend or a family member with stroke.					
29. Nobody explained to me my risk to stroke.					
30. I'm afraid that stroke will make me dependent on others.					
31. My family can supports me to be healthy.					

<i>Self-efficacy:</i>					
32. I will walk after sunset.					
33. I will follow a healthy diet.					
34. I will follow my medication as prescribed.					
35. There are actions that I will do at present to reduce my risk to stroke.					

Thank you for your contribution

Appendix 5: The questionnaire in Arabic

~ D / N B ~

ربر#

استبيان عن الجلطة الدماغية

يستكشف هذا الاستبيان استطلاع معرفتك و فهمك و سلوكياتك اتجاه عوامل خطورة الجلطة الدماغية لديك . و هو مقسم الي ثلاثة أجزاء. الرجاء قراءة الإرشادات مقابل كل جزء قبل الإجابة على الأسئلة.

الجزء الأول: المعلومات الجغرافية و الشخصية

هذا الجزء يسأل عن بياناتك الجغرافية . الرجاء وضع علامة (√) على الصندوق المقابل لإجابة المناسبة لك.

1. العمر:

- أ. 30 - 39 ب. 40 - 49
ت. 50 - 59 ث. 60 فما فوقها

2. الجنس:

- أ. ذكر ب. أنثى

3. المستوى التعليمي:

- أ. لا تقرأ و لا تكتب ب. غير متعلم و لكن تقرأ و تكتب
ت. تعليم ابتدائي ث. تعليم إعدادي
ج. تعليم ثانوي ح. تعليم جامعي
خ. أخرى (حدد طبيعة الدراسة) _____

4. الحالة الاجتماعية (حاليا):

- أ. أعزب ب. متزوج
ت. مطلق ث. أرمل

5. التشخيص الطبي:

الرجاء وضع علامة (√) على الصندوق المقابل لتشخيص حالتك الطبية (بإمكانك الإشارة على أكثر من صندوق حسب حالتك).

- أ. ارتفاع ضغط الدم ب. السكري
ت. أمراض القلب ث. أخرى (حدد الحالة المرضية) _____

6. دخلك الشهري يتراوح بين (بالريال العماني):

- أ. أقل عن 500 ب. 500 - أقل عن 1000
ت. 1000 - أقل عن 1500 ث. 1500 فما فوق

7. تسكن في أي ولاية:

- أ. صور ب. جعلان بني بو علي
ت. جعلان بني بو حسن ث. الكامل و الوافي
ج. مصيرة ح. أخرى (حدد) _____

8. هل أنت حاليا:

- أ. تعمل ب. متقاعد
ت. باحث عن عمل ث. رب أسرة أو ربة أسرة

الجزء الثاني: المعرفة بالجلطة الدماغية، هذا الجزء يستطلع معلوماتك عن الجلطة الدماغية.

9. أي من عوامل الآتية هي من عوامل الخطورة (أو الأسباب) المؤدية للجلطة الدماغية؟ الرجاء وضع علامة (√) تحت كلمة نعم إذا كنت تعتقد أنها من عوامل الخطورة أو (√) تحت لا إذا كنت تعتقد أنها لا تعتبر من عوامل الخطورة؟

لا	نعم	
		أ. ارتفاع ضغط الدم
		ب. نقص الحديد
		ت. السكري
		ث. السفر إلى دول خارجية
		ج. زيادة الوزن بأكثر من 9 كيلوغرام المعدل
		ح. نقص الكالسيوم في أكل الغذاء
		خ. حدوث جلطة للقلب في السابق
		د. تحنين السجائر
		ذ. العيش قريب من محطات الطاقة
		ر. التعرض للشمس بكثرة

10. أي من الأعراض الآتية من أعراض الجلطة الدماغية؟ الرجاء وضع علامة (√) تحت نعم إذا كنت تعتقد انه العرض من أعراض الجلطة أو (√) تحت لا إذا كنت تعتقد انه العرض ليس من أعراض الجلطة الدماغية.

لا	نعم	
		أ. ضعف في جانب واحد من الجسم
		ب. الإسهال
		ت. صعوبة في المشي
		ث. ألم في الصدر
		ج. تيبس (عنان) في جهة واحدة من الوجه
		ح. حرقة المعدة
		خ. ألم مفاجي و شديد في الرأس
		د. حمى
		ذ. التحدث بكلام غير مفهوم
		ر. كحة

11. ما هي الاستجابة المناسبة التي يجب اتخاذها إذا ما ظهرت أعراض الخطورة عليك او على شخص في حضورك ؟ (الرجاء وضع دائرة على الإجابة الصحيحة)؟

أ. استدعاء الإسعاف

ب. الذهاب مباشرة إلى المستشفى

ت. انتظار الموعد لإخبار الطبيب

12. أي من مصادر المعلومات الآتية تعتبره مصدر رئيسي لك للحصول على معلومات صحية بشكل عام و خاص عن الجلطة الدماغية؟

أ. التلفزيون

ب. المنشورات الصحية

ت. الإنترنت

ث. الفريق الطبي

ج. الاهل و الأصدقاء

ح. أخرى (حدد) _____

الجزء الثالث: المعتقدات و السلوكيات الصحية

الجاءات الآتية تستطلع فهمك لعوامل خطورة الجلطة الدماغية لديك إن وجدت ونبيناك للتقليل من خطورتها. بعد قراءة كل عبارة، ضع إشارة (√) في المربع المناسب محددًا مدى موافقتك على الجملة بأحد الخيارات: أوافق بشدة، أوافق، محايد، لا أوافق، لا أوافق بشدة.

العبارات	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
	1	2	3	4	5
13. من الممكن الوقاية من الجلطة الدماغية.					
14. الجلطة الدماغية لا تؤدي إلى الوفاة.					
15. ممارسة التمارين المنتظمة لا تقلل من خطورة الجلطة الدماغية.					
16. تقليل الملح في الطعام لا يقلل من خطورة الجلطة الدماغية.					
17. التقليل من أكل السكر يقلل من خطورة الجلطة الدماغية.					
18. المتابعة على الفحص الطبي من الممكن أن يساعد على استكشاف عوامل خطورة الجلطة الدماغية لدي.					
19. الجو لا يساعد على ممارسة التمارين.					
20. هناك أماكن مغلقة لتأدية التمارين في جوار سكني.					
21. أكل المنزلي تحتوي كمية محدودة من الحلويات.					

العبارة	أوافق بشدة	أوافق	محايد	لا أوافق بشدة	لا أوافق بشدة
	1	2	3	4	5
22. الأقل الصحي يكلف الكثير ماديًا.					
23. من السهل على الوصول إلى العيادة .					
24. لدي صديق أو فرد من العائلة مصاب بالجلطة الدماغية.					
25. لم يشرح لي احد خطورة الجلطة الدماغية لدي .					
26. أنا أكثر عرضة للإصابة بالجلطة الدماغية عن معدل الشخص العادي.					
27. اعتقد إنني سوف أصاب بالجلطة الدماغية في وقت ما في حياتي.					
28. تشخيص الجلطة الدماغية من الممكن أن يغير نمط حياتي.					
29. لدي عامل أو عاملين من عوامل خطورة (مسيبات) الجلطة الدماغية.					
30. الجلطة الدماغية قد يكون لها تأثير خطير على نوعية حياتي.					
31. أنا خائف أن تجعلني الجلطة الدماغية معتمد على الآخرين.					
32. أدويتي بإمكانها تقليل من خطر إصابتي بالجلطة الدماغية.					
33. من الممكن أن تكون عائلتي الداعم لي لأكون صحيحًا.					
34. سوف أمارس المشي بعد غياب الشمس أو صباحًا					
35. سوف اتبع الغذاء الصحي .					
36. سوف أداوم على اخذ أدويتي حسب وصفة الطبيب.					
37. هنالك أشياء بإمكانني أن أقوم بها حاليًا للتقليل من خطورة الجلطة الدماغية لدي.					

شكرا لك لإسهامك في هذا البحث

Appendix 6: The interview guide in English

Interview Guide

Instruction:

Patient should agree to participant in the interview with notice that it the interview will be recorded either by audio recorded or by writing transcript if patient refuse to be audio recorded. Information sheet about the study and a written informed consent should be practiced prior to the interview.

Interviewee:

Patients with three major risk factors (HTN, Diabetes, Heart Disease) and are willing to be interviewed and can contribute to the study.

Introduction:

Introduce myself and reintroduce the study purposes.

Demographic data:

Questions regarding patient information and data will be collected first including: name, sex, age, marital status, and educational level.

Main questions
- Since your diagnosis of (HTN, Diabetes or heart disease), can you tell me the things you have change in your lifestyle. And why? - Tell me about the changes in lifestyle you wanted to do, but not able to do and what kind of support you need to do it? - Following your diagnosis, who gave you the most useful lifestyle advice? -Whom helps you to adopt changes in your lifestyle and how? - How do you describe your health 5 to 10 years from now? - From your experience how the health professional did helps you or can be helpful to you to improve your health? - Can you tell me what worries you about your future health?
- What does the term "stroke" mean to you? - How do you think stroke is related to you? - In what ways might you be susceptible to stroke in the future? ... Why? - Do you have any experience of family or friends with stroke? Can you tell me what happen?(how they found out, how they been treated)? - What did their experience mean to you and how it can influence your health? - If you thought you are developing a stroke at a time, what would you do first?
- Why do you think you have to look after your health? - From your experience, what advice would you give to patients whom discover they are (HTN, Diabetes or heart disease) and why? - is there any things you would like to discuss or add?

Appendix 7: The interview guide in Arabic

دليل المقابلة

المقدمة: التأكيد على انه المقابلة سوف يتم تسجيلها او كتابتها في حالة رفض المريض للتسجيل. التعريف بالبحث و الهدف منه.

المعلومات الديموجرافية (بيانات المريض): تهيئة بيانات المريض في الورقة المخصصة لذلك.

الأسئلة الأتية هي الأسئلة الرئيسية وق تندخل المقابلة أسئلة أخرى على حسب روية الباحث.

الأسئلة الرئيسية:
<ul style="list-style-type: none">- منذ تشخيصك بمرض (السكري, الضغط, القلب) هل بإمكانك أخباري بالأشياء التي غيرتها في نمط حياتك او أسلوب حياتك- أخيري عن التغير الذي تريد ان تحدثه في حياتك ولكن لا تستطيع?- ما هي الأشياء التي تمنعك من إتباع نمط حياة صحي? او تمارس حياة صحية?- بعد أن تم تشخيصك, من هو الشخص الذي أعطاك أفضل نصيحة لنمط حياتك الصحي? او افضل نصيحة صحية و لماذا?- من الذي ساعدك على تغير نمط حياتك و كيف?- كيف تصف صحتك من 5 الى 10 سنين من الآن?- من خبرتك, كيف استطاع الفريق الطبي من مساعدتك تحسين وضعك الصحي?- وكيف يستطيع الفريق الطبي مساعدتك لتحسين حالتك الصحية مستقبلا?- هل تستطيع إخباري ما الشيء الذي يقلقك بخصوص وضعك الصحي مستقبلا?
<ul style="list-style-type: none">- ماذا يعني لك مصطلح (الجلطة الدماغية)? ما هي وما اعراضها وما أسبابها? هل قراءة عنها او تفشت في احد المسلسلات عنها او غيره- كيف تعتقد انه الجلطة الدماغية لها علاقة بك?- بأية طريقة تعتقد انك معرض للجلطة الدماغية في المستقبل..... و لماذا?- هل لديك فرد في العائلة أو صديق مشخص بالجلطة الدماغية? (أسئلة إضافية: ماذا حدث لهم, كيف عرفوا بالتشخيص, كيف تم علاجهم)- ماذا عنت لك تجربتهم وكيف اثر ذلك عليك و على صحتك?- ما هي الخطوات التي تفكر في القيام بها لتقليل خطر الجلطة الدماغية عليك?- في لحظة ما إذا أحسست بحدوث الجلطة الدماغية ماذا ستفعل?
<ul style="list-style-type: none">- لماذا تعتقد انك ملزم بالعناية بصحتك? وكيف تشجع نفسك على المحافظ على صحتك?- من تشجيعك على المحافظ على صحتك?- من خبرتك, ما هو النصائح التي تقدمها لمرضى حديثي التشخيص و لماذا?- هل لديك شي آخر تحب الحديث عنه?

شكر المريض على المشاركة .

Appendix 8: The information sheet in English

Participant' Information Sheet

Project title: [Patients` knowledge, perception and action toward their stroke risk factors in the Sultanate of Oman].

INVITATION

You are invited to participant in this study.

This study aim to explore patients' knowledge, perception and behavioural action toward reducing their risk among patients in Oman.

This study is part of the researcher doctoral degree at the University of Edinburgh, that the project has been approved by the School of Health and Social Science Research Ethics Committee and the Research and ethics Committee in Oman.

WHAT WILL HAPPEN

In this study, you will be asked to respond to a questionnaire. The researcher will provide you with a questionnaire asking about your knowledge, perception and behavioural actions toward your risk to stroke. Also, the researcher might ask you to set for a conversation about your health and your stroke risk.

TIME COMMITMENT

The questionnaire will typically takes between 15 to 20 minutes. If you asked to be interviewed it might take around 30 minutes but not restricted.

PARTICIPANTS' RIGHTS

You will be ask to sign an informed consent to indicate your voluntary agreement to participate in the study. However, you may decide to stop your participation at any time. You have the right to ask that any data you had supplied to that point of withdrawal to be destroyed.

Feel free to ask questions at any time. If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

After the study been published, a copy of it will be available for your review in the clinic notice board.

BENEFITS AND RISKS

This study poses no known risks to you. The study does not provide direct benefits rather than the scientific knowledge and suggests future implication to practice.

COST, REIMBURSEMENT AND COMPENSATION

Your participation in this study is voluntary. There is no reimbursement and compensation for participating in this study.

CONFIDENTIALITY/ANONYMITY

As a default, your personal information will not be revealed. Your name will be coded and renamed on private list and numbers confidently with the researcher. The data will be securely store and destroyed in accordance to the University of Edinburgh policy. The data will be documented in the PhD thesis and published by the University of Edinburgh. The data collected will be presented at conferences and in academic publications. However, the publication will involve only the data not personal identifiable information.

FOR FURTHER INFORMATION

The Researcher name: Salwa Alalawi

I will be glad to answer your questions about this study at any time.

You may contact at: Salalawi@outlook.com or

Call your clinic and leave me your phone number to respond to you

Sur Hospital (Medicine OPD): 25561303

Sur Diabetic Centre: 25561870

If you have a complaint:

If you have any complaint you can contact
Dr Colin Chandler who is the researcher supervisor at
Tel: 0044131 6515168, Email: colin.chandler@ed.ac.uk

Appendix 9: The information sheet in Arabic



معلومات للمرضى المشاركين في البحث

عنوان البحث: المعرفة والإدراك ونية لتعديل السلوكيات الصحية للحد من مخاطر الإصابة بسكتة دماغية لدى المرضى المعرضين للخطر للسكتة الدماغية في سلطنة عمان.

دعوة للمشاركة في البحث:

أنت مدعو للمشاركة في هذا البحث العلمي.

حيث تهدف هذه الدراسة إلى استطلاع المعرفة والإدراك ونية لتعديل السلوكيات للحد من مخاطر الإصابة بسكتة دماغية لدى المرضى المعرضين للخطر للسكتة الدماغية في سلطنة عمان.

هذا البحث جزء من رسالة طالب دكتوراه في جامعة أدنبرة، وهذا البحث تمت الموافقة عليه من لجنة الدراسات والبحوث بكلية الصحة والعلوم الاجتماعية بجامعة أدنبرة وكذلك حصل على الموافقة من لجنة الدراسات والبحوث التابعة لوزارة الصحة بسلطنة عمان.

ما الذي سيحدث:

في هذه الدراسة سوف يطلب منك الإجابة على استبيان، حيث سوف يقدم لك الباحث الاستبيان الذي يسأل عن مدى معرفتك وإدراكك و نيتك لتعديل لسلوكياتك الصحية للتغلب من خطر الإصابة بالجلطة الدماغية. ومن الممكن أن يقوم الباحث لدعوتك لمقابلة للسؤال عن صحتك و خطورة الجلطة الدماغية لديك.

الوقت المطلوب:

خلال فترة انتظارك للدخول على الطبيب سوف يتطلب الإجابة على الاستبيان حوالي 15 إلى 20 دقيقة و إذا تمت دعوتك للمقابلة قد تأخذ حوالي 30 دقيقة أو أكثر.

حقوق المشارك:

سوف يطلب منك التوقيع على ورقة الموافقة على المشاركة التطوعية في البحث و لك كل الحق في الانسحاب من البحث في أي وقت و بإمكانك طلب التخلص من معلوماتك في البحث.

لك حرية طرح أي أسئلة متعلقة بالبحث. وإذا كان لديك أي أسئلة نتيجة قراءة هذه المعلومات بإمكانك سؤال الباحث قبل بدء المشاركة في البحث. عند نشر البحث سوف يوفر الباحث نسجه منه في العيادة في لوحة الاعلانات و بإمكانك الاطلاع عليها.

الفوائد و المخاطر:

هذه الدراسة لا تعرضك لأي خطر. الدراسة لا تقدم فائدة مباشرة و لكن تقدم فائدة علمية و تقترح تحسين الخدمات الطبية.

الكلفة و التعويض:

مشاركتك في هذه الدراسة تعتبر مشاركة تطوعية. ليس هنالك أي تعويض جراء المشاركة في هذه الدراسة.

السرية و الخصوصية:

بطبيعة الأمر، معلوماتك الشخصية سوف لن تكشف، و اسمك سوف يرمز و يعاد تسميته في قائمة خاصة وسرية لدى الباحث. سوف يتم الاحتفاظ بالمعلومات في مكان امن و يتم التخلص منها حسب سياسة جامعة أدنبرة. للمعلومات سوف تنشر في رسالة الدكتوراه بواسطة جامعة أدنبرة و تنشر في المجلات الأكاديمية. و سوف تنشر الإجابات و البيانات و ليس معلوماتك الشخصية.

لمزيد من المعلومات:

اسم الباحث: سلوي العلوي

ارحب بأي أسئلة بخصوص هذا البحث و بإمكانكم التواصل معي على salalawi@outlook.com او على رقم العيادة للتواصل معي:

مستشفى صور: 25561303

مركز السكري: 25561303

إذا كان لديكم اي شكوى التواصل مع:

دكتور كولن شلندر (المشرف العلمي) ت: 00441316515168 او ايميل colin.chandler@ed.ac.uk

Appendix 10: The consent form in English

INFORMED CONSENT FORM

PROJECT TITLE: Patients` knowledge, perception and action toward their stroke risk factors in the Sultanate of Oman.

PROJECT SUMMARY

This research study aims to explore your knowledge and perception about your risk to stroke. You have been selected based on your medical condition or diagnosis. You will be asked to fill a questionnaire for about 15-20 minutes and might be asked to participate in an interview that might take around 30 minutes and not restricted. This will happen during your waiting time in the clinic. If you refuse to participate this will not affect the clinic care provided to you.

By signing below, you are agreeing that: (1) you have read and understood the Participant Information Sheet, (2) questions about your participation in this study have been answered satisfactorily, (3) you are aware of the potential risks (if any), and (4) you are taking part in this research study voluntarily (without coercion).

Participant`s Name (Printed)*

Participant`s signature*

Date

Name of a witness (if necessary) (Printed)*

Signature of a witness (if necessary) *

Date

Name of person obtaining consent (Printed)

Signature of person obtaining consent *Participants wishing to preserve some degree of anonymity may use their initials (from the British Psychological Society Guidelines for Minimal Standards of Ethical Approval in Psychological Research)

Appendix 11: The consent form in Arabic

رقم #

الموافقة على المشاركة في البحث

عنوان البحث: المعرفة والإدراك ونية لتعديل السلوكيات الصحية للحد من مخاطر الإصابة بسكتة دماغية لدى المرضى المعرضين للخطر للسكتة الدماغية في سلطنة عمان.

ملخص البحث:

هذا البحث يستطلع مدى معرفتك وإدراكك بخطورة الجلطة الدماغية، و النية لديك لتقليل من خطر الإصابة بها. تم اختيارك على حسب التشخيص الطبي و العمر و قد يطلب منك الإجابة على استبيان لمدة 15 ال 20 دقيقة و قد يتم اختيارك لمقابلة مدتها حوالي 30 دقيقة أو أكثر. و سيتم ذلك خلال فترة انتظارك في العيادة. في حالة رفضك المشاركة هذا سوف لن يؤثر على تلقيك للعلاج في العيادة. عند توقيعك في الأسفل، أنت توافق على (1) قراءة و فهم معلومات المرضى المشاركين في الدراسة، (2) أي أسئلة عن المشاركة في هذا البحث تم الإجابة عليها بنجاح، (3) أنت تعي المخاطر المحتملة من هذه البحث، (4) أنت تشارك في هذا بشكل تطوعي و (بدون إرغام أو أكراد).

أسم المشارك

توقيع المشارك

التاريخ

أسم الشاهد (في حاجة الضرورة)

توقيع الشاهد

التاريخ

أسم الشخص الذي جمع الموافقة

توقيع الشخص الذي جمع الموافقة

التاريخ

Appendix 12: **interview** information document

Interview Code#

Interview documentation sheet:

Date of the interview:	
Place of the interview:	
Duration of the interview:	
Medical diagnosis of the interviewee:	
Age of the interviewee:	
Gender of the interviewee:	
Education level:	
Working status:	
Marital status:	
Monthly Income status:	
Remakes or comments by the researcher:	

Appendix 13: Examples of themes and extracts

Theme	Sub/theme	Extract
The control is not only in my hands	Physical control	
	- Dependent on car	<i>“But now there are cars in front of the door. It takes us from to doors and we get used to it.” P007</i>
	- difficulty with diet	<i>- “in the beginning, there was some difficulty in diet. When I started to reduce the amount of food, there were some effects on my nutrition status.” P014</i> <i>- “They end with not letting you eat nothing. They kill you from hunger.” P017</i>
	- no time	<i>- “If I don’t have time I don’t walk.” P005</i> <i>- my working system, now you see I just came at six o’clock and I have to relax and should go back by ten at night. I just came for my appointment. I can’t miss it.” P012</i>
	- sickness	<i>- “stopping me, I want to do sport but my knee stops me. I like to walk around but because of my knee.” P001</i> <i>- “I want to walk but recently I had eye surgery and they advised me not to go in sun or wind.” P007</i> <i>- “no, now I got an injury. My sport is less.” P011</i> <i>- “I had inflammation in my joints. The inflammation causes pain, especially when I pray or sit down, I feel stiffness in my joints.” P017</i>

		<p>-- <i>“nothing stopping me, the healthy life is telling you to walk, but I cannot walk. The disease by itself is stopping you. The disease is the barrier that doesn’t allow you to practise a healthy lifestyle.” P002</i></p> <p>- <i>“But this is the problem, if I walk both my legs will be tired here (pointed to his back) I will sit five to ten minutes then I will walk again.” P003</i></p>
	- weather	<i>“ in cold weather I cannot walk” P004</i>
	Psychological control	
	- Psychological stress	<p>- <i>“there are some psychological stress and circumstances, these circumstances happen and it makes stress and pressure and increases the blood sugar, these are the things that cause problems for people from it they will develop diseases.” P014</i></p> <p>-- <i>“because if a person sits and thinks about the disease, this will be the reason his case will be worse. So, better to not think about the disease, he is better to forget he has this disease. Just continue his treatment and forget and he will see how he will be.” P002</i></p>
	- Hide disease	- <i>“yes, I hide my sickness; many of my friends, they don’t know about it. I feel embarrassed, too much embarrassed, not a little. Even they noticed and told me that your weight went down, do you have diabetes?” P017</i>
	- My worries	- <i>“Nothing that worries me only thing related to me children. I’m afraid only about them.” P001</i>

		<p>-- <i>“But will have worries about what you don’t know what will happen to you. I had seen many people who complain of diabetes are exposed to many diseases, many things like heart attack or many other things.” P017</i></p> <p>- <i>“The worry that there will not be any improvement.” P002</i></p>
	- Get used or addicted to drugs	<i>“I don’t want to get addicted to it.” P007</i>
	- Feel of getting old	<p>- <i>“He shouldn’t give up to the disease, either diabetes or hypertension, he shouldn’t give up himself.” P005</i></p> <p>- <i>“We get old, the disease is getting more, we are tired and the death of family members’ brothers and sisters. All the things are getting together.” P007</i></p>
Social control		
	- No accompany	<i>“In the evening time, I don’t have someone at home to go with me” 007</i>
	- The effects of family and friends	<p>- <i>“Some of my friends who have diabetes, in the change of some medication.” P012</i></p> <p>- <i>“The coterie of friends is bad. The problem was being with friends and all in the same car. Try and try. You know the youth.” P011</i></p> <p><i>“The opposite they are telling me not to move, they said, “you are tired and have back pain”. They even get angry at me. Even going to the kitchen they will fight</i></p>

		<p><i>with me. They do everything for me, they cook and clean.” P007</i></p> <p><i>-“Some of my friends who have diabetes, in the change of some medication.” P012</i></p>
	- Traditions	<p><i>-“It got mix, you know here our breakfast, is that [khabiz regeg(bread) and skar(sugar)] bread with oils and I don’t know what.” P011</i></p> <p><i>--“it is time if we have the time or arrange it. We are Omani community, we should go to visit our family and... I’m living with my mother and older son. So I have to visit my brothers. So this takes my time.” P012</i></p> <p><i>-“I attended many social events but as I was telling you I was avoiding these things.” P05</i></p> <p><i>-“it is time if we have the time or arrange it. We are Omani community, we should go to visit our family and... I’m living with my mother and older son. So I have to visit my brothers. So this takes my time.” P012</i></p>
	religious effects	
	- Health in Allah’s hand	<p><i>-“Thanks Allah things are good.” P003</i></p> <p><i>-“It is all from Allah. It is all predestination.” P004</i></p> <p><i>-“well... it is a prescience a prescience.” P005</i></p> <p><i>-“If Allah writes for a person a life he will continue, these are all a reason operation and sickness.” P005</i></p> <p><i>-“Five to ten years everything in Allah’s hands.” P012</i></p>

		<p>- <i>“Future you don’t know, it is Allah know, now you don’t know what will happen to you.” P014</i></p> <p>- <i>“But, I’m putting a hope. I’m holding in Allah and inshAllah it will go.” P002</i></p> <p>- <i>“inshAllah Allah keep it away from me. If it comes that is from Allah.” P007</i></p> <p><i>“I depend on Allah. I’m not afraid of death or anything. If I die thanks Allah. If Allah cures me thanks Allah. Everything in Allah’s hands.” P003</i></p> <p>- <i>“It all from Allah but these maintaining things give you a longer life, and longer life is something from Allah, no doubt about. But if you maintain it you live longer”. P005</i></p> <p>- <i>“try to avoid risk and mainly it is all about sports practice sport and then all in Allah's hands.” P014</i></p>
<p>Slow response to stroke event</p>	<p>Knowledge</p>	
	<p>- I don’t know or know little about stroke</p>	<p>- <i>“I don’t know much about it only little”. P011.</i></p> <p>- <i>“I don’t know about it really”. P03.</i></p> <p>- <i>“paralysis to one side that is it, it calls paralysis nothing else.” P04</i></p> <p>- <i>“he will be either paralysed or he will go with it or he will live like that condition.” P07</i></p> <p>- <i>“the change will be different some will have one side of body paralysis; some will not be able to talk he will see you but will not be able to talk a will be crying if you knew you or because of his condition. He cannot answer you or his condition he</i></p>

		<p><i>might feel in himself that he become in this condition". P017</i></p> <p><i>- "if hypertension is more it will affect the brain and if sugar is more the same thing". P014</i></p> <p><i>- "he will be either paralysed or he will go with it or he will live like that condition." P07</i></p>
	<p>- Knowing or hearing from others about stroke</p>	<p><i>- "first, he loses his consciousness, his eye you feel, and his breath will be weak a little. His face feature will be different". P05</i></p> <p><i>- "I have my aunt, she has hypertension. The reason was hypertension". P012</i></p> <p><i>- "but they will say a fellow got stroke and it make hands or legs become hard or fixed. From there we don't know what is it" 001</i></p> <p><i>-- "There is a one person, he was having hypertension and didn't take his medication, in the morning he was sick not talking. They took him to the hospital, they said he had stroke". P03</i></p> <p><i>-- "I don't know what the cause is. but they said because of increase in hypertension or more cholesterol. This disease starts with these". P03</i></p>
	<p>- Listening to untrusted messages</p>	<p><i>- "I heard that if you got it you have to cough, I'm not sure it might be for heart attack not stroke or may be rumours." P012</i></p> <p><i>- "No this message from India, a doctor from India. I heard they tried it, I don't know if it is correct." P011</i></p>

	Resources availability	
	- Equipment available	- <i>“he should have a blood pressure monitor at home, he can ask his son or daughter to get it for them.” P007</i>
	- The health team is not prepared	- <i>“Nobody advised me. No.” P001</i> - <i>“we ask for awareness.” P012</i> - <i>“at least a training course will prepare them for cases higher like stroke.” P011</i>
	Ask my family or someone to take me to the hospital	- <i>“go only direct to hospital”. P011</i> - <i>“he didn’t go direct to the doctor, if he will be late he might get stroke”. P05</i> - <i>“I ask my children to take me directly to hospital.” P05</i> - <i>“the hospital has expert doctors and instruments.” P014</i>
Perception of stroke risk	Because of my risk I can develop stroke	- <i>“there is relation, diabetes is the relation. It might be increased or reduced and make me fall down.” P011</i> - <i>“I’m exposed to everything, if you have diabetes and hypertension and stress. I’m exposed to it too.” P014</i> - <i>“I’m exposed, I’m exposed. The only way to avoid it is by doing sport.” P011</i>
	I have risk but may not develop stroke	- <i>“I think if I will not continue with my treatment, I didn’t take it, I may expose myself to having a stroke. That is it.” P002</i> -- <i>“I cannot say or determine.” P003</i>

<p>Stroke is not related to me and I will not have it</p>	<p>- <i>"I'm personally excluding it. Allah not to say, inshAllah."</i> P005</p> <p>- <i>"no... no, I pray for everyone to be healthy."</i> P007</p>
<p>I can reduce my risk to stroke</p>	
<p>Doing diet control</p>	<p>- <i>"avoid these foods affect a person like oils and fats, these what is getting us disease. We avoid it now."</i> P003</p> <p>- <i>"avoid fats, sweet, salt, people tell you it has salt is good, no. They have to make for themselves a diet programme."</i> P005</p> <p>- <i>"if you do sport without diet, this is a problem. If you take insulin without diet, this is also a problem."</i> P011</p>
<p>Doing sport</p>	<p>- <i>"Continuing with sport daily."</i> P011</p> <p>-- <i>"with these, I can see myself might avoid a stroke. But if I stop sport and other things this might make me exposed at any time. Unless you practise sport and move your body and you have resistant, this might avoid stroke."</i> P014</p> <p>-- <i>"I'm expose, I'm expose. The only way to avoid it is by doing sport".</i> P011</p> <p>- <i>"I see walking is better. Walking helps improve blood flow."</i> P007</p> <p>-- <i>"walking is important to burn sugar."</i> P005</p>
<p>Feeling optimistic about improving my health</p>	<p>- <i>"my hope in medicine is big, to find a final treatment for diabetic"</i> P012</p> <p>- <i>"as usual I will continue my system and with medication inshAllah my case will be better".</i>P02</p>

	Following treatment	<p>--“who have diabetes to continue their treatment. And who have hypertension to take his medication.” P003</p> <p>--“Nothing in specific as I told you medication with walking and food.” P002</p>
	I did and can do more changes in my lifestyle	<p>-“I started to reduce sugars expect dates, I think 5 dates per day will be enough and sweet, I avoid” P011</p> <p>-“yes, the amount of food and practicing sport and take more water, reduce sugar in diet. And these things’ P014</p>
My motivator	Doctor’s advice had encouraged me	<p>-“I encourage myself by something the doctor tells me.” P003</p> <p>-“from advice, through advice that they gave me, that was useful for me. But, I feel my status become stable much better than before.” P002</p>
	Fear as motivator	
	Fear from stroke	<p>“I depend on Allah. I’m not afraid of death or anything. If I die thanks Allah. If Allah cures me thanks Allah. Everything in Allah’s hands.” P003</p> <p>-“aha, if you don’t take medication you feel afraid.” P004</p> <p>-“kept in my mind this disease is dangerous. For a person who has diabetes or hypertension I advise him he must take his medication.” P003</p> <p>--“diseases and sickness might be worse and multiply.” P014</p>
	Fear from complications	--“I told you about the kidney most of my worries...” P012

		- <i>“Some people had diabetes and not taking medication, will get kidney failure.” P003</i>
	Fear of sickness as motivator	- <i>“the sickness gives you encouragement, if you are sick and tired it will encourage you because you will be exposed to everything.” P014</i> -- <i>“right, but when you are healthy you don’t think about. When you are fine don’t look behind. But when you see yourself sick this is the problem.” P017</i>
	Feel of pain as motivator	- <i>“aha, myself... the disease... I feel the pain”. P004</i> - <i>“I cannot see a patient in pain, I will not go to see patient in this situation. I cannot”. P002</i>
	My family can contribute in my lifestyle	- <i>“My sisters used to tell me to reduce your weight and do sport. My sons also the elder one and the one after him. They told me: mam do sport, reduce your weight and eat well.” P001</i> -- <i>“the madam (his wife). We told her this matter and she took care of food and the needed.” P003</i> - <i>“by regular diet and following up....by walking, she is advising me always. She is in my head. She went through an experience in her family.” P011</i> - <i>“in walking also, he was taking me to walk and he was walking with me. Really, he was useful for me.” P002</i> - <i>“he should have a blood pressure monitor at home, he can ask his son or daughter to get it for them.” P007</i>
	My responsibility toward health as motivator	

	I am my own doctor	<p>- <i>“for myself my life I’m committed. It is a responsibility.” P011</i></p> <p>- <i>“yes., I’m my own doctor and person is a doctor for himself.” P012</i></p> <p>- <i>“of course, for sure, this is a must. I have to care for my health and be committed.” P005</i></p> <p>- <i>“for example, the doctor gives me advice but he doesn't know if I do it or not. It is my health, I take care of it, the things I do inshAllah for better.” P002</i></p> <p>- <i>“no one... only by myself, a person by himself, what he sees harmful to him he should stay away from it, and what is good he should follow it.” P007</i></p> <p>- <i>“I have to maintain my health if I want to live longer.” P005</i></p>
	My children and family want me	<p>- <i>“because I’m responsible towards my family. It is a responsibility.” P012</i></p> <p>- <i>“having my kids in front of me is the main responsibility. It is giving me the encouragement more”. P012</i></p>