

School of Public Health

**Health Behaviour in a Cultural Context:
A Qualitative Study of the Impact Culture and Lifestyle Has on the
Management of Type 2 Diabetes Mellitus Among UAE Nationals**

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**This thesis is presented for the degree of
Doctor of Public Health
of
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Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

Human Ethics

The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007a) updated March 2014. The proposed research study received human research ethics approval from Curtin University Human Research Ethics Committee (EC00262), and Sheikh Khalifa Medical City, Institutional Review Board and Research Ethics Committee approval (#REC-15.01.2015[RS-332]).

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Abstract

The United Arab Emirates (UAE) has seen dramatic changes over the past 45 years. The country was once comprised of small fishing villages and Bedouins living a nomadic lifestyle, where daily physical activity was the norm and such food as meat was a luxury (Hajet, Harrison, & Shather, 2012). In the last few decades, due to a rapid increase in urbanisation and wealth, there has been a major increase in the over consumption of food and inactivity. This has contributed to a society with increased rates of Type 2 Diabetes Mellitus (T2D) and obesity (Hajet et al., 2012).

According to the World Health Organisation (WHO), 422 million adults over the age of 18 had T2D in 2014 (World Health Organisation, 2016a). Globally, the prevalence of diabetes continues to increase (Danaei et al., 2011) with the main risk factors including increased body weight and lack of physical activity (WHO, 2014). In 2012, T2D was the direct cause of 1.5 million deaths, of which 46% occurred among those under the age of 70 (WHO, 2000-2012).

The UAE has a T2D prevalence of 19% among 20–70-year-olds, ranking the UAE as 15th highest in the world (Martinez, 2013). The current management of T2D among UAE Nationals is through a medical model approach, with minimal focus on prevention and early detection. Research shows there is good evidence that prevention strategies can reduce the prevalence and incidence of T2D (Ahmad & Crandall, 2010).

Alhyas, McKay, and Majeed (2012) completed a systematic review of published papers and found 27 studies that focused on the prevalence of T2D in the Gulf Cooperation Council (GCC) region. However, within this review, no research explored the impact that culture and lifestyle has on the prevention and management of T2D among the UAE National population (Alhyas et al., 2012).

This qualitative research study begins to address this gap, with the aim of gaining a deeper understanding of T2D and the UAE National culture. It includes the impact culture has on the prevention and disease management of T2D and the associated barriers. The findings will inform health practitioners, health authorities and health service organisations to enable them to tailor services to culturally meet the needs of this population group, in addition to informing policy at an organisational level (Boutayeb et al., 2012).

This study uses a grounded theory approach to explore T2D among UAE Nationals. Within grounded theory, the research uses a descriptive and exploratory design with an inductive approach. The research was carried out conducting in-depth, one-on-one, face-to-face

interviews (n = 26) with UAE Nationals aged 40–59, who had been diagnosed with T2D for a minimum of three years and were current patients at Sheikh Khalifa Medical City (SKMC) in Abu Dhabi, UAE. Focus groups (n = 2) with health professionals (n = 6) working at the diabetes clinic at SKMC were also carried out.

The semi-structured interview guide was informed by the literature and based on five key areas: diabetes, diabetes knowledge and disease prevention, family response to T2D and disease management, cultural impacts, barriers and enablers to healthy lifestyles, and service provision. The Health Belief Model (HBM) and Social Cognitive Theory (SCT) also helped inform the development of the interview guide. A conceptual framework was used for the research approach, which allowed for themes to be identified and analysed.

A theoretical model was developed from the research findings. The Theoretical Model '*Influences of T2D*' encompasses Culture, Barriers and Enablers to Healthy Lifestyles, and current T2D information and support. The findings demonstrated the main influences on lifestyle and behaviour change were culture and cultural norms, including religion, time spent with family and friends and family history of T2D. Some of the main Barriers to a Healthy Lifestyle discussed were lifestyle and lifestyle changes, food availability and the environment. Conversely, some of the Enablers of a Healthy Lifestyle included family support, availability of physical activity and good food options, and mental health. The majority of T2D information and support was accessed by health professionals such as doctors, dietitians and diabetes educators and through public health campaigns and programs. Discussed within the literature are theories such as cognitive dissonance, self-determination, labelling and the socio-ecological model, which are also linked to the findings within the study.

The study aims to add to the body of knowledge by gaining an understanding of the complexities of what impacts the health behaviour of UAE Nationals in relationship to T2D. The research will also highlight recommendations that were discovered throughout the study. The findings will be transferable to other Arabic population groups including those within the GCC.

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Abbreviations

BMI	Body Mass Index
CP	Client Participant
CPXF	Client Participant X Female
CPXM	Client Participant X Male
CDT	Cognitive Dissonance Theory
GCC	Gulf Cooperation Council
GDP	Growth Domestic Product
HAAD	Health Authority Abu Dhabi
HbA1C	Glycated Haemoglobin
HBM	Health Belief Model
HP	Health Professional
IDF	International Diabetes Federation
IFG	Impaired Fasting Glucose
IRB	International Research Board
LT	Labelling Theory
MENA	Middle East and North Africa
MOH	Ministry of Health
PHC	Primary Health Care
SCT	Social Cognitive Theory
SDT	Self Determination Theory
SKMC	Sheikh Khalifa Medical City
T2D	Type 2 Diabetes Mellitus
UAE	United Arab Emirates
USA	United States of America
USD	United States Dollar
WHO	World Health Organisation

Glossary

GCC	Regional intergovernmental political and economic union consisting of all Arab states of the Persian Gulf, except Iran. Member states include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.
UAE National	A UAE National is an individual born in, a citizen or inhabitant of the United Arab Emirates.
<i>Ramadan</i>	<i>Ramadan</i> is one of the five pillars of Islam. It is the ninth month of the Islamic calendar and is observed by Muslims worldwide. It is the holy month of fasting (<i>saum</i>) where Muslims fast from sunrise to sunset.
<i>EID</i>	<i>Eid Al-Fitr</i> is known as the festival celebrated when Muslims complete their month of fasting. It is also known in English terms as the sweet festival, or <i>Ramadan</i> feast.
<i>Majlis</i>	<i>Majlis</i> is an Arabic word used for a place of sitting and gathering.
Consanguinity	Is a term used to describe an individual who is a blood relation and descended from the same ancestor line as another individual.

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“She believed she could, so she did”

*This PhD is dedicated to my loving and beautiful Mum
who believed in me, my dreams and vision
and always encouraged me to reach for the stars.*

*Thankyou mum for all you gave me, for encouraging me
not to be afraid, and for always reminding me that
'if you want to see a rainbow you have to learn to like the rain'*

Chapter 1 Introduction

1.1 Overview

1.1.1 UAE

The United Arab Emirates (UAE) is a federation of seven emirates, situated on the shores of the Arabian Gulf and the Gulf of Oman, sharing land borders with Oman and Saudi Arabia. The capital of the UAE is Abu Dhabi, located in the emirate of Abu Dhabi. The UAE has a total land area of approximately 83,600 square kilometres. The dominant features of the landscape are flat coastal plains which merge with rolling sand dunes and vast desert hinterland. The UAE is known for its world trading, transportation hub and modern infrastructure (Australian Government, Department of Foreign Affairs and Trade, 2014). According to the 1995 census, the total population of the UAE was 2.7 million, of whom 20% were Arabic UAE Nationals, 25% from other Arab countries, 50% of South Asian origin (mainly India and Pakistan), and 5% from other countries, mainly European and East Asian (National Census, 1995). The 2010 population estimate for the UAE was approximately 8.2 million (UAE National Bureau of statistics, 2015). This population figure is an estimate as the 2010 census was not conducted due to lack of financial resources (UAE National Bureau of Statistics, 2015). Comparatively, in 2015 the estimated total population of the UAE was 9.7 million (Trading Economics, 2016). Throughout a 20-year period (2005–2015) the country's population has seen a rapid growth of approximately seven million, with a decline in UAE Nationals from 20% to approximately 13% (UAE National Bureau of Statistics, 2015).

Over the past five decades major economic and social changes have occurred within the UAE, resulting in rapid economic development and major lifestyle changes in nutrition and physical activity. These changes have seen an increase in obesity, hypertension, type 2 diabetes mellitus (T2D) and tobacco smoking within the UAE and Gulf Region (Arab, 2003). The prevalence of T2D in the UAE is one of the highest in the world (Martinez, 2013), ranked 15th globally with a T2D prevalence of 19% of the total population aged between 20–70 years. The UAE also has the 5th highest prevalence of T2D within the Middle East and North Africa (MENA) region (International Diabetes Federation Diabetes Atlas, 2011). To define diabetes mellitus, both the Martinez study (2003) and the IDF Diabetes Atlas (2011) used the current World Health Organisation (WHO) diagnostic criteria for T2D. This is a fasting plasma glucose of equal to, or greater than, 7mmol/l or 2-hour plasma glucose during an oral glucose tolerance test of equal to, or greater than, 11.1mmol/l (International Diabetes Federation Diabetes Atlas, 2011).

1.1.2 Diabetes

The most common form of diabetes mellitus, T2D, results when the body produces amounts of insulin, but not enough for the body to function properly (Diabetes Australia, 2015). T2D usually occurs due to environmental and sometimes genetic factors, however the risk of developing T2D is substantially increased due to lifestyle factors, such as insufficient physical activity and poor diet. It is often associated with individuals who are overweight, obese, and have hypertension (Diabetes Australia, 2015). T2D can often be prevented by maintaining a healthy lifestyle and can initially be managed by diet and physical activity, however, most individuals need some form of medication to assist in disease management and to help minimise long term complications (Bate & Jerums, 2003).

Weight loss and physical activity have been shown to reduce blood pressure, cholesterol and improve diabetes control; therefore, maintenance of a healthy body weight and the promotion of healthy eating and physical activity would assist in both the treatment and prevention of diabetes (Wing et al., 2001). With the robust relationship between lifestyle behaviours and the prevention and treatment of diabetes, the promotion of individual or population behaviour change and the promotion of healthy eating and regular physical activity for individuals with diabetes is paramount to improving health outcomes and to decreasing the global diabetes epidemic (Wing et al., 2001).

The diagnostic criteria for T2D in the UAE is based on The American Diabetes Association guidelines. The diagnostic criteria are Glycosylated haemoglobin (HbA1c) of more than, or equal to, 6.5%, or an oral glucose tolerance test of more than, or equal to, 200mg/dl (11.1 mmol/l) (Saadi et al., 2010). This was the diagnostic definition used for this research.

Diabetes – UAE

According to the International Diabetes Federation, in 2015 the total cases of adults (20–79 years) with T2D in the UAE was over one million ($n = 1,086,300$) with an estimated total number of cases over 300,000 undiagnosed ($n = 387,200$) (International Diabetes Federation, 2015). According to the Health Authority Abu Dhabi (HAAD), T2D is one of the top leading causes of death in the UAE (Health Authority Abu Dhabi, 2011). Some of the main contributing factors to the high levels of T2D in the UAE are the rise in obesity rates and lack of physical activity (Imperial College London Diabetes Centre, 2011). The modern epidemic of T2D and its association with the rising prevalence of obesity are well established (Wild, Roglic, Green, Sicree, & King, 2004). The WHO predicts the number of individuals in the world with T2D will double between the years 2000–2025 (World Health Organisation, 1998).

The impact of the rapid development of the UAE from a traditional society in the mid-20th century, to a modern society at the beginning of the 21st is difficult to quantify. The rapid change in lifestyle, individual behaviours and environmental and economic factors is thought to have had a substantial influence on individuals, groups and population health status (Hajat, Harrison, Shather, 2012).

The UAE's rapid growth and urbanisation has brought about positive changes in transforming it into a thriving modern and wealthy country offering many opportunities. However, this has also brought about challenges in attempting to manage the population's health status. According to Hajet et al. (2012), the negative impacts of these rapid changes has resulted in the UAE Nationals' lifestyle being characterised by poor diet, high tobacco use (24% males), physical inactivity and high BMI (average UAE total population mean BMI 29kg/m² (Hajet et al., 2012).

1.2 Research Overview

Due to the scarcity of research about UAE Nationals relating to T2D and the extremely high prevalence rates of diabetes among this population group, the focus of this research will be solely on UAE Nationals, excluding the UAE expatriate population.

This qualitative research study will begin to address the research gap, with the aim of gaining a deeper understanding of T2D and the UAE National culture. The findings will potentially assist health practitioners and health service organisations to tailor prevention and healthcare to more appropriately meet the needs of this cultural group, in addition to informing policy at an organisational/government level within the UAE. This study will also be of interest to neighbouring Arabic countries with similar cultural and economic backgrounds such as Saudi Arabia, Qatar, Oman, Bahrain and Kuwait.

1.3 Research Project Objectives

1. To explore knowledge and attitudes about the management of T2D among UAE Nationals with a diagnosis of T2D.
2. To explore the impact the diagnosis of T2D has on the family unit in UAE.
3. To explore how UAE Nationals with T2D manage cultural celebrations and how the Muslim faith influences disease management of T2D.
4. To identify barriers and enablers associated with the management of T2D amongst UAE Nationals.
5. To make recommendations on how health services can develop culturally sensitive programs to better manage T2D among nationals of the UAE.

1.4 Significance of the Research

This qualitative research study gains an in-depth understanding of the impact lifestyle and culture has on the management of T2D among UAE Nationals and will contribute to the limited body of research that has been conducted in the MENA (Middle Eastern and North African), and more specifically, the Gulf Cooperation Council (GCC) region (Abdi, Sadiya, Ali, Varghese, & Abusnana, 2015). As predicted the rates of T2D are going to continue to increase and there is currently little research and limited qualitative studies that allow for the exploration of attitudes and barriers, and enablers that impact on the prevention and management of T2D among UAE Nationals. There are also very few health-promoting interventions that target this age group. This research study could be utilised by local government, public and private healthcare agencies and academic institutions to influence the delivery of culturally appropriate interventions, assist in policy and guideline changes, support government initiatives, and provide new knowledge that is applicable within the UAE, the wider GCC and other cultural groups that are affected by lifestyle and lifestyle changes.

Chapter 2 Literature Review

2.1 Introduction

This literature review explores the influences on the management of T2D for UAE Nationals, with emphasis on the impact culture, lifestyle changes and Westernisation has played on developing and managing T2D. Thought, consideration and analysis of this literature review was informed by literature sourced from the following genres: historical overview (including cultural beliefs, traditions and cultural politics), and prevalence of T2D (including global prevalence, economic, social and environmental impacts and morbidity). Prevalence within the Gulf region, and more locally in the Gulf Cooperation Council (GCC) and the UAE will be discussed to highlight the public health significance of the disease. A historical overview has been included to allow for an increased understanding in the local cultural context, which is vital to this research. Contributing factors to T2D and overseas learnings will also be addressed. Health behaviour models, theories and frameworks have also been explored and their application to this research discussed (Redding, Rossi, Valicer, & Prochaska, 2000). The review has sourced literature specific to the UAE and local area, in addition to relevant global literature. The review will critically review T2D prevention and management interventions. Thought, consideration and analysis of this literature review was informed by literature sourced specific to the UAE and local areas, in addition to relevant global literature.

2.2 Historical Overview

Prior to oil discovery in the 1950s, the local Arabians in the UAE lived a nomadic, Bedouin lifestyle, either in the desert, where farming was the main identity, or by the sea, with sea trading and pearling their identified trade and lifestyle. These groups of Bedouins were independent of each other and formed their own culture and identity from their desert or sea existence (World Culture Encyclopedia, 2017).

In 1962, the first oil was exported from the UAE with the exportation of oil continuing though to today. In 1966 Sheikh Zayed became the ruler of Abu Dhabi with goodwill and generosity, including financial support, being offered immediately to all UAE Nationals (Al-Fahim, 1995). During 1967–1972, the “metamorphosis of Abu Dhabi occurred at a lightning speed” (Al-Fahim, 1995, p137). The city was landscaped by construction and developed, literally overnight, from a sleepy fishing village to a city involved in the exportation of oil, development, and construction. As many of the UAE Nationals at this time were uneducated, the government supported them, by issuing agreements that all foreign companies had to work

in partnership or be sponsored by a UAE National (Al-Fahim, 1995). Government supplies were also only generated from local suppliers which also allowed for in-country business ventures (Al-Fahim, 1995). This then encouraged the local banks to support the UAE Nationals with funds/credit for start-up company costs. This is still the case today. In Abu Dhabi, there are multiple locally-owned, locally-run business, sponsored and supported by UAE Nationals.

In 1971, the country of the UAE was formed between the seven previously independent emirates of the UAE (World Culture Encyclopedia, 2017). After UAE Federation occurred, the government renewed many of its initiatives, including the land grant program (where land was given to UAE Nationals to build businesses for long term stability) and the provision of low cost financing (0.5% per annum). The sudden wealth and change in lifestyle came at a cost to many UAE Nationals. Numerous locals were unable to manage the transition from poverty to wealth. They were also uneducated and unable to manage large sums of money hence many poor investments were made (Al-Fahim, 1995). To assist with this challenge, local government put regulations in place to protect UAE Nationals and assist them in their financial decisions. Up until the late 1980s, the banks were also prohibited from repossessing land against loans that were unable to be paid (Al-Fahim, 1995).

Prior to globalisation and the discovery of oil, UAE Nationals bought and consumed simple necessities, for functional use rather than image. The influence of oil discovery and western lifestyles has resulted in evolving cultural changes. Changes in culture can be seen as a change of identity that has become the driving force behind political, economic and social change.

UAE Nationals are divided into four main social classes: the ruling Sheikh families, the merchant class (known as the pearling merchants) who now sell international goods, the new middle class, and low income groups of newly settled Bedouin nomads, pearl divers and farmers. All UAE Nationals benefit from state laws and the country's strict business regulations (World Culture Encyclopedia, 2017).

The Islamic religion is the cornerstone for all Muslims and is the religion followed by the majority of the population in the UAE (Central Intelligence Agency, 2005). The UAE has seen a rapid change in population structure, where its population includes approximately 88% expatriates (Kapiszewski, 2006). Such changes in population structure can bring about challenges in cultural identity and social interaction (Moore, 1967). Despite the disproportionate imbalance of the local population and the explosion of expatriates to the region, challenging national identity with their own cultural backgrounds, the sense of identity in the region is strong (Castells, 2006). In the UAE, the official language is Arabic, however, English is the language of commerce.

2.3 Cultural Beliefs and Traditions

The history of the UAE is embodied in rich cultural traditions dating back to ancient civilisations. Traditional culture, mixed with modern cultures and lifestyles, makes for a unique society which aims to balance cultural traditions while being open to changes and progression. The discovery of oil reserves has brought about economic growth which has influenced lifestyle changes in the way the UAE Nationals live on a day to day basis. This includes their activities, food and shopping behaviours, moving from traditional *Souqs* to high end shopping malls and luxury stores (Vel, Captain, Al-Abbas & Al-Hashemi, 2011).

However, despite the many lifestyle changes, the tradition of family remains the most important institution and forms the basis of societal life for UAE Nationals. UAE Nationals are heavily influenced by family; conformity and commitment to the group are paramount (Vel et al., 2011). An example of the commitment to religion and culture are the five pillars of Islam. The Islamic faith encompasses submitting oneself to God and the five pillars are tenets to which all members of the Islamic religion adhere to.

The five pillars of Islam are:

- *Shahada*-the profession of the faith;
- *Salat*-praying five times a day (whether it be at work, on the side of the road or at the local mosque);
- *Zakat*-the third pillar representing sharing of wealth with those less fortunate;
- *Saum*-the fourth pillar that represents fasting during *Ramadan*. Muslims fast from sunrise to sunset throughout the ninth month of the Islamic calendar, known as the holy month of *Ramadan*. There is reference to the fourth pillar (*Ramadan*) within this study; and
- *Hajj* is the final pillar which represents the pilgrimage to mecca. All Muslims are expected to participate in the pilgrimage once in their lifetime.

(Raj & Raja, 2017)

The country is also founded on social class and power. Potentially, the display of wealth portrays status and for some, financial wealth could be viewed as a symbol of success that feeds into the materialistic, luxury lifestyle which communicates affluence and social image (Vel et al., 2011). Many UAE Nationals use their family and close friends to aid in decisions in relation to health and purchases, such as property and automobiles (Vel et al., 2011).

Food consumption prior to the 1960s was mainly fish, bread, rice, dates, vegetables, and meat from camels, sheep and goats. The cultural traditions were followed of no alcohol and pork, with meat requiring to be slaughtered in Islamic *Halal* style (World Culture Encyclopedia, 2017). The

Emirati culture is known for its hospitality and socialising with friends and family. Most guests are greeted with coffee and dates (World Culture Encyclopedia, 2017) and the main meal shared with the family is the lunch time meal. At large social gatherings, food is generously shared. Individuals who may be viewed as overweight, are sometimes seen as a sign of wealth, social status and beauty (Badran & Laher, 2011). The importance of sharing food together as a vital component of the Emirati culture contributes to the risk factors for T2D, especially obesity, poor diet and minimal physical activity (Boutayeb et al., 2012).

Within the Emirati culture, women are encouraged to engage in education and to join the workforce. Some cultural traditions do not involve men and women mixing, so many women are employed in education, health or social services (World Culture Encyclopedia, 2017). According to official statements, men and women have equal rights, however, men play a much more significant role in religious life and politics. Individuals have a greater choice in marriage and can marry outside of UAE National status and marriage can be accepted when not arranged (World Culture Encyclopedia, 2017). However, many UAE Nationals still prefer an arranged marriage. In Islam, men are allowed up to four wives; however, many have one wife. Large families are encouraged by UAE National policy; however, the average birth-rate has declined (World Culture Encyclopedia, 2017). The increase of risk factors for T2D in Arabic-speaking countries is also evident following marriage. According to Badran & Laher (2011), physical activity reduces following marriage and food consumption and obesity increases (Badran & Laher, 2011). As discussed earlier, food consumption patterns are influenced by the changes in lifestyle within the UAE and the surrounding Gulf region. Food is part of socialisation and, in some families, a ritual shared with the wider family and friendship group. The food is also managed by home help which also encourages a sedentary lifestyle (Badran & Laher, 2012).

The research indicates that the Emirati culture and T2D are somewhat negatively intertwined. The impact culture and the Muslim religion has on one's ability to manage a disease such as T2D is impacted by multiple social, environmental, societal, and cultural factors. A cross-sectional study that begins to highlight this unique region of the world, and diabetes and culture, collected data in 2013 from 523 people aged 18 and over, who had had T2D for more than one year using a self-administered questionnaire (utilising the illness perception questionnaire & Morisky Medication Adherence scale) (Ashur, Shah, Bosseri, Morisky, & Shamsuddin, 2015). The study found the most common perception of T2D was that it was given to them as Allah's will. Other significant predictors of medication adherence included an individual's perception of diabetes, treatment control, being male and employed (Ashur et al., 2015).

2.4 Cultural Politics

The UAE is one of the world's wealthiest nations, with one of the highest Growth Domestic Products (GDPs) in the world. In the year 2000, the country's GDP per capita was approximately \$25,000 (Central Intelligence Agency, 2005). Given the population of UAE Nationals is relatively small compared to that of expatriates (Davidson, 2006), the GDP per capita based solely on the UAE National population, would make it one of the highest GDPs in the world (Nation Master, 2000). The UAE's history exemplifies one of the most powerful autocratic systems in the world, (Freedom House, 2005) promoting rapid modernisation, political stability and peace while being surrounded by civil unrest in neighbouring countries (Davidson, 2006).

To promote stability and peace in the UAE, the ruling family (hereditary), distributed wealth in-country and developed alliances with some of the biggest oil buyers globally. Loyalties lie both within and outside the ruling family and the leaders in power align themselves with tribal support (Davidson, 2006). Since the discovery of oil, Abu Dhabi remains the wealthiest Emirate of the seven Emirates, due to its oil and gas reserves and has always, and continues to, support the other Emirates financially. As discussed earlier, property loans and grants, interest free bank loans, and other monetary offerings are offered to all UAE Nationals (Davidson, 2006).

Working in collaboration with the ruling family in each emirate, the UAE's Federal Government comprises a President, a Supreme Council and Cabinet, a Federal National Council, and an independent judiciary with a Federal Supreme Court. Under the umbrella of the federal system, each Emirate family rules their own emirate as a local government system (World Culture Encyclopaedia, 2017).

2.5 Prevalence of Type 2 Diabetes

2.5.1 Global

T2D is a globally increasing disease, similar to the other non-communicable diseases which are being addressed globally by national and international agencies, including the World Health Organisation (WHO), the United Nations (UN) and the International Diabetes Federation (IDF). In 2013, the IDF produced the 6th edition of the *Diabetes Atlas*, which stated that there are 382 million people living with T2D (International Diabetes Federation, 2014) which is predicted to increase to 592 million by 2030 (International Diabetes Federation, 2014). A similar trend was illustrated in a recent WHO global report on diabetes, which stated

that the rates of individuals living with diabetes had increased from 108 million in 1980 to 422 million in 2016 (WHO, 2016a).

WHO states that the prevalence for adults with T2D over the age of 18 had increased from 4.7% in 1980 to 8.5% in 2014 (WHO, 2016a). In contrast, based on the United Nations population estimates, the worldwide prevalence of T2D was 2.8% in 2000 and was projected to increase to 4.4% by 2030 (Wild et al., 2004). While these statistics vary, both indicate an increase in the prevalence in T2D over time. The statistics based on the UN projections have potentially under-estimated the increase in the prevalence of T2D over time, compared to the WHO prevalence estimates. The causes of variance in the statistics from both the UN and the WHO are due to the data being collected during different time periods and of varying age criteria. The WHO reported that the increase in prevalence had been seen more in middle to low-income countries (World Health Organisation, 2016a) and highlighted that maintaining a healthy diet and participating in regular physical activity can assist in the prevention or delay of developing T2D (World Health Organisation, 2016a).

The IDF *Diabetes Atlas* indicated the countries experiencing diabetes growth include South East Asia, Sub-Saharan Africa, the Western Pacific and the Middle East, with a projected prevalence of 96.2% in the MENA Region by the year 2030 (IDF, 2011). It is believed that this is attributed to the lifestyle changes caused by large economic growth and development (Rahim et al., 2014).

The WHO global report supports these findings, indicating the majority of the increase in prevalence were from similar counties, especially the Pacific Island Nations, Middle East and North Africa. The report further details that North Western Europe has the lowest rates of T2D. In 2014, over half the adults with T2D lived in China, India, the United States, Brazil and Indonesia (WHO, 2016b).

Economic, Social and Environmental Impacts

The burden of T2D globally is not a new phenomenon. In 1998, the global burden of disease projections for 1995–2025 were published (Aubert et al., 1998), with the aim of estimating the number of individuals with T2D and the prevalence of those who were aged over 20 in all countries for the years 1995, 2000 and 2025 (Aubert et al., 1998). The prevalence rates were applied to the United Nations population estimates, whilst developing countries were reviewed independently (Aubert et al., 1998). The projections indicated that the prevalence of T2D worldwide would increase from four percent in 1995 to 5.4 percent in 2025 (Aubert et al., 1998). The number of adults with T2D will increase from 135 million in 1995

to 300 million in 2025 (Aubert et al., 1998). The projection also highlighted an increase in urban areas (Aubert et al., 1998).

In relation to demographic changes, WHO noted that by the year 2050 it is likely that more than 70% of the global population will live in urbanised cities which offers both opportunities, and challenges, particularly for health (World Health Organisation, 2016c). There is an increased risk of a further escalation in non-communicable diseases in urban environments, particularly those with an increase in population in a small locality (World Health Organisation, 2016c).

In 2013, WHO delivered the Global Action plan for the prevention and control of non-communicable diseases for 2013–2020 (World Health Organisation, 2013). Within this action plan cost saving interventions, including screening for early signs of diabetes and related diseases such as kidney disease, were promoted, alongside interventions such as blood lipid control and regular screening and treatment for retinopathy (World Health Organisation, 2013).

Morbidity

The global loss attributed to T2D is significant and continues to increase steadily each year. The statistics presented on T2D global prevalence are varied and the way data is collected and reported is also diverse. The Global Burden of Disease study reported that, globally, in 2010 there was a total of 52.8 million deaths of which 34.5 million deaths were attributed to non-communicable diseases (Lozano et al., 2012). In 2010, 1.3 million deaths were attributed to T2D, which is double that of 1990 (Lozano et al., 2012). The WHO stated that by 2008, diabetes mellitus was one of the 10 leading causes of death in both middle income and high income countries, with a global death rate of 1.26 million annually (World Health Organisation, 2008a). The rise in T2D globally (Lozano et al., 2012) can be attributed to an increase in diagnostic availability, population growth, and an increase in the average age of the population worldwide.

2.5.2 Gulf Region

The Gulf States is a term widely utilised to represent the Gulf Co-operation Council (GCC) of the Arab states in the Gulf Region. These countries include the UAE, Bahrain, Saudi Arabia, Oman, Qatar and Kuwait. The countries are run independently of each other, but support each other in representing their culture and religion and sharing land and sea borders.

Based on IDF findings, within the Gulf region the majority (nearly three quarters of the population) of those with T2D are under the age of sixty, resulting in an increased health and

economic burden to these emerging nations, in comparison to developed countries where the prevalence tends to be higher among older adults (Boutayeb et al., 2012).

Within the broader region, a systematic review conducted by Zabetian, Keli, Echouffo-Tcheugui, Narayan, and Ali (2013) included studies focusing on diabetes in the MENA region from 1990–2012. The review found a lack of prevalence data in the region. Prevalence varied across studies from 2.5% in 1982 to 31.6% in 2011, with the main risk factors older age, obesity and an increase in BMI (Zabetian et al., 2013).

This review identified the need for enhanced surveillance data within this region to better understand the global diabetes epidemic. This information would aid policy makers, government, health authorities, and health institutions in understanding the ‘real’ burden of disease and assist in a more appropriate design and implementation of prevention strategies, to meet the needs of the local area (Zabetian et al., 2013).

Currently, the UAE data is aggregated with the MENA grouping, where there are vast contrasts in the MENA countries’ wealth, lifespan and health status (Brownie et al., 2014). The UAE and many of the other GCC countries are in the World Bank’s high income category; therefore, there is a need for them to be benchmarked on a more homogeneous level. Due to the rapid changes in urbanisation and opulence, and changes in dietary intake and physical activity, the UAE and GCC alike require a more culturally focused and contextual comparison (Brownie et al., 2014).

Data reported at the 5th IDF conference in Dubai in 2012 showed six out of ten countries with the highest prevalence of T2D among adults aged 20-79 were based in the Arab region (Boutayeb et al., 2012). These countries included Kuwait, Lebanon, Qatar, Saudi Arabia, Bahrain and the UAE (Boutayeb et al., 2012). These figures, derived by IDF, were based on estimates by different authors relating to a variety of studies carried out in different Arabic countries and different regions. The comparisons were made across countries using four main variables, and including prevalence data shown in the WHO standards as published by IDF: impaired glucose tolerance (IGT); T2D related deaths and T2D expenditure (Boutayeb et al., 2012). Due to the lack of data in many countries in the Arab region, the IDF used extrapolations from neighbouring countries or from local data released by Arab governments at a local or National level. They used a comparison with any data published by researchers in the region between 1997-2011, with no set criteria for the studies included in the analysis (Boutayeb et al., 2012).

Another systematic review focused on the prevalence of metabolic syndrome among the population of the GCC (Marby, Reeves, Eakin & Owen, 2010). The literature search identified

nine studies of relevance which were undertaken between 2003–2009; of these, four were considered of high quality and indicated that the prevalence of metabolic syndrome ranged from 20.7%-37.2% (using the adult treatment panel definition) and 29.6%–36.2% (using the IDF definition) (Marby et al., 2010). These four studies were undertaken in:

- 2004 in Kuwait (1);
- 2005 and 2006 in Saudi Arabia (2);
- 2008 in the UAE (1).

High quality was determined based on the following four criteria:

- Equal gender representation;
- At least 500 participants of each gender represented in the study;
- A National level population sample.

An explicit sampling method was utilised (Marby et al., 2010). Limitations included that the review was restricted to only four studies and the studies reviewed were only those published in English (Marby et al., 2010).

A systematic review of studies between 1990–2009 found a total of 38 studies which had a National representation investigating the prevalence of excess weight, obesity and nutrition related non-communicable diseases in the GCC. The 38 studies include a mix of research conducted with both adults and children; however, obesity and excess weight rates among middle-aged adults were found to be highest in both Saudi Arabia and Kuwait, compared to all other Gulf States. There was limited comparable data on the UAE and Oman (Ng, Zaghoul, Ali, Harrison & Popkin, 2010). The prevalence was based on a mix of both self-reporting and measured results. For example, some studies used self-reporting for diagnosis, while other studies took clinical measurements. The data may be problematic due to various measures being used in each study, therefore obtaining differing estimations which are difficult to quantify and compare. For illustration, among the measures used to assess children and adolescents, measures for excess weight and obesity varied, as each study utilised different guidelines. Non-communicable diseases, including hypertension and T2D, increased with age with the UAE identified as having the highest prevalence in the Gulf Region due to a rapid increase between 1995 and 2000. Further studies, such as household or individual surveys, are required to identify the factors contributing to these trends (Ng et al., 2010).

Comparative data searches on research in the GCC found that some of the other Gulf states carry out more active research than others. Some examples of studies from various GCC countries are described below.

Qatar

A cross sectional study was conducted in semi-urban and urban Primary Health Care (PHC) centres in Qatar in 2009, incorporating over 1000 participants aged 20 years and over (Bener, Zirie, Janahi, Al-Hamag, & Musallam, 2009). Face-to-face interviews were conducted using a structured questionnaire followed by laboratory testing. The prevalence of T2D was found to be 16.7%. In this study, the prevalence of newly diagnosed diabetes was 5.9%, and the prevalence of impaired glucose tolerance was to be 12.5%. The rates of diabetes were higher in Qatari women (53.2%) than in Qatari men (46.8%) with the 40–49-year-old age group reporting the highest prevalence of 31.2%. The prevalence increased with age and a family history of diabetes and smoking was high in those with diabetes (Bener et al., 2009).

Saudi Arabia

In 1997 Al-Nuaim explored the prevalence of glucose intolerance in urban and rural communities in Saudi Arabia. The purpose of this study was to gain an understanding of the trend of T2D prevalence in the Arab world and suggest programs to reduce the burden of disease (Al-Nuaim, 1997). The study was based on a household survey of those living in Saudi Arabia between 1990–1993 and aged 15 and older ($n = 37,000$). The findings established that obesity, age and family history were associated with T2D and, in addition, the need for a multidisciplinary approach. A focus on the female participants for reducing risk factors, such as inactivity and obesity, was also required (Al-Nuaim, 1997). Findings of the study illustrated that to reduce the burden of disease, prevention strategies are required to promote a healthy lifestyle, including physical activity and healthy dietary intake (Al-Nuaim, 1997). The health authorities in the region are also responsible for providing prevention strategies and early diagnosis, to avoid the increasing burden of diabetes in the region (Al-Nuaim, 1997).

Oman

Comparative research was undertaken using both 1991 and 2000 household surveys. Participants are Omani Nationals aged 20 years and older (Asfour et al., 1995). The 1991 survey participants consisted of 5086 ($n = 2,128M$ & $2,958F$) and in 2000, the total equalled 6400 ($n = 3,069M$ & $3,331F$). In 1991 participants were requested to visit the nearest health centre for anthropometric measurements to be taken, while in 2000, the measurements were conducted by trained health professionals in the home. The survey conducted in 1991 found a high prevalence of T2D (10%) and impaired glucose tolerance ($F=13%$, $M=8%$). The 1991 survey was reanalysed, together with the national survey undertaken in 2000. The two cross-sectional surveys found that the prevalence for women had decreased by 1.2%, while there

had been an increase among males of more than six percent between 1991-2000 (Al-Lawati & Jousilahta, 2004). The research suggests that the reason for an increase in males during this period could be due to the rapid change in lifestyle from active jobs to increased sedentary roles. For women, the decrease could be attributed to a decrease in fertility rates, awareness of self-image and an increase in education (Al-Lawati & Jousilahta, 2004). The survey also illustrated that the prevalence of diabetes increased with age for both males and females. The prevalence of impaired glucose tolerance was more than 50% among women in their seventies and men in their eighties, respectively (Al-Lawati & Jousilahta, 2004).

Additional studies were undertaken with the Omani population in 2006 to gain further understanding as to whether urban or rural dwelling plays a significant factor in the development of diabetes (Al-Moosa, Allin, Jemai, Al-Lawati, & Mossialos, 2006). The findings clearly illustrated a higher prevalence in urban areas; for example, prevalence of T2D was 17.7% in the capital Muscat, in comparison to 10.5% in rural areas (Al-Moosa et al., 2006). The survey also indicated that there was a significant association between an individual's age, urban dwelling, obesity and high levels of blood pressure with diabetes (Al-Moosa et al., 2006).

2.5.3 UAE

The estimates of the prevalence of diabetes in the UAE is based upon, and informed by, regional and global research which indicates that the rate of diabetes in the UAE is one of the highest in the GCC and the world (Hunter, Robb & Brownie, 2014).

Innovative studies focusing on T2D in the UAE began to be undertaken in the early 1990s. One of the first studies in the region was a community-based survey which focused on UAE Nationals (n = 322, 20 years and over) and diabetes, obesity and hypertension. This study found that those individuals living in urban dwellings had higher blood glucose levels and were classified obese. It also illustrated that females living in urban dwellings had higher Body Mass Index (BMI) than males (El-Mugamer, Zayet, Hossain & Pugh, 1995). Health record analysis also indicated a higher prevalence of diabetes among females, with a gradual rise in prevalence among older adults (Balasy & Radwan, 1990). These studies recommended further research to determine the perceived difference between urban and Bedouin dwelling and its impact on the development of chronic diseases. Further research was also recommended on tribal influence, to gain a better understanding of on the impact the tradition of consanguinity in the UAE has on the genetic development of T2D (El-Mugamer et al., 1995).

According to El-Sharkawy (2004), in support of these findings two unpublished studies were conducted in 1997–1999 and 1998–2000 which reinforced the theory that diabetes

prevalence was higher among UAE Nationals, and higher in urban areas, compared to rural settings (El-Sharkawy, 2004). The first study was conducted by Dun and Colleagues in Al Ain, between 1997–1999; a random sample of UAE Nationals aged 30 and older demonstrated a prevalence of T2D (20%) and 25.4% in urban dwellings, compared to 14.1% in a rural environment (El-Sharkawy, 2004). This study was not published and there is no further information in El-Sharkawy's article as to how this data was obtained. The authors did not report the number of participants in the study. The second unpublished study is a National survey conducted by the Ministry of Health (MOH) and the WHO between 1998–2000 examining both UAE Nationals and expatriate adults (n = 6609; UAE Nationals n = 2363; Expatriate n = 4246) (El-Sharkawy, 2004). The findings showed an overall T2D prevalence of 19.6%, with a prevalence rate of 24% among UAE Nationals (El-Sharkawy, 2004). During the two years of the study, there was a clear rise in diabetes among the UAE population.

For many children and adolescents living in an environment where food is readily available and there is a lack of dietary supervision in the home, it can be difficult to maintain a healthy weight (Musaiger et al., 2013). From the 1999 UAE National Iodine Deficiency Surveillance Study data was analysed to review the prevalence of excess weight and obesity among children in the UAE (Malik & Bakir, 2007). Height and weight was used to calculate BMI, which was calculated using the International Obesity Taskforce (IOTF) reference charts. These indicated greater than 25kg/m² as overweight and greater than 30kg/m² as obese (Malik & Bakir, 2007). Anthropometric measurements were based on WHO protocols and a trained nurse carried out the height and weight measurements. The height measurements were carried out in centimetres and weight was calculated using a balance scale calibrated every day. Within this study, BMI is calculated by weight (kg) divided by height (metres). The findings indicated that (21.5%) of children (n = 4381, age = 5-17 years) were overweight and (13.7%) were obese, with girls being more likely than boys to be overweight (Malik & Bakir, 2007). The reasons given for the increased trend in children being overweight and obese included changes to traditional eating habits as the lifestyle and environment changed. Perhaps being overweight was a sign of wealth and status in this cultural environment (Malik & Bakir, 2007). The study highlights the need for prevention strategies to be implemented towards halting the trend in obesity among children in the UAE (Malik & Bakir, 2007).

In 2010, fifteen years after the initial published studies on diabetes among UAE Nationals, and with the support of the MOH, three major hospitals and nine primary care centres recruited 23,064 volunteers to participate in the Emirates Family Registry (Alsafar, Jama-Alol, Hassoun, & Tay, 2012). Patients' information (n = 23,064) was collated from nine primary care centres and three hospitals within the UAE and, according to the patients' medical records, 88% of the patients were classified as having T2D. The findings also indicate that

59% of the patients diagnosed with T2D were between the ages of 40–59 years. Thirty percent of the original 23,064 patients were UAE nationals, with 21% of these UAE Nationals being diagnosed with T2D. Seven hundred and forty-one UAE Nationals agreed to donate blood in phase one of the study. Participants were categorised as: healthy non-diabetic (47%), diagnosed diabetic (23%) and pre-diabetic (30%) (Alsafar et al., 2012). The results from this sample demonstrate that the prevalence of T2D among UAE Nationals in 2010 is similar to that of the mid–1990s.

In justification of the Emirates family registry study carried out in 2010, a systematic literature review was conducted to identify the main health priorities for the UAE (Loney et al., 2013). Databases Medline, EMBASE and PsycInfo were searched for the period 1950–2012. Information was also gathered from reports by local health authorities, hospitals, local government agencies and also through personal contact with staff at local government agencies and health authorities. From the search, the four-main public health priority areas for the UAE included cardiovascular disease, injury, cancers and respiratory disorders (Loney et al., 2013). It was also noted that the data sets from the UAE were outdated, and that up to date data would be useful for understanding the occurrence and trends of disease in the UAE (Loney et al., 2013).

A cross-sectional study of 447 individuals aged between 18-80 of both genders with T2D attending primary health centres in three Gulf countries (the UAE, Oman and Bahrain) was conducted in 2005. The study excluded those with gestational diabetes and type 1 diabetes and tested for levels of albuminuria and micro albuminuria. After fasting overnight, each participant carried out a morning spot urine test and the results indicated that overall, 36% of participants had albuminuria and 32% had micro albuminuria, with increasing prevalence accompanying increased age and duration of T2D (Prashanth et al., 2010). These levels were similar to those reported from both The Global Developing Education on Microalbuminuria for Awareness of Renal and Cardiovascular Disease Risk in Diabetes (DEMAND) study (39%) (Parving, Lewis, Ravid, Remuzzi & Hunsicker, 2006) and the Asian DEMAND study (44%) (Pan et al., 2008). The levels reported for microalbuminuria in the gulf region was 4% among those with T2D (Prashanth et al., 2010), while the overall prevalence in the global age standardised DEMAND study was 10% and 3.5% in the Italian DEMAND study (Rossi et al., 2008). Kidney disease can be attributed to a combination of poor glycaemic control and poor control of hypertension (Parving et al., 2006).

A systematic review was carried out on studies based on the GCC countries (Alhyas, McKay & Majeed, 2012). The search identified 27 studies. All were cross-sectional and were published between 1980–2000. Six of these studies were based on the UAE population (Alhyas, McKay, & Majeed, 2012). One study considered that the UAE population had

relatively high rates of diabetes. The review also suggests that diabetes prevalence increases with age and there was clearly a higher rate among urban dwellers, as opposed to those living in rural environments (Alhyas, Mckay & Majeed, 2012).

This review was limited by some of the definitions used as well as the methodologies undertaken that were difficult to use comparatively. Some literature relied on previous records for diagnosis and, sometimes, the diagnostic criteria was unclear. One study relied only on blood sampling for diagnosis and prevalence estimates, while another study disregarded individuals who had dyslipidaemia; in both cases prevalence, could be under-reported. One study used primary care consultations to measure prevalence rather than using the population; by doing this there may have been loss of cases to secondary care with the prevalence rates misrepresented (Alhyas, Mckay & Majeed, 2012).

More recent findings suggest the prevalence of T2D in the UAE in 2013 was 18.98%, in comparison to the global prevalence of 8.3%. These estimates were not age standardised. However, Abu Dhabi is burdened with high rates of obesity, diabetes and other non-communicable diseases, and there are gaps in reliable health data sets and published health and demographic status (Brownie et al., 2014).

Population figures of the UAE are difficult to ascertain, with the most recent population data published in 2010 and the latest census data based on 2005 figures. As the population of the UAE increases, so too does the burden of disease (Hunter et al., 2014).

What also makes the UAE more complex is its unusual population mix of expatriates, UAE Nationals (UAE Nationals=11.5% in 2010) and a large male labour workforce, comprising a large proportion of the expatriate population. Diabetes trends in the UAE need to be assessed using population-based surveys with appropriate diagnostic tools (Hunter et al., 2014).

A screening program for UAE Nationals called the *Weqaya* Screening Program was undertaken from 2008–2010 (data analysis is based on data collected from April 2009–June 2010) and has provided the Emirate of Abu Dhabi with an extensive baseline health profile which highlights the magnitude of non-communicable disease burden among UAE Nationals (Hajat, Harrison, & Al Siksek, 2011). Of the 173, 501 Nationals screened, 50,138 (28.9%) were included in an initial analysis indicating extremely high rates of T2D, obesity, pre-diabetes and hypertension. Of the 50,138 included in the initial analysis, ‘67% were either overweight or obese (BMI greater than 25kg/m²) and 57% had central obesity (using hip to waist ratio 0.85 or greater among women and 0.9 or greater among men)’ (Hajet et al., 2012,

p3). Of the 28.9% included in the initial analysis, T2D was present in 18%, while 27% had confirmed pre-diabetes.

The *Weqaya* program may be a useful guide in understating the prevalence rates for diabetes in Abu Dhabi. Interestingly, the data and data collection process is not publicly available and the IDF has not used the *Weqaya* program data in their estimates (Hunter et al., 2014). The program was a one-off to gain a baseline understanding of the cardiovascular risk among UAE Nationals. To date, the program has not been repeated (Hunter et al., 2014).

A quantitative study that investigated glucose intolerance and associated factors, such as obesity and hypertension, in the multi-ethnic population in the UAE was carried out in 1999–2000. Participants aged between 20–70 years (n = 5844) were drawn from 4000 randomly selected households. Both UAE Nationals (n = 2360) and UAE non-Nationals (n = 3484) participated in the research, however workers living in worker's barracks were excluded. This study used the WHO definition for abnormal glucose tolerance with a diagnosis of T2D given when venous blood glucose concentration is equal to, or greater than, 7.0mmol/l and/or a venous blood concentration of equal to, or greater, than 11.1mmol/l two hours' post completion of the oral glucose tolerance test (Malik, Bakir, Saab, & King, 2005). Impaired Fasting Glucose (IFG) was defined on the basis of a venous blood concentration of 6.1-6.9mmol/l (Malik et al., 2005). The study was contained to those diagnosed with T2D or IFG, and did not screen for Type 1 diabetes and gestational diabetes (Malik et al., 2005).

The crude prevalence of diabetes was 20%, however of the 2,360 UAE nationals sampled, the prevalence of T2D was 25%, in comparison to 13%–19% among non-nationals from countries such as Syria, Jordan, Palestine, Iraq, Egypt, North Africa, Sudan, East Africa and North Asia. IFG was also observed in four to six percent of the expatriate group and nine percent of UAE Nationals (Malik et al., 2005). The study also found that the prevalence of obesity and hypertension was high in the adult population of the UAE, with overall levels particularly high among UAE Nationals (Malik et al., 2005). Blood pressure levels were highest among individuals with diabetes and IFG and higher among men than women (Malik et al., 2005).

The WHO, 1977 World Health Assembly agreed the main target globally was the implementation of the WHO Health for All 2000 strategy. The strategy set targets for every person across the world to have access to healthcare and to be able to lead a productive, social and economically stable life by the year 2000 (WHO, 1998). To support the WHO Health for All 2000 strategy, a study was undertaken in 2013 with the objective to estimate the prevalence and determinants of obesity in childhood and adolescence and their association with blood pressure in Abu Dhabi. UAE. A total of 1,541 students aged between 6–19 years were

randomly selected from 246 schools (50% were male) (Al-Junaibi, Abdulle, Sabri, Hag-Ali, & Nagelkerke, 2013). A total of 1,440 students provided results. Of this total, 7.6% were underweight, 14.7% overweight and 18.9% obese. Within this study, UAE Nationals (n = 1035) also participated and of this group, 8.3% were underweight, 14.2% overweight and 19.8% obese (Al-Junaibi et al., 2013). Obesity significantly increased with age and being of an older age and male, lack of dairy intake and higher BMI among parents are contributing factors to the high rates of obesity among this population group (Al-Junaibi et al., 2013). These high rates of obesity clearly indicate an urgent need for a complete system overhaul.

2.6 Contributing Factors to Type 2 Diabetes

To decrease morbidity and mortality and improve long term outcomes for individuals with T2D, awareness of healthy living is vital together with the promotion of physical activity and a healthy dietary intake (International Diabetes Federation, 2014). It is critical that governments, health professionals and policy makers work together to combat the risks associated with diabetes (and obesity), and ensure diabetes is on the health and political agenda to lower the prevalence of diabetes globally (International Diabetes Federation, 2014).

A systematic analysis of the Global Burden of Disease Study 2010 was undertaken, reviewing both published and unpublished data in 1990 and 2010 (Lim et al., 2012). The findings showed that combined dietary risk factors and a lack of physical activity accounted for 10% of the global disability-adjusted life years (Lim et al., 2012). These findings are attributed to not only T2D, but also to many other non-communicable diseases. The rise in the risk factors could also be attributed to change. This is in exposure in addition to an ageing population, which has been shown to produce a change in causes of death (Lim et al., 2012).

2.6.1 Global

There are many contributing factors to the rise in T2D globally. The diabetes epidemic is now seen in both developed and developing countries and is one of the main public health challenges for the 21st, century including the management of the economic costs and health burden due to premature morbidity and mortality (Zimmet, Alberti & Shaw, 2001). Some of the contributing factors include environmental, behavioural and lifestyle changes, such as sedentary existences, a consumption of high fat foods, globalisation and people living longer (Astrup & Finer, 2000). Some examples of these changes include the introduction of computerisation, changes in work patterns, from labouring to sedentary work, and improved transport which has decreased the uptake of walking (Zimmet, 2000). When designing health interventions for the reduction in non-communicable diseases such as T2D, these lifestyle changes need to be

considered, including the reduction of access to high fat, high calorie foods. An example of a public health initiative supported by the government of Philadelphia in the USA, is the *Get Healthy Philly Campaign*. The campaign implemented changes in public health policy, providing physical activity facilities at workplaces, produced changes in taxation and reimbursement for health promotion, installed monitored weighing machines in the streets of the city and many other health promotion initiatives (Bonetta, 2001). Some of the other health promotion initiatives supported by the Philadelphia Government included implementing farmers' markets in low income communities, providing incentives to over 600 corner stores to provide healthier food options, encouraging schools to eliminate junk food from schools and ensuring physical activity is included daily (Philadelphia Department of Public Health, 2011). Many schools across the city made these changes (120/171) and 50 other schools also initiated movement breaks during class to promote movement and activity (Philadelphia Department of Public Health, 2011). The government also supported the provision of calorie-labelling information on vending machines and reduced the availability of soda drinks with high sugar content (Philadelphia Department of Public Health, 2011). The 2014 *Get Healthy Philly Annual Report* outlines the main outcomes of the campaign which include an 18% reduction of smoking prevalence among adults since 2008 (age not specified) and a 30% reduction in smoking among youth since 2007 (age not specified) (Philadelphia Department of Public Health, 2014). The report also highlights a reduction in childhood obesity of 6.3% since 2006/7 from 21.7% to 20.3% (numbers and ages not specified), however there was a greater reduction evident in childhood obesity among the African American and Asian population groups compared to other populations (Philadelphia Department of Public Health, 2014).

In general, research demonstrates that physical activity plays a vital role in prevention of T2D, obesity and cardiovascular disease (Hamilton, Healy, Dunstan, Zderic & Owen, 2008). An increase in physical activity can have a positive effect on an individual's overall health, mental health, quality of life, morbidity and mortality (Shaw, Gennat, O'Rourke & Del Mar, 2006).

In 2012, as part of the Lancet physical activity series working group, the effects of physical inactivity on major non-communicable diseases worldwide were reviewed as part of an analysis of the burden of disease and life expectancy (Lee et al., 2012). Physical inactivity was found to be attributable to 6% of the burden of disease from coronary heart disease, 10% of breast and colon cancer and seven percent of T2D (Lee et al., 2012). Inactivity contributes to mortality, and if there was a 10%–25% increase in physical activity, it is estimated that the average life expectancy, across the world's population would increase by 0.68–0.95 years (Lee et al., 2012). This minimal average-per-person life expectancy increase represents an increase in physical activity across the world population, including both active and inactive people, rather than only focusing on those who are inactive becoming active (Khoja, Piva & Toledo, 2016).

To support these findings, Kohl et al. (2012), developed a global action report in collaboration with the Lancet physical activity series working group. According to the report, physical inactivity is the fourth leading cause of death worldwide, and there is an urgent need to promote healthy lifestyles and the importance of physical activity for health and longevity. The report illustrates the importance of the need for physical inactivity to be addressed in health policy, planning, leadership and advocacy; and for it to be placed on the agenda to improve health outcomes worldwide. Similarly, a global review also raised the profile and illustrated that a lack of physical activity is a major cause of chronic diseases, including T2D (Booth, Roberts & Laye, 2012). The report exemplifies that chronic disease is a major contributor to morbidity and mortality. The report findings compliment Lee et al.'s (2012) work by concluding that physical inactivity leads to a decrease in an individual's total years of life (Brown et al., 2016).

Similarly, others have found associations between education, physical inactivity, obesity and increased television viewing in the Bharani population. Among the Bahraini population, the perception of wealth or affluence is likely to be associated with excess weight or obesity (Al-Mahroos & Al-Roomi, 2001).

2.6.2 Gulf Region

As discussed globally, T2D and other non-communicable diseases are also on the rise in the Gulf region and there are many causal factors that have contributed to this increase. The prevalence of T2D, obesity and hypertension in the Gulf Region are among the highest in the world (Ng et al, 2010). The increase in prevalence across the Gulf region has been driven by rapid urbanisation, economic development, and globalisation (Golzarand et al., 2012). These environmental changes have impacted on the increase in risk factors for T2D, such as poor diet and lack of physical activity (Rahim et al., 2014).

The discovery of oil in the 1960s provided an increase in population, income and wealth and with that came an increase in food consumption and sedentary lifestyles (Ng et al., 2011). Self-reporting of T2D in the UAE more than doubled between 1995 and 2000 (Ng et al., 2011). As mentioned earlier, in general the UAE National population are living longer, and age is a contributing factor associated with T2D globally and in the Gulf region (Malik et al., 2005). Obesity is also a contributing factor for T2D in the Gulf and globally (Bjorntorp, 1998). According to the World Health Organisation, (2002) World Health Report, approximately 58% of T2D globally is attributed to individuals with a BMI of greater than 21 (World Health Organisation, 2002).

Various studies on T2D have been undertaken in the Gulf States, including two systematic reviews. The main focus of these reviews related to the risk factors for T2D, impaired glucose tolerance, metabolic syndrome, obesity and non-communicable diseases. The first systematic review (n = 43) examined risk factors for diabetes in the Co-operation of the Arab states of the Gulf Region (GCC) (Alhyas, McKay, Balasanthiran & Majeed, 2011). Studies excluded were those population groups outside the GCC, and duplications of data in various studies. The following groups and settings were included in 43 studies: general population (n = 23); primary care (n = 7); school children (n = 4); students (n = 3); working population (n = 5); and young people (n = 1). This study does specify the age of the school children, students or young people. The studies were from various Gulf countries including Saudi Arabia (n = 20), Emirati (8), Kuwait (7), Oman (4), Bahrain (3) and Qatar (1). Thirty-three studies addressed excess weight and obesity. The studies in the review found 25–50% of participants to be overweight and 13–50% to be obese. The prevalence of both overweight and obesity was higher among women. The prevalence for impaired glucose tolerance was approximately 10–20% (Alhyas, McKay, Balasanthiran & Majeed, 2011).

Limitations of this review include the variability of the quality of the studies that have been completed over many years. The population characteristics were varied and the studies were carried out in different regions across six different countries. The definition of “risk factors” in each study was inconsistent and only studies written in English were included (Alhyas, McKay, Balasanthiran & Majeed, 2011).

Within the Gulf region, social and cultural norms play a vital role in the increase in T2D. Socialisation and the sharing of food with friends and family is embedded in the Arabic culture. The food shared tends to be high fat, high sugar and high calorie (Kandela, 1999). Many studies have shown that the consumption of fruit and vegetables is low and fast food and soft drink consumption is high (Musaiger & Abuirmeileh, 1998). The accessibility and affordability of these foods has contributed to this change. Due to lifestyle changes, and an increase in car use, incidental physical activity, planned physical activity and participation in group sport is minimal as most Gulf Nationals spend their leisure time in sedentary activities (Marby et al., 2010). The hot climate in the Gulf Region may also contribute to the lack of outdoor activities.

2.6.3 UAE

Rapid Modernisation

In many Arabic speaking countries, the Nationals' lifestyle has changed from one of a rural Bedouin existence to that of a change in social status. These changes have been primarily influenced by changes in financial status which have influenced the increase in lifestyle-related diseases, such as obesity and T2D (Badran & Laher, 2011). This rapid change in lifestyle has also resulted in an increase in socio-cultural behaviours and Arab generosity, which leads to a higher calorie intake and an increase in consumption of a more westernised diet (Boutayeb et al., 2012). It is noted that those living in a rural environment have a lower prevalence of obesity and T2D, compared to those from urban areas (Badran & Laher, 2011). Compounding this, a study conducted in 2009 also indicates that there is potentially a genetic disposition for T2D among UAE Nationals (Alsmadi et al., 2008).

Westernisation/Urbanisation

Due to the GCC countries' close proximity to each other and the sharing of similar cultures, language and religion, a constitution was formed in 1981 to promote their identity (Al-Khouri, 2010). Since the inception of the GCC, which holds approximately 45% of the world's oil reserves, the countries have achieved economic growth. The UAE, particularly, has diversified into tourism and developed a cosmopolitan culture (Al-Khouri, 2010).

Despite the shift in population, the UAE, in particular, has become a place for many ethnic groups to live together and practice their own cultural activities with common values where all nationalities are respected (Azari, 2012). This westernised lifestyle and urbanisation has supported an increase in sedentary lifestyles with, for example, an increase in car use, computer use and television viewing, along with an increase in income. It is also common in this region to employ domestic help, including nannies, house maids, drivers and cooks (Badran & Laher, 2011) which can also contribute to the promotion of a sedentary lifestyle.

A study by Roumani (2005) explored the impacts of maids in both Kuwait and UAE. One hundred families were selected across Kuwait and the UAE to be involved in a survey, 30 maids employed by families with children under 5 years were also randomly selected and staff from two nurseries; one in Dubai and one in Kuwait made observation of parents and maids interactions with children (n = 85 children enrolled at the nurseries). Findings from the surveys with the families found maids were employed for personal convenience, economic reasons and social status. Employment of maids was high for all nationalities with the study finding 80% of European and 40% of Arab and Asian expatriates with working mothers hire a maid, however

almost all Nationals employed at least one maid and delegated more childcare duties to the maid compared to other nationalities.

The significant changes in socioeconomic status among UAE Nationals has led to the ability to employ maids for cooking, domestic chores and child minding, which encourages an increased sedentary lifestyle (Badran & Laher, 2012). Obesity is a strong predictor for T2D with the prevalence in the Middle Eastern and North African region one of the highest in the world (Badran & Laher, 2012). The statistics on obesity in women from Arabic-speaking countries, including Kuwait, Egypt and UAE, ranked higher than all European countries (WHO, 2005).

Al-Fahim (1995, p.184), summaries the lifestyle changes evident in the UAE.

We live in contemporary housing and high rise buildings instead of primitive huts made of palm fronds or mud. We have air conditioning to cool us in the intense heat of the summer; blankets, jackets and sweaters to warm ourselves during the chill winter evenings. We no longer drink brackish water drawn from hand-dug wells and hauled to our homes in goat skins. We have fresh desalinated water piped directly wherever we need it, at considerable expense to the government but at almost no cost to us. We no longer wash in the sea. Instead we shower and bathe in the comfort of marbled and mirrored bathrooms that would be the envy of Roman emperors.

The history of the UAE is embodied in rich cultural traditions dating back to ancient civilisations. The traditional culture, mixed with modern cultures and lifestyles, makes for a unique cultural society which aims to balance cultural traditions while being open to changes and progression. The discovery of oil reserves has bought about economic growth, which has influenced lifestyle changes in the way the UAE Nationals live on a day to day basis including their activities, and food and shopping behaviours, including moving from traditional *Souqs* to high-end shopping in malls and luxury stores (Vel et al., 2011).

However, despite the many lifestyle changes, the tradition of family remains the most important institution and forms the basis of societal life for UAE Nationals. The religious beliefs and behaviours of UAE Nationals are heavily influenced by the family; conformity and commitment to the group are paramount (Vel et al., 2011).

Physical Activity & Diet

As discussed earlier, in 2010, the Emirates Family Registry longitudinal study was conducted followed by a systematic literature review to identify the main health priorities for the UAE (Loney et al., 2013). The systematic review found lifestyle risk factors to be similar to those found in the Emirates Family Registry longitudinal study in 2010. The authors

recommended that further research and funding was required to understand the relationship between lifestyle risk factors that are prevalent in the UAE, such as a lack of physical activity, consanguinity, vitamin D deficiency, and poor dietary intake and their impact on the development of chronic diseases, such as cancer, cardiovascular disease and diabetes (Loney et al., 2013). It was also noted that school-based education programs with a focus on primary prevention and health education and awareness programs that consider the sociocultural, religious and ethnic needs of the UAE population would be beneficial to tackle this global health problem (Loney et al., 2013).

In 2010, with the support of the MOH, three major hospitals and nine primary care centres recruited 23,064 volunteers to participate in the Emirates Family Registry. It was concluded that factors influencing a diagnosis of T2D comprised a large waist circumference, physical inactivity, unhealthy nutritional intake, obesity, consanguineous marriage, and high cholesterol levels (Alsafar et al., 2012).

A qualitative study using grounded theory explored factors that UAE National women perceived to be barriers to weight reduction and their attitudes towards being at risk of T2D (Ali, Baynouna, & Bernsen, 2010). For many of the women the barriers to weight management included environmental, social and personal barriers. These included:

- Limited nutrition awareness;
- Lack of time;
- Low motivation;
- Medical conditions;
- Lack of social support; and
- Lack of culturally appropriate physical activity facilities.

Participants suggested walking tracks for women, physical activity facilities in PHC centres, dietitian availability to assist with education about healthy food and workshops to assist with healthy cooking, as possible interventions to prevent excess weight and obesity (Ali et al., 2010). They also suggested physical activity facilities for women only and parks remaining open later in summer for access when the weather is cooler (Ali et al., 2010).

Dietary intake and practices are a contributing factor to the increased levels of T2D in the UAE. Maintaining a healthy diet reduces the development of diabetes complications, improves HbA1C levels and can also impact on many comorbidities of T2D, such as hypertension, high cholesterol, and obesity (Al-Kaabi et al., 2008).

Modifiable behavioural risk factors such as obesity, physical activity and food intake all impact on the reduction of T2D incidence (Balk et al., 2015). Health promotion programs

combining both diet and physical activity encourage individuals to actively engage in physical activity and healthy food choices (Balk et al., 2015). A systematic review by Balk et al (2015) identified 53 studies demonstrating physical activity and nutrition interventions for people with T2D, highlights that such interventions can have a positive impact on long term outcomes (Balk et al., 2015). Balk et al's (2015) review found studies reported a reduction in T2D, body weight, fasting blood glucose and an improvement in cardiac risk factors.

In 2010, a study of lifestyle behaviour change involving diet and physical activity in the United Kingdom was tailored to individuals with T2D (Clark, Hampson, Avery, & Simpson, 2010). The study incorporated the stages of change, barriers to change and self-efficacy. Follow up with the intervention group was carried out at three months and one year with follow up telephone calls in the interim.

After the research, the intervention group showed significant change from contemplation to action with diet ($p = 0.000$) and physical activity ($p = 0.000$) compared to the control, however no change was evident in self-efficacy (Clark et al., 2004). This research provides evidence that behaviour change and preventative medicine can have an impact on those with T2D who have multiple risk factors such as high fat diets, and physical in activity (Clark et al., 2004).

Dietary habits and compliance of patients with T1D and T2D in the UAE were reviewed in 2008 (Al-Kaabi et al., 2008). For this study 409 patients were interviewed, and of the 409, 96% had T2D. Forty six percent stated they had never seen a dietitian since diagnosis and 11% specified that their main method of cooking was frying. Seventy six percent reported that they were unable to differentiate between low and high carbohydrate food items and none of the participants indicated that they participated in calorie-counting (Al-Kaabi et al., 2008).

In 2013, a lifestyle study was undertaken in Ajman, a northern Emirate of the UAE. Thirty-five UAE Nationals (intervention group $n = 18$ and control group $n = 17$) with T2D were recruited for the randomized control trial (Abdi et al., 2015), however, only twenty-nine completed the research. The program consisted of a six-month lifestyle program delivered by clinical dietitians. Each individual in the intervention group received four individual one-on-one education sessions and four phone discussions with the dietitian. Cognitive Behavioural Therapy (CBT) was used to aid in the facilitation of behavioural change, in conjunction with goal-setting, self-monitoring, SMART (specific, measurable, achievable, realistic, time based) goals, dietary change, weight loss and physical activity goals. The intervention included calorie-based diet plans encouraging a reduction in carbohydrates, development of SMART goals and 30 minutes of physical activity, five times per week, was encouraged (Abdi et al., 2015). The overall results indicated a reduction in HbA1c levels and carbohydrate intake

within the intervention group, compared to the control group, at three–and six months. In contrast, there was no significant change in weight or increase in physical activity within the intervention group, compared to the control group. This indicates that the reduction in HbA1c levels was impacted by the reduction in carbohydrate intake, rather than the goal of 30 minutes of physical activity, five times per day. The primary focus of the study was to improve glycaemic control, which may have negatively impacted on weight loss (Abdi et al., 2015).

Family History

It has been highlighted that certain genes and genetic factors can increase an individual's risk of developing T1D and T2D as an adult. It is also recognised that the environment plays a significant role in the development of T2D, (El-Sharkawy, 2004). Consanguineous marriages are common among Arab people, with the population identifying a range of social and economic advantages which they believe outweigh the disadvantages (Tadmouri et al., 2009). Some of the advantages include: compatibility between partners, relationships not being strained, promotion of family stability, maintenance of the family structure and preservation of the family possessions and land (Tadmouri et al., 2009). In the case of marital disputes, the husband's family would support the wife, as she is part of the extended family (Tadmouri et al., 2009). These findings support a theme illustrated in much of the research; that the common traits among those with T2D and pre-diabetes are a lack of physical activity, unhealthy dietary intake, high cholesterol, obesity, family history, and a consanguineous marriage (Alsafar et al., 2012).

Clothing and Attire

The traditional dress, worn by both men and women, is culturally required outdoors and is a loose-fitting robe covering the body, arms and legs. Loose clothing was also a preference indoors for comfort, and ease of movement. However, it is thought that this may be a contributing factor to increased weight and T2D as it hides the features and details of the body (Musaiger & Qashqari, 2005). Many women prefer to wear the traditional dress as it reduces both social and bodily discomfort, however, it can also impede physical activity and reduce the motivation for physical activity, and weight gain can be easily overlooked (Abdollahi & Mann, 2001). The traditional dress is part of the Arabic cultural identity, obligation and commitment. In some studies, women underestimate their weight status, and levels of obesity are higher in those who wear the traditional dress inside and outside of the home, compared to those who wear trousers (Al-Tawil, Abdulla & Ameer, 2007).

Environment – Weather

The weather in the UAE is hot and humid during the summer (April–September) and warm throughout the winter (October–March). In summer temperatures reach approximately 45 degrees Celsius, with even higher temperatures inland, where the humidity reaches 90 percent in the cities and 50–60% in coastal areas. In winter the average temperature is approximately 26 degrees, with cooler nights ranging between 12–15 degrees (UAE interact, 2016). During the winter months, local north-westerly winds (*shamal*) bring about cooler temperatures (UAE interact, 2016). The harsh climate could be another potential element that deters participation in physical activity as some of the determinants of health behaviour are the physical environment (Chan & Ryan, 2009).

Social determinants of physical activity are defined as, modifiable factors that influence physical and social environments that influence our engagements in physical activity (Wiley, Paik, Sacco, Elkind, & Boden-Albala, 2010). Individual determinants include:

- Age;
- Gender;
- Attitudes;
- Self-efficacy; and
- The perceived benefits of participating in physical activity.

Social, environmental, and cultural determinants include:

- Access to physical activity opportunities;
- Weather;
- Community dimensions and culture; also, the way one views oneself within one's own cultural environment;
- Socio-economic status; and
- Time.

The influences of attitude and behaviour towards physical activity heavily engaged in the culture and cultural expectations from within the culture itself (Berger & Peerson, 2009).

To support these findings, a systematic review was undertaken by Tucker & Gilliland (2007) which reviewed the effects of seasons on physical activity. The review identified that weather is a barrier to physical activity (Tucker & Gilliland, 2007) and influences physical activity behaviour (Merrill, Shields, White & Druce, 2005). This includes cold and extremely hot climates (Baranowski, Thompson, DuRant, Baranowski & Puhl, 1993). The UAE government is acutely aware of this barrier and the affect the extreme climate has on physical

activity and offers many options for indoor physical activity such as gymnasiums and exercise classes which offer many women's only options. There are also indoor walking groups in many of the cities malls. Personal training is also offered in various indoor locations including individual's homes, hotels, beach clubs, and gymnasiums.

Knowledge, Attitudes and Practice

A cross-sectional survey investigating knowledge, attitude and practices of diabetic patients in the UAE was completed by 575 participants (65% UAE Nationals; 55% female; 46% illiterate). The survey was based on a modified instrument from the Diabetes Research Training Centre of Michigan (Al-Maskari et al., 2013) with the results indicating that in relation to T2D, 33% of participants had good knowledge, 36% fair knowledge and 31% poor knowledge, with a positive correlation between visits to the diabetes educator and knowledge. General knowledge of diabetes symptoms was assessed through a questionnaire (23 questions assessed using the Likert scale) and similarly, attitudes were assessed using a questionnaire with both positive and negative questions. Knowledge of T2D may be attributed to many of the participants stating they have close relatives with diabetes (Al-Maskari et al., 2013). An increase in knowledge does not always equate to better health outcomes, as the study found that the overall knowledge and understanding was good and fair. However, 72% of participants had a negative attitude towards their T2D while only six percent had a negative attitude towards the importance of disease management and care (Al-Maskari et al., 2013). Therefore, it may also be useful to make changes to education methods and models to improve the delivery of information to increase compliance (Al-Maskari et al., 2013).

Interestingly, a large proportion of participants didn't engage in physical activity or follow a healthy diet, and 27% had good glycaemic control (Al-Maskari et al., 2013). Regarding practice, there was a marginally significant positive correlation between practice and the participant's level of education, marital status, frequency of seeing the diabetes educator and duration of disease. However, there was no correlation between practice and gender, age, nationality, income, or occupation. Within this study, practice represents the participants overall control of T2D, self-control of blood sugar, self-testing of blood sugar and barriers to self-testing (Al-Maskari et al., 2013). These findings illustrate that regular access to a diabetes educator could improve overall knowledge and assist with self-management (Al-Maskari et al., 2013). As this study was undertaken at an out-patient's clinic attached to a teaching hospital (*Tawam*), the results may not be representative of the general population and knowledge may be lower in areas with less access to health services and support (Al-Maskari et al., 2013). When focusing on behaviour change, skills and attitude need to also be considered (Al-Maskari et al., 2013).

2.7 Strategies to address Type 2 Diabetes

2.7.1 Global

The last two decades have seen the T2D epidemic rise globally and its increase has nearly affected most nations globally, both developed and developing. There has been an urgency for strategies to be developed to reduce the economic and social burden of T2D. Many of the programs have addressed some of the risk factors for T2D including obesity, diet and lack of physical activity.

Global leaders such as the World Health Organisation have been developing strategies to address risk factors for chronic diseases, including T2D, since the late 1990s. One of the strategies relevant to this research is the 2006 strategy focusing on diet, physical activity and health (World Health Organisation, 2006). The strategy was developed due to the increase in morbidity and mortality from chronic diseases including T2D (World Health Organisation, 2005). There is evidence to suggest that inactivity and poor diet are high risk factors in the aetiology of chronic disease (Barnes, French, Mitchel, & Wolfson, 2016), (Pan et al., 1997) and (Zimmet et al., 2001). The schematic model used within this strategy is based upon process, output and outcome. Recommendations are based on supportive policies and programs to promote behaviour change, with an overall outcome of an improved environment, including both social and economic factors. The model also included ongoing monitoring, surveillance and evaluation (WHO, 2006). To support this strategy, WHO also produced a similar strategy/framework and guidelines for schools for the implementation of policies in schools to support diet, physical activity and good health outcomes (World Health Organisation, 2008b).

There have been many international studies that focused on T2D and lifestyle interventions, such as diet and physical activity. One of them was the Da Qing Impaired Glucose Tolerance and Diabetes Study conducted in China and published in 1997 (Pan et al., 1997). This was a randomized intervention study of individuals with IGT who were randomized to diet and/or physical activity treatments for a period of six years. The study found that the risk of developing T2D from IGT in this population reduced from 15.7% to eight percent, showing a large reduction of risk by lifestyle changes (Pan et al., 1997).

Similar to the study conducted in China, The Finnish study was also based on lifestyle over a period of 3.2 years (Tuomilehto et al., 2001). The intervention for the lifestyle group included intensive face-to-face counselling on both diet and physical activity, which offered positive outcomes (Tuomilehto et al., 2001).

Another study conducted in the USA called the Diabetes Prevention Program (DPP) was conducted from 1996–1999 which was a combined study with a placebo group (n = 1082), metformin group (n = 1073) and a lifestyle group (n= 1979) (Knowler et al., 2002). The lifestyle group received 16 sessions in the first two years of the study on behaviour modification. They were encouraged to participate in 150 minutes of physical activity per week and received training in both diet and physical activity. After the study the lifestyle group saw a 58% reduction in the progression to T2D (Knowler et al., 2002). The placebo and metformin group commenced on one tablet daily (850mg metformin) and at one month, the metformin groups' metformin was increased to twice daily. The placebo and metformin groups received written information on lifestyle and healthy eating and physical activity and were invited to attend an annual 20-minute consultation with a health professional (Knowler et al., 2002).

Another US study, the Look AHEAD (Action for Health in Diabetes) clinical trial, was conducted in 16 centres across the USA. The intervention is funded by the National Institutes of Health to investigate the long-term health impact of an intensive lifestyle intervention (Look AHEAD research group, 2007). The participants (n = 5,145) were 45–74 years of age, overweight and with type 2 diabetes. The inclusion criteria also required individuals to have a BMI of >25kg/m², a HbA1c < 11% and triglycerides <600mg/dl (Look AHEAD research group, 2007).

The program combined an initial two–week start-up program to encourage diet and physical activity. The first year of the program involved three group meetings and one individual meeting each week for the first six months (Look AHEAD research group, 2007). The participants were encouraged to participate in 175 minutes of physical activity each week. The health professionals involved in the weekly meetings included a dietitian, a behaviour specialist and physical activity specialists (Look AHEAD research group, 2007). In the second half of the year, the participants committed to group sessions each fortnight and monthly individual meetings. Within the first year of the program there was an overall weight loss of seven percent, diet modification and an increase in physical activity. There was also an overall improvement in T2D and cardiovascular risk factors were reduced (Look AHEAD research group, 2007).

Activity on Prescription is a tool designed for general practitioners (GP) to prescribe physical activity scripts to patients. The overall aim was to improve exercise uptake and tolerance particularly among cardiac patients (Wise, 2010). Persson, Brorsson, Hansson, Troein, and Strandberg (2013) found that the Physical Activity on Prescription tool was not regarded as a priority task for GPs who would prefer to refer to other health professionals such as registered nurses or physiotherapists to administer the prescription plan (Persson et al.,

2013). This reiterates that personal coaching, supervision and group and individual meetings, as described in the Look AHEAD Program (Look AHEAD Research Group, 2007), have more overall success, better long term outcomes and adherence to change. A clinical trial was also undertaken to determine the effects of case management for those with T2D (Krein et al., 2004). The clinical trial was conducted at two Department of Veteran Affairs Medical Centres in America with (n = 246) individuals with T2D and a HbA1c level greater than 7.5%. The clinical trial didn't produce any changes in either HbA1c, and cholesterol levels (Krein et al., 2004). These findings support the need for health interventions involving individuals with T2D. Physical activity and dietary modification require a specifically tailored program, with a supervised approach to meet the needs of the population group.

These studies and the development of strategies and guidelines by WHO, UN and other diabetes companies globally, are promoting the benefits of changes in lifestyle risk factors for the prevention and reduction of T2D globally. The above research examples have proven that changes in lifestyle risk factors can lower the incidence of development, or progression, of T2D. Limitations to these strategies and guidelines is the ability to replicate them in various countries however such programs could potentially be cost saving and provide long term sustainability. This research highlights the socio-cultural factors that also need to be considered when developing global strategies in differing countries.

For many, T2D is developed through lifestyle risk factors, such as a lack of physical activity and an unhealthy diet; however, research shows that T2D is preventable. Health promotion strategies have been developed and promoted in many countries, including strategies such as consumer education and the promotion of healthy diets and physical activity (Zimmet et al., 2001) and are supported by Global leaders in health such as the WHO and the UN, and individual country leaders. Research also illustrates that successful health promotion interventions are those that are undertaken using a multifaceted approach (Jackson et al., 2006). Some of these strategies include; an intersectoral approach, planning and community engagement, infrastructure to support healthy lifestyles, healthy settings, such as schools and work places, and political support (Jackson et al., 2006). Health promotion strategies within any region, particularly the Gulf region and the UAE specifically, require an understanding and emphasis on the cultural context, including an awareness of the socioecological environment.

Population Studies

Primary prevention

One effective method of outreach and community-based diabetes education is through pharmacy-based diabetes prevention programs (Dhippayom, Fuangchan, Tunpichart, & Chaiyakunapruk, 2013). Over a period of three months, seven pharmacies in Thailand used a validated diabetes risk tool to screen clients 35 years and older who had no previous history of T2D. In this study, individuals who participated (n = 397) were offered a self-check of capillary blood glucose. Following completion of the risk tool, 49.4% of participants were deemed to be at high risk of diabetes; 48.5% of these participants completed the capillary blood glucose test, and elevated levels were found in 12.7%. From these findings, two individuals were diagnosed with T2D. Participants deemed at high risk were referred to their General Practitioner. All clients were offered educational information.

Further investigation of the benefits of community-based educational approaches and the use of allied health professionals in education opportunities for those with T2D will be crucial to decrease the current pandemic and global burden. These innovative approaches to health promotion could potentially be incorporated into health planning in the UAE.

Secondary prevention

Another alternative access point for individuals with T2D is to utilise allied health professionals such as physiotherapists. Mulligan, (2011) recommends the use of physiotherapists in the care team for individuals with T2D. Additionally, a more common avenue for education access could be to widen the dietitian's scope of practice and incorporate their role in health promotion (Oldstad, Raine, & McCargar, 2013). This method was predominantly utilised by organisations who had the financial support to fund such a position. Data collection was undertaken through one-on-one interviews with the participants (n = 12), and two to three 30-minute observation sessions were conducted by independent observers. The Diffusion of Innovation model was used as the theoretical framework for the interview guide (Oldstad et al., 2013). The findings from the interviews indicated positive feedback from those that did use the service (Oldstad et al., 2013). This educational approach and shift in guidelines has been supported by dietitians from academia, government positions and private and community-based practices (Oldstad et al., 2013).

It was also identified that, for the future of dietetics, the academic education program requires a change to reflect the developing areas of practices and community needs. For dietetics to play a key role in the future of health promotion, the role of the dietitian in the area

of health promotion will need to be further explored as it's an area that have perhaps never been promoted in the past (DiMaria-Ghalili et al., 2014).

In 2001, the Finnish Diabetes Prevention study, which involved 523 participants with impaired glucose tolerance (IGT) illustrated that a lifestyle intervention can produce positive results in weight loss, an increase in physical activity and improved dietary intake (Tuomilehto, et al., 2001). The participants in this study were enrolled from five different health centres, were 40–65 years of age, had IGT and were classed as overweight with a BMI of $> 25\text{kg/m}^2$ (Tuomilehto et al., 2001). They were randomly assigned to the control or intervention group. The control group received written and verbal information about diet and physical activity at the beginning of the study, while the intervention group received individualised diet and physical activity advice through seven face-to-face sessions with a dietitian in year one, and every three months until the conclusion of the study (Zimmet et al., 2003). The physical activity component was also monitored and supported by local health club staff and health professionals. The study ran for approximately three years, and at the end of year two, the number of participants who progressed from IGT to T2D was 3.2% in the intervention group, 7.8% in the control group and 11% and 23% respectively at the conclusion of the study (Zimmet et al., 2003). This study demonstrates that lifestyle interventions can improve long term outcomes for those with pre-diabetes.

Clinical studies

The Diabetes Prevention Program (DPP) was implemented between 1996–99 in the USA. The DPP was initiated with 3234 participants, across 27 centres, with individuals who had an elevated plasma glucose concentration following fasting and two hours post oral glucose intake. Individuals were randomly allocated one of three interventions:

- Group One: standard lifestyle recommendations and a placebo twice daily;
- Group Two: standard lifestyle and metformin 850mg twice daily;
- Group Three: an intensive program of lifestyle modification.

(The Diabetes Prevention Program Research Group, 2002)

The individuals were assigned case managers who had frequent contact with the participants. A 16-session education program was developed and delivered, including information on behavioural self-management strategies for weight loss and physical activity (The Diabetes Prevention Program Research Group, 2002). The participants were also engaged in supervised physical activity sessions. The control group was treated with metformin. After 24 weeks (six months) the highest weight loss and increase in physical activity was seen in the lifestyle intervention group. Fifty percent of the participants in the

lifestyle intervention group had a weight loss of seven percent and 75% of the group met the physical activity goal of 150 minutes per week. The highest daily reduction in calories at 24 weeks was also higher in the lifestyle intervention group (The Diabetes Prevention Program Research Group, 2002).

After one year of the program, the lifestyle intervention group had decreased the incidence of developing T2D by 58%, compared to 31% in the control group (The Diabetes Prevention Program Research Group, 2002). The outcomes from this clinical trial clearly illustrate the benefits of lifestyle interventions where the incidence of diabetes has been dramatically reduced. (The Diabetes Prevention Program Research Group, 2002). These findings reveal a need to modify clinical care to incorporate lifestyle intervention approaches to care, including motivational and behavioural approaches (Egger, Binns & Rossner, 2009). The benefits of these approaches include long-term cost savings for long term health outcomes. The improved health outcomes are seen at all levels including individuals and health organisations, and, in turn, bring about a decrease in morbidity and mortality (Egger et al., 2009).

2.7.2 Gulf region

An example of research that has been used to inform strategy development to address T2D in the Gulf Region is the community-based household world health survey conducted in Oman in 2008, including both Omani Nationals and non-nationals (expatriates). The survey was conducted with 5000 participants aged 18 and over. The main aim of the survey was to gain an understanding of food consumption and physical activity levels among various population groups. The findings indicated that the majority (69.8%) were consuming less than five fruit and vegetables a day and 40% were physically inactive (Al-Bahlani & Mabry, 2014).

Following these findings, a legislative review was undertaken in Oman of the Gulf States laws and regulations and it was noted that there are 54 legislative laws on behavioural risk factors, 44 on tobacco use and six on diet and physical activity (Al-Bahlani & Mabry, 2014). The four laws in relation to food are; one on food safety, one on food importing, and two on food labelling, and addressing food ingredients and additives (Al-Bahlani & Mabry, 2014). The legislations relating to physical activity were accountable by the councils of ministers of health and included: research on the economic impact of non-communicable diseases (1), special groups such as children and workers (2), and strengthening policies and programs (3) (Al-Bahlani & Marby, 2014). However, none of these legislations (comprised of policy endorsements) were associated with physical activity. Legislative laws are vital to protect the future of the country and the population groups residing there. Legislation relating to healthy diet and physical activity assists in protecting the future health of the nation (Musaiger, Lloyd, Al-Neyadi, & Bener, 2003).

2.7.3 UAE

Healthcare Cost Associated with Type 2 Diabetes

Given the lack of datasets available it is difficult to quantify accurate estimates for those with diabetes in the MENA region. However, according to the IDF, in 2013 the MENA region spent 13.6 billion United States Dollars (USD) on diabetes care (IDF, 2011) with the UAE spending approximately 2228 USD per person on diabetes (IDF, 2011). The UAE health authorities play a central role in shaping all aspects of the healthcare sector. The Health Authority in Abu Dhabi (HAAD) has projected a four-fold increase in healthcare costs for UAE Nationals between 2010–2030 (HAAD, 2011).

Healthcare Services

Health services in the UAE have developed considerably throughout the forty-four years since federation, however, despite their high levels of GDP, in 2011 the UAE's expenditure on healthcare per capita was approximately \$1,640 USD, compared to an average of \$4,593 USD in other countries (The World Bank, 2013). Underfunding and underinvesting in healthcare services has an impact on the health outcomes of the population (Informa, 2012). In addition, the lack of a fully developed healthcare workforce has resulted in challenges for PHC practitioners to provide improvements in healthcare (Brownie et al., 2014).

The Institute of Medicine in the USA (established in 1970), which works as an advisor to provide improvements in health in the USA delivered a report which outlined vital steps for improvements in the nursing profession; this makes up the largest proportion of the healthcare sector (Institute of Medicine, 2011). The report highlights the need for an improvement in nursing education and the need to allow nurses to take on leadership roles and be a part of the management team. This change leads to overall empowerment, and an improvement in the nursing health workforce and staff satisfaction (Institute of Medicine, 2011). The report also highlighted the need to incorporate research on all levels (including nursing) into the daily operation of a healthcare organisation. This provides policy and workforce improvements which allow nurses to have a voice in change and work to their full capacity. Working as a team in healthcare provides not only staff satisfaction, but also improved patient outcomes (Institute of Medicine, 2011).

Within the UAE, a sustainable healthcare system requires T2D prevention strategies to address quality gaps and deliver best practice. By providing advanced nursing leadership, setting clinical performance targets, conducting regular quality and auditing processes, working as a team with allied health professionals to address patients' needs regarding T2D

and mental health, the overall patient outcomes, patient satisfaction and cost benefit will improve (Peimani, Tabatabaei-Malazy, & Pajouhi, 2010).

To manage the increase in non-communicable diseases, including T2D, the UAE will require a workforce that has the knowledge and understanding to deliver the required services. All healthcare staff need to be included in the planning and solution to address this disease burden. Trained health professionals are needed with a focus on primary prevention to ensure that health education and promotion meets the socio-cultural and religious needs of this diverse population group. The new Nursing and Midwifery Council in the UAE is working on the development of a framework to incorporate specialist nurses in the UAE health workforce (vision2021, n.d.). Pharmacists, physiotherapists and physical activity physiologists are also being engaged to work at the front line in a range of community settings (vision2021, n.d.).

To support PHC practitioners in their role, the IDF has produced practical guidelines for Diabetes and *Ramadan* (IDF, 2016). The guidelines have been developed in collaboration with the Diabetes and Ramadan (DAR) Alliance and have been produced for healthcare professionals to use as a guide when managing patients throughout the holy month of *Ramadan* (International Diabetes Federation, 2016).

Throughout *Ramadan*, Muslims fast from sunrise to sunset, and in some areas of the world this can be up to 20 hours a day. The management of hypoglycaemia, hyperglycaemia, dehydration, and, in some cases, Ketoacidosis diabetes can be particularly challenging for some individuals (International Diabetes Federation, 2016). In the words of *Allah*, anyone with a chronic condition is exempt from fasting, however, most Muslims will take the risk and continue to fast (IDF, 2016). Healthcare practitioners working with individuals with T2D who are fasting for *Ramadan* can be guided by these practical guidelines to support individuals during *Ramadan* to ensure their T2D is managed appropriately.

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The Government relies heavily on an expatriate workforce; however, this is changing and much of the workforce development and capacity-building has been tailored for the employment of local UAE Nationals to ensure healthcare delivery can be undertaken by Emirati professionals (Brownie, Lebogo & Hag-Ali, 2014). This has been supported by local universities offering both medical, nursing and allied health degrees (Brownie et al., 2014).

Legislation

Due to heightened awareness of the health challenges facing the UAE, including the rise in non-communicable diseases such as T2D, the UAE Government has outlined a “UAE 2021 vision for health” as a priority (vision2021, n.d.). To progress this strategy, the rulers of all the UAE Emirates met for a strategic planning retreat to discuss and outline the priorities to meet the UAE 2021 Vision for Health Plan (Brownie et al., 2014). Part of the retreat included a Government-innovation laboratory meeting. The delegates were divided into five streams to work on various ideas and suggestions from the community, with one stream identified to change lifestyle patterns to improve general health (Brownie et al., 2014).

Following the meeting of the UAE leaders, the Government acted promptly to develop local legislation including; regulations on fast food advertising, food regulations in school canteens and restrictions on the super-sizing of fast food serving and soda sizes. These have been adopted in schools, however, adherence to the legislation and consequences for not adhering to the guidelines is not enforced (Brownie et al., 2014).

Schools

The focus of this research was on adults and those who had a diagnosis of T2D. However, it is important to understand the context pertaining to schools and the UAE’s vision for future generations. As discussed earlier, the UAE’s vision 2021 also encompasses education, health and disease prevention as a top priority (UAE interact, n.d.).

In 2010, a global school based survey was undertaken measuring school students aged 13-15 years’ dietary behaviour (Moonesar, 2015a). Of the students who participated in this survey (total numbers not published), 38.4% were classed as overweight, 14.4% as obese, 27.5% participated in 60 minutes of physical activity five days or more per week, 27.8% attended physical education classes at school and 51.2% watched three hours or more of television per day (Moonesar, 2015a).

One example of the UAE government’s efforts to increase participation in physical activity for youth is the school Olympics Games Project which was launched in 2012. In 2013,

the Ministry of Education (MOE), the United Nations Children’s Fund (UNICEF) the telecommunications network “Du” and SEHA health services teamed together to deliver a school health project aimed at increasing awareness of healthy lifestyles (Emirates 24/7 news, 2013). The pilot project was conducted over a year in 18 Government schools across the seven Emirates (two pilot schools in each Emirate) and two in Al Ain and the Western Region of the UAE (Emirates 24/7 news, 2013). Through a participatory approach to the program and through information collected from each of the school participants and school nurses, a manual was to be developed for the future delivery of health education in schools for the promotion of a healthy generation (Emirates 24/7 news, 2013). From the findings of the program, a policy was to be devised to be utilised across all public schools to ensure the newly devised healthy lifestyles manual is made mainstream (Dubai PR Network, 2014). A search of the literature has not found any report of program evaluation, or any publication describing the program in the peer review literature.

A key indicator for the vision 2021 is to reduce obesity among children from 54.7% to 31%. To begin to achieve this the “Healthy Eating and Active Living” – HEAL campaign was developed (Moonesar, 2015b). HEAL is a three-step campaign, with the first step involving information delivery and counselling on healthy eating and the exploration of a healthy food plan. The second step involves the students devising their own food contracts, and sharing it with family and friends for support (Moonesar, 2015b). The third step is to support healthy eating through the potential development of peer support groups at school and involving the individual’s caretakers or parents in the food plan maintenance. In collaboration with the three-step healthy eating campaign, HEAL campaign also promotes the importance of regular physical activity in schools. The success of the campaign will also need to be supported by Government, health authorities and policy (Moonesar, 2015b).

There are several school-based campaigns being devised to promote healthy eating, physical activity and lifestyle changes and to meet the UAE’s National vision for 2021. The challenge is ensuring that these campaigns are supported and integrated, and that supporting and advocating for healthy food options and physical activity be mandatory components of school life (Moore, Silva-Sanigorski, & Moore, 2013).

City Planning

The Abu Dhabi Council for Economic Development and The Abu Dhabi Urban Planning Council have created an “Abu Dhabi vision–2030”, balancing traditional life with that of a modern city. The vision encompasses the environment, economy, society and culture up to the year 2030. One of the main visions for the society is to create safe, well-connected outside

spaces and to encourage people to participate in community activities outside the home. It will also create outside space for recreational activities and for meeting and relaxing with friends and family (Abu Dhabi Council for Economic Development & Abu Dhabi Urban Planning Council 2030, 2016). One of the key directions for community development and sustainable communities includes the development of open spaces and parks and shaded, walkable streets to encourage people to walk and cycle all year round (Abu Dhabi Council for Economic Development & Abu Dhabi Urban Planning Council 2030, 2016). These key directions link to the community facility planning standards, which aim to create overall improvements in health, safety and wellbeing for the diverse population of the Emirate of Abu Dhabi (Abu Dhabi Council for Economic Development & Abu Dhabi Urban Planning Council 2030, 2016).

2.8 Early Intervention and Management Programs

Over the last decade, the UAE has been actively involved in multiple prevention and early intervention programs in relation to T2D and chronic disease management. Many of these initiatives are outlined in 2.8.1. There has also been an increased awareness through the development of National strategies and future government planning. The media has been used as a focal point for increased information dissemination.

2.8.1 Recommended Early Intervention & Management Programs

Several initiatives have been implemented in response to the high rates of T2D among UAE Nationals. A community-based survey conducted in 2008 screened both males (n = 403) and females (n = 414) between February 2004–February 2005 in Al Ain, UAE. The screening included blood pressure, height, weight, fasting blood glucose and lipid profile for cardiac disease and T2D and found 23.3% of participants to have diabetes and 37.3% to be obese (Baynouna et al., 2009). The findings from this research promoted the need for health interventions for those managing a chronic disease, such as cardiovascular disease and diabetes, and also promoted the need for early intervention screening (Baynouna et al., 2009).

To supplement these findings, further study was undertaken to ascertain the level and quality of diabetes education delivered in local diabetes clinics, compared to international standards (Afandi et al., 2006). The audit findings concluded that the standard of education and healthcare provided to the patients was seen as acceptable in most clinical areas; however, the areas of eye examination, physical activity advice, nutrition advice, foot care and smoking cessation were insufficient (Afandi et al., 2006). When diabetes education is inadequate, it makes it difficult for individuals to self-manage their disease appropriately (Delamater, 2006).

An example of an intervention that reported successful outcomes in improving glycaemic control was a Randomised Control Trial undertaken in PHC clinics, with 138 patients with T2D and 17 with T1D (Aubert et al., 1998). The objective of the research was to compare patients who received usual care and those who received nurse case management. HbA1C was measured at baseline and at 12 months. Of the 72% of patients who completed the follow up, a mean decrease of 1.7% in HbA1c was seen in the nurse case management group and a decrease of 0.6% in the group who received usual care (Aubert et al., 1998). On average, the usual care group illustrated a decrease of 0.80mmol/L, while the nurse case management group showed an average decrease of 2.68mmol/L. The study suggests nurse case management, in collaboration with the primary care physician and endocrinologist, can improve overall glycaemic outcomes for patients with diabetes (Aubert et al., 1998).

2.8.2 Primary and Secondary Prevention Programs

As previously discussed in the prevalence section, the HAAD developed a screening program called *Weqaya*. The main aim of the program was to gain an understanding of the prevalence of cardiovascular risk factors among UAE National adults aged 18–75. The program was supported and promoted by the HAAD, the PHC centres and the main health insurance provider, Daman. The screening used demographic data including age, gender and nationality, anthropometric measures including hip-to-waist ratio, BMI and blood pressure. Blood testing included non-fasting glucose, cholesterol and HbA1c. Self-report data was also collected to determine smoking habits, heart disease, and family history of heart disease (Hajat et al., 2011).

The *Weqaya* program was supported by a multifaceted health promotion campaign that targeted adults with pre-diabetes, T2D and the risk factor of obesity (Hajat et al., 2012). An example of some of the interventions conducted included an educational media campaign that was used to target these adults. A targeted health promotion activity was developed for those at high risk of obesity. A lifestyle-modification program was delivered for those at high risk of developing pre-diabetes. For those with T2D, care pathways and case-management was offered to encourage compliance, and to encourage uptake and follow up. The program was linked to the National Health Insurance Scheme (Hajat et al., 2012). To raise the profile of obesity, a media campaign was devised to target this population group. Health promotion activities, including school based, primary prevention programs were developed with a third party to support program implementation (Hajat et al., 2012).

In 2010, a Dubai declaration was agreed upon: “Diabetes and Chronic non-communicable diseases in the MENA Region” (Novonordisk, 2010). In December 2010, a forum was hosted by the UAE MOH, the executive Board of the Health Ministries Council for GCC states, the

World Bank (MENA region) and the World Diabetes Foundation. The forum was also supported by the Health authorities in both Dubai and Abu Dhabi, the IDF, The Emirates Diabetes Society, Imperial College London, the Joslin Diabetes Center, and the Gulf Group for the study of Diabetes. Representatives who took part in the forum approved the Dubai Declaration (Novonordisk, 2010).

Within the forum, it was acknowledged and agreed that, according to the WHO, the prevalence of diabetes in the MENA region would be the main cause of death in the region in the 21st century (Novonordisk, 2010). It was also widely acknowledged that the treatment of diabetes accounted for a large portion of healthcare costs in the region and the loss of productivity, costs to individuals and their families, and costs to the economy was vast, compared to other countries (Novonordisk, 2010).

The outcomes of the forum included initiatives such as raising health awareness, with the aim of reducing the risks of diabetes and other non-communicable diseases. It also included the promotion of policies, prevention and treatment at a National policy level and the promotion of healthy lifestyles, self-management, further research, and monitoring systems to understand the burden of disease and economic burden (Novonordisk, 2010). The outcome of this forum was presented at the United Nations General assembly in 2011 entitled “Non-communicable disease summit 2011”.

With the development of the WHO–Health for All by the year 2000, the UAE developed a National Health Strategy with the aim of meeting the WHO target. The UAE’s main aim was to achieve this goal by increasing the number of PHC centres (Al-Hosani, 2000). By the end of 1999, the PHC clinics had increased from 45 to 105, with the deliverables encompassing health education and promotion, maternal and child health, school health, and chronic disease management (Al-Hosani, 2000).

In the last few years, information about T2D and its risk factors has been presented in many local newspapers which have produced articles highlighting obesity, diabetes, school canteens, food availability in schools and the importance of regular physical activity. The use of media is one way to enhance awareness. Within the UAE the media, especially local newspapers, are the primary vehicle for government and public opinion (Elbarazi, Raheel, Cummings & Loney, 2016). Local newspapers play a vital role in the delivery of health initiatives and campaigns, and aids in raising public awareness (Elbarazi et al., 2016). Appendix H illustrates some examples of T2D and related articles written in local newspapers.

In 2016, WHO produced a report entitled Global Assessment of the Burden of Disease from Environmental Risks - Preventing Disease through Healthy Environments. The report

outlined the links between disease or injury and areas of intervention (World Health Organisation, 2016b). The relationship between this report and the risk factors for non-communicable diseases including diabetes and their association to the environment, included interventions such as the implementation of environments promoting physical activity and transport and infrastructure, allowing for appropriate parks and open spaces. It also highlights travel modes; i.e., the ability to walk or cycle, rather than utilising a motor vehicle (World Health Organisation, 2016b).

To address this need, at the closing of a cabinet meeting in 2010 the UAE Rulers and the UAE Government launched the UAE Vision2021. Vision2021 addressed the need for planned infrastructure, including covered walkways outside, and increased pedestrian footpaths to encourage walking throughout all months of the year (vision2021, n.d.). The Vision2021 also incorporates plans for an increase in green spaces and parks for both physical activity and places to socialise outside the home (vision2021, n.d.). Another priority within the plan is to increase health awareness in the community to decrease non-communicable diseases such as T2D (vision2021, n.d.).

Health gains can be achieved through a decrease in risk factors for chronic diseases with a particular relation to T2D and metabolic syndrome in the Gulf region (Marby et al., 2010). As discussed, this can be achieved through a healthy dietary intake, weight maintenance, and physical activity (World Economic Forum, 2010). This would not only bring about individual health benefits, but also cost savings to the economy and workplaces. Health prevention campaigns have been proven successful in western countries such as Canada, USA, and Australia; the learnings from these could be adopted in high risk countries (Zimmet et al., 2003).

An example of a prevention program carried out in the UAE was the Fat Truth Awareness Campaign and Obesity Prevention Program developed by UNICEF (UNICEF, 2012). The Fat Truth was a three-month awareness campaign developed by UNICEF and implemented by many government and private industry partners in 2009, to raise awareness of obesity and the importance of a healthy lifestyle. The campaign included school and community events, media coverage on both television and radio and newspaper advertisements (UNICEF, 2012). The target audience was children, adolescents and parents. School seminars, information booths at local shopping malls, cookbooks and community sports days were also offered. Following the campaign in 2010, in 2013 the UAE Governments cabinet representatives announced that schools would be banned from selling junk food and have healthy foods enforced. A law was passed to ban the sale of unhealthy food items in canteens (The National, 2013). The outcomes of this program are not publicly available.

The Childhood Obesity Prevention Project was a follow-up on the success of the Fat Truth Project. The one-year project was implemented in eight schools throughout 2011–2012 with the main objective to teach students, school staff, parents and school nurses on how to adopt a healthy lifestyle. The project included physical activity and nutrition education and psychological and social services. The outcomes of this project are not publicly available (UNICEF, 2012).

In 2012, telecommunications company “Du”, with the support of the Ruler of Dubai and the Vice President of the UAE, launched a two-year campaign called “Every Step Counts” (Du, 2012). The campaign’s aims included the promotion of education and encouragement to lead a healthy lifestyle, creating a national culture of healthy living, and the promotion of positive lifestyle practices for both individuals and workplaces (Du, 2012). The Heart Foundation in Australia conducted similar campaigns to promote healthy lifestyles, including the promotion of “Get Active” and “Sit Less” (Heart Foundation, 2016).

Intervention and prevention programs are supported to improve the individual’s overall health and wellbeing. An example of a workplace wellness program in Australia was called “Sit Less and Move More”. It was a health intervention program undertaken by The New South Wales Ambulance in Sydney, Australia. The program was carried out between April and November in 2015, with both a control (n= 22) and intervention group (n = 30) (Heart Foundation, 2016). The intervention group were supplied with timer lights to encourage them to stand up every 30 minutes, and posters and informative emails (Heart Foundation, 2016). The outcome of the program showed a reduction in sitting from 79%–64% and standing time increasing from 13%–27%. There was also a reported feeling of being more alert, and less neck and back pain (Heart Foundation, 2016).

Another recent campaign promoted by the National Heart Foundation in Australia was “Australia’s Two Billion Step Challenge” (Heart Foundation, 2016). This health promotion campaign was launched to encourage Australians to get “fitforgood”. Everyone in Australia had the opportunity to join the campaign and raise funds for heart disease research (Heart Foundation, 2016). An evaluation of this initiative was not publicly available, however, Dwyer et al. (2015) measured daily steps in a self – reported daily steps study conducted in Australia between 2000–2005 (n = 2576) with adults with a mean age of 58.8 years. Daily steps were carried out from a sedentary baseline to 10,000 steps per day. Ninety percent of participants were followed up over ten years until 2011. Forty nine percent of participants increased their daily step count to 10,000 steps over the monitoring period (Dwyer et al., 2015).

2.9 Models and Theories Linked to Study

It has been proven that behaviour change interventions are more successful and effective when based on theory, compared to those which lack a theoretical base (Jirojwong & Liamputtong, 2012). Health promotion over the past forty years has highlighted the importance of social, economic and political factors as clear evidence, based on determinants of health (Talbot & Verrinder, 2005). Health promotion encompasses policy, structural, organisational, and economic changes.

According to Smedley & Syme (2000), health interventions based on behavioural and social factors need to address multiple determinants, including the individual, community, interpersonal, policy and institutional prerequisites. Changes in the health system over the years have provided opportunities for health promotion and health education (Arora, 2003). There has also been a shift in the delivery of health policy and social support to an interplay between self-management and environmental determinants of health behaviour (Bandura, 1989).

There has been multiple models and theories identified to support and link with the findings within this study. The theories and models referred to within the study include the Social Cognitive theory (SCT), Health Belief Model (HBM), Socio-ecological model, Labelling Theory (LT), Cognitive Dissonance theory (CDT), Theory of Planned Behaviour (TPB) and the Self Determination Theory (SDT).

2.9.1 Social Cognitive Theory

The Social Cognitive Theory (SCT) addresses both individual and social determinants, however, behaviour change requires a more comprehensive approach to promote social systems change, rather than changes within the individual (Bandura, 1989).

According to Annesi, Johnson & McEwen (2015), SCT incorporates behavioural, cognitive and environmental factors to predict behaviours and self-efficacy. Self-efficacy plays a central role in self-reflection and self-regulation which impacts how individuals interpret their own behaviour. This in turn informs an individual's environment and personal factors which plays a vital role in behaviour change (Bandura, 1989). This highlights the need for aptitude and ability, in order to maintain behaviour change (Annesi, Johnson & McEwen, 2015). It has been observed that by incorporating behaviour change theory into weight loss treatments, the results have been marginally better than a pure educational approach (Annesi et al., 2015). The relationship between SCT and self-efficacy, and behaviour changes such as improved dietary intake and increased physical activity, have been successful in some other

studies (Lee & Loke, 2013). It has been proven that self-efficacy can be developed through physical activity participation which can be then used to bring about self-regulation for dietary changes (Lee & Loke, 2013). Improved dietary intake has also been seen through the individuals setting and reviewing behavioural goals and progress feedback which, in turn, brings about self-efficacy and, in some instances, increased physical activity. Positive change aids in reinforcing self-efficacy and self-regulation and can often bring about further positive behavioural changes (Annesi et al., 2015).

It is also useful to set achievable goals; for example, manageable amounts of physical activity for those who are usually not physically active and feel uncomfortable with physical workouts. A study by Annesi et al., (2015), focusing on the components of self-efficacy and self-regulation within the SCT comprised of 136 individuals who were placed in a 'self-regulation' group and 138 were placed in a 'self-efficacy' group (Annesi et al., 2015). Self-regulation assists with addressing unproductive statements and planning, while self-efficacy emphasizes the desire for competence and feelings of ability to initiate and develop desirable behaviours (Annesi et al., 2015).

A validated scale was used to measure self-regulation and a physical activity self-efficacy scale was used to measure self-efficacy. The five factors scored on the self-efficacy scale included availability; physical discomfort, positive activities, negative emotions and social pressure. Physical activity volume was measured using the Godin Shephard Leisure-time physical activity questionnaire. Eating behaviour was assessed through self-reports of intake and descriptions of food portions, sizes and counts (Annesi et al., 2015).

All participants had the same physical activity support treatment, which comprised six 45–60 minute meetings over six months. Physical activity support was offered individually and individual programs were derived by a wellness specialist. Cognitive behavioural methods included goal setting, progress feedback, relapse prevention, cues and prompts for physical activity, disassociation from discomfort and a behavioural contract (Annesi et al., 2015).

The dietary component of the study was offered slightly differently in each group. The self-efficacy group highlighted personal role models, encouragement for persistence, controlling negativity, and a real focus on short term goal achievement. The self-regulation group used the same self-regulation skills that were used in the physical activity support but emphasised the need to overcome barriers and promote healthy eating habits (Annesi et al., 2015).

At baseline, there was little statistical difference between both groups, and after the intervention, there was significant evidence of improvement in physical activity and eating self-efficacy and self-regulation. The main result illustrated that, by using self-regulation and self-

efficacy and being able to overcome barriers to healthy eating and physical activity, self-efficacy increases particularly with the use of role models (Annesi et al., 2015).

2.9.2 Health Belief Model

The Health Belief Model (HBM) views behaviour against an individual-perceived susceptibility, perceived severity (threat), perceived benefits (and barriers) and self-efficacy. The HBM has been used for many years to predict barriers to change and bring about behaviour modifications (Janz & Becker, 1984). Individuals with T2D (n = 88) who were attending an Iranian diabetes education seminar were divided into two groups (n = 44 control group & n = 44 intervention group). The intervention group received two educational sessions of 80 minutes' duration and the authors used components of the HBM to inform the intervention. This was measured using the questionnaire, including questions in the pre-and post-questionnaire on perceived severity, susceptibility, threats, benefits and barriers. The questionnaire was used to collect the data before the intervention, and one month after the intervention (Sharifirad, Mohammad, Kamran, & Azadbakht, 2009).

Knowledge and perceived susceptibility increased significantly among intervention, compared to control group participants (29.6 +- 18.5 vs -2.6 +- 14.0, p <0.001) whereas, perceived barriers reduced in the intervention, compared to the control group. There were no significant differences in perceived severity, perceived threat and perceived benefits between the two groups (Sharifirad et al., 2009).

Another study, implemented in Iran in 2005, tested the HBM to predict behaviour change in individuals with T2D. Eighty patients were randomly selected from a population of patients attending a diabetes clinic in Bandor, Abbas and allocated to intervention (n = 40) and control (n = 40) groups (Agha-Moulaej, Eftekhar & Mohammad, 2005). The intervention group received education at the diabetes clinic. Health behaviour was assessed using a valid questionnaire tool at the initial visit and four months' post education (Agha-Moulaej, Eftekhar & Mohammad, 2005). The results showed that the intervention group had a substantial increase in perceived susceptibility, perceived severity, perceived benefits and self-efficacy; a decrease was also noted in relation to perceived barriers. This study demonstrates the positive impact the HBM can have on behaviour modification, particularly for those with diabetes (Agha-Moulaej, Eftekhar & Mohammad, 2005).

A study was conducted to investigate the barriers for treatment and the correlation between self-efficacy and self-care with people with T2D (n = 309) (Aljasem, Peyrot, Wissow & Rubin, 2001). The results showed that the perceived barriers to self-care were associated with diet and physical activity. Self-efficacy related to increased blood glucose testing, taking

medication, a decrease in binge-eating and increased adherence to healthy eating (Aljaseem et al., 2001). This study demonstrated that an individual's perceived capability to carry out behaviour change should be assimilated into health education using the HBM (Aljaseem et al., 2001). Gaining an understanding of an individual's beliefs in relation to their disease and their beliefs concerning severity, susceptibility, benefits and barriers, assists in being able to tailor education to increased compliance and overall motivation to make behavioural changes (Aljaseem et al., 2001).

The research findings that emerged from this study were associated with other sociological theories and frameworks, as discussed below. Some of these theories and frameworks assist to inform the findings, whilst others inform discussion. The theories and frameworks are discussed in further detail in the results and discussion chapters.

2.9.3 Socio-ecological Model

The Socio-ecological Model was originally developed in the 1970s and became a formalised theory in the 1980s. It was a framework used to explain human development and to improve the understanding of the interaction between genetics and biology with an original focus on children (Bronfenbrenner, 1989). The model continued to be revised to include the interrelatedness of the physical and social environment and the impact this had on an individual's attitudes and beliefs (Bronfenbrenner, 1989). The socio-ecological model has been used widely in a variety of different arenas including politics and economics, teaching, healthcare, community health, human nutrition and public health.

The socio-ecological model illustrates the interaction between an individual, community and society and helps understand how individual behaviours are influenced by multiple factors. An individual may be influenced by family, family history and genetics. Communities such as schools, work places and neighbourhoods also impact an individual's behaviour and attitudes, the broader society influences an individual's social and cultural norms (McLeroy, Bibeau, Steckler, & Glanz, 1998). For behaviour change to be instilled, culture, environment and government policies need to be aligned (Caprio et al., 2008).

2.9.4 Labelling Theory

The Labeling Theory of deviance was extremely popular during the 1960s and 1970s. The theory states that behavioural tendencies alter when individuals are negatively labelled (Gove, 1975). More recently, the Labelling theory has been used outside the deviance field in areas such as sociology and psychology (Bedson, McCarney, & Croft, 2004). Within this study, the application of the labelling Theory is applied in the results and discussion chapter

illustrating how an individual identifies themselves and their behaviour (Trice & Roman, 1968), and how society views that individual person. Labelling a disease, and in this case, T2D, can have both a positive and negative effect on how an individual respond and manages the condition (Bedson, McCarney, & Croft, 2004). It can also be a cultural response that defines the disease and the interaction between the individual and others which leads to the person being labelled or acting accordingly (Bedson, McCarney, & Croft, 2004).

2.9.5 Cognitive Dissonance Theory

Cognitive Dissonance Theory (CDT) was developed in the 1950s based on the idea that individuals require consistency in life for daily functioning and when inconsistencies are developed individuals adjust their cognition to justify behaviour (Festinger, 1962). The CDT is demonstrated throughout the results and discussion chapters in this study demonstrating how individuals change their attitude to fit their behaviour, and to reduce dissonance they rationalise their behaviour by justifying their actions (Festinger, 1962). When individuals are faced with difficulties, the immediate reaction is to reduce dissonance. Cognitive dissonance can be illustrated in four ways: by ignoring information that conflicts with existing beliefs and values; justifying behaviour including a new cognition; altering the conflicting cognition, or changing behaviour or the cognition (Festinger, 1962).

2.9.6 Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) is an extension of the Theory of Reasoned Action (TRA). The TRA illustrates the relationship between attitudes, and behavioural intention. Whilst the TPB incorporates an individual's perceived control over behaviour (Ajzen, 1985). It encompasses understanding, predicting and changing human behaviour (Ajzen, 1985). The TPB is explored in the results chapter linking behaviour and beliefs, which assists in explaining human behaviour (Ajzen, 1985). The TPB predicts an individual's intention to engage in a behaviour at a certain time and place. Within the Theory of Planned Behaviour an individual's behaviour is influenced by subjective norms, perceived behavioural control and attitude towards behaviour (Ajzen, 1985). It has been applied to many studies exploring beliefs, attitudes and behaviour (Ajzen, 1985).

2.9.7 Social Determination Theory

The Social Determination Theory (SDT) is briefly discussed in the results chapter. The SDT is a theory of motivation that addresses the intrinsic and extrinsic motivation. It is based on three psychological needs including competence, autonomy and relatedness (Deci &

Vansteenkiste, 2004). Individual behaviour is predominantly impacted by the individual's social condition and individuals can either be proactive and engaged or passive (Deci & Vansteenkiste, 2004). An individual's proximal (family or workgroup) or distal (cultural values or social economic status) can affect an individual's motivation and overall health and wellbeing (Deci & Vansteenkiste, 2004). SDT illustrates an individual's motivation behind the choices they make (Deci & Vansteenkiste, 2004).

2.10 Chapter Conclusion

The literature review provides cultural context by including a historical overview of the UAE; its beliefs and traditions and cultural politics. The review incorporated both local and global research with key parts of the review, including T2D prevalence, contributing factors to T2D, strategies to address T2D, current interventions and overseas learnings. It also provided information on the models and theories that were used to reinforce the study.

The literature review clearly illustrates the paucity of literature and the need for further research aimed at gaining a deeper understanding of the cultural and lifestyle impacts that influence the prevention and management of T2D among UAE Nationals and other Arab nations. Developing a better understanding of the cultural and lifestyle impacts on diabetes prevention and management among the UAE National population and will inform appropriate health interventions and services to this cultural group and the wider Gulf Region.

As the population continues to increase, globally and within the UAE, the incidence of T2D will continue to increase. Many countries, including the UAE, are facing an uphill challenge to initially understand the burden of disease through the challenges in gaining an understanding of rigorous and up-to-date data sets, which would support the provision for appropriate healthcare services to meet the need and demand for those individuals with T2D, and provide a multisector approach to early detection and prevention. An increase in public awareness of the effects of diabetes on an individual's long term health and the economic burden it places on the country and healthcare system needs to be highlighted and advocated (Badran & Laher, 2011).

Chapter 3 Methods

3.1 Introduction

This study employed a qualitative approach to collect data from UAE Nationals residing in the UAE with a diagnosis of T2D. This chapter describes the qualitative research design. The HBM and SCT were used as conceptual frameworks to help inform the development of the interview guide. Grounded Theory was used to inform data collection, data analysis and data presentation. The procedures employed for recruitment, data collection and data analysis are described. The importance of cultural context, reliability, validity and ethical considerations are discussed.

3.2 SKMC Research Support Group

A small SKMC Research Support Group was established in the UAE to provide local support for this research. The SKMC Research Support Group (n = 11) consisted of the Associate Director of Nursing, nursing research and education department members, the outpatient speciality clinic manager, the outpatient clinical resource nurse, acting unit manager (diabetes clinic), charge nurse and diabetes educators.

Communication with the support group began in the early stages of the research and continued throughout the duration of the study. The researcher met with the diabetes educators and other members of the support group five months prior to the interviews being conducted, to discuss the research aims and objectives, inclusion and exclusion criteria and timeframes. Discussions with the support group were instrumental in clarifying the direction of the research, providing feedback on the interview guide, support in accessing participants and a suitable location to undertake the interviews.

3.3 Conceptual Framework

The conceptual framework is a system of concepts, beliefs, theories and assumptions that supports the research (Corbin & Strauss, 2007). It provides an outline to the main effects that were researched and the relationship between the questions outlined in the interview guide and the existing frameworks (Corbin & Strauss, 2007). The conceptual framework assists in justifying the research and it incorporates existing frameworks and theories; however, the structure and overall findings of the phenomena are something that is built and

something that does not already exist, as is true to Grounded Theory research (Corbin & Strauss, 2007).

Conceptual frameworks can be used to verify and complement findings, provide insight, and assist in guiding initial concepts (Corbin & Strauss, 2007). These frameworks provide guidance in developing a theory. Within this research, Grounded Theory provided the theoretical basis and conceptual guide to build and generate a theory from the data generated, which, in turn, assisted in framing the research findings (Corbin & Strauss, 2007). While the Health Belief Model (HBM) and Social Cognitive Theory (SCT) assisted in informing and developing the interview guide, the lines of questioning were not restricted to these models and theories, and were informed by client participant responses. The questions within the semi-structured interview guide were based on both the constructs of the HBM and the SCT.

3.4 Theoretical Perspective – Grounded Theory

This qualitative study adopted a Grounded Theory approach which aims to “generate, discover, or construct a theory for a process of an action” (Corbin and Strauss 2007, p. 107). Grounded Theory was originally developed by Glaser and Strauss in the 1960s and its emphasis is on research starting from the ground up; for example, generating theory from the data, rather than from the top down. Grounded Theory enabled a theory to be constructed from the data derived from the participants being studied.

The main strengths of Grounded Theory research are that it provides an effective approach to build new theories, and the findings are always “compared and refined with the theories identified, and are usually being helpful in guiding future investigation into the phenomenon” (Hood, 2007, p.163). Grounded Theory is an inductive approach to research (Strauss and Corbin, 1998), has been used to successfully inform public health issues (O’Neal, 2011) and enables a deeper understanding of the influence on health behaviours for individuals, groups and populations. As the findings of Grounded Theory research are generated from the participants being studied, this can have a positive impact on the lives of those involved; however, the main purpose of Grounded Theory is to develop theory to help better understand behaviours of a specific group which may inform practice and policy (Al-Busaidi, 2008).

In 1967 Glaser and Strauss developed Grounded Theory as a form of qualitative research, which had the ability to be used to develop a theory grounded in data. After their original publication in 1967, Glaser and Strauss applied the method of Grounded Theory in different paradigms and Strauss began to work, write and co-author with Juliet Corbin (Kelle, 2005). The main differences between Glaser and Strauss is that Glaser emphasised

the emergence/induction with a clear set of stages whilst Strauss was interested in a systematic and validated approach (Kelle, 2005). The Grounded Theory method developed by Corbin and Strauss (2008) was selected to guide this research, to enable the development of a systematic and validated theory (Corbin & Strauss, 2008).

Qualitative research based on Grounded Theory enables the researcher to develop a deeper understanding and an insight into the issue. This research aimed to develop an understanding of the impact lifestyle and culture has on the management of T2D among UAE Nationals. Grounded Theory provides the opportunity to explore the inner experiences of the client participants, to view the world from their perspective, to examine areas that have not yet been researched in-depth, and to give some foundation to future research (El-Hussein, Hirst, Salyers, & Osuji, 2014).

The main feature that separates Grounded Theory from other methodologies, as a theory is developed from the data collected during the research, not prior to the research commencing, hence the name 'Grounded Theory' (Corbin & Strauss, 2008). In addition, data collection and analysis are carried out concurrently. While qualitative research is inductive, allowing for theoretical models to be developed from the data research, using semi-structured interview guides may use theoretical models to help inform the development of the interview guide (Patton, 2002). Two widely-used behaviour change models, the HBM and the SCT, were used to help inform the development of the semi-structured interview guide.

3.4.1 Health Belief Model

The HBM was developed in the 1950s by social psychologists Hochbaum, Rosenstock and Kegels, with the focus on the individual's beliefs and attitudes and their influence on health behaviour (Glanz, Rimer & Lewis, 2002). The model has subsequently been adapted to explore a variety of short-and-long term health behaviours. The HBM has four main constructs that focus on perceived threats and benefits which may influence health behaviours: *perceived susceptibility*, *perceived severity*, *perceived benefits* and *perceived barriers* (Glanz et al., 2002). In 1998, Rosenstock included cues to action to incorporate lifestyle behaviours such as over-eating, smoking and sedentary lifestyles (Glanz et al., 2002).

The HBM has been used to help understand health behaviours of individuals, and it recognises the complex interaction between beliefs, perceptions and attitudes towards a health issue (Janz & Becker, 1984). The constructs of the HBM suggest behaviour change is more likely to occur if an individual believes they are vulnerable to a disease, if the individual recognises that there is enough reason for them to make the health concern relevant, or if the individual believes that behaviour change will be beneficial to them (Janz,

& Becker, 1984). This research used the HBM to help inform questions relating to an individual's perception of the severity of their T2D, their vulnerability to T2D and its complications, their levels of adherence and compliance, control of their own beliefs and values in relation to their T2D and their levels of self-efficacy (Gillibrand & Stevenson, 2006). The key constructs from the HBM were used to inform the development of the interview questions. These associations are detailed in Table 3.1 – Table 3.5.

3.4.2 Social Cognitive Theory

SCT recognises the reciprocal determinism of the environment, the individual and the individual's behaviour. According to SCT an individual's self-efficacy plays an important role in health behaviour change and maintenance (Bandura, 2004). This change encompasses motivation and perseverance to change and the ability to maintain the change. Self-efficacy is influenced by values, beliefs and attitudes (Bandura, 2004) which can also be influenced by the environment. For example, attitudes towards physical activity, physical activity opportunities, availability of healthy food and a healthy workplace interact and may impact on individual factors, such as self-efficacy and ultimately, behaviour (Abby & Ershow, 2009). Influences and observation of peers and noteworthy others, such as family members are also important, and are likely to be important factors when cultural issues impact on diet and physical activity opportunities (Wood & Bandura, 1989).

Within SCT, the main factors that determine human behaviour include *cognitive factors* such as knowledge, expectations and attitudes; and *environmental factors*, which incorporate social norms, access in community, influence on others and the ability to influence one's own environment. In addition, *behavioural factors* such as skills, practice and self-efficacy interact with cognitive and environmental factors (Bandura, 2004). SCT informed the development of interview questions focusing on cognitive, behavioural and environmental factors (refer to Table 3.1 – Table 3.5).

3.5 Interview Guide

The semi-structured interview guide prepared for this research was developed based on the current literature and the theoretical models of the HBM and SCT, as described above. The interview guide was reviewed by an expert panel comprising of experts (n = 6) in diabetes prevention, management and qualitative research. The panel consisted of professionals from SKMC to ensure that the questions were culturally appropriate for the target group. The questions were also reviewed by two health promotion and public health experts (Research Supervisors) from Curtin University. The interview guide was pilot-

tested with two adults from the target group to ensure the wording was correct, culturally appropriate and to confirm that the questions enabled collection of appropriate data for the research (Burns, Maycock, & Cross, 2010).

Constant reviewing and modifying of the interview questions are part of a Grounded Theory approach. The interview guide was reviewed and modified throughout the interview process as new data emerged (Burns, Maycock, Cross, & Brown, 2008a). Within the research, the interview guide was modified four times throughout time period one of the interview process, with new questions being added and modified as the research evolved. Prior to the second-time period of interviews, further amendments were made to the interview guide; then, no further amendments were made during time period two of the interview process. The semi-structured interviews provided a framework but also provided flexibility to allow exploration as new issues and themes emerged (Cooper, Marjei, Rossiter, & Brownie, 2014). The interview guide (Appendix A) included five key areas, which are detailed below. The interview guide presented is the final version after the modifications occurred during the interviews.

Section 1: Diagnosis, disease knowledge and disease prevention

The individual interview guide informed by the HBM and SCT provided a framework for the interviews to be conducted with client participants. The focus group interview guide was used when conducting the focus group interview with health professionals and is based on the same categories. Client participants were interviewed in time-period-one and both client participants and a focus group with health professionals was conducted in time-period-two.

The semi-structured interview questions asked how long the client participant has had T2D and at what age they were when they were diagnosed. In addition, the questions aimed to explore how client participants felt when they were diagnosed and how they manage their diabetes. Client participants' knowledge about how T2D develops, health consequences, risk factors and how the client participants believe the disease can be prevented, were also explored.

The links between section 1 of the interview guide and the HBM and SCT theories are detailed in Table 3.1.

Table 3.1 Interview Guide (section 1) links to HBM and SCT

Question	HBM Construct	SCT
How long have you been diagnosed with T2D	This question sits outside the HBM and conceptual framework	This question sits outside the SCT and conceptual framework
What age were you when you were diagnosed with T2D	This question sits outside the HBM and conceptual framework	This question sits outside the SCT and conceptual framework
Can you tell me what it was like when you first found out you were diagnosed with T2D and have your feelings changes since then	Perceived severity	Cognitive factors
Can you tell me what you know about T2D and how it happens	Perceived severity	Cognitive factors
Can you tell me what the risk factors are for developing T2D—how do you think people get T2D	Perceived susceptibility	Cognitive factors
Can you tell me how you manage your T2D	Perceived benefits	Cognitive factors
What motivates you to adhere to a treatment plan	Perceived benefits	Environmental factors
What are, for you, the most important treatment objectives	Perceived severity	Cognitive, Environmental and Behavioural factors
What do you think are some of the consequences of T2D	Perceived severity	Cognitive and Environmental factors

(Glanz et al., 2002 & Bandura, 2004)

Section 2: Family response to type 2 diabetes and disease management

Family plays an important role in the Arabic culture; therefore, it was important to explore the influence of family and how this impacts on the management of diabetes. Questions focused on gaining an insight into the impact and involvement of family in the management of diabetes. Table 3.2 describes section 2 of the interview guide and the association with the HBM and SCT.

Table 3.2 Interview Guide (section 2) links to the HBM and SCT

Question	HBM Construct	SCT
What support do you receive from your family in relation to your T2D	This question sits outside the HBM and conceptual framework	Environmental factors
Can you describe how your diabetes has impacted / affected the family unit	Perceived Severity	Environmental factors

(Glanz et al., 2002 & Bandura, 2004)

Section 3: Cultural response in relation to type 2 diabetes management

The way in which individual's approach life is underpinned by culture which, in turn, directly influences lifestyle and behaviours. One of the aims of this study was to discover what part the Muslim faith and cultural norms and behaviours play in the client participant's management of T2D and what effect culture has on disease prevention and management. The association between section 3 of the interview guide and the HBM and SCT theories are detailed in Table 3.3.

Table 3.3 Interview Guide (section 3) links to HBM and SCT

Question	HBM Construct	SCT
Can you tell me how your religion (Muslim Faith) plays a part in the management of your diabetes	This question sits outside the HBM and conceptual framework	Cognitive and Environmental factors
Can you describe the impact your culture has on managing your diabetes	Perceived severity	Cognitive and Environmental factors
Can you describe how you manage cultural celebrations such as <i>EID</i> and <i>Ramadan</i> in relation to T2D	Perceived severity	Cognitive and Environmental factors

(Glanz et al., 2002 & Bandura, 2004)

Section 4: Barriers and enablers to physical activity and good nutrition

Another aim of this research was to explore perceptions of UAE Nationals overall participation in physical activity and good nutrition. The questions also explored how client participants maintain good health, what motivates them to be healthy and their participation in physical activity. Barriers to good health maintenance and regular physical activity were also conversed and perceptions of barriers for the UAE National population was discussed. The association between section 4 of the interview guide and the HBM and SCT theories are detailed in Table 3.4.

Table 3.4 Interview Guide (section 4) links to HBM and SCT

Question	HBM Construct	SCT
Do you think UAE Nationals participate in physical activity? Why/ why not?	Perceived benefits & perceived barriers	Cognitive and Environmental factors
Can you describe to me how UAE Nationals access physical activity opportunities?	Perceived benefits & perceived barriers	Cognitive, Environmental and Behavioural factors
What do you think are UAE National's attitudes towards good nutrition/food—do they take it seriously?	Perceived benefits & perceived barriers	Cognitive, Environmental and Behavioural factors
How do you maintain good health? If not, why?	Perceived benefits & perceived barriers	Cognitive, Environmental and Behavioural factors
What would/does motivate you to be healthy?	Perceived benefits & perceived barriers	Cognitive, Environmental and Behavioural factors
Can you describe the healthy food options available at your workplace or in Abu Dhabi?	Perceived benefits & perceived barriers	Environmental factors
Do you participate in physical activity? If Yes, what physical activity do you participate in?	Perceived benefits	Cognitive, Environmental and Behavioural factors
Do you think, in general, UAE Nationals make an effort towards preventing diabetes? If not, why— what do you think are the barriers to diabetes prevention for UAE Nationals?	Perceived barriers	Cognitive, Environmental and Behavioural factors

(Glanz et al., 2002 & Bandura, 2004)

Section 5: Service provision

Within this category, the aim of the research was to explore what the client participant believes could have assisted them to prevent the onset of T2D, to ascertain whether the client participant attends regular appointments for their T2D, and what services they believe hospitals, or the wider community could offer individuals with T2D that might assist them in their disease management. Section 5 of the interview guide and the HBM and SCT theories are detailed in Table 3.5.

Table 3.5 Interview Guide (section 5) links to HBM and SCT

Question	HBM Construct	SCT
What do you believe could have helped you prevent the onset of diabetes?	Perceived severity	Cognitive factors
Do you attend your clinic appointments? If not, why?	Perceived barriers, Perceived benefits & Cues to action	Cognitive, Environmental and Behavioural factors
What would be the reasons for you possibly discontinuing with your appointments?	Perceived barriers	Cognitive, Environmental and Behavioural factors
Looking back, what has helped you the most with your T2D?	Perceived severity	Cognitive, Environmental and Behavioural factors
From your perspective, has there been good communication and continuity in the treatment process?	Perceived barriers, Perceived benefits & Cues to action	Cognitive factors
What sort of services should hospitals and the wider community be offering to people with T2D?	Perceived barriers	Cognitive, Environmental and Behavioural factors

(Glanz et al, 2002 & Bandura, 2004)

The HBM & SCT help better understand influences of behaviour change and, through this understanding, help inform the development of interventions. Both the HBM & SCT include a focus on the cognitive perspective which is one of the key influences of behaviour change (Glanz et al., 2002 & Bandura, 2004). The HBM encompasses the perspective that attitudes and beliefs play a major role in the determinants of an individual's health behaviour.

Predictors of health behaviours include comparison of barriers versus benefits. Perceived barriers and benefits may be influenced by a range of factors, including the environment, socio-cultural variables, (susceptibility and seriousness) and self-efficacy and confidence in the self (Glanz et al., 2002).

Social approval, self-evaluation of behaviour and health status, individual control over the outcome and elimination of barriers (including confidence and self-efficacy) can all influence behaviour change (Bandura, 2004).

3.6 Cultural context

The importance of cultural context to health behaviour is paramount, particularly when carrying out cross-cultural research. The researcher requires an in-depth understanding of the client participant's environment and setting, which has the capacity to give the data meaning (Strauss & Corbin, 1998). This was achieved through the researcher living and working in the Middle East for seven years. The interview guide for this research was reviewed by members of the SKMC Research Support Group, and staff at the diabetes clinic. The interview guide was also pilot-tested with the target group prior to the interviews commencing.

3.7 Data sources

Grounded Theory allows for multiple sources of data to be utilised (Corbin & Strauss, 2008). The main sources of data used within this research were; in-depth individual semi-structured interviews (n = 26 client participants), one staff focus group (n = 6), client participant case history review, and a journal by the researcher detailing the research progression.

3.7.1 Semi Structured Interviews–Client Participants

Client participants were purposively sampled from the diabetes clinic at SKMC based on inclusion and exclusion criteria.

Inclusion/exclusion criteria–individual interviews

Client participant inclusion criteria for this research included:

- UAE Nationals' aged between 40–59 years; the age range was restricted to provide a more succinct group to enable detailed discussion of lifestyle, work and family issues.
- This age group was chosen as the prevalence of T2D has been associated with increasing age (Amos, McCarty & Zimmet, 1997) and within the Gulf States, prevalence is highest in the 40–60 years' age group (Alyhas et al, 2012). Within the MENA region and globally, this age group has the greatest proportion of people with T2D (IDF Diabetes Atlas, 2011).
- UAE Nationals who have had T2D, as defined by American Diabetes Association guidelines, which is based on the WHO diagnostic criteria for diabetes; for a minimum of three years and attending the diabetes clinic at SKMC.
- Be able to converse in English; and
- Equal numbers of both males and females.

Client participant Exclusion Criteria for this study included:

- UAE National women who have been pregnant in the last three years

UAE national women have, on average, two-and-a-half children and marry at around 24 years of age (Al-Awad & Chartouni, 2014). Therefore, it was expected that women aged between 40–59 would have been unlikely to have been pregnant in the three years prior to the study. Pregnant women were excluded from the study due to the associations with gestational diabetes and, as a grounded theory was being developed, it was important the research focus was on an equitably homogenous group (Patton, 2002). The focus of the study was on individuals with a diagnosis of T2D, without a previous diagnosis of gestational diabetes (Patton, 2002).

The initial inclusion age bracket of 40–49 years was revised to 40–59 years early within the individual interview process due to issues of recruiting suitable individuals to participate in the research. Early into the first interview period, this issue was addressed with the research supervisors and correspondence sent to the chair of the SKMC IRB; approval to extend the age to 40–59 years was approved within 24 hours' post-request. It was considered that the increase in age range would not impact on the homogeneity of the group significantly.

The interviews were carried out over two time periods throughout November 2015 (n = 15) and February 2016 (n = 11). These time periods were amenable to the diabetes support group staff. In addition, the researcher needed to travel to Abu Dhabi to collect data; hence, it was necessary to collect data in two time periods.

3.7.2 Focus Group–Health Professionals

Focus groups are useful to gain a different perspective; they assist in identifying a consensus on a topic and are utilised when culture is of particular interest for the study (Morgan & Kreuger, 1993). The recommended size of a focus group is approximately six to ten participants (MacIntosh, 1993). Diabetes clinic staff are experienced in working with UAE Nationals with T2D, and could provide a health professional perspective on barriers and enablers to diabetes management and prevention. The focus group aimed to explore the perspectives of healthcare providers in relation to patient knowledge, family impact and support, patient's management of cultural impacts on disease management, influences on attendance of the diabetes clinic and barriers and enablers to physical activity and nutrition for patients.

One focus groups were carried out with healthcare providers from the SKMC diabetes clinic (n = 6). Staff knowledge, insight and perspective provided a professional perspective and allowed for triangulation with client participant data. The focus group semi-structured

interview guide (Appendix B) was based on the same five categories as the client participant interview guide: 1. Disease knowledge and disease prevention; 2. Family response; 3. Cultural response; 4. Barriers and enablers to physical activity and nutrition; and 5. Service provision.

3.7.3 Client Participant Case History

A client participant “patient case history” was completed prior to the commencement of each interview, with the information accessed from existing hospital progress notes. The patient case history included the individual’s age, gender, occupation, place of residence, year of diabetes diagnosis, HbA1C (on diagnosis and current) and treatment regime including diet, physical activity, oral medication and insulin use. This information was a valuable source of data that assisted to inform the research by providing background information on each individual client participant’s diabetes case (Curry, Nembhard, & Bradley, 2009). It also assisted in providing a more comprehensive understanding of the individual’s treatment regime (Curry et al., 2009).

3.7.4 Researcher Notes

Field notes were taken by the researcher after each interview was completed and entered into NVivo 10. This was carried out to assist in the analysis of the information collected and was also used to prompt critical thinking (Thomas, Silverman & Nelson, 2015). The research notes were taken only in round one of the interviews and encompassed information such as what worked and what needed to be altered to fit the needs of the diabetes clinic and potential client participants. The notes also included clinic challenges, how these were overcome and working through the best way to purposively sample client participants and the interview process (Corbin & Strauss, 2008).

3.7.5 Journal

A journal was also maintained by the researcher to provide additional information that contributed to the analysis process and, if necessary, for auditing purposes (Corbin & Strauss, 2008). The information maintained in the journal compiled a daily record of what the researcher achieved each day (for example, interviews undertaken, transcription) and documented thoughts, themes and conceptual ideas. The journal also contained information regarding communication with the research supervisors, the transcribing company and the SKMC Research Support Group (Carcary, 2009). Journal entries were completed daily during data collection periods and weekly throughout the analysis of the research. After discussions with the SKMC Research Support Group and Research Supervisors through emails, the journal

was also used to include tasks and issues that needed to be addressed. The journal was referred to weekly, to address tasks and pending issues (Carcary, 2009).

Within time-one of the research being carried out in Abu Dhabi, there were a few noteworthy challenges with the research process. On day five, it was identified that the age range specified (40–49 years) was too limited for the scope of client participants. Therefore, with agreement from SKMC IRB board and Curtin University Human Research Ethics Committee, the age range was extended to 40–59 years.

In the first week, it was also acknowledged that, in some cases, the language was going to be a limitation and a challenge for some of the client participants. To rectify this, purposively sampling was discussed with the diabetes educators to ensure participants were fluent English speakers.

Client participants were purposively sampled in advance of appointment with the researcher via phone calls. However, in collaboration with the Diabetes Clinic Acting Charge Nurse/ Diabetes Educator it was agreed early in the research to schedule interviews to coincide with the potential client participant's clinic appointment with either the diabetes educator or endocrinologist. In combination with this, if suitable clients were attending the diabetes clinic for appointments and met the research criteria, they were also invited to participate in the research.

Accessing the client participants HbA1C levels was a challenge as not all information was documented on the electronic system. With assistance from the Diabetes Clinic Acting Charge Nurse/Diabetes Educator, this information could be accessed.

3.8 Data Collection

3.8.1 Semi-structured One-on-One Interviews Procedure

Consistent with Grounded Theory research, data collection continued until saturation was achieved. A list of potential client participants was generated by staff from the diabetes clinic. At the next regular diabetes education appointment, the proposed client participant was introduced to the researcher by the diabetes educators and the research was discussed with potential client participants. Those who expressed interest in participating were provided an information sheet (Appendix C) and a consent form (Appendix D) and were added to an internal database of potential client participants, only accessible by the SKMC Research Support Group and the researcher.

Confirmed client participants were subsequently contacted by the researcher or diabetes educator by phone and further information about the research was provided to the potential client participant. Interview dates, times and venue were offered to the client participant by the researcher or diabetes educator from the diabetes clinic and appointments confirmed. For both time-period-one and time-period-two interviews, the client participants were also phoned by the diabetes educator and/or researcher the day before each scheduled appointment as a reminder of their appointment.

The staff at the diabetes clinic (n = 13) were all offered the opportunity to take part in the research and invited to attend the focus group session. Staff who participated in the focus group included three female diabetes educators, one dietitian, and one female and one male clinic nurse (HP1-6).

In the first round of data collection, and following modification of the age criteria to 40–59 years, all 15 client participants could be included from the pre-booked client participant list created by the diabetes educators. However, of those 15 client participants, five spoke poor English and therefore could not be included, leaving 10 eligible client participants.

Two client participants did not attend the diabetes clinic for their scheduled appointment (one during each data collection period), therefore, other suitable candidates who were attending the diabetes clinic and were willing to participate, and who met the inclusion and exclusion criteria, were encouraged to participate. Five client participants were included in the study via this method during the first data collection period.

In the second round of interviews, nine client participants were pre-booked by the diabetes educators, however, one client participant of the nine did not attend. An additional three client participants who were attending the diabetes clinic, and who met the inclusion criteria, were invited to participate. Two other individuals expressed interest, however, their English was limited and therefore could not be included. A total of 11 client participants were interviewed during the second round of interviews.

In data collection time-one, 15 interviews were conducted (n = 10 female; n = 5 males). An additional 11 interviews were carried out in data collection time-two (n = 3 females; n = 8 males). A total of 26 interviews (n = 13 female; n = 13 male) were completed.

All interviews were conducted at the SKMC diabetes clinic at a time convenient to the client participant. At the beginning of the interview, the researcher introduced herself (Appendix E), provided the client participants with the information sheet and outlined the research purpose and its benefits to the UAE population (Appendix B). It was explained to the participant that the research was being conducted to fill a research gap and to support future

recommendations for diabetes healthcare for UAE Nationals. Prior to the commencement of the interview, the researcher also collected a patient case history, including the participant's occupation, place of residence, year of diabetes diagnosis, HbA1c on diagnosis and current treatment regime.

Client participants signed the consent form prior to commencing the interview. Consistent with SKMC hospital policy, the consent form was provided in both Arabic and English. The interviews were approximately 30–45 minutes in duration and were audio-recorded.

Consistent with Grounded Theory (Strauss & Corbin, 1998), the interviews were conducted face-to-face by the researcher which allowed for complete immersion in the data and a reduction in interview bias. The recording was uploaded and sent for transcription within 24 hours post the interview completion.

3.8.2 Health Professionals Focus Group Procedure

Prior to the commencement of round two interviews in February 2016, the researcher sent an email invitation to all staff from the diabetes clinic to participate in a focus group session. The SKMC diabetes clinic employs six endocrinologists, four diabetes educators, six practice nurses (four clinic nurses on each day), one dietitian, one charge nurse (acting role by one of the diabetes educators) and one pharmacist. The email was re-sent to all staff by the charge nurse once the researcher was in Abu Dhabi. Due to the logistics of the day-to-day operational needs of clinic, two clinic nurses and one diabetes educator needed to remain available for patients during the scheduled time of the focus groups. Unfortunately, there was no response from the pharmacist and no endocrinologists were available to attend.

The focus group (clinic nurses (n = 2), diabetes educators (n = 3), and dietitian (n = 1) used a semi structured interview guide using a similar framework to the interview guide used with the client participants (Appendix B). Prior to the commencement of the focus group, the staff completed a consent form in both English and Arabic (Appendix D). The focus group sessions were conducted in English. The focus group interviews were audio-recorded and were approximately one hour in duration.

3.9 Data Analysis

Prior to data transcription, all personal identifiers were removed and an interview code was developed to protect participant confidentiality. Data collection and analysis were carried out concurrently with data comparisons and sampling continuing until saturation was reached and no new themes emerged (Burns et al., 2008a), as consistent with Grounded Theory

research (Strauss & Corbin, 1998). All interviews and the focus group transcriptions were completed within 24 hours post the interview to allow for analysis to be undertaken concurrently as the interviews were carried out. The transcribed interviews were then imported into NVivo 10 to enable data analysis to be undertaken and themes to be identified.

3.10 Data Coding

Grounded Theory analysis involves coding and generating theories from the information presented. Within this research, basic data analysis was conducted throughout the interview process which allowed for the addition of supplementary questions to be added to the interview guide. Some questions were compared in 1st and 3rd person - for example, Do UAE Nationals participate in physical activity/do you participate in physical activity?

The researcher analysed the text and coded the information (Bernard & Ryan, 2010) and utilised NVivo 10 to manage the data. Coding was carried out based on the data presented. Nodes (themes) were created from the various themes that emerged from the data and consistent with Grounded Theory, new categories emerged as the data coding was undertaken. Thirty-Three tree nodes and 50 sub-nodes were created and, in addition, 19 individual nodes were developed. Some of the nodes were linked and some remained free. The theoretical model was developed by collapsing the nodes. The four main themes identified for the theoretical model were: Culture, Barriers to Healthy Lifestyle, Enablers to Healthy Lifestyle and T2D information and support.

Thematic identification was carried out throughout the entire data collection and analysis process and key themes were identified and modified during the analysis. Constant comparison of the data was conducted throughout the research by listening to the audio recordings, re-reading the transcriptions, categorising information in NVivo and identifying themes (Strauss & Corbin, 1998). Selective coding, including reviewing the researcher's journal notes and post-interview memos was conducted (Bernard & Ryan, 2010). Inductive and deductive thinking was used to generate theory from the data; induction is used as the key process, while deduction occurs with emerging patterns and aids theoretical development (Bernard & Ryan, 2010).

Open coding commenced by reading the transcript in full and referencing the audio for accuracy. The transcript was then imported into NVivo 10 where it was re-read. The information was then assigned to new or existing codes (referred to as free nodes in NVivo) (Welsh, 2002). Each free node was given a name to avoid confusion when coding in the future. By coding the information, themes were identified from the interviews, and the information was integrated using constant comparison (Taylor, Kein, Sparrer, Van Delinder, & Parker,

2004) to support theory generation (Strauss & Corbin, 1998). As more data was reviewed, new codes and categories and sub categories (Taylor et al., 2004) emerged and the codes were refined to fit the data (Strauss & Corbin, 1998).

Axial coding was carried out when the coding became more in depth and data related to each other were captured and tree nodes created (Welsh, 2002). Axial coding is the process undertaken when the researcher creates relationships between the information found by developing nodes and sub nodes during the open coding process. Selective coding assessed the relationship between the constructs, and assessing how the concepts were related aided in establishing a phenomenon (Taylor et al., 2004).

By using open (basic themes defined), axial (categories clustered) and selective coding (concepts constructed and integrated) core concepts emerged (Burns et al., 2008a), emerging themes were analysed and linked back to the research aims and objectives, which in turn assisted to build a body of evidence to support the identified theory (Welsh, 2002).

3.11 Reliability and Validity

The research team consisted of research supervisors from the School of Public Health at Curtin University and the PhD student as the researcher. The researcher carried out all the interviews with the support of the SKMC research support group and initially coded the data following each interview, with the analysis reviewed by the team regularly. To reduce bias, key themes and concepts were discussed within the research team. The involvement of the research supervisors from Curtin University is vital to the research to reduce bias and enhance conformability (Lincoln & Guba, 1985).

A truthful representation of what had been said during the interviews and focus group was authenticated. This was achieved throughout the interview process with the researcher asking the client participants if the observation concerning them was correct and probing throughout the interview process to gather the data from the client participants, rather than taking information on face value.

Respondent validation was carried out throughout the interview process to improve validity of the research (Creswell, 1994) and the interviews were transcribed by an external company. Throughout the interviews, the interviewer restated some of the participant's answers to ensure the information received from the client participants and the data interpretation was accurate.

Respondent validation was also carried out with eight client participants who were presented with a copy of their own transcripts to ensure the information accurately represents

the participant's views and was a true representation of their thoughts and discussion (Lincoln & Guba, 1985). This also develops consensus and builds rapport between the researcher and the participant (Flewitt, 2005). The eight client participants verbally agreed to the information portrayed in their individual transcriptions.

Triangulation was conducted by triangulating the interview questions themselves, and triangulating the findings from the one-on-one interviews and the staff focus groups. Purposively sampled participant respondent validation was also carried out to provide credibility to the findings (Seale, 1999) and transferability (Burns et al., 2010).

Credibility of the research was also gained by the researcher developing familiarity with the culture of the region and client participants. A relationship of trust was established through consultation with the support group prior to the research commencing, throughout the research process and by gaining an understanding of the staff's workload so as to not place excessive demands on their time (Guba & Lincoln, 1994). The interview is a social interaction with rapport and trust being built with the client participants at the beginning of the interview (Guba & Lincoln, 1994). This was illustrated at the beginning of the interview, where common ground and a level of empathy was established so the client participants felt comfortable to be honest and open in the discussion, and the researcher actively listened and was genuine in their approach to the participant (Guba & Lincoln, 2004).

Transferability is the ability of the research to be applied to other situations and a wider population group (Merriam & Tisdell, 2015). Although this research specifically focuses on UAE Nationals living in Abu Dhabi, the findings and conclusions will be useful and applicable to other Arabic Nationals living in the wider Gulf Cooperation Council (GCC). However, the results should be interpreted in the context of the organisation in which the research is undertaken and the geographical area (Merriam & Tisdell, 2015).

Guba and Lincoln (1994) believe that if the researcher can demonstrate credibility, then this assists in identifying dependability. This can be identified when using various interview methods, such as focus groups and individual interviews. It can also be illustrated through the research process being documented in detail, which allows the reader to ensure that thorough research methods have been undertaken and triangulation can assist in reducing investigator bias (Guba & Lincoln, 1994). Within this research, both individual interviews with client participants and a focus group with health professionals was conducted, and the research process was documented in detail to ensure dependability. Confirmability is expressed throughout the results section of the research, highlighting the experiences of the client participants and ensuring the participant's voice is accurately documented.

Maintaining a journal throughout the research process also enabled the researcher to capture thoughts, experiences, mistakes and obstacles and can be used to assist in the data analysis, data interpretation, triangulation and as part of the research audit (Maxwell, 1996). The team also needs to ensure pre-conceived ideas don't block emergent data; therefore, to reduce bias, the data was coded and discussed with the research supervisors on a regular basis (Willig & Stainton-Rogers, 2007). Validity and reliability were also maintained through regular contact and discussion with the support group, external transcribing and review, and notes made by the researcher-post each individual interview.

3.12 Ethical Considerations

3.12.1 Ethics Approval

Ethics committee approval for this project was obtained from the Curtin University Human Research Ethics Committee (HR 119/2015) and the SKMC International Research board (rec-15.1.2015 {RS-332}). Ethics approval was gained from the SKMC IRB in January 2015 (Appendix F) and the Human Research Ethics committee at Curtin University approved the research through a reciprocal approval process in July 2015, with the approval granted until March 2017 (Appendix G). Guidance and mentorship was also provided from the Head of School at Fatima College of Health Sciences, Griffith University, based in Abu Dhabi. This research was low-risk, however measures were taken to ensure client and health professional participants confidentiality was maintained at all times.

3.12.2 Participant Consent

The client participants were fully informed of the research prior to the interview being conducted and written consent was obtained from each participant prior to participating in the research (Appendix D). A copy of each consent form was kept by the researcher and a second copy of all consent forms labelled with participant details was filed in each participant's hard copy file, in accordance with the SKMC IRB regulations.

3.12.3 Participant Privacy

Given the UAE is a small area geographically and the client participants were purposively sampled from one of the leading public hospitals, the researcher ensured that the client participants information and privacy was protected (Liamputtong, 2010). To protect the participant's confidentiality, no private information or identifiable details were included in the study data. All information collected from the client participants was stored in password

protected files, and participant identities remained anonymous, using de-identified interview codes (Carpenter and Suto, 2008). The audio recordings were stored electronically on a protected Curtin University server. Providing incentives for participation in research is not common practice in the UAE, therefore, participation incentives were not offered.

3.12.4 Cultural Sensitivity

Diversity plays a role in Grounded Theory research and cultural influences and norms impact on the cultural context. When researching in a country other than your own, the researcher must be respectful and sensitive to the country's beliefs, values, customs, cultural heritage and local laws, which may differ from their own (National Health and Medical Research Council, 2007b).

The researcher's knowledge and awareness of the UAE Nationals' Arabic culture and their cultural norms, beliefs and behaviours was developed and enhanced while residing in Abu Dhabi the capital of the UAE for six years, and working at SKMC within the nursing education and research department. The researcher was culturally aware of the participant's environment and had an acute awareness that cultural sensitivity is key to positive research outcomes (Bryant & Charmaz, 2007).

To ensure sensitivity was maintained, the researcher dressed professionally and ensured elbows and knees were covered to respect the local cultural standards. Local terms were used by the researcher to greet the potential participant, prior to the commencement of the interview. For example, the researcher greeted the participant with *marhaba kayf halik*; which in English translates to "hello, how are you?". At the end of each interview, the researcher stated *shukkraan* (thankyou) and *maas-salaama* (goodbye) to each participant. This was carried out as a sign of respect for the country and the individuals participating in the research. The researcher greeted each female participant with a handshake and a handshake was exchanged with each male participant, if the male, himself, offered that gesture. The researcher was acutely aware of the importance to speak clearly and concisely and attempted to break down information into a format that the participant could understand. Cues for this were evident by the individual's facial expressions or tone of voice. Minimal eye contact was evident with some, but not all male client participants; this is not a sign of disinterest, but of a cultural respect given to those of the opposite gender (Al-Busaidi, 2008).

It is also vitally important to understand the value of relationships and rapport built on trust within the Arabic culture (Durst, 1994). Once the individual has gained your trust, they will feel comfortable to be open and honest in your presence (Durst, 1994). It was also important for the researcher to gain an understanding of the individual's family, as family in

this environment is a collectivist culture where every individual is part of the family's identity; everyone, depending on their ordinal position in the family, has a specific role (Al-Krenawi & Graham, 2000). The researcher also ensured that the interview was conducted in a safe, private, and familiar location to the participant (Knox & Burkard, 2009).

3.13 Chapter Conclusion

This chapter outlined the methodology chosen for this research, and the conceptual framework used to support the research process. Grounded Theory was deemed as the most appropriate research method for this qualitative study. By using Grounded Theory as the foundation for this research, it allowed for theory to be built from the ground up, discovering a phenomenon, rather than testing an existing theory. The interview guide was informed and developed using the HBM and SCT, however, the interview questions were not confined to these models. The interview guide was used to support the interview process, while the research involved constant comparison between data collection, note taking, coding, and literature analysis. The research continued until saturation was achieved. Vital aspects of this research included cultural sensitivity and an awareness of cultural norms and an acute consciousness of the cultural context and environment. Ethical considerations, validity and reliability approaches were also outlined. This methodology allowed for the research question to be explored and provided a platform for understanding UAE Nationals' experiences and cultural and lifestyle impacts when managing T2D.

Chapter 4 Results

“There are no barriers, it’s the lifestyle. It may increase the opportunities of getting diabetes, yes.”

CP7F

*“We have restaurants here 24 hours; you can get food anytime
– Health Professional”*

HP3

“If you follow as your family did and be a role model and put it in practice in your family, then the community will change”

HP4

This chapter describes the findings from the client participants and health professionals who took part in this study. The chapter outlines themes that have emerged from the data and a theoretical model, “Influences of T2D” which has been derived from the research findings. The theoretical model is used to guide the chapter discussion highlighting the main themes and sub-themes that emerged from the findings. The chapter also describes the theories that have emerged as links to the findings; these are discussed in further detail in the discussion chapter. The results are drawn from the data collected in one-on-one interviews and health professional focus groups.

Throughout the chapter, quotes have been used to allow the voice of the client participants to be heard. This is an integral component of Grounded Theory research. The Client Participants have been identified as Client Participant (CP) one to 26 and male (M) or female (F), and the Health Professional Participants have been identified as HP1–HP6. Some of the quotes may contain Arabic words such as “*Insha’Allah*” (god willing), with the English translation in brackets.

The Client Participant and Health Professional demographics are outlined below, in Table 4.1 and Table 4.2, to give a clear understanding of the client participants and health professionals involved in the research. This information is followed by background information pertaining to the Theoretical Model and the theories supporting the findings.

4.1 Client Participant Demographics

A total of 26 Client Participants aged 40 to 59 years participated in one-on-one interviews and a total of six Health Professionals participated in a focus group. A description of the Client Participant and Health Professional demographics is contained in Table 4.1 and Table 4.2.

The majority of Client Participants resided in the city of Abu Dhabi (n = 19), with a few living off the island of Abu Dhabi, a 30-minute commute into the city (n = 4). A few others resided many hours out of Abu Dhabi in Ras al-Khaimah, Bani Yas or Delma Island (n = 3). Just over half of the women who participated were working in government positions (53.8%) or were business owners, while the other women were employed in unpaid household duties or retired (46.1%). Of the male client participants, eight worked in government positions or were self-employed (61.5%), while the remainder of the male client participants were retired (38.4%). The time since diagnosis of T2D ranged between two–20 years and is outlined in Table 4.1.

Table 4.1 Description of Client Participant Demographics

Characteristics	<i>n</i>	%
Gender		
Male	13	50.0
Female	13	50.0
Residence		
Abu Dhabi City - Island	19	73.1
Abu Dhabi City - Mainland	4	15.4
Other	3	11.5
Age at Interview		
Mean age (range)	51 (41–59)	
Occupation		
Government	10	38.5
Self Employed	5	19.2
Retired	6	23.1
Home Duties	5	19.2
Years since diagnosis		
Mean years (range)	12 (2–31)	
Mean HbA1C% (range)	8.3 (5.7 – 13.1)	
Number of immediate Family Members with Diabetes		
1	10	38.5
2	3	11.5
3	5	19.2
4	2	7.7
5	3	11.5
6	1	3.9
Not known	2	7.7

Number Interviewed *n*=26

Table 4.2 Description of Health Participant Demographics

Characteristics	Years
Years working in the:	
profession	12–37
Middle East	12–20
UAE	9–16
Residence	
Abu Dhabi City - Island	All
Abu Dhabi City - Mainland	0
Other	0

Number Interviewed $n=6$

Age range (years) 33-59

4.2 Theoretical Model ‘Influences of T2D’

The Theoretical Model ‘*Influences of T2D*’ (Figure 4.1) was developed from the research and includes the key themes of Culture, Barriers and Enablers to Healthy Lifestyles and T2D information and support. The sub-themes are those that are derived from the three key themes, as outlined below.

- **Culture:** sub-themes of religion, family and friends, family history;
- **Barriers to Healthy Lifestyle:** sub-themes including lifestyle and lifestyle changes, food availability, environment, cost of physical activity and good food, disease knowledge, clinic support;
- **Enablers to Healthy Lifestyles:** incorporating the sub-themes of family support, availability of good food and physical activity opportunities, disease knowledge and clinic support;
- **T2D information and support:** incorporates the main avenues for current T2D education and public awareness raising. T2D information and support influences both barriers and enablers to a healthy lifestyle.

The Theoretical Model ‘*Influences of T2D*’ will be displayed and the theme highlighted in each relevant section of the results chapter. Within this research, as illustrated in Figure 4.1, Culture was identified as the main theme that emerged from the data and is identified as a fundamental component of UAE Nationals’ existence before Federation and today. There is a strong cultural identity intertwined in the way UAE Nationals conduct their life and their thoughts inclining their behaviour. Within this context, Culture incorporates the sub-themes of religion, family history and family and friends. The theme of Culture, and its sub-themes, influence the themes and sub-themes incorporated into Barriers and Enablers to Healthy

Lifestyles. The way individuals' access T2D information and support for health education is also interlinked and influenced by Barriers and Enablers to Healthy Lifestyles and Culture.

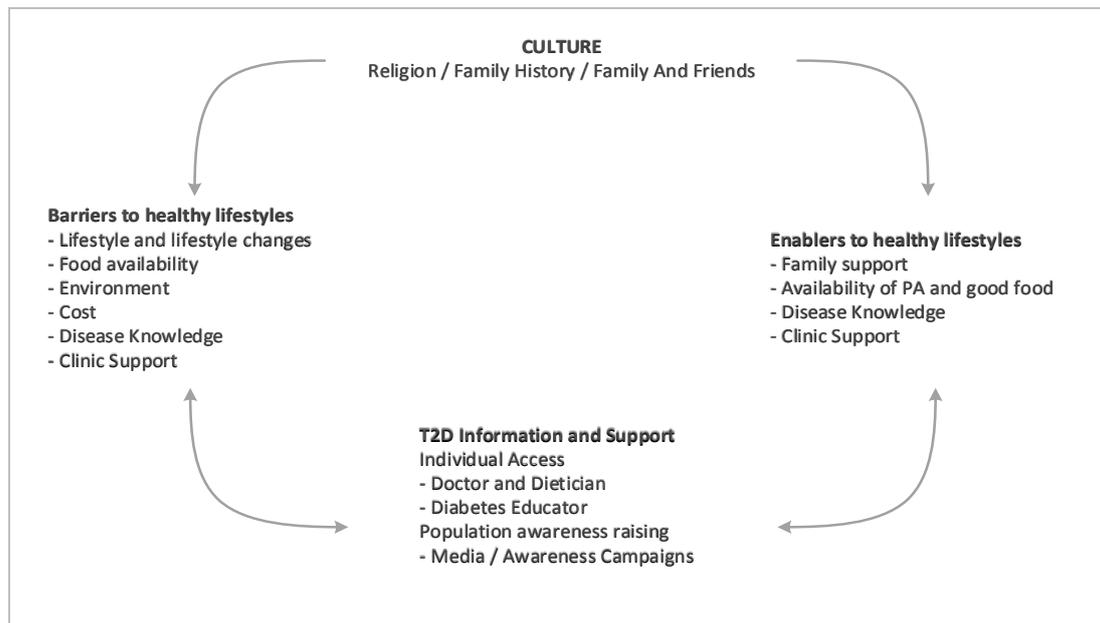


Figure 4.1 Theoretical Model 'Influences of T2D'

4.3 Culture

Culture (Figure 4.2), emerged as a key theme that influenced Barriers and Enablers to Healthy Lifestyles associated with T2D information and support. The sub-themes of Culture, including family and friends, family history, and religion, help explain the influence of Culture. This section also draws on the impact the diagnosis of T2D has on the family unit. Within these constructs, there were several key influences that emerged throughout the theme of Culture. The main sub-themes identified were; religion, family history and family and friends. The constructs within these sub-themes will be discussed in further detail.

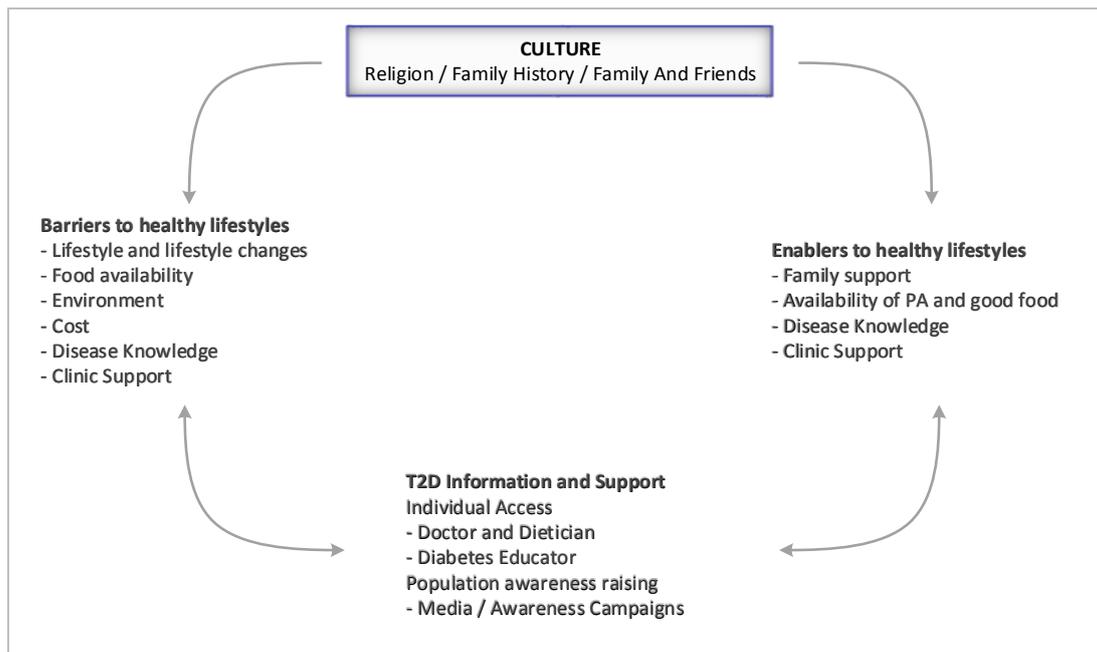


Figure 4.2 Theoretical Model 'Influences of T2D' – Culture

4.3.1 Religion

As highlighted in the Theoretical Model 'Influences of T2D' (Figure 4.2), religion is emphasised as one of the sub-themes of Culture. Each religion, including the Islamic religion, is diverse in its beliefs and values. There are many facets to the Islamic religion with the body and spirit being two of the main focuses. Food is seen as a gift from God; alcohol and pork are prohibited, due to the belief that they have negative effects on the body; foods such as honey, dates and pomegranates are promoted for good health (Tober & Budiani, 2007). Another Islamic view in connection to health is that for every disease given, God provides a cure (Tober & Budiani, 2007). This is highlighted by one participant who linked their diabetes to *Allah* and their faith when sent a disease or a divine test: *faith motives us to look for a cure*. However, the main discussion in association to the Islamic religion was the client participants and health professionals' views on *Ramadan*. According to Tober and Budiani (2007), *Ramadan* is a requirement to cleanse the body and spirit.

This study reinforces the important role of religion, and the holiest month in the Islamic calendar, known as *Ramadan*, plays on the management of T2D. *Ramadan* is one of the core religious practices of Islam. In the history of the religion, Muslims are to practice self-control, focus on prayers and spend time reflecting on those in the world who have very little. In the teachings of Islam, those with chronic diseases are exempt from fasting, however, many individuals with diabetes insist on fasting as it is viewed as a significant component of the religion (Al-Arouj et al., 2010). The findings from this study illustrate that the main reason for fasting is the Islamic religion; it is a requirement and a significant pillar within the faith, and

of importance to the individual to carry out. All client participants provided examples as to how *Ramadan* influenced their management of T2D. Within the religion and traditional Arabic cultural values, family, and loyalty to family and friends is extremely highly valued, including family traditions, family relationships and socialisation (Budhwar & Mellahi, 2016). Organised cultural patterns of behaviour are underpinned by their beliefs, values, and attitudes (Budhwar & Mellahi, 2016).

Most client participants stated that their religion and the teachings from the *Koran* and Prophet Muhammad are something to strive for in everyday life and something to be proud of. *Ramadan* is one of the five pillars of Islam. Originally, the focus of *Ramadan* was a time of self-reflection, self-purification and fasting from sunrise until sunset. It applies not only to food and drink, but also to the use of tobacco, medications that are not essential and sexual and intimate relations. Those who are unable to fast are encouraged to compensate for this by providing a donation of food for the poor. Throughout *Ramadan*, arguments and all negative thoughts about others should be avoided. The majority of client participants felt it to be very important that the teachings of the *Koran* and Prophet Muhammad were followed. It was also acknowledged that some of the traditional meanings have been modified over time. For example, traditional fasting has been replaced with fasting, then feasting, as described by CP6M:

It's for life, yes. He gave us the best example, especially for Ramadan, and he said Fast, you will become healthier if you fast you will become healthier. Now we don't do that. We fast but then we eat a lot. We are not following his teachings unfortunately, we know that.

One of the core teachings of Prophet Muhammad as the Islam religion, is that one should not harm himself or others. As stated by CP8F:

It says that you should take care of your body, you shouldn't eat... the sayings of Prophet Muhammad [state that], you should eat properly, which nobody knew about that... at [the]... time that it was written, [we] don't overindulge in anything, including food.

HP2 also highlights that instead of reducing food intake there is often extra food consumed throughout *Ramadan*:

Ramadan is coming it's as if the month of food is coming. And it's totally opposite. It's lost the purpose of fasting. And we are preparing ourselves, we are going to Carrefour [supermarket] for all of us, we're preparing, but this is what we're used to; especially Ramadan when the family is together, they prepare more sweets, the whole night eat and sit and chat and morning sleep.

In addition, HP6 discussed the difficulties she faced trying to support clients through *Ramadan*:

So the tradition, in a way, is their food and in Ramadan, it's really affecting their diabetes and really, I'm trying to support the patient in Ramadan but, sometimes we are just ignoring Ramadan. They add a lot to their food, especially at Ramadan, also, and I feel that the mother, like, has to showcase in Ramadan, and she has to cook extra, she has to do lots of new or nice recipes... it will lead to more eating and more sugary or fatty goods according to the mother, what she chooses.

Other comments also reinforce the association with over-indulgence, as opposed to the minimalistic beliefs of the *Koran* which reinforce minimizing food intake: as HP2 comments:

We say from the religious side, the opposite [to what we are doing], you have to take less food, not that much varieties, try to minimize the food you take.

The findings of the research, highlighted by these comments suggest many individuals with T2D are using *Ramadan* as a festival of food and sugar. This is despite the actual meaning in the *Koran* which suggests minimising food intake and harm to self from over consumption. Consequently, while an individual's weight may remain the same through *Ramadan*, their intake of fat and sugar is likely to increase and hence increase glucose and HbA1c levels (Sadiya, Ahmed, Siddieg, Babas & Carlsson, 2011). The findings suggest cooking styles are altered during *Ramadan* with a greater emphasis on food high in fat and sugar. The findings is reflected in the following comment from a HP6:

Most of it is fried, they put lots of ghee on it, you know, or Arabic butter. They add a lot to their food, especially at Ramadan; this will lead to more eating and more sugary or fatty goods.

For many client participants, the relationship between their religion, *Ramadan* and diabetes can be complicated by their lifestyle. Many client participants, but not all, agreed that they over-consume food high in fats and kilojoules during the holy month of *Ramadan* which, compounded with fasting, can make it a challenge to maintain good blood glucose control.

The justification of behaviours which may be conducive to management of T2D during *Ramadan* can be explained by Festinger's Cognitive Dissonance Theory (CDT) which suggests the behaviour performed may contradict an individual's beliefs and values (Festinger, 1962). The CDT focuses on how individuals aim to produce consistency in their life. According to Festinger, dissonance reduction can be achieved in four ways: to change the behaviour or cognition, to justify the behaviour by altering the conflicting cognition, justifying the behaviour by adding a new cognition or by ignoring any information that conflicts existing

beliefs and values (Festinger, 1962). In this research, the client participants realise they are eating foods which may impact their T2D negatively, however, they justify their eating through the constraints of *Ramadan*. The client participants also justify their behaviour by ignoring information given to them that conflicts their own beliefs and values, with the belief that *Ramadan* is a part of their culture and religion and somehow it must be good for them. CP2F states,

It's opposite of things, it's good for the body

and follows this statement by commenting that the food consumed is:

too much sugar and too much sweet (CP2F).

CP3F supports this by stating:

when you're fasting, you will feel good.

CP2F and CP3F strongly believed that fasting and participating in *Ramadan* is good for them and for their bodies, even though it states in the *Koran* that those with a chronic disease are exempt from fasting. The behaviour is reinforced and justified by the constraints of *Ramadan* with CP10M stating:

some days I take care, but I forget, I eat like too much sweet, I eat the sweet, but not all the time [sic].

CP7F confirms the reality:

Sometimes I inject myself extra insulin. Instead of 20 ml, I will do 25 just to be... to compensate what I don't eat, especially if there are desserts and something like that. Especially Ramadan.

The comments CP10M, CP7F, and CP6M illustrate that they participate in food indulgence after sunset. All client participants are educated by both the endocrinologists and diabetes educators on how to manage T2D during *Ramadan*. The majority of client participants commented on over-eating high fat and high-sugar foods during this time and will, in some cases as represented by the comments, compensate by increasing their own insulin doses.

The health professionals did not comment on the client participants' medication management throughout *Ramadan*, however, HP6 states:

I tell them Ramadan I will close my eyes because, you know, for Ramadan they have traditional foods. It has to be done [Ramadan] and most of it, like for more than one year I'm doing it with Ramadan foods and some observation on it, but most of it is very high carb food. One hundred percent you can say it's all carbs with a little bit of meat and sweets... every day on Ramadan they have sweets.

While HP1 commented that the health authority is promoting healthy eating and medication use by:

doing these advertisements, they are in Arabic and you can see they are in the Magilis sitting and talking about medication, talking about Ramadan meals; it's very good.

Ramadan is an extremely social time for Muslims, especially when they break their fast at sunset with extended family and friends; this can be challenging for those with T2D. However, while some found this difficult, others described the support they received from friends and family. CP21M remarks:

In the beginning, the first three or four days for Eid, but after that, it's fine. It's so easy. It's okay for me. Now, nothing will stop me, you know. I know I have diabetes, so don't go there; I have to celebrate with my friends, I have to go to parties, camping, normal, but I'm controlling myself and my friends know.

Many of the HP's agreed that Ramadan is an important social time where:

The food is cultural, not only for religion; the food itself here comes from culture, and we have to celebrate.

However, for some other client participants, the awareness of the effects of diet on their diabetes, especially during Ramadan is difficult for friends and family to understand. For example, CP6M states:

They become a bit upset because they say when I say I'm diabetic, so what, this is just a small piece, is this house so harmful. Yes, it is...this little bar, or whatever, or tea with sugar, it is this by itself [that] is harmful. So, I have to talk to them several times, then they will understand.

Some client participants commented that their friends and family felt they were using their diabetes as an excuse to avoid participating in the festive celebrations. CP5M comments:

We visit people and they offer for us food and we cannot reject it. You cannot reject it. It is kind of unrespect. For some item, maybe will not take it much; will take it only for taste and you tell him that your excuses from this. It's happened like this [sic].

This is an example of cognitive dissonance (Festinger, 1962) where participants know the food is not acceptable for their T2D, however they justify their behaviour by using a part of their religious beliefs and social norms; even though there is an awareness that those with a chronic disease are exempt from fasting, as it is seen as disrespectful to not take and share the food offered. Many of the health professionals agreed that *Ramadan* can be a challenging time:

When you want to show others that they are generous, it's by food. If you are not serving a good amount of food you are not caring, you are not generous. (HP2)

There was a mix of responses regarding the difficulty in not accepting food during *Ramadan*. Some client participants said it was not a problem for them, while others found it difficult to say no. Others found that, after they educated their friends and family, it was manageable. Some client participants also commented that it is easier to remain in their own home and eat with their own family and have guests come to their home, rather than visiting other people's homes. This can also be challenging to explain as breaking fast each day with family and friends is one of the important components of *Ramadan*.

An example of social, cultural, cognitive and environmental influences is the discussion by CP5M regarding *Ramadan*:

Nothing changes. I don't think there's any change. I will do my fasting. I will continue my fasting. This is my belief. Before Ramadan comes or something like this, the doctor advises a way of taking the pills and medicines during Ramadan period and we will go with his instructions. The blood sugar levels jump rapidly. There is fruit, there is sweet, yes, there is sugar foods, sweets [sic].

Most of the client participants in the research fasted throughout *Ramadan*. Despite some client participants feeling their blood glucose levels were challenging to manage during *Ramadan*, many felt that fasting was a positive experience for their health. As CP12M stated:

I fast...when I fast, you know, I feel my body is good. It will be stable, I manage my fasting, okay. And it will be stable so nothing comes to the body and fasting, to be honest with you, is cleaning the body, you know what I mean? So, it cleans, to be honest with you it cleans. When I, when I fast I feel really good [sic].

For some client participants, there was a sense that they personally try to control their diabetes more diligently, as fasting is a spiritual issue for which the patient makes their own decision on how to manage it after receiving advice from both their religious leader and healthcare professional (Al-Arouj et al., 2010). In contrast, two client participants chose not to participate in fasting throughout *Ramadan*, as CP15M states:

If I fast you know [it is]...difficult to control my sugar.

CP18M reiterates:

To maintain medicine...I don't take fasting every Ramadan.

CP18M goes onto state:

[I] tried to go far from friends, not to see [during Ramadan], here the family [in his house], they eat [the] same meal and together. Like, but me, I have my own food, normal. I'm not like this, and this, and this, and big haroof [lots of food in Arabic].

The client participants didn't disclose any feelings of isolation when they were not fasting. CP18M states:

I try to follow what doctor said, I try, but not 100%, but at least better than...we are all human [sic].

4.3.2 Family History

The findings from the research illustrated a strong link between Culture and the sub-theme of family history (Figure 4.2). There were mixed responses from the client participants when family history and the impact of their diagnosis of T2D was discussed. Many client participants expressed that they felt their diagnosis of T2D was inherited and to be expected, due to their family history of T2D and multiple members of the family also having T2D.

CP19F states:

Because I have a family history of diabetes, so I could expect this [sic].

Many client participants also conveyed that, due to family history of the disease, and their perceptions of the disease being inherited, their diagnosis didn't have a huge emotional impact on them. For many, the initial diagnosis of T2D was not a shock: some were sad but accepted it as the standard for example CP23M explained *it made me feel sad*, but accepted it. For example, CP17F stated:

It didn't make a difference, because my family, we're diabetic and the way, I don't know, I mean, I know some people they...I know when my sister was, she started crying, but for me it was, maybe because I've been living, you know, in the environment where my parents were diabetic.

For those client participants who only had one family member with T2D, their views and responses towards their T2D diagnosis, in many cases, was similar to those who had multiple family members with T2D. As CP16F states:

No, actually, maybe this is the time. Because, my Dad is diabetic, so it's genetics.

The majority of client participants commented that the impact of the diagnosis of T2D was “the norm” due to many having between two and six immediate family members with T2D; in some cases, it was viewed as acceptable to have T2D. Due to the high incidence of T2D and their family history, their expectation for the future was the assumption that their children would also become diabetic. For example, CP3F stated:

Because my family, it's the history of all my family. All they had diabetic; my mother, my father and my brothers, all my brothers. It's normal; my kids will be

with the assumption that, due to diabetes being in the family, it will be a given for the child. In some cases, the health professionals view that the clients are proud to have T2D. A chronic disease such as T2D is a silent disease and many individuals don't suffer complications in the early stages, therefore potentially feel 'normal'. To be 'proud' of T2D may be due to the normalisation of the disease within this culture and the commonality of T2D among Arabic families. HP6 states:

They are very well educated, they are very supportive, and in their words, they are even proud. They have diabetes and they don't care. It's something normal, they support their children or their wife or husband and I feel it's much according to the keeping of the family and their education.

The dialogue lends itself to a label being given before the disease or when diagnosed (Trice & Roman, 1968). This is clear in the comments made by the client participants, who view the impact of the diagnosis of T2D as expected, or the norm; they play the sick role and don't take responsibility for their disease. The medical diagnosis can then occupy a social status in the wider family and community and the family reinforces its normality. Some of these discussions show links to the Labelling Theory (LT), which was first developed by Becker in the early 1960s through the studies of deviance and crime (Becker, 1963). The theory is based on individuals being assigned a sick role, being labelled with a diagnosis and then not taking responsibility for the disease (Trice & Roman, 1968).

The discussions also complement the Theory of Planned Behaviour (TPB), including the attitudes towards self-care, normative beliefs and subjective norms. It is viewed as “normal” (normative beliefs) by the family, extended family and social groups to be diagnosed with T2D. Therefore, what's perceived as normal (subjective norms) are influenced heavily by family and friends and other social groups. According to the TPB an individual's behavioural intention and behaviour is also influenced by their normative beliefs and subjective norms and a health-related behaviour might be heavily dependent on social influences (Ajzen, 1985).

4.3.3 Family and Friends

Data emerged from the research demonstrating the importance of the sub-theme of family and friends within the overall main theme of Culture (Figure 4.2). Client participants discussed several cultural factors that influenced their behaviour, which may have had an impact on the onset or management of T2D. Family and friends emerged as a strong sub-theme linked to Culture. The majority of client participants suggested traditional diet and the culture of food and sharing food with family and friends sometimes made it difficult to manage their T2D. Traditionally, diet in the UAE includes produce such as fish, bread, rice, dates, vegetables, and meat from camels and sheep and goats; with some traditional cooking methods involving the use of foods high in saturated fats. Client participants discussed how the use of some traditional foods and cooking methods made it difficult to adhere to dietary requirements associated with T2D. CP18M stated:

[we] cook with oil [fat and sugar], this is the problem.

CP8F reiterates:

It used to be very good nutrition, and now, anything fast, mostly maids are cooking so you have to check if they're putting [in] too much salt, if they're putting [in] too much sugar.

The changes within the lifestyle over the past 46 years have affected the change in nutrition. Nutrition was good when the UAE Nationals were living off the land, eating fresh fruit and vegetables, legumes and meat on occasion. The food consumed was fresh and less processed and physical activity was undertaken daily (Loney et al., 2013).

HP1 highlights the use of ghee in her mother's cooking and how this improves the taste of the food.

I will tell you something, our taste buds from when we are young we are used to fatty food. Because it's; – not fast, fatty my mum will cook rice, she will put real ghee, not oil, ghee, so we're used to that taste. Now in my house I don't cook this, I'm trying my best not to do it. But when my mum cooks the rice it tastes better, so it's not easy to change. It's not really easy to change people because unhealthy food is really tastier than healthy food.

One of the sub-themes encompassed within the theme of Culture is family and friends. The culture in the UAE is to spend time with family and friends, to share food together and, in many cases extended families live together in the same house. The majority of client participants commented that they felt supported by their families with the family encouraging them to eat healthy food and, in some cases, supporting them to participate in physical activity.

While a few client participants could make food changes, not only for themselves but for their families, for some this was a challenge. CP20M and CP21M are good examples of how their T2D diagnosis has impacted upon their extended families in a positive way. CP20M stated:

I encourage them, not me. I'm encouraging the family.

While CP21M noted:

Now even the family, they start to change the diet for the family. I mean, they started now, their Dad (CP21M) is eating like this, so we have to eat the grains, and stop the oily cooking. So, they are educated now from me because I am educated from the hospital [sic].

In contrast, some client participants had little support in the home environment. CP19F stated:

I am receiving no support. I am on my own, at the moment.

CP21M also explained:

No because I am the first one, because now... anything with my family, my own family, my wife and the kids. So, I am the number one person who has diabetes in the family [sic].

CP21M commented:

but for the education from the nurses and the doctors, I educate my wife and the family [sic].

All health professionals discussed encouraging clients to adopt healthy lifestyles and eating for the entire family, rather than the individual. HP3 stated:

We usually tell them that this advice is not only for you, it's for your family members. This is an environmental factor so it should all work together. And the issue, let's say in UAE; they are living in a big family. Not one in each house can make whatever changes he would like to make.

Interestingly, HP3 explains:

the extended family, like grandmother, grandfather, they are all in the same house. Because of [the] culture issue they don't give the support. Not because they don't love them; No, they are trying to take care of them but with a way —No he has to eat everything, don't say no, don't start this, this is healthy for him.

This environment, which is associated with family behaviour, is culturally embedded and to break a pattern that has been carried out for many years is difficult. To be the one family member to bring about and encourage change can be challenging. The data that has emerged from the HP's reiterates some of the findings from the client participants. If there is limited support in the home environment it becomes challenging to instil changes in the family's eating practices, difficult to change overall individual behaviour towards a healthy lifestyle and challenging to understand if the individual's T2D is of importance within the family.

One example, which was not highlighted by all client participants in this study, but was highlighted as a cultural challenge by a health professional, was the difficulty in determining portions when sharing food:

How do they know how much they are eating because one of the cultures is that they have to all eat in one big dish and they are very stubborn. Not all people are like this because they started to change but some families they are really stubborn, but I think nowadays we are changing; we start to accept it more and understand a bit more [sic] (HP1).

The Theoretical Model '*Influences of T2D*' and the research findings suggest a strong relationship linking social interactions between family and friends, and Culture. Culture and tradition are based on social time spent with family and friends, which often involves sharing of food; generally traditional foods and beverage consumption. For some people this may mean visiting several friends in the day. The home environment can be both supportive and challenging for individuals to choose healthy food options. An example of the importance of socialisation and culture was explained by HP2:

We were living in a place where it was like rural. So, you can see in each area, after 7pm, all the old ladies are roaming around in the Shabir [local neighbourhood], like this. But once, she says hello in this house, she will have three dates with a cup of coffee. And she will continue to the other house, three dates and another cup of coffee. The culture here—they like to visit each other; it's very social, so when they have no duties like going to work they find one hour or two hours they would like to have social things, rather than going to do something else. I think so, this is for ladies, and I think this is what we prefer [sic].

Many client participants commented that physical activity was not part of their daily routine, and sharing food and socialising was a more important component of their culture. For example, HP6 commented:

They are really following like static life here [sic] which leads them to a very bad way and I think there are cultural things [that] also affects many. HP2 stated, 'Because it's mainly, the food is cultural, not only for religion; the food itself here comes from culture, we have to celebrate generosity.

HP3 discussed food intake which is believed to be a part of the cultural behaviour:

Regarding the rice with the culture here, with the way of eating, maybe correct me if I'm wrong, the way they eat usually they have rice, they have saluna [sauce] or just a little sauce. It's not like a lot of sauce mixed with the rice when you [researcher] eat.

In many cultures, the women are viewed as the care-givers, where the family and children's needs are met before their own. This was noted by the health professionals who feel this is evident in some of their female clients' diabetes management. As HP4 noted:

The female is thinking of everything but her own health. Everyone's health but not her health, kid kids [sic], her house, what they will eat, what they will drink, and she will forget about herself, so the difficulty with women is more than the men here anyway.

4.4 Barriers to a Healthy Lifestyle

Barriers to a Healthy Lifestyle as illustrated in Figure 4.3, emerged as a key theme influencing T2D management. This research illustrates the link and influence between the theme Culture and its sub-themes and the role these play in relation to Barriers to a Healthy Lifestyle. Family and religious obligations, expectations and cultural behaviour all influence an individual's attitude, values and beliefs. The progression of T2D is associated with not adopting healthy lifestyle behaviours. One of the objectives of this study was to identify barriers to a healthy lifestyle among UAE Nationals with T2D living in Abu Dhabi. Understanding the barriers to a healthy lifestyle gives insight into the support required to promote and engage in behavioural change. The sub-themes (Figure 4.3) that emerged from within the theme of Barriers to a Healthy Lifestyle include; the rapid lifestyle change from that of rural to urban, increased car use and lack of incidental physical activity. Other themes that emerged include the influence and impact of home help such as a maid, indolence, and the perception of not having enough time for physical activity. The multi-national environment and food availability from many countries, the environment including the weather, urbanisation, the school environment and family influences were also emphasized as barriers. The cost of good food, good food opportunities, disease knowledge and clinic support emerged

as the sub-themes to Barriers to Healthy Lifestyles. The sub-themes will be explained in further detail.

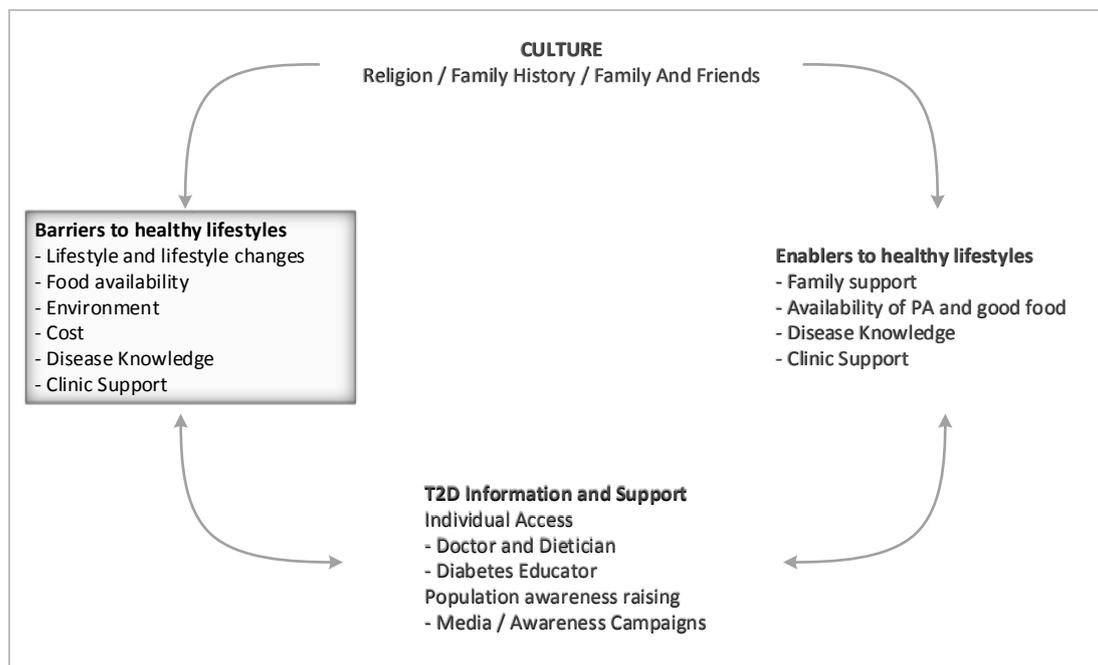


Figure 4.3 Theoretical Model 'Influences of T2D' – Barriers to a Healthy Lifestyle

4.4.1 Lifestyle and Lifestyle Changes

Most client participants agreed that one of the main factors that influence behaviour is the extreme lifestyle and lifestyle changes as shown in Figure 4.4.

The lifestyle change from that of a Bedouin existence is articulated by CP15M's comment that, in the past, people [were]:

Maybe walking every day, maybe 20 kms. Minimum. Yes, they were strong before, the people. Not like now. Only the car and the office. Like that, only maybe 80% of the time only they sit [sic]. This life is changed, you know? Not like before [sic],

[contemporary Bedouins live] a sedentary lifestyle. As CP22M states:

They sit too much, my nationality.

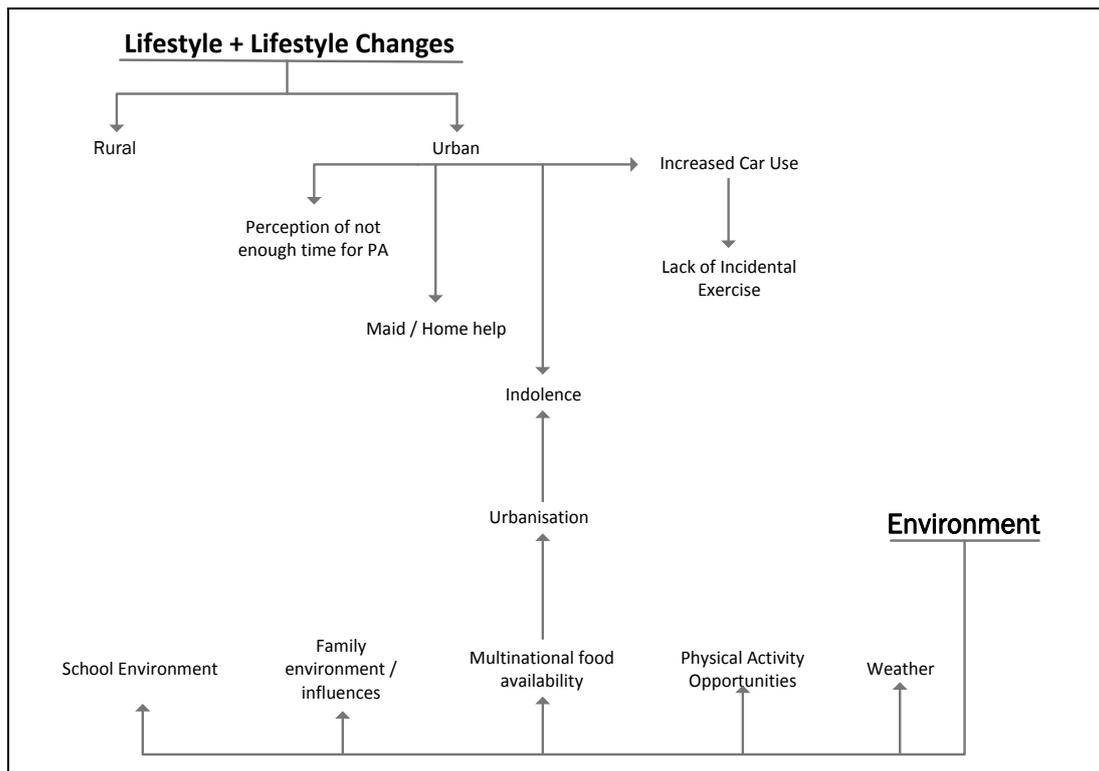


Figure 4.4 Sub-Theme Model – Lifestyle and Lifestyle Changes

As demonstrated in Figure 4.4, the lifestyle in the past was that of living off the land, fishing for food and walking long distances, as described by CP21M: ‘*We worked with our hands. That age ... we were very healthy. Nowadays, we are using the cars [sic]. It's easy*’. Many client participants agreed that compliance to a healthy lifestyle is proving to be challenging for many UAE Nationals, which has been affected by the change in lifestyle and economic wealth that supports UAE Nationals. An example of this is illustrated by CP11F:

For my parents, because they're not nanny like this, help me to help. They work by themselves, you know. Nobody help like us now. Two housemaids, three at home, you know. We must change this [sic].

The rapid change in lifestyle and a shift from a rural lifestyle to mass urbanisation has had a positive impact, both financially and economically; however, these changes have had an unfavourable effect on the health of the Nation. Many client participants discussed the change in lifestyle and the impact this has had on their health. Participants recognise changes in diet and physical activity have been significant. This extends to the availability of food outlets, as well as utilising large supermarkets instead of markets. Some of the reliance on large malls has also resulted in people spending a lot of time at these shops. These changes are reflected in the comments by HP2:

Ten years ago, we started having malls and the like, we didn't have, we would go to the park is what I remember. And if you want a supermarket, there is a small supermarket to buy everything. Now you can see, like, ten malls inside a small city. And one click on the phone, you can have delivery now. You don't need to talk to the man, just click on there, put your order, for example, from McDonald's and you will get it. We have restaurants here 24 hours; you can get food anytime.

The discussion in relation to changes in lifestyle have been common throughout the research findings and has highlighted the changes in food availability and physical activity. This comment from CP26M provides another example:

Through our life. Not this one, this is not life. It's a very bad life, to sit, go to a mall, shopping mall. Why? We don't need it. We can buy from any market outside. [We] don't need to stay in the mall from morning until evening [sic].

The dramatic lifestyle changes from the past until today were evident to all client participants. As CP19F stated:

It's too easy, life; too comfy. You know there is not a lot of physical activity or physical work, and a lot of good food around, and money around [sic].

A lack of incidental physical activity and the impact on cumulative physical activity was a common theme that emerged from the data. The majority of client participants and health professionals also commented that the change in lifestyle, including lack of physical activity and an increase in food consumption, has contributed to their T2D diagnosis. HP1 commented:

I think some of them they understand and they realise again their lifestyle is a problem or their kind of meal is a problem and this is why they have diabetes. I don't think all of them rely on what reason and causes we mention and that is what they have. Some of them will say yes, because our lifestyle—or because of what we eat or because they have obesity'. HP2 reflected, 'Because it's mainly, the food is cultural, not only for religion; the food itself here comes from culture.

Indolence

As highlighted in Figure 4.4, the sub-theme of lifestyle and lifestyle changes incorporates many environmental and behavioural factors that contribute to Barriers to a Healthy Lifestyle and T2D management. One of the contributing factors highlighted by the client participants is laziness. As CP17F stated:

Could be lazy, but the same thing I feel [is that] they're so pampered. Yes, you know, they [the UAE Nationals] find everything is available for them. They don't struggle for it, yes [sic].

Many of the client participants claimed that this was due to their indolent lifestyle. CP7F commented:

Not moving, activity... and I remember our food did not change. We... are still eating the cuisine like we did before; like our grandfathers. But they used to walk from long distances, they used to go selling, you know. And the lifestyle is different; now it depends on cars, on house maid bring us even the purse or anything. We have become lazy.

Many client participants believe that the rise in T2D is due to their rapid lifestyle change. According to CP26M:

Before, we are working in our garden, or we have it in the home, everything, we do it ourselves. Now we are lazy, too much lazy. We can say like light; we cannot change it. We bring people to change it. This is very bad. I saw, now I am starting from maybe a long time, myself, I change it, in the home I do it myself. But still, my people are lazy too much, I know. It is very bad for us [sic].

Behaviour modification for any individual or population group is challenging, particularly when it involves dietary and physical activity changes. Many of the client participants involved in the research believed they are “lazy”. CP8F stated:

You get lazy. When you have, everything done for you, you can just say, oh, I can just sit back, do nothing.

These two comments represent both personal feelings and the feelings that the UAE people, in general, are lazy. Many client participants referred to their behaviour being influenced, and indicative of, the current lifestyle, in comparison to the life their forbearers lived, who lived off the land. As CP26M stated:

We are lazy because the people when they came to us to work with us... We have everything ready now. If we need to think, we can't think, we can't do anything. We can't make house; we can't make anything we want. Like another people, what, they are different than us. No. We have mind, yes? But I think, I hope, they change this situation, I hope, Insha'Allah [Arabic word for god willing].

The Arabic word “*inshallah*”, is used by Muslims at the end of a sentence, if it refers to something they intend to do in the future. In this case, “God willing” the lifestyle will improve in the future. The perception of lack of time to participate in physical activity and the lack of interest thereof is compounded by the current lifestyle, rapid lifestyle changes and culture. The daily household activities are performed by a maid or house keeper and transport is carried out by cars, door-to-door. Culturally it's evident that time spent with family and friends, and sharing food together is valued higher than physical activity.

Motor Vehicle Use

As illustrated in Figure 4.4, an increase in motor vehicle use emerged as a sub-theme of lifestyle and lifestyle changes. Client participants discussed an over-reliance on the use of the car, even to travel very short distances. Most client participants expressed that they had become indolent with the lifestyle change, and their perception of having very little time for physical activity was also highlighted. Many client participants mentioned that they, or their drivers drive, to and from their commitments, as opposed to walking or using other forms of transportation. This is supported by Lukwaro (2010), who stated that ‘Ninety-one percent of UAE commuters use cars’ and the majority are unwilling to give up their cars for public transport. According to CP20M:

those people, they have to change their mind, or you have to change them. In general, the family in the house, all the family in the house, they have to do physical activity. They have to go out, they have to walk. The main issue is to walk. The main issue is to walk, but the people, they say; no, we don't like to walk. Take me by car.

Many client participants stated that they use their cars for commuting short distances that they could walk; for example, CP18M recalled:

‘You want to go next-door, you know, you take the car, you know. This is the problem. Its ... really true [sic].

HP1 commented:

The UAE has been changed, the ways of communication, the way transportation has changed, extra food is there. We are very urbanized. Forty years back, we were not like this.

Many client participants are aware that this sedentary lifestyle contributes to health conditions such as T2D. CP7F recalled:

Oh, this lifestyle plays a major role. It may increase the opportunities of getting T2D, yes.

Home Help/Maid

The majority of client participants also discussed that having a house-maid attending to home duties (Figure 4.4) doesn’t encourage them to perform any incidental physical activity around the home. As CP8F recalled:

Now we have all housemaids, so you don't have as much activity [sic].

HP1 reflected:

It's because the maid is doing all the work so [this] is motivating her to be lazy. They are more dependent now on maids so they are not doing anything.

The impact of this lifestyle on the overall health and wellbeing is detrimental.

CP8F expands on this, stating:

You get lazy. When you have, everything done for you, you can just say, Oh, I can just sit back, do nothing [sic]. It used to be very good nutrition, and now, anything fast. And now, mostly maids are cooking.

Many client participants felt that the current situation isn't healthy and many also commented on the impact of having home help and drivers has had on their current lifestyle. When a *Khadama*, the (Arabic word for housekeeper) is employed in the UAE by a UAE National, the dynamics of the family and how the family members interact with each other is dramatically changed (Al-Ameri, 2014). The *Khadama* is usually employed from a country outside the UAE, such as Nepal, Sri Lanka or the Philippines, and lives either in the house or in living quarters, in a separate building on the same property as the main home (Al Ameri, 2014). CP7F referred to the housemaids in some UAE National families:

[Our] lifestyle is different now; it depends on cars, on house maids; we have become lazy [sic].

The discussion in this study illustrates that client participants are aware that their behaviour is perhaps not acceptable, but is justified by the rapid change in lifestyle; to have a maid is the norm. CP21M remarked:

The family tell the maids to do this, and this, and this. The same meal, which the wife learnt from her Mum, and the Mum from the Mumma. And they try because they thought that the other wives, they would make their husbands satisfied. They bring you nice meal. And it really is, we are satisfied [sic].

This scenario can have a direct impact on the individuals with T2D. The maid is trying to please her employer and feeling pressured to supply the family with a nice meal, and the food prepared would usually be high fat, high energy food, which was needed when walking for miles in the past. However, with the current lifestyle changes, this type of food intake coupled with wealth and sedentary behaviour all impacts on T2D and the ability to change behaviour (Klautzer, Becker, & Mattke, 2014).

In many cases in the UAE National's home, ownership of household responsibilities is given to the *Khadama*, who becomes an integral part of the family. She/he manages

responsibilities including cleaning, laundry, ironing, cooking, preparing the children's food for school, assisting the children to get ready for school and running errands (Al Ameri, 2014). The *Khadamas* work between the divide of home-helper/nanny to family member and, in many cases, support the entire functioning of the family home environment (Al Ameri, 2014). These lifestyle and home environment changes impact on the client participant's ability to participate in incidental exercise in the home. If the maid is contributing to the home cooking, the food could be cooked in high fat and high oil, similar to that of the maid's home country, or to please the family. This style of cooking could also be due to a lack of education and awareness,

HP1 remarked:

They have a special maid just to cook, this is her job, so she is creative to do a very nice dinner or a very nice lunch. Between lunch and dinner there is a snack. It's not a snack, it's a big meal. All kind of Arabic pastries, cakes; it's really nice to see, but the fat.

This comment highlights the challenging home environment that some of the client participants are managing. The high intake of sweet food is common in the Arabic culture and difficult for those with T2D to manage.

Data collected from health professionals indicated that it can be challenging to educate the maids about healthy food preparation as they aren't educated in healthy food options and possibly feel their role is to satisfy the family to maintain their job. HP6 observed:

I don't think the maid really has the education about how to cook healthy or lower in fat and how she can support her family with more fruit and vegetables or even their way of cooking. Some of the families, the maid is using one, two or three litres of oil in one week.

HP1 commented:

And if I am cooking, for example, I will check the amount of oil I have to put, maybe I have to check the balance of the meal, but the maid will not take care of how much food, how much oil she added or whatever spices or if the meal is balanced or not. She will just cook; she will never think about if it's fried or grilled or whatever.

One of the roles of the maid is to prepare and cook food for the household and by doing this, as stated above, there could be pressure for the maid to sustain her job.

HP6 also commented:

The maids I think they are cooking with more oil and concentrate on like starchy foods more.

The traditional Arabic food is cooked with high levels of fat and, in some instances, these cultural habits of food consumption are hard to change. CP19F commented on the usual cooking methods:

Yes, a lot of butter, clarified butter, and a lot of oil for deep frying. But then how you can cook, like, samosa or French fries, you need a lot of oil [sic].

Perception of Not Having Enough Time for Physical Activity

As demonstrated in Figure 4.5, the main discussions involving the perception of a lack of time to participate in physical activity included that it was not part of the daily routine. This is due to having very little time to physical activity, due to work and family commitments. In this instance CP5M indicated that personal motivation is also a factor:

For example, for me if I make one month physical activity and I'm happy, maybe next month I will not, am not able to continue this in your whole life, you know, like this is what I believe and maybe you are busy with something, you have a commitment and you work somewhere or like this or you are attention to do the physical activity and you have another intention so the mood, you know, this mood, it's not steady. That okay, five o'clock I go to walking. That's my mood. It's not programme [sic].

In this case, potentially time, lifestyle and mood are all factors in commitment to a physical activity regime; work and other commitments are a higher priority impact CP5M's motivation and capacity to participate in physical activity.

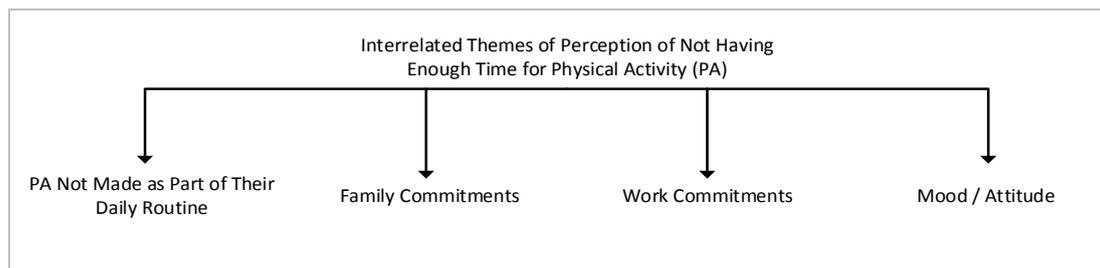


Figure 4.5 Sub-Theme Model – Perception of Not Having Enough Time for Physical Activity

This sub-theme has robust associations with the other sub-themes of indolence, maid and home-help and car use that have already been discussed within the Lifestyle and Lifestyle Changes theme. A few client participants in this study reflected on the perceived lack of time available in the day for physical activity, particularly due to the increased working hours:

We are busy; before, we are working say, from 7.30 until 1.30, nothing like this. Now we work from eight to four and we are crazy, now we don't have habit to play football, go swimming and this, people from UAE, here and Dubai, these people not live life, just all the time busy [sic] (CP10M).

4.4.2 Food Availability

One of the main contributing risk factors to the development, progression and poor management of T2D is poor dietary intake. Many of the client participants discussed the impact food has on the management of T2D. Many of the client participants commented that they were aware that they have increased their consumption of processed, high calorie foods. Client participants in this study recognised the importance of food in influencing T2D and, as illustrated in Figure 4.6, reflected that food accessibility, availability and food variety from many nationalities influenced food intake. In particular, the availability of fast food, easily accessible restaurants and changes in eating patterns and quantities were identified as key barriers to healthy eating. The availability of food and food choices has expanded as the country has grown, progressed and prospered. The lifestyle changes, as discussed earlier, has impacted on the way UAE Nationals conduct their everyday lives.

CP5M observed:

The food is part of the, what you call, the environment. The environment has its own food but this food will transfer from one environment to another. This is my belief. It will not be the right thing or it should not be like this. People are used, for example, in India taking some food. This food, it's not applicable here for us because of the environment here is different [sic].

This comment reflects that many nationalities have immigrated to the UAE and that an international variety of food is available, which some client participants believe could possibly be contributing to the increase in T2D. The availability of food from multiple nationalities exists in almost every country across the globe; however, in Abu Dhabi the geographical layout of the Emirate is small and the affordability and accessibility of fast food and food from many cultures is commonplace. HP3's comment reflects the overall findings:

Because it's an international community here, before we didn't have something like appetizer and then a dessert, we don't have those things. Now you can see for breakfast lunch and dinner, and especially lunch and dinner, they have appetizers like spring rolls, French fries. Then main course, then dessert. So, the international community here also affects the way they are eating, it's a really multicultural community [sic].

HP3 stated:

Even 24 hours, we have restaurants here, 24 hours, you can get food anytime [sic].

HP6 commented that:

Most of their day there is one meal it should be from a restaurant, either breakfast or dinner. It should be, rarely lunch because they are gathering at lunch. It's like their daily routine. For most of them, you will see that the restaurants are more in their days [sic].

The impact of a disposable income, combined with the extra hours of operation of take-away outlets in the UAE, has also contributed to the consumption of take-away food and high fat, high sugar foods.

CP10M agreed, noting:

They eat anything. They eat anything they like. They are eating fast food more [sic].

As highlighted earlier, the vital importance of food for the family is part of lifestyle, culture, socialisation and religion. The UAE Nationals, behaviour and food is tightly interweaved. However, the type of food eaten today is vastly different from their forbearers and is readily available, accessible and affordable.

As CP6M stated:

We eat mostly rice and meat. We must train ourselves to eat vegetables, our prophet used to do that; meat didn't come to his dish, maybe once or twice every two to three months, not every day [sic].

Client participants also commented on the food available to them in the workplace, where the 'cultural norm' is to provide food at meetings. This food is usually processed, high fat, high calorie food. CP6M explained:

That's the problem; we have good access to eat at work, and to my knowledge, almost in every government office there is a time, or during the meetings we have different foods, to my knowledge, the way I look at it it's too much, that's why mostly we become fat. Overweight [sic].

Some client participants also mentioned that food availability and accessibility has become a habit:

Yes, because it depends on the food you will take. If you will eat, like, the way you eat before, like I'm eating too much sugar, eating too much carbohydrates or anything, it will change your life, your habit, you know [sic] (CP9F).

This illustrates that client participants are aware of their behaviour and acutely aware it needs to change. However, they justify their actions through cultural constraints, environmental and lifestyle changes.

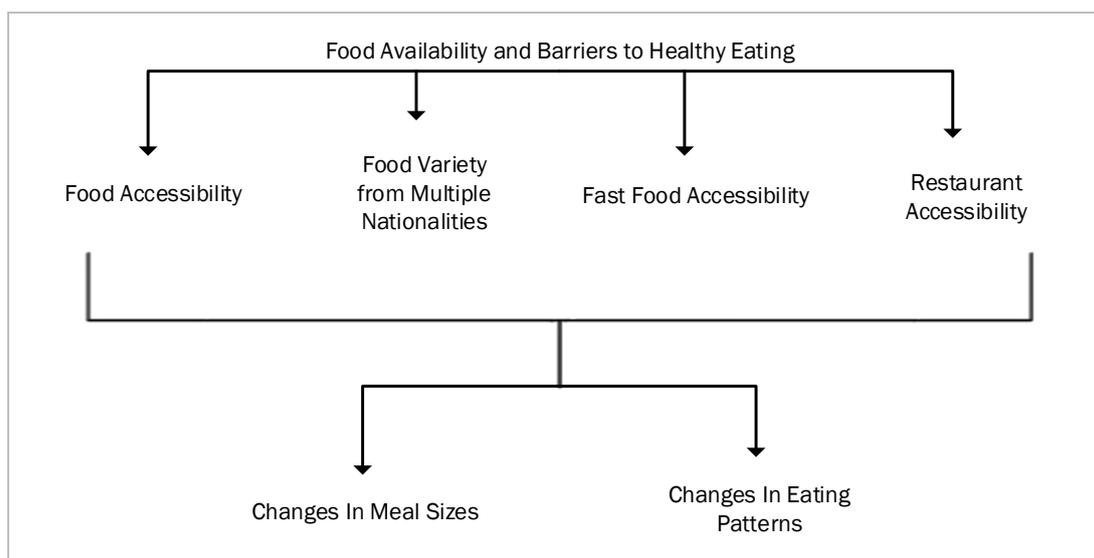


Figure 4.6 Sub-Theme Model – Food Availability

As identified at the beginning of the Results chapter, there are multiple theories illustrating behaviour change that identify with the research findings. The HBM and SCT were used to inform the interview guide, but also provide theories that demonstrate elements that make changing behaviour difficult; such as an individual's environment, personal behaviour, social impacts and social environment (Bandura, 2002). Meanwhile, the HBM explains the individuals perceived threats, barriers, benefits and susceptibility to change (Glanz et al., 2002). The TPB is also linked and aligned to behaviour change difficulties illustrating the strength and control an individual requires to perform a behaviour change and make it sustainable (King et al, 2010).

4.4.3 Environment

Weather

The environment was highlighted as a sub-theme of Barriers to Healthy Lifestyles (Figure 4.3). There were a few themes raised within the sub-theme of the environment that contribute to Barriers to Healthy Lifestyles. These include the weather, urbanisation, school and the home environment, and will be discussed below. A few client participants mentioned the

environmental impact of the weather; the UAE consists of a hot climate reaching temperatures of 45 degrees Celsius throughout summer, which can restrict outdoor activity (Al-Junaibi et al., 2013). CP5M stated that:

Walking, you can walk anywhere even in your sector. Summer and humidity night and morning is hot. The day is hot and night is humid so [it] doesn't motivate the people to go out and to walk [sic].

However, there are many opportunities for indoor physical activity within this hot environment; the adaptation to the environment is similar to those who live in extreme cold weather climates.

Some client participants suggested people were more likely to carry out physical activity in cooler months; however, as in the case of CP7F, it was also acknowledged that there are opportunities for physical activity in the hotter months:

They stop doing physical activity especially in summer, maybe in winter they can go out and physical activity by walking. But now... we have like six months hot, six months like that, so, the weather doesn't also help in summer, especially in summer. But we can compensate that by, you know, walking the malls or at home, we can have some machines, you know. It's not an excuse (CP7F).

However, not all client participants felt that the hot weather was a deterrent to physical activity. For example: CP1F walks every day, whether it's hot or cold, stated:

Walk and this become more hot. This is better. It come quickly [weight loss]; in hot [weather] it's better than cold. For me. Because more sweating, yes [sic].

The physical activity patterns of the client participants do suggest that more activity is undertaken in the cooler months; as CP5M stated:

The problem is the weather, summer and humidity night and morning is hot. The day is hot and night is humid so doesn't motivate the people to go out and to walk. You feel here and with this diabetes you feel always thirsty so the weather plays a role here [sic].

CP13F agreed, commenting:

In the summertime, zero [physical activity] and during the winter time, five times [a week physical activity]. So, you see the negative of the weather with the food, because you're stuck in the home most of the time, don't want to go out because maybe your car is like an oven, or maybe if you're going to go somewhere and park, then there's oven [sic] (P13F).

Urbanisation

While client participants reflected upon the reliance on cars for transport, one client participant also reflected that, in some situations, people wanted to drive to a nice place to walk; for example, *The Corniche* however, there was limited parking available. The *corniche* is based in Abu Dhabi city on the western side of the main Abu Dhabi Island. It has eight kilometres of beach front including walking paths, cycle paths, park areas and playgrounds.

You want to go to the Corniche really, this is the worst thing, and I really, really wish that somebody listen and realize and do something about [it]. You go to the Corniche, there is no good parking availability in a way that should be normally to the side of the water. Not on the other side and there is like, one piece here and one piece there and you have to walk from God knows where the parking until you get inside of that entrance ... you know what I'm trying to say to you [sic] (CP13F).

The majority of individuals who enjoy cycling at any level will choose to avoid road riding in the cities in the UAE. CP12M commented:

In winter time, they go to the desert and bike and all these things. The new generation I'm talking about.

CP17F states:

Yas [Grand Prix track], they have a special day for ladies and they also have these awareness programmes of cycling, you know, to keep fit.

According to Stewart Howison, an ex-professional rider from South Africa and the founder of Cycle Safe 'We have great weather and great flat, smooth roads to cycle here, but we don't have the tracks to make it safe; putting in tracks as an afterthought to a city is very difficult' (Swan, 2010). As HP1 observed:

If you go to Europe you will find pavement for walking and cycling and for people who like to jog. Here it's not yet prepared for these things. But I don't think it's coming- if we want to do it, we will do it.

This quote illustrates that the UAE may not be as conducive to physical activity in comparison to somewhere such as Europe. However, if any individual including UAE Nationals want to participate in physical activity, they will regardless of the environment. To offer an alternative to outdoor road cycling, both Dubai and Abu Dhabi have opened their Aerodrome and Grand Prix tracks for riding twice a week (Swan, 2010). CP4F stated:

Yas Grand Prix Track it's near us; it's good, one day in the week, more go now. Only one place now, they need two places [sic].

School Environment

The school environment was discussed as an important setting for influencing behaviours related to T2D. Many client participants felt that there had been some positive changes and improvements to school canteens for example, according to CP16F:

At least now in the school, like the canteens, they don't have much of these unhealthy foods.

However, although recognising positive changes some client participants suggested that more changes needed to be made, as reflected in the comment by CP2F:

They will even drink juice and the problem for me at school is, they consider the juice is healthy. When they changed the canteen, they changed it for better but still we need more changes.

The media in the UAE is one of the main avenues for promoting key messages to the wider community, including health and well-being messages. There can also be environmental and cultural challenges around how food is consumed before school and after school, prior to the child's parents arriving home after work. According to CP8F:

It's all too easy, and everybody else is doing it, so... Even if you pack them a nice lunch, they're not eating it... there are only certain nationalities bring lunches. If you're Emirati, you can't bring your lunch. They just have, like, Zataar [sandwich with cheese and pita bread], or cheese sandwiches or juices, but the main meal is at home, after they come home from school.

In contrast, HP6 gave an example of a client:

In the morning I have this patient, he's 11 years old, directly he comes from school and he orders from the cafeteria, that's it, and he eats lunch before the family arrive home at three, so he eats his lunch, fast food, and that's it. He don't eat with the family [sic]. So, it's really a big issue.

[The] Abu Dhabi Education Council (ADEC) follows the policy and guidelines for school canteens set out by the Abu Dhabi Food Control Authority (ADFCA) and the Health Authority Abu Dhabi (HAAD). The guidelines stipulate that all public schools within the Emirate of Abu Dhabi are to provide students with healthy food choices to promote and develop healthy eating habits (Dhabi, 2011). The public schools within Abu Dhabi differ in their food options available; some public schools have canteens and whilst others don't. Some children bring their lunch and some order it from the canteen. Some examples of food choices in the school canteens include: breakfast cereal boxes and bars, bread (both white and brown), rice, noodles

and pasta, garlic bread, baked potatoes, pies, corn, legumes, dates, fruit, vegetables, salads, yoghurt, cheese and milk. Many canteens also supply *manakeesh*; an Arabic savoury pastry, similar to a pizza, topped with ground meat or cheese.

Physical activity within the school environment has also changed. According to CP12M:

We used to play football, play basketball, and play all this activity. But nowadays I don't see them, to be honest with you, the school can become more, the space, there is not space..., no space for activity.

In contrast, CP17F stated:

They play basketball in the school but I still get complaints about my daughter, that she would not participate. So I say No, she has to participate, because this is part of her curriculum, she should not be left. Some students, they don't like to do, they just sit and chat and you just leave them—no. But, you will find some students who are keen, who are interested and they'll be participating in this and you'll have some who are just lazy, you know.

CP13F commented:

The women have a problem of associating this as a healthy life thing. It's not a job that you will have to get a grade for it in school [sic].

It has been proven that physical inactivity can increase an individual's risk of developing obesity and T2D (Sullivan, Morrato, Ghushchyan, Wyatt, & Hill, 2005). Physical activity directly impacts on the reduction of risk factors for T2D and T2D itself (Sullivan et al., 2005). It is essential for schools to offer physical activity and ensure it remains a core component on the school curriculum. Physical activity is essential for healthy lifestyles, self-efficacy, sportsmanship and a reduction in developing risk factors for preventable lifestyle diseases such as obesity and T2D (Bailey, 2006).

Home Environment – Family Influences

As discussed earlier under the theme of Culture, most of the client participants commented that they felt supported by their families and felt that they helped them with their medicine and encouraged them verbally (not always practically) to make healthy food choices. In contrast, HP3 suggested that few UAE Nationals have supportive home environments. This may indicate that the client participants perceive support to be different to the health professionals who are considering this in terms of making changes to diet and physical activity while some of the client participants perceive support from the family in a different manner. HP3 provided an example of one client who:

changed his kid's lifestyle, he changed his wife's lifestyle, and he did a really good job with his family.

The majority of the HPs agreed that many clients who attend the diabetes clinic have challenging home environments. This is compounded when the extended families live together:

Let's say in UAE, they are living in a big family. Not one in each house can make whatever changes he would like to make [sic] (HP3) they cannot change because everyone is doing the opposite. (HP3)

Despite this health professionals discussed the need for changes in the home environments as is reflected by HP3's comment:

We usually tell them that this advice is not only for you, it's for your family members.

Behaviour change is difficult for every individual and is compounded by the complexity of behaviours. Behaviour change is impacted by multiple factors discussed earlier such as self-efficacy, self-determination, social influences and cultural norms.

4.4.4 Cost – Good Food and Physical Activity

The cost of good food, and healthy food choices and physical activity options were also raised as a Barrier to Healthy Lifestyles (Figure 4.3). While availability of fresh food was identified as an Enabler to Healthy Lifestyles, there was also discussion regarding the cost and availability of fresh produce. While fresh produce is readily available some CPs suggested they needed to go to different markets to access organic produce. In addition, organic foods were more expensive than other food while fast foods which were readily available were inexpensive. Some CPs tended to discuss healthy foods as being 'organic'. The findings are supported by the following quotes: CP5M stated:

No, I don't think this, the organic food is expensive, first of all. If you want to buy it, for example; it will be higher cost. Organic food means healthy food, but the price is very high and you will buy the normal food with half the price of this. And junk food is there, and for my kids, for example, if they don't have a meal at McDonalds a week they will be upset. Not everybody can get offer [ed] [the organic food] on continuous basis. Because of the cost [sic].

CP7F discussed a similar thread regarding the cost of healthy food, stating:

When you go shopping, they say that it's organic; they'll tell you its genetic[ally] developed or something. So, [you] have to go, like, to expensive markets to buy and not always you can provide for yourself expensive fruits or vegetables. So, this is the problem, if it is provided it will be very expensive.

CP10M commented:

They must have more healthy food, because I want the Carrifour, Lu Lu [supermarkets], you see for healthy foods, it's not big section.

For some client participants within this study, the quotes illustrate the understanding of what constitutes healthy food options and their understanding of organic food maybe limited. The client participants expressed purchasing organic food and food from the health food isle at the supermarket was a healthier option and potentially viewed as an investment in health compared to purchasing general produce. However, this investment in organic food is costly. The client participants understanding of general food produce (not organic) which offers healthy and affordable food choices is potentially limited.

In relation to cost being a barrier, some client participants highlighted the cost of gymnasium memberships. CP 16F noted that the yearly gymnasium fees could potentially be a barrier for participating in physical activity.

They said it's a lady's club for UAE Nationals. When you go there you should pay yearly fees. You pay yearly 6-7000 dirham [2,500 Australian Dollars], I mean some of them would rather stay home. That 6,000 they say; I buy food for myself.
(CP16F)

CP20M commented:

Here, any project, or anything they do, they only asking for money. It's not fair. It would help people for their health. So, for example, if, in my area, my location, they put a big gym, ladies and guys, all the activities, small and big. Some people are controlling, for example, in each side, there's ten staff to control and manage the people and this. The government has to pay. This has to be paid. This is expensive for them. But they have to make it; it's good to help the people. Long term, because they'll never get it in the short term, but in the long period, they'll get a benefit out of these things.

The Government of the UAE is engaging with the population, conducting some health interventions and providing avenues for increasing health information, awareness and health campaigns. CP20M explains that there will be long-term benefits for the government if the

financial support is given to healthcare, and in particular, chronic disease such as T2D. As outlined in chapter 2, some examples of local health interventions supported by the Government include the *Weqaya* program, The Fat Truth Awareness Campaign, Every Step Counts and World Diabetes Day

4.4.5 Disease Knowledge

Diabetes knowledge, as illustrated in Figure 4.3, is an important component of disease management, and self-management, and can also aid in encouraging compliance. Varying perceptions of disease knowledge emerged from the research through discussions with both health professionals and client participants. HP6 commented:

I think they don't even really understand how the healthy eating is. It should be during a normal life. They think if I'm following a healthy eating that means I am sick or I have to have a disease like diabetes or something. They think they this is something if I'm normal I can eat everything and whatever I want. They don't think they have to eat healthy [sic].

HP1 commented:

They are coming [up] with a lot of myths. I got diabetes because I drank a lot of juice last week. I'm not having diabetes because I eat a lot.... the patient will say its related to the environment; it's not a hereditary factor, or they are coming with poor lifestyle so they will blame the hereditary factor more than the lifestyle [sic] (HP1).

In contrast, the majority of the discussion around disease knowledge reflected an understanding of the need for a healthy diet and physical activity, with a few client participants also referring to the influence of genetics an influence of T2D. The comments below reflect the discussion:

CP4F explained:

How it happens is because of the food and maybe something happens inside the pancreas, it's changing. I become fat more. From sitting all the time, eating all the time.

Genetics and maybe the way of the life is tiring what we have got no activities, no sport, no movement much and food is a factor, yes [sic]. (CP5M)

Through my reading, I think it is mostly hereditary and that it happens by not moving, eating a lot of not necessarily sugar, but something that makes the sugar high, something like rice. Too much rice, too much, and bread and staying idle. It's a lifestyle [sic]. (CP6M)

Genetics, maybe one factor. Maybe diet. Lack of diet, physical activity, obesity but probably my problem is insulin resistance because as soon as I lose [my] belly fat, my blood sugar stabilises. (CP8F)

However, while the CP demonstrated some understanding that diet and physical activity influenced their T2D diagnosis and management, their knowledge was superficial. The discussion with health professionals suggests the majority of CPs did not really understand what healthy eating and other lifestyle changes really means.

4.4.6 Clinic Support

As highlighted in Figure 4.3, clinic support is an integral partnership between the client and the health professional to optimise care and provide support for T2D management. Clinic support is where the health professionals work together to provide patient-centred care. In the UAE, the MOH regulates the Public Health Sector and the health authorities in both emirates of Dubai and Abu Dhabi are responsible for the delivery of healthcare at a state level. UAE Nationals are provided with free healthcare. Clinic support at the SKMC Diabetes Clinic is given to all UAE National clients without a financial fee. Medication and supplies are also offered to UAE National clients at no cost. The provision of free services and medication was commented on by the client participants, for example:

they're providing the medicines with no charge...they are doing the blood test for me also, the laboratory is giving me the results and they are testing the pill quantity and prescription [sic] (CP5M)

They give me the machine and they give me the strips, everything [sic] (CP21M)

In contrast, the health professionals commented that the majority of client participants attended clinic appointments for free medication and insulin pump support. For example:

if they are following up with the doctor for medication, they are really coming. (HP2)

if you have a goal of carb counting or where he is ending up with pump, and its free he will fill all his appointments [sic]. (HP6)

In some cases, the health professionals viewed free access to medication and supplies as a barrier to self-care and individual responsibility. A few health professionals expressed feelings of being blamed by clients for the miss management of their T2D and briefly commented if this would be different if there was a fee for service. In some countries, a fee for service generates greater satisfaction.

Another reflection from the health professionals was that health professional is blamed so the client doesn't blame themselves (cognitive dissonance). The health professionals also expressed that until a relationship is established between the client and health professional, and trust and a report is maintained the client participants will blame anything else other than lifestyle for the diagnosis of T2D. However, health professionals felt that once the relationship was built and the client participant expresses their awareness of lifestyle factors, the health professionals are able to provide support, motivation, and education to promote behaviour change.

Within this research, the findings demonstrated clinic support to be both as barrier and enabler to a healthy lifestyle. Whether the behaviour and attitudes of clients such as blame would change and self-responsibility would increase if a fee for service was introduced to UAE Nationals is unknown. As highlighted however, some health professionals felt strongly that some of the client participants were attending clinic appointments to satisfy their own needs such as free medication, rather than engaging in all services provided.

4.5 Enablers to Healthy Lifestyle

As illustrated in Figure 4.7, one of the main themes identified within the research was Enablers to Healthy Lifestyles, which encompassed many sub-themes. Within this research, the key enablers to change identified by the client participants were: family support, the availability of good food and physical activity, disease knowledge and clinic support. It has been identified in many studies that changes in the environment and society have contributed to a lack of physical activity, an increase in sedentary behaviour and the availability of low cost, high fat food which has contributed to an increase in T2D globally. Identifying enablers to support lifestyle behaviour change and promoting and supporting individuals to lead a healthy lifestyle, can work towards producing better health outcomes for population groups at risk of high levels of T2D and other non-communicable diseases.

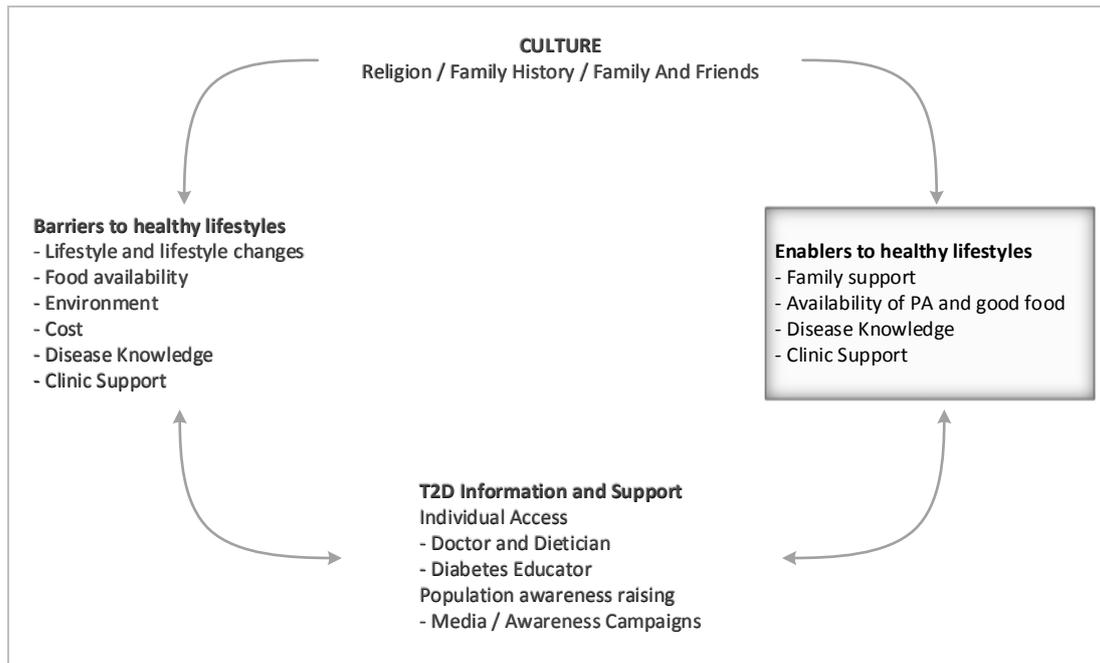


Figure 4.7 Theoretical Model 'Influences of T2D' – Enablers to Healthy Lifestyle

4.5.1 Family Support

Figure 4.7 describes family support as a sub-theme of the theme Enablers to Healthy Lifestyles. The majority of client participants stated that they had support from their family who encouraged them to participate in physical activity, assisted with their medications and food intake. Family support was highlighted in the discussions. CP7F provided an example:

My husband always warns me what I can and can't eat, and Don't forget your diabetes. Even my work colleagues—they always remind me, don't forget your diabetic, my surroundings are very good [sic].

CP17F agreed commenting:

She [Mum] keeps on insisting and reminding—you should walk, you should do physical activity. At least that support is there.

For a few client participants, there have been changes in the entire household regarding the types of foods eaten and the portion sizes. CP8F explains:

Now were all on a healthy diet, the whole family...we don't eat any white bread or white rice; all brown. The servings are also less than we used to eat. A lot less rice, because here, its rice every day. A lot more soups now, with vegetables.

The client participant's comments illustrate a positive and supportive home environment which supports and enables positive behaviour change. As highlighted earlier, the constructs of subjective norms within the TPB illustrate the importance of everything around an individual,

such as their social network, cultural norms, beliefs, and most importantly, family support. These all influence and impact on an individual's decision to change behaviour (Ajzen, 2005).

4.5.2 Availability – Physical Activity Opportunities & Good Food

The availability of good food and physical activity options are highlighted within this research as an Enabler to Healthy Lifestyles (Figure 4.7). Some client participants identified many opportunities to access good food such as local fruit and vegetable markets, fish markets and many local and international supermarkets. Physical activity opportunities such as local parks for walking and playing sport, walking groups available in shopping malls were also identified by some of the client participants. As highlighted earlier however, some client participants also expressed barriers to physical activity opportunities and good food such as the cost of good food and physical activity opportunities, and the easy access and availability of fast food. An individual's attitude towards an act or behaviour is influenced by a positive or negative contribution to that person's life. The choice to participate in physical activity or choose to consume healthy or unhealthy food is influenced by an individual's attitude and availability of opportunities (Ajzen, 2001). CP17F stated:

Diabetes, I think at the end it's the determination of the person, because now there is a lot of awareness on diabetes in the UAE and a lot of facilities are here. They have these awareness campaigns of cycling, to keep fit. There are fitness clubs where you can do it. But I don't know what puts us back. Maybe because the way we used, I mean, when I compare Westerners, physical activity is a part of their daily routine [sic].

According to the SDT, the individual requires intrinsic motivation and supportive and positive reinforcement from external sources to make a lifestyle change (Deci, 1971). As illustrated by the client participant's above quote, the availability of physical activity facilities is good, however, individuals are not motivated; perhaps due to not seeing the importance of physical activity or perhaps a lack of external support. When fitness is seen as important by a community, more people are likely to participate. The above quote also makes comparisons to Westerners for whom (some) physical activity is a part of a daily routine. Social norms influence health promoting behaviours such as physical activity and healthy eating. If physical activity is considered a social norm among family and friends and viewed as important as commented in the quote above by CP17F, this supports social change. Social norms are important determinants of healthy behaviours and incorporated into many theories discussed within this study including the social cognitive theory (SCT) and Theory of planned Behaviour (TPB) (Ball, Jeffrey, Abbott, McNaughton, & Crawford, 2010). If individuals are well-educated and not concerned about T2D, it makes prevention harder. Social norms are key to

understanding the T2D epidemic among UAE Nationals. Social influences provide a necessary link between T2D and related behaviours (Peek, Ferguson, Roberson, & Chin, 2014).

The majority of client participants stated that there were many physical activity opportunities in the UAE and opportunities for women to carry out physical activity at ladies-only facilities which is reflected in the comments below.

We have here also for ladies, clubs. (CP4F)

Some people go on the corniche because they made it good now. Some people go around the house. (CP3F)

If the weather is problematic, other physical activity opportunities include walking groups in the malls, as discussed by CP10M and HP2:

Some of them, I saw in the mall they walk [sic]. (CP10M)

We cannot go out from April till November, but they open the malls from seven. It's open for anyone who would like to walk. (HP2)

A few client participants commented that they would prefer to carry out physical activity at home in their own swimming pool or with a physical activity machine, for example:

All walking, or others do their physical activity in the home. (CP4F)

I come from my work, I come like, three o'clock. I will sit with my family; I will sit teaching my children. So, the best place is at home [sic]. (CP7F)

Some of them, in the mall they walk. They go to the gym, but not go, CP10M

meaning that some people sign up as a member of the gym, however, don't attend.

In comparison, the Barriers to Healthy Lifestyles identified the cost of good food and the need to shop at more than one market to purchase healthy food options. However, a few client participants believed that there are healthy food options available in the UAE, for example:

There plenty of good food. Fish and all kinds of meats. (CP8F)

Normally I go to the market, vegetable market. I choose my food. There is different places. Here we have very much healthy food, fresh food [sic]. (CP14F)

The choice to choose healthy food and participate in physical activity is heavily influenced by an individual's social norms, individual attitude and the attitude of social networks and perceived behavioural control (Ajzen & Driver, 1991). The socio-ecological environment influences an individual's behaviour patterns, social interactions and, in turn,

behaviour change (Whittemore, D'Eramo-Melkus & Grey, 2004). There is a complex interplay between individual behaviours, cultural influences and environmental factors that is represented by the socio-ecological model which illustrates the multiple factors that influence behaviour (Townsend & Foster, 2011). Access to a supportive social and cultural settings and environment is necessary to promote healthy lifestyles (Townsend & Foster, 2011). As illustrated in the quote from CP7F, the main cultural impacts illustrated in this research include cultural norms and expectations, religion, social accountability, the importance of family and friends and socialisation, and what the individual values most highly. The findings from this study illustrate an individual's Barriers and Enablers to a Healthy Lifestyle and link to multiple theories. An example of a linkage between the research findings and theory is explained by the SDT. For an individual to make positive choices about health and wellbeing, it's important to understand what motivates an individual to act or behave in a certain way. The SDT consists of three main constructs that also need to be aligned, for an individual to make positive choices in relation to health and wellbeing. The three main constructs include:

- Competence-control of an outcome;
- Relatedness-the way in which an individual interacts with others;
- Autonomy-where there is the ability to work with, and alongside others, but to also can be causal agents in one's own life.

(Deci & Vansteenkiste, 2004)

Some of these findings are similar to those found by King et al., (2010), who illustrated that social environmental support, self-efficacy and problem-solving were associated with, and influenced by, an individual's behaviour towards diet and physical activity. King et al., (2010) recommended future interventions for those with T2D to focus on the socio-ecological environment.

4.5.3 Disease Knowledge

Disease knowledge emerged from the data as a sub-theme of the theme Enablers to Healthy Lifestyles (Figure 4.7). Some of the client participants indicated that they understood some of the symptoms and some of the lifestyle changes that could be made to assist in self-managing their T2D. Some client participants also expressed an understanding of some of the complications that can develop if the disease is poorly managed. According to CP6M:

I think it is mostly hereditary and also happens by not acting, not moving, eating a lot of not necessary sugar, too much rice, and bread and staying idle.

Client participant 8F supports this comment and goes further to state some of the risk factors for T2D such as a *lack of diet, physical activity and obesity* (CP8F).

A few of the client participants could also highlight some of the complications if their T2D isn't managed well. For example, CP19F:

It will cause problems with the feet, with the kidneys.

In contrast, as reflected in the Barriers to Healthy Lifestyle sub-theme of disease knowledge, some of the health professionals expressed that some client participant's disease knowledge was based on myths. In addition, a few health professionals expressed client participants felt T2D was influenced mainly by life stress and pressures. HP1 states *they don't know there is risk factors linked to this*.

The sub-theme of disease knowledge within the Enabler to Healthy Lifestyle theme highlights the importance of developing personal skills and understanding through education which aims to increase knowledge and awareness which, in some cases, can assist an individual to make healthy lifestyle choices. However, the TPB illustrates that three constructs need to be aligned for an individual to make a behavioural change. Knowledge and understanding of a disease and its complications supports behavioural change, however, the change needs to make a perceived contribution to the individual's life, the subjective norms surrounding the individual (such as their social networks, family, and cultural norms) need to be supportive of the change, and if the individuals perceived behavioural control is accepted, changes can be made (Ajzen, 2001).

T2D control involves lifelong lifestyle measures, appropriate dietary practices to reduce complications and improve risk factor profiles. Disease knowledge is one enabler to promote and support T2D and assisting the prevention of complications. However, as highlighted, good education and knowledge does not always produce compliance.

4.5.4 Clinic Support

Clinic support is illustrated in the Theoretical Model '*Influences of T2D*' (Figure 4.7) as a sub-theme of Enablers to Healthy Lifestyle. The findings from the research highlighted the sub-theme clinic support as both a Barrier and Enabler to Healthy Lifestyles. Clinic support is of importance to increase knowledge and awareness of T2D, support self-management and enable individuals to promote healthy lifestyles. HP3 commented:

The trust relationship should be there from the first session and the continuity is also very important. You need to update yourself on new medications, advanced technologies; so you are prepared for the patient's questions.

HP1 reiterates:

It's very important the patient feels you are listening to him, just listening, he will feel fine, listening not just always giving advice. Once you start listening to him, he will build that trust [sic].

The majority of client participants felt that the clinic support and continuity of care from the staff was outstanding. For example, CP9F stated *The doctors because they did give me advice; the nutritionists because they teach me how, what kind of food that I will take for; it's good for me.* CP10M commented:

This place is a good place, good taking care, give you advice, don't be lazy, they try to give you everything.

The diabetes clinic offers one-on-one, face-to-face appointments with the entire diabetes clinic team consisting of clinic nurses, endocrinologists, dietitians, diabetes educators and the pharmacist. The face-to-face appointments allow for goals and action plans to be discussed and agreed upon. The diabetes educators at this clinic also offer phone consultation as needed. The majority of client participants felt supported by the services provided by the clinic as reflected in the comments below. Similar to CP5M a few participants recognised the need to take some responsibility themselves:

There is motivation from the doctors and the nurses (CP2F)

They're doing the blood test for me also, the laboratory and giving me the result, and they are testing the pills quantities and prescription and they are trying and this is my own also and I have to push myself [sic]. (CP5M)

They are helping me. They are good. They are taking care, you know, about the patient[s] here. The people. The doctors here, they take care about everything [sic]. (CP15M)

The patient-provider relationship is paramount to engaging the patient, ensuring there is respect and an active interest in the patients concerns (White, 2016). The above quotes illustrate that within this setting the diabetes clinic is a place where the client participants feel supported through a therapeutic relationship, where information is gathered and communicated. It's a place where the client participant can express their concerns, and be a part of the treatment process. Most client participants stated that they attended their diabetes clinic appointments and felt supported by the diabetes clinic staff, including the practice nurses, dietitians, diabetes educators and endocrinologists. CP5M stated:

Yes, doctor advice, it's valid no doubt, and my lifestyle has to be changed.

CP19F stated:

They are very good. Starting with nurses and doctors, they are all professional. The dietitian also, they are doing their job, and they are taking care of the people and trying to educate [sic].

According to CP5M, the doctors spend time reiterating lifestyle influences on diabetes:

Change your lifestyle and food and your eat and your lifestyle. These is the advice from the doctor really and always they are telling the same issue... go for walking, even for half an hour on a daily basis, take the right food, don't take much food, and avoid the sweet, for example [sic].

Patients, in partnership with clinic support, are encouraged to make behavioural changes to decrease their risk of T2D complications and to improve health outcomes for themselves, their families and their country for the future. CP26M states:

Yes, they help me, they help me, and they teach me how to take care of myself [sic].

4.6 T2D Information and Support

T2D information and support, as highlighted in the Theoretical Model '*Influences of T2D*' in Figure 4.8, demonstrates the variety of ways the client participants access T2D information. Some of the main avenues for individuals to access information include the doctor, dietitian, and diabetes educator. Client participants also discussed receiving information via the media, such as radio and television, and from awareness campaigns for special events, such as World Diabetes Day. The avenues for education and the way individuals' access information is influenced by Culture and the sub-themes of religion, and family and friends. T2D information and support also influences both Barriers and Enablers to Healthy Lifestyles.

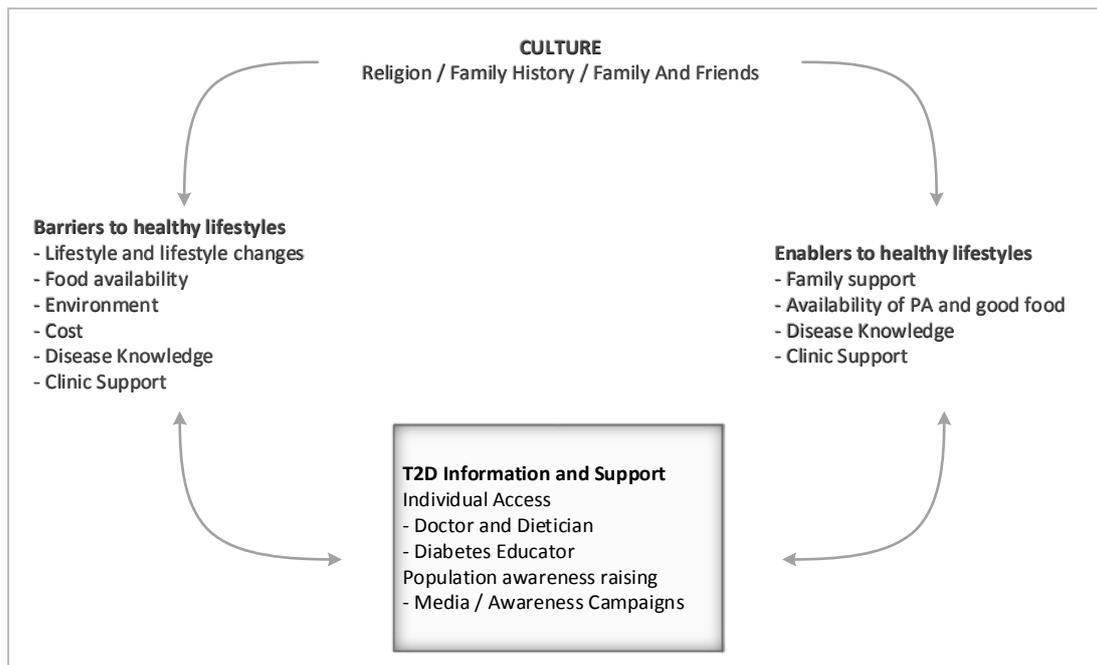


Figure 4.8 Theoretical Model 'Influences of T2D' – T2D information and support

4.6.1 Individual Access

Doctor and Dietitian

The majority of the client participants felt that they were supported by both the doctor and dietitian; however, in varying ways. Each client participant is required to see the Endocrinologist at the clinic at each appointment and follow this session with an appointment with the diabetes educator/ and or dietitian. The appointment with the specialist is for information sharing and medication advice. During the appointment with the dietitian food plans, food diaries and ways food consumption can be managed are discussed. The role of the diabetes educator is to increase individuals understanding of T2D, the management plan, medications, and to reiterate the importance of a healthy diet and physical activity. The roles of the health professionals are highlighted in the following quotes: *The doctors give me the advice.* CP9F

CP9F explained:

The nutritionists teach me how, what kind of food that I will take for, it's good for me; and for my family, and my friends. Because sometimes my friends, they know that I'm already a diabetes, they remind me of don't eat this one, you have to take this one. They also give me advice [sic].

The client participants acknowledged the importance of the support they received from the health professionals, but were also acutely aware of their own lack of motivation and

attitude towards self-management, which can make it increasingly difficult for both the health professional and client participant. CP10M reiterated the paramount importance of the dietitian's role in T2D management, stating that the dietitian:

tells me about what to eat, what kind of food to eat, this is the best [sic].

HP6 goes onto explain:

Some of them, they are happy because they could change things because we have reached a way that we can share something with them, and we can do it gradually. Some of them, they don't want to tell me what they are eating, they are lying to me, and I can know it. I know from experience this is the first and the last time I will see him because he doesn't accept. He doesn't accept the change, he feels like I'm interfering with his life, you know, so he will not really accept it [sic].

This quote encapsulates some of the barriers and enablers health professionals face when assisting clients in behaviour change. One of the most challenging changes is adherence to a healthy diet. Drawing on the SCT and HBM (Bandura, 1991; Sharifirad et al., 2009), this quote illustrates the client's responsibility in self-management, their understanding of their own role and competence and willingness to change. In contrast, some other clients are unwilling to change their habits and their behaviour when the client realises it's too difficult to change. Their behaviour is based on beliefs, habits and experiences which can enable or inhibit behaviour change.

Diabetes Educator

The diabetes educator is paramount to a diabetes clinic and diabetes care. The majority of client participants demonstrated respect for the diabetes educator and reinforced the need for a good relationship with the educator as CP19F comments:

It's very important to have a good educator; not just any educator, an educator with a human personality.

The role of the Diabetes Educator is to work collaboratively with the client to manage the disease and promote self-care. The promotion of the teaching-learning process is evident when the Diabetes Educator listens to the client, actively spends time with the client and their family, shows empathy and understanding and works together to provide an appropriate treatment plan.

CP7F reiterates this by commenting:

See the most important is, as a patient, I need you to give me my self-respect, self-esteem and I... when I come see you, I... it doesn't mean that I'm inferior. Maybe you'll notice that, as an Arab and Muslims, we care about social relations more. Okay, you are my teacher, suppose you are my teacher? But as a student... as your student I will have difficult relation, like, more humble, more merciful, more supportive and like that. We always make our personal feelings with professional always interlinked together [sic].

Providing culturally competent diabetes education to this population group is paramount to promoting and supporting disease management and potential behaviour change. An understanding of the importance of the Islamic beliefs including social relations, self-respect, modesty, patience and prayer supports cultural competence and appropriate care delivery.

According to CP12M:

The diabetes educator she really listened, she spent a good amount of time with me to listen and understand.

However, while the client participants reflected on the useful advice received from the educators, and the repour they had developed some health professionals suggested clients attended the clinic for the free medication. While they received, advice regarding lifestyle behaviours this was generally information they did not want to hear and did not usually act on it. For example, HP2 commented:

We have patients who are coming regularly because they are involved with us in a program—for example insulin pump therapy and they need us. If it's just for education in regards to their food and lifestyle, you can see that they are not coming that regularly because they don't want to hear that all the time.

Health professionals suggested the majority of their clients were not especially concerned with their T2D diagnosis. As discussed earlier a diagnosis was considered normal and participants were consequently not concerned about the implications or the need to change behaviours, particularly lifestyle behaviour. HP6 comment about her impressions of some the clients who attend the diabetes clinic reflects this discussion:

They are very well educated, they are very supportive, and in their words, they are even proud. They have diabetes and they don't care. It is something normal, they support their children or their wife or husband and I feel it's much according to the keeping of the family and their education [sic].

4.7 Population Awareness Raising

4.7.1 Media / Awareness Campaigns

The media and awareness campaigns have become valuable resources for individuals with T2D and their families and friends. These campaigns provide a platform for information to be shared with the wider population. In the UAE, the newspaper, television and radio is a practical form of media which is utilised by the majority of the population to gather practical information on health related issues such as T2D. Increasing T2D awareness through awareness raising campaigns promotes and encourages the importance and benefits of T2D management through tailored material and messages for the general audience and at risk populations. Campaign materials include education materials and information suitable for various forms of media such as radio, print and television.

In this study, many client participants commented that there is information about diabetes and food in the media. CP3F states:

From the TV, they talk about sugar, how to take care for your health, everything, and on the radio.

CP17F reiterated this by commenting that there is ‘advertising on the TV’ and CP18M commented:

I have seen it many times on Arabic TV.

Awareness campaigns such as World Diabetes Day are promoted and supported by both public and private health sectors, and the Government. The World Diabetes Day campaign in the UAE is a multi-strategy approach promoting medical check-ups such as blood glucose testing and blood pressure testing, foot examinations and information sharing about healthy nutrition and physical activity.

As CP4F states in support of the awareness campaigns:

The hospital, they are teaching all the time.

HP6 comments:

I feel it's on the TV, the media, even outside; if you go into a mall, there's lots of banners, and there is lots of nice education outside [sic].

A few client participants commented that they were involved in the diabetes walk for World Diabetes Day and one client participant mentioned the banners at the local mall. Many

client participants also mentioned that they listen to health information provided on the radio and television.

I want the government to do something, I want a more powerful hand. Fast foods should be restricted, they should have some rules about saturated fat, a rule in using fats in restaurants because they are choosing the cheapest, palm oil, full of saturated fat, I want the government to put some rules in schools and care about physical activity; they don't care about physical activity. There would be certain rules and if they broke it, there would be punishment. It will help the society to grow healthy (HP6).

HP3 also states:

There should be a very major city plan for this program, they should make it more healthy living here [sic].

A few client participants discussed the physical activity component of the school curriculum and supported the need for this to increase and be made compulsory. One client participant referred to the restriction of fast food opening hours.

4.8 Chapter Conclusion

The overall findings demonstrate the impact of Culture and its sub-themes of religion, family history and family and friends are vital to lifestyle and that culture encompasses deeply rooted behaviours that are challenging to change. The majority of client participants had family members with T2D, and to some degree, it is viewed as the norm. The client participants and health professionals discussed the complexities of the Barriers to Healthy Lifestyles behaviour, which are heavily influenced by the current lifestyle and rapidly changed environment: from one of living off the land, to that of an urbanized city and potentially, the level of affluence. The client participants and health professionals also expressed that food consumption, overall, is one of high fat and high oil; and that foods such as rice, traditional Arabic meats and fast food are consumed frequently and in large quantities. The accessibility and affordability of fast food was also raised by the majority of client participants and health professionals as a compounding factor to their lifestyle. The cost of healthy food options, particularly organic foods, and lack of disease knowledge were also seen as Barriers to Healthy Lifestyles.

As highlighted in the Theoretical Model '*Influences of T2D*', there were many enablers highlighted by the client participants that support them to make healthy choices. The majority of client participants expressed that they felt supported by their family to manage their T2D, however some health professionals commented on how difficult it was for clients to change behaviours due to the challenges faced in the home environment. While barriers were

identified around food availability and cost some client participants and health professionals felt that there was good availability of healthy food and a range of physical activity opportunities, for both male and females, if they wanted to participate. Some client participants expressed that being healthy and feeling an overall sense of good health improved their general mental health and wellbeing. Some client participants had good disease knowledge and understood the impacts of poor management. The majority of client participants felt extremely supported by the diabetes clinic staff to assist them to make healthy lifestyle choices, however some health professionals discussed that in some cases there was feelings that the use of the diabetes clinic was only being utilised for free medication. The triangulation of the perspectives of the client participants and the health professionals provided the opportunity to develop a richer analysis of the data. As discussed for some issues the perspectives of the client participants and the health professionals were similar while for other issues the discussion differed. For example, while client participants felt they had a good understanding of dietary requirements, some of their comments indicated superficial understanding. This was supported by the health professionals who suggested client participants did not necessarily have strong knowledge in this area and did not fully understand the implication of diet on the management of their T2D.

Theory suggests that, for positive change to be enabled, many paradigms need to be aligned (Deci & Vansteenkiste, 2004). Some of these include; self-motivation, a positive attitude to change and a sense of self control (Ajzen, 2001). Subjective norms and external influences, such as social networks, cultural influences and beliefs, also impact on our ability to modify behaviour (Ajzen, 1985). Our observed behavioural control, as seen by others, is also paramount to behaviour transformation. Within this study for UAE Nationals, it is evident that the majority of client participants have family support, and professional support from the diabetes clinic. However, their self-motivation, social network support, and cultural influences and norms heavily impact the management of T2D.

Chapter 5 Discussion

5.1 Introduction

This chapter will discuss the themes and sub-themes within the Theoretical Model '*influences of T2D*' and will be compared with key theories and models. The theories which support the findings that have emerged and their relationship to the research will help frame the discussion of the research objectives. This chapter provides a discussion of the outcomes presented in the results chapter: including, the client participant views on T2D, their behaviour and actions in regard to their disease, what impacts their ability to manage their T2D and what supports and enables them to make healthy choices. This chapter will also discuss the health professionals' views on what impacts the client participants' management of T2D—providing the opportunity to triangulate data.

5.2 Theoretical Model '*Influences of T2D*'

The data from this research has guided analysis and development of a theoretical model. The development of the Theoretical Model '*Influences of T2D*' has provided the platform for the generation of theory from data, illustrating the main factors that impact human and health behaviour (Glaser & Strauss, 1967). The research provides an in-depth analysis of the feelings and perspectives of each client participant and their own situation, which offers an insight into their T2D history and lifestyle. The client participant findings are triangulated and compared with the health professional's viewpoints.

Culture, encompassing family history, cultural backgrounds, cultural norms, religion, family and friends, has been found in this research to be the major construct in the UAE Nationals' values that reinforce their behaviour, inside and outside the home environment. T2D is interlinked with the theme of Culture and impacted by the constructs and expectations of the UAE Nationals culture. A study that began to highlight this unique region of the world and the relationship between T2D, culture and religion was a cross-sectional study which collected data via a self-administered questionnaire in 2013 (n = 523 individuals with T2D) (Ashur et al., 2015).

The study found the most common perception (86.6%) of T2D was that participants felt it was given to them as *Allah's* will. Some of the other main perceptions of T2D development included hereditary factors (53%), emotional state (44.4%), family problems (40%) and dietary habits (35.6%) (Ashur et al., 2015). Important predictors of medication adherence included an individual's perception of the severity of T2D, treatment control, being male and

being employed (Ashur et al., 2015). Interestingly, in contrast in this research, the perception of the disease being given to them as *Allah's* will was only raised by one participant. The majority of client participants felt that T2D was developed through lifestyle and lifestyle changes. It was also viewed as the norm within the family, as many family members also had T2D.

Barriers and Enablers to Healthy Lifestyles were key themes that emerged and sub-themes within these themes formed part of the development of the Theoretical Model '*Influences of T2D*'. Disease knowledge emerged as both a barrier and an enabler to T2D management. While most participants demonstrated a good understanding of T2D and the benefits associated with maintaining good health some of the client participant's knowledge was superficial. There was also an understanding of what constitutes a healthy diet, the need to undertake regular physical activity and where to access good food and physical activity options. However, the availability of food, particularly the accessibility and affordability of fast foods, was also seen as a barrier. While participants identified a range of physical activity options they also cited lack of time as a barrier. Family support emerged as a sub-theme of enablers, despite the cultural challenges within the home environment. The majority also attended the diabetes clinic regularly for check-ups with health professionals.

This research demonstrated sub-themes including lifestyle and lifestyle changes, food availability and accessibility, environmental changes, the cost of healthy food options and physical activity. The research demonstrates these environmental, physical and social influences as barriers to behaviour change (Bandura, 2004). This study also identifies disease perception and disease severity, alongside practical considerations such as perceived lack of time, indolence and lack of motivation as factors contributing to an individual's self-management and adherence. Lack of time is a common global phenomenon in relation to physical activity; however, it is unknown if the barrier accurately reflects individuals' time commitments. A study conducted by Heesch & Masse (2004), found that actual time commitments did not predict the perceived lack of time for physical activity. Most client participants commented that they received encouragement from their family regarding either food, exercise or medication. Cultural considerations such as cultural and social norms, food rituals, and the importance of cultural socialisation and the significance of cultural celebrations and religious events all influence an individual's ability to place disease management as a priority.

The final element of the Theoretical Model '*Influences of T2D*' incorporates the key theme of T2D information and support. The theme T2D information and support incorporates sub-themes including individual access, which highlights the main avenues through which the

client participants access health information, support and population awareness, raising, such as media and awareness campaigns.

The Theoretical Model *'Influences of T2D'* (Figure 5.1) was developed based on the research findings. It illustrates the main theme of Culture and the interaction and impact it has on the other main themes of Barriers and Enablers to a Healthy Lifestyle. The first four research objectives will be used to guide this discussion. Recommendations addressing research Objective Five will be discussed in Chapter 6.

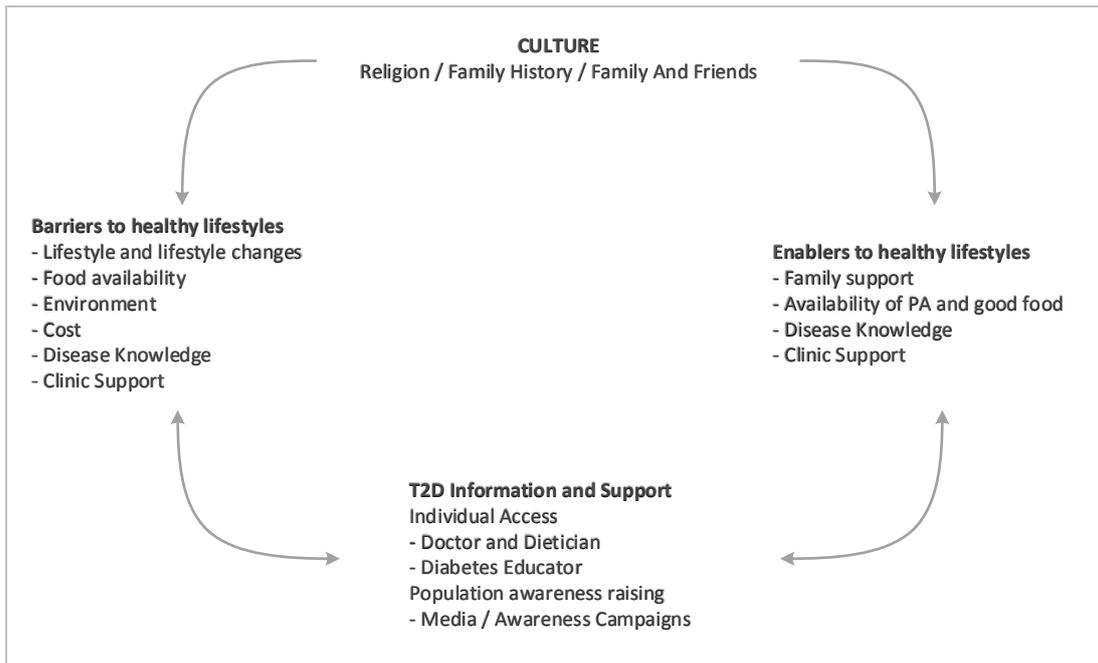


Figure 5.1 Theoretical Model *'Influences of T2D'*

5.3 To Explore Knowledge and Attitudes about the Management of T2D among UAE Nationals with a Diagnosis of T2D

5.3.1 Research Objective 1

Objective One was to explore and gain an understanding of the client participants' knowledge of T2D, including their knowledge of risk factors, benefits of disease management and risks of mismanagement. Throughout the interview, feelings about their T2D diagnosis and the impact the diagnosis had on their lifestyle and their attitude towards their disease and disease management were also explored. The effect the diagnosis has had on the family unit was explored through objective two. The client participants' motivation for treatment and maintaining good health were also examined. This discussion will identify key findings of knowledge and attitudes to T2D management, refer to theories that support the findings, compare the findings with other research and identify influences of the main themes of Barriers

and Enablers to Healthy Lifestyles in the Theoretical Model *'Influences of T2D'*. Subthemes from the Theoretical Model *'Influences of T2D'* relevant to objective one are highlighted in Figure 5.2.

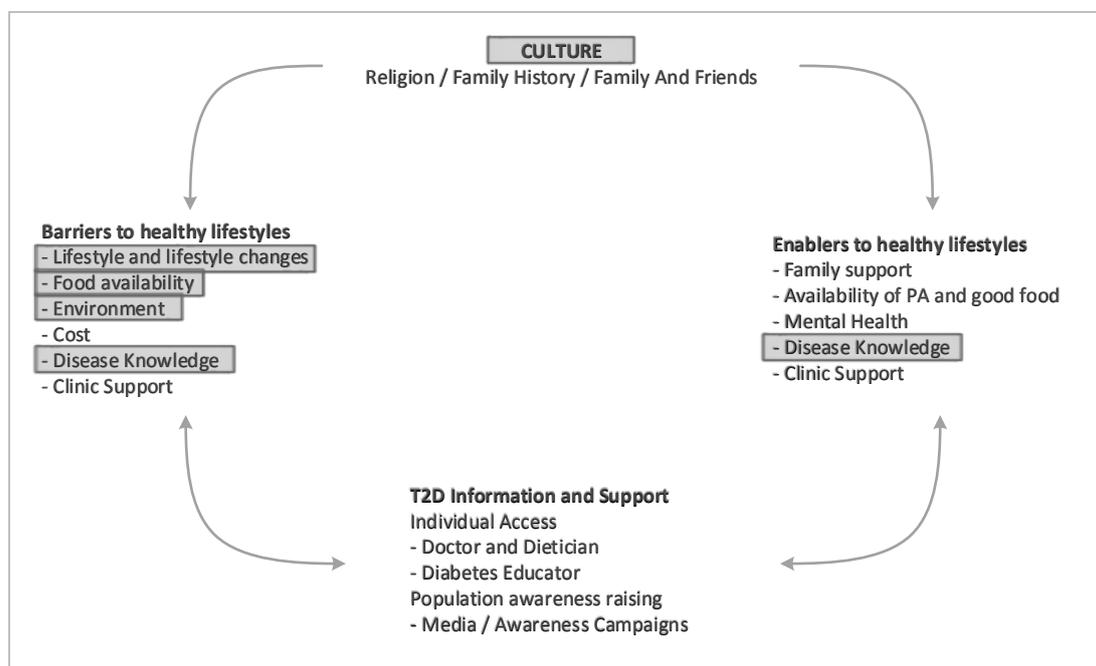


Figure 5.2 Theoretical Model *'Influences of T2D'* – Objective One subthemes

5.3.2 Knowledge about the Management of T2D

The majority of the client participants had a good understanding of the risk factors associated with T2D. CP4F gave an example of risk factors for T2D, stating that they got T2D:

from sitting all the time, eating all the time, and not being active.

Similarly, Aljaseem et al., (2001) found in their cross-sectional study of adults with T2D (n = 309) in the Middle Eastern country of Kuwait, that the participants had an understanding of the risk factors for T2D. The main conclusions of the study by Aljaseem et al. (2001) illustrated that the perceived barriers to T2D self-management were diet and physical activity behaviour.

However, a qualitative study by Ali et al. (2010), which researched what Emirati women (n = 75), aged 20–60 years, at risk of T2D perceived as barriers and facilitators of weight management, did not identify physical activity or diet as the main risk factors for T2D. The issues identified in this study were: low motivation when attempting to lose weight (associated with diet and physical activity) and no changes were achieved, lack of social support, competing demands, and socio-cultural norms. Most client participants demonstrated good knowledge and understanding of how to manage T2D during their discussion. Diet and

physical activity were identified as important factors for successful management of the disease.

In comparison to the findings of this research, a recent questionnaire-based study (n = 575) by Al-Maskari et al. (2013) conducted in Al Ain in the UAE, showed a contradiction in findings where the levels of knowledge of T2D are particularly low. The knowledge-component of this study focused on the symptoms of T2D, the causes and its, complications and definitions. Each correct answer was given one point. Al-Maskari et al. (2013) study was quantitative in nature, while this study was qualitative where the assumption of good knowledge is subjective compared to a quantifiable scale. The client participants within this study had a good understanding of symptoms, the importance of a healthy diet, regular physical activity and some complications of T2D, however the health professional's discussion suggested that client participants did not always demonstrate a good understanding of symptoms, prevention or management strategies. This may be explained by client participants having a more superficial understanding of influences and management of T2D.

Many client participants in this study commented that poor management of T2D can lead to kidney disease, heart disease, deteriorating eye sight, pancreas, and liver disease and can impact mental health. Some also commented that if T2D is mismanaged, they may experience tiredness, weight gain, an increase in pain, particularly in their feet, and that skin lesions take longer to heal.

A cross-sectional study conducted in Iran by Mohammadi, Karin, Talib, and Amani (2015) evaluated the Knowledge, Attitudes and Practices (KAP) of 100 T2D patients (n = 61F and 39M) aged 37–66 years attending an out-patient's clinic. The study's findings illustrated that the participants' general knowledge of T2D was insufficient; while, according to the findings, the attitude of most participants towards their T2D was viewed as satisfactory. The study also found that those who had the disease for a longer length of time had better KAP; however, older age had a negative effect on KAP.

The data from this study indicated a good level of knowledge, however as discussed, the qualitative nature of this study precluded a sound understanding of level of knowledge. However, the client participants were not surprised by their diagnosis, mainly due to other members of their family also having T2D so the diagnosis was viewed as the norm and hence, acceptable. There is limited published research on this finding specifically, however, a study by Alhyas, McKay, Balasanthiran, and Majeed (2011) found that UAE Nationals with T2D are influenced by their beliefs and lifestyle and that there is a correlation between beliefs and behaviour. An example of this was described by many client participants and health professionals; when describing *Ramadan*, the food consumed is usually high in sugar and fat

content. This is not the original intent of *Ramadan* (Tober & Budiani, 2007) but this behaviour is justified by means of religion, culture, and somewhat, through social responsibilities and expectations. Many client participants in this study used their culture and cultural norms to justify their behaviour and choices. Within this study, the conversations around the holy month of *Ramadan* demonstrated cognitive dissonance: where the behaviour carried out contradicts values and beliefs and allows for justification and eliminates the potential threat, competence and efficacy (Axsom, 1989).

Similar to the findings of Chung, Herceg, and Bookallil, (2014) the health professionals in this study found that regular attendance to a diabetes clinic often leads to an increased use of medication for diabetes, but is also beneficial as the regular checks often lead to earlier intervention and peer support. However, a paper discussing the advantages and disadvantages of universal healthcare in Canada, discussed medical abuse where the system is used for unnecessary GP and hospital visits which places extra burdens on the health system (Formosa Post, 2017). The HP's within this study commented on the use of the clinic only for the free medication and that clients were often reluctant to hear the advice from diabetes educators and dietitians, as is reflected in the quote by HP6:

If they try the dietitian they know what is that. The next appointment it will no show. They like the idea but they do not like us. Some of them if they want to reach something, I mean, diabetes– if you have a goal of carb counting or where he is ending up with pump, he will fill all his appointments [sic].

The majority of client participants within this study discussed attending the diabetes clinic every three months for a check-up with the endocrinologist. When the client participants attend appointments with the endocrinologists, they have access to free medication. The support and positive education received from the diabetes educators and dietitians was commented on by the majority of client participants; however, the client participant can choose how frequently he/she visits the diabetes health professionals and health professionals suggested this was usually not the main intent of the client participants visit. Within this study, the importance of accessing health services was imperative to T2D management, and provide opportunity for access to a range of health professionals.

However, in a study by Gucciardi, DeMelo, Offenheim, and Stewart, (2008), health services were not identified as a vital component to T2D management by many of the patients who participated in the study. Three hundred and ninety-nine patients were originally contacted and 267 agreed to participate in the study. Within the study, over half the patients (n = 118) who had T2D believed that conflict between the centre's opening hours and work schedules, confidence in their own self-management and knowledge, apathy towards

education, forgetfulness, distance to the diabetes centre and low perceived severity of T2D were the main reasons for nonattendance to appointments with diabetes educators and dietitians. (Gucciardi et al., 2008). Within this study, the low perceived severity of T2D links to the Health Belief Model (HBM), illustrating a health belief which produces a barrier to adherence thus preventing a desired health outcome. The majority of client participants within this study, adhered to their diabetes clinic appointments, and understood the importance of the health professional role in assisting with the management of their T2D which maybe more associated with free medication and services and low adherence to advice. Some client participants responded to the advice and some did not. Non-adherence to T2D self-management can be influenced by many factors including disease perception and duration, lifestyle factors, family support, and sometimes gender and age (Garcia-Perez, Alvarez, Dilla, Gil-Guillen, & Orozco-Beltran, 2013).

In contrast, a systematic review conducted by Renders, Griffin, Eijk-yan, and Assendelf, (2001) reviewed the effectiveness of interventions to improve the management of T2D in primary care, outpatient and community settings. The review showed that, of the 41 studies meeting the inclusion criteria, professional interventions and regular patient reviews were effective in improving overall outcomes among patients with T2Ds. The addition of nurses and diabetes educators increased outcomes and improved the process of care. Further recommendations suggested that post-graduate education of staff to improve knowledge and skills could potentially improve overall services (Renders et al., 2001). Also, the use of a centralised computer tracking system to carry out patient follow-ups and increase regular patient contact also enhances service provision and assists in closing the gap on losses of follow up patients (Renders et al., 2001). The cost effectiveness of these additional supports was not addressed within this study, however participants in this study did have access to free medical care which the majority used.

5.3.3 Attitudes about the Management of T2D

This study found while the majority of client participants were aware diet is an important factor in managing T2D, very few adhered to a healthy diet which is reflected by CP17F *it's an effort, so I keep postponing; maybe I can control my food, my diet. I find it very challenging.*

These findings support other research which suggests knowledge alone does not always impact on an individual's behaviour. A quantitative study conducted by Green et al. (2007) illustrated that those with T2D had good knowledge and understanding of good health and the practices required to improve their T2D, however, this knowledge did not transfer into lifestyle behaviour changes. Similar to this study, other studies have identified that cultural lifestyle

factors, such as religious beliefs (IDF, 2014), social gatherings (Serour, Alqhenaei, & Ben-Nakhi, 2007), social food consumption and generosity are of high importance in the Islamic religion (Badran & Laher, 2012), and in some cases, are more important than adhering to regular participation in physical activity and healthy eating (Badran & Laher, 2012).

The change in lifestyle and economic progress has led to an altered lifestyle within the UAE. Physical activity has decreased and both home help and car use has increased (Alhyas et al., 2012). A national survey conducted in Iran by Azimi-Nezhad et al., (2008) highlighted an increased prevalence of T2D in urbanised areas of Iran due to environmental changes, food access, personal behaviour and perceived severity of T2D. These findings are similar to Musaiger et al. (2003), who found in their qualitative study (which reviewed lifestyle factors associated with obesity among male university students (n= 300) in the UAE that environmental changes such as rapid changes in lifestyle, food habits, and socio-economic changes has altered behaviour, and that sedentary behaviour is viewed as the 'norm'. The students included in the study were randomly selected from university hostels and a questionnaire was completed by each participant including questions on socio-economic background and lifestyle factors. Within this study, the client participants were aware of the importance of both healthy eating and physical activity, however, their attitudes towards altering their behaviour was mostly poor. The main barriers to change were cultural impacts, perception of time, indolence and lack of motivation.

These findings are similar to Ali, Baynouna and Bernsen (2010) who found in their qualitative study of Arab women aged 20-60 years at risk of T2D, that the main barriers to change were low motivation, perception of time, competing demands, socio-cultural norms (such as socialisation and sharing of food), and home help and house maids (Ali et al., 2010). This study illustrates similar findings to both Ali et al. (2010) and Musaiger et al. (2003) with the main barriers to change including cultural norms, expectations and obligations, socialisation and time spent with family and friends. The time spent together with family and friends is usually based around the sharing of traditional foods known to be high in fat, salt and sugar. In comparison, the participants in this study also highlighted indolence, a perception of lack of time and competing demands as some of the main factors for their inability to participate in physical activity. The use of home help and house maids were considered to be the 'norm' subsequently impacting on the level of incidental physical activity undertaken within the home.

The findings from this research also illustrate major environmental, cultural and cognitive impacts that are interrelated with society's social system. When external influences are changing, behaviour change becomes more challenging, however, is still potentially possible

(Bandura, 2004). The Social Cognitive Theory (SCT) and the influence of cognitive factors (Bandura, 1991) and socio-ecological model assist in explaining the findings of the study. The SCT is a causal structure which incorporates self-efficacy to promote goals and positive outcomes. Perceived environmental impacts interact with an individual's motivation and self-efficacy to consider behaviour change (Bandura, 2004). The main factors within the SCT that influence behaviour include the individual's cognitive, environmental and behavioural factors. Self-efficacy is also part of the SCT as it is influenced by the individual's attitude, beliefs and values (Bandura, 2004), which is in turn influenced by the environment.

The cognitive factors identified by the majority of the client participants and health professionals included a feeling of indolence, with the majority perceiving the culture as 'lazy' and lacking in motivation to change. The majority of client participants were consciously aware of their T2D; how it develops and its long-term consequences if poorly controlled. The client participants also understood the benefits of maintenance and good control, however, their self-efficacy and motivation to change is compounded by environmental and cultural impacts and cognitive behavioural factors. As illustrated in the SCT, environmental factors and the individual's cognitive factors play a major role in behavioural change. Similar to the findings of Bandura (2004), environmental and cognitive factors play a role in behaviour change. The individual's knowledge of health risks and benefits and perceived self-efficacy can control their habits. Environmental factors, such as social interactions, and reactions can also impede health behaviour change. The majority of client participants believe their T2D has had no impact on their family. A few participants stated that there had been a change in food eaten in the home; for example, a change from white bread to wholemeal and a change from white to brown rice. A few client participants also noted that they receive support and encouragement from their family regarding good nutrition and physical activity. The majority also commented that the food available in their workplace environment was high in fat, sugar and salt. These environmental impacts provide barriers to motivate an individual to change. Cognitive, behavioural and environmental factors were also acknowledged by the majority of client participants who explained that, in general, good nutrition and attitude towards healthy food is not taken seriously by UAE Nationals. This is impacted by the attitude of indolence and, in some cases, motivation, and is interrelated to environmental factors such as housemaids cooking traditional foods high in fat, oil and sugar. Further examples of these impacts, including the importance of socialisation and food sharing within the Arabic culture, cultural celebrations, such as *EID* and *Ramadan*, food availability and accessibility, home help and the maid's assistance with cooking and general home duties, lack of motivation and indolence, are explored in Objectives Three and Four.

A study by Anderson, Winett, and Wojcik (2007) explored the impact of the SCT, self-efficacy and nutrition behaviour. The participants were aged 18–92 years and included 66% females and 18% African Americans. The study was conducted with 158 members of two churches within the same geographical area (Anderson et al., 2007). The findings of this exploratory study illustrated the importance of social and family support in behavioural change. The influence of self-efficacy on the long-term outcomes was paramount for positive behaviour change, such as eating healthier food (Anderson et al., 2007).

The socio-ecological model as depicted in Figure 5.3 supports the findings illustrating the interaction between personal/social and environmental factors, and highlights how integral beliefs and values are to an individual’s development, and functioning and, in turn, the impact this has on disease management (Bronfenbrenner, 1993). The socio-ecological model emphasises that our health behaviour is influenced by many factors, including an individual’s social environment and level of social support (Bronfenbrenner, 1993). It also emphasises the importance of ones’ environment in providing opportunities to live a healthy lifestyle. Within this study urbanisation and environmental changes have been a barrier and an enabler to behaviour change. The rapid changes have resulted in increased access and availability of a wide variety of restaurants and food outlets providing more food options; both healthy and unhealthy. Urbanisation and environmental changes have had also impacted upon physical activity; by reducing opportunistic physical activity options, while increasing gymnasium and outdoor walking path availability.

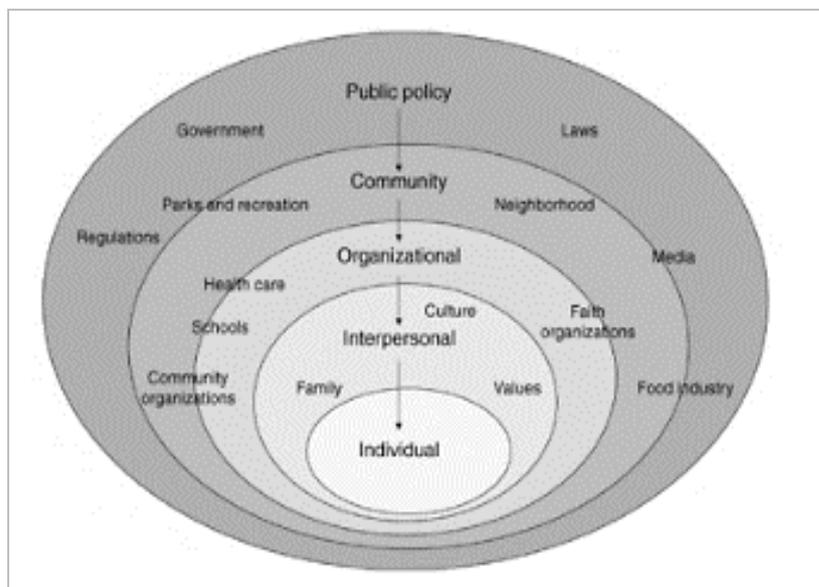


Figure 5.3 Socio-ecological Model (Bronfenbrenner, 1993)

The findings in the research illustrated that the client participants had good knowledge about the types of food they needed to avoid; however, they did not always adhere to this due

to family and cultural influences which in turn impact on attitudes, beliefs and values. These findings are similar to those of Delores (2004), who found in her qualitative study of African Americans (n = 40) aged 21–40 years, that food and choices of food is influenced by the social and cultural environment, cost of ‘healthy’ food, and the perception that eating ‘healthy’ is a loss of cultural identity/heritage. Food choices are informed by cultural identity, and social, environmental and socio-economic factors. Attitudes and beliefs towards food consumption are heavily influenced by social circumstances; for example, family and friends (Delores, 2004). It is vitally important to understand food and eating patterns of cultural groups as these shape practices and beliefs. Cultural identity is embedded in Arabic eating patterns, attitudes and beliefs about food (Airhihenbuwa, Ford & Iwelunmor, 2013). As illustrated in the Theoretical Model ‘*Influences of T2D*’, within this study the majority of the client participants and health professionals agreed that culture is the main influence on behaviour related to managing T2D. Some examples highlighted in this research include the impact of cultural demands and expectations, the importance of socialisation, and participation in sharing of food. The research also highlighted that in most cases, culture, including family, family values and cultural norms, are viewed as the priority.

Many client participants commented on the availability of fast food and the new ‘cultural’ acceptance of eating fast food regularly. As HP6 commented:

It’s their daily routine. Most of them you will see that the restaurants are more in their days [sic].

The availability and convenience of a variety of restaurants, including fast food, being readily available was also highlighted as a barrier to behaviour change. Studies indicate that the greater the availability of fast food the higher the consumption, and in some cases, increased availability can also lead to a decrease in fast food price which can also contribute to an increase in consumption (Jekanowski, Binkley, & Eales, 2001). Evidence also suggests that the increase in portion sizes has coincided with an increase in the prevalence of T2D and obesity (Ello-Martin, Ledikwe, & Rolls, 2005). Data also indicates that there is a correlation between increased portion sizes and increased energy intake and when individuals continue to consume large portions of food the body’s ability to respond to feelings of fullness is overridden (Ello-Martin et al., 2005). Therefore, the increased availability of food leads to higher food consumption, and the higher the consumption, the more increased energy intake, which is a difficult behaviour to change (Jekanowski, Binkley, & Eales, 2001).

The client participant’s knowledge of perceived susceptibility to diabetes complications was evident; however, perhaps a lack of the perceived seriousness of T2D may also play a part in knowledge and awareness. These findings are supported by Glasgow, Hampson, Strycker,

and Ruggiero (1997), where an individual's perceptions of the perceived susceptibility of the seriousness of T2D, and the perceived threat and perceived benefits of T2D maintenance were understood by the majority of the client participant's and health professionals. However, the likelihood of action is limited by barriers to behaviour change (Baker et al., 2010).

According to HBM, the perceived severity of an individual's T2D and the barriers and benefits of behaviour change may be assessed by the individual before making any lifestyle changes (Rosenstock, 1974). Within this study, T2D is viewed as the norm as many family members also have T2D, so cues to action and perceived threat of the condition are also lead by example from other members of the family. For example, CP7F stated *I was expecting it because it is inherited in our family*. Due to having multiple family members also managing T2D, and who are aware of the long-term implications but choose to ignore them, the perceived disease severity of T2D is low.

'Perceived benefits' are identified as a key influence of behaviour change within the HBM. This was illustrated in this study when the client participants discussed the main motivators of adherence to a treatment plan, in order to '*make you feel better [sic]*'. Positive results reported from the following a treatment plan included: stable blood glucose, a reduction of side effects suffered and protection of overall health (Janz & Becker, 1984). The health professionals identified that the client participants attended the diabetes clinic as they recognised benefits. As highlighted earlier, the majority of client participants had an understanding that their self-management activities controlled their T2D and assisted in the reduction of long term complications. The main barriers to further action within the HBM included individual behaviour and cues to action. Within this study, the findings illustrated individual behaviours, such as diet and physical activity adherence, indolence, lack of motivation and other commitments as taking priority.

The majority of client participants and health professionals identified other environmental impacts, such as home help, urbanisation and a rapid change in lifestyle. This has impacted on lifestyle behaviours, including an increase in car use and a lack of incidental physical activity. As CP8F discussed:

The women used to do everything in the house, and now we have all housemaids, so you don't have as much activity. You get lazy. When you have, everything done for you, you can just say, Oh, I can just sit back, do nothing.

Similar to this study, Musaiger et al. (2003) found in his study undertaken with male university students in the UAE (n = 300) aged 18-25 years social and lifestyle factors such as car use increased the risk of developing obesity which could lead to the development of chronic diseases such as T2D.

These findings are similar to a systematic review by Kumanyika (2008) which highlights various cultural groups within America (Black African American, Hispanic, American Indian, Alaska Natives, Native Hawaiian, Asian American & Pacific Islander). It found that cultural attitudes and beliefs, and socio-structural and environmental variables play a major role in behaviour. The rising prevalence and availability of high fat foods and beverages are socially and culturally valued and, in some of these cultural groups, minimal physical activity is also viewed as culturally acceptable (Kumanyika, 2008). A consensus statement developed by Caprio et al., (2008) following the Shaping Americas Health conference conducted in 2008 also found that food is viewed as an expression of cultural identity and family unity. Urbanisation and acculturation (lifestyle changes) has promoted changes in food preferences and physical activity behaviour. Traditional diets rich in vegetables and grains have altered to include an increase in processed foods and animal products. Similar to Caprio et al., (2008), this study also discussed that eating fewer home cooked meals, an increase in motor vehicle use and sedentary behaviour were being viewed as the norm (Caprio et al., 2008). Most participants in this research also viewed rest after work or time with family as more important than physical activity. Similarly, the client participants within this study also expressed the perception that they don't have enough time for physical activity. Many client participants suggested they reached home reasonably early, with few explaining that their time after work is spent with their children, spending time together or resting. The majority of participants explained that the housework and cooking was carried out by the maid and home help. These findings are similar to those of Heesch & Masse (2004), who found in their qualitative study of (n = 249) African American and Hispanic ladies aged 45 to 70 years, that the perception of lack of time versus reality of time to commit to physical activity was misunderstood. Their findings illustrated that the majority of participants watched television, talked with friends and family, sat quietly and read or had a nap or rest, when they could potentially be participating in physical activity (Heesch & Masse, 2004). Similar to these findings, this study found that client participants valued socialisation and time with family and friends above physical activity and overall T2D management.

Despite physical activity not being seen as a priority for the majority of client participants within this study, there are many physical activity options that are freely available in the UAE and Abu Dhabi. For example, some free activities include: the Corniche Beach ten-kilometre walking track, walking paths around local parks, parks with free physical activity facilities, free use of basketball courts in the city of Abu Dhabi, and the *Yas* Marina Circuit located on *Yas* Island, which is open two nights a week for cycling, running and walking (one night a week is for women only). There is also a running club 'Striders' which offers group running in the evenings for all ages for a nominal fee. There is also the option to participate in physical

activity indoors at paid gymnasiums, and for a nominal fee, walking groups are available in the shopping malls for all ages. As discussed earlier, social norms such as physical activity in Western countries, if supported by family and friends, can increase engagement and be a predictor for behaviour change (Ball et al., 2010).

The research findings support the socio-ecological model where health behaviours and characteristics such as knowledge, attitude and beliefs of the individual in addition to genetic factors are affected by interpersonal influences such as family and friends, community, workplace, family and peer influence in addition to public policy. While many of these influences cross more than one domain. The socio-ecological model reiterates the findings from this study: that not only is knowledge required for behaviour change, but also supportive social norms and both private and public health sector collaboration. For sustainable behaviour change, the culture, environment and government policies need to be aligned to promote healthy lifestyle and food options (Caprio et al., 2008).

5.3.4 Conclusion

Gaining an understanding of UAE Nationals' knowledge about T2D and attitudes towards T2D is paramount for the promotion of compliance and improvement in overall management. This study's findings illustrate that knowledge alone does not always produce behaviour change. Culture, including cultural norms and cultural expectations and the importance of time with family and friends and socialisation, is viewed as a priority over health needs. The findings of the study also demonstrate attitudes, such as indolence and a lack of motivation, as factors influencing T2D management. Environmental factors such as rapid urbanisation, and lifestyle and lifestyle changes, such as home help and food availability, impact on an individual's attitude towards positive T2D management.

The research demonstrates that our societies are complex and interrelated and that there are inherent links between individuals— their knowledge and attitudes, social environment and environmental setting— which forms the basis for a socio-ecological approach to health (Talbot & Verrinder, 2005). This is evident within this research with the majority of client participants having a good understanding of T2D; however, their attitudes towards T2D management were influenced by their social and environmental setting. There are also integral links evident between the findings from Objective One and the SCT and HBM, which highlight the necessity to focus on external factors that influence disease management, understanding of disease severity and behaviour, concurrently. This includes individual, community and society relationships. (Moore et al., 2013).

5.4 To Explore the Impact the Diagnosis of T2D has on the Family Unit in the UAE

5.4.1 Research Objective 2

Research Objective Two focused on exploring the impact of the diagnosis of T2D and its impact on the family unit in the UAE. The support the client participants received from their family and how their T2D diagnosis impacted on the family unit was explored. The majority of client participants felt supported by their family who encouraged and supported healthy food choices, however, this did not always result in behaviour change. Some were supported with their medication regime, and for a few, family encouraged participation in physical activity. CP7F commented:

My husband always warns me– don't eat, don't forget your diabetes. Even my work colleagues they always remind me– don't forget you are diabetic, don't eat like that. My surroundings are very good.

Interestingly, some of the participants suggested their T2D diagnosis had no effect on the family unit. For others, one or more family members had T2D and it was perceived as the 'norm'. These findings suggest participants did not perceive that their T2D impacted the family unit, for example

It didn't make a difference, because my family were diabetic. (CP17F)

Cultural norms, beliefs and values shape behaviour and attitude which impact overall behaviour change. There is a strong need to comply with cultural norms for identity and conformity.

The HBM in Figure 5.4 identifies the perceived severity of ill health as one of its four aspects to behaviour change. The majority of client participants in this study were complacent about their T2D, perhaps due to T2D being perceived as the norm due to having many family and friends with T2D. Although most participants know the issues most have not made significant changes. According to the HBM, an individual calculates whether benefits of a behaviour change outweigh the personal and practical barriers (Rosenstock, Strecher, & Becker, 1998; Green & Murphy, 2014). Within this study, the severity of T2D encouraged a small number of participants and their families to make behaviour changes. These participants stated that the diagnosis of T2D had been positive for them and that their families gained more awareness and understanding of good food and healthy food choices. Three other participants highlighted that their family encouraged them with their food choices by supporting them to avoid high sugar foods, removing chocolate and other sweets from the house.

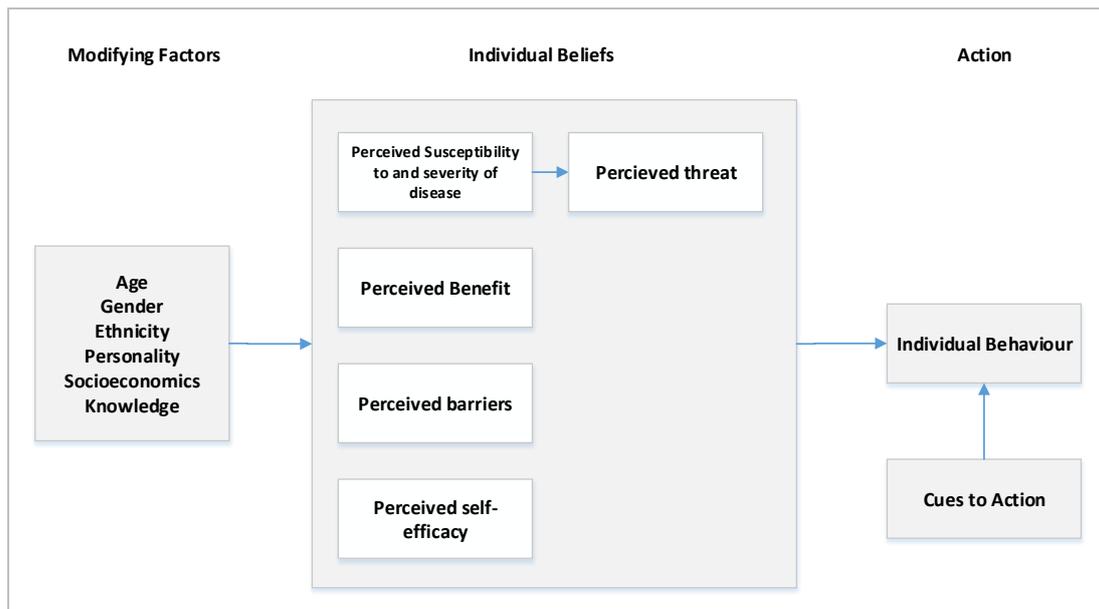


Figure 5.4 Health Belief Model (Rosenstock, Strecher, & Becker, 1998)

Only a few client participants commented that the T2D diagnosis had a positive influence on the home and family unit; for example, the food choices and food serving sizes were altered for everyone and it offered an opportunity for the entire family to be educated. Adherence to T2D management has been correlated with an individual’s beliefs and their awareness of the severity of the disease (DiMatteo, Haskard, & Williams, 2007). Within this study, the HBM and socio-ecological model, as discussed earlier, help to explain the relationships between the constructs of family and cultural norms: their expectations and obligations being integral to lifestyle, irrespective of the severity of their disease. An individual’s beliefs, attitudes and behaviour are impacted and influenced by cultural norms and expectations, cultural identity and the wider community. One health professional made the comment that, in some cases, if a male in the household wanted to change, for example, his eating habits, then this might influence the entire family to change. The communication style in some Arabic families can be hierarchal in nature, with the males tending to lead the family decisions with the fathers usually taking control of the family. This example was not further explored regarding females.

Despite a few client participants describing changes in the home environment, the majority of the health professionals acknowledged that it is often difficult for some of their clients to make these changes, particularly if the entire family is not supportive. The health professionals also expressed that the home environment is heavily influenced by the type of food the maid cooks for the family. There was agreement among the health professionals that the maid’s job is to please and satisfy the family; therefore, the food provided is often high in fat, sugar and oil. These findings are similar those described in a review by Musaiger et al. (2012), where the food-based guidelines for the Arab Gulf countries were examined. The

review highlighted similar findings, such as the change in lifestyle, increased food consumption, lack of physical activity and an increase in the dependency on home help and maids. The review also highlighted that traditional foods consumed in the Gulf region are generally known for containing high levels of fat, salt and sugar (Musaiger et al., 2012). The findings from these studies, illustrate the acceptance of traditional foods, high in fat, as part of cultural identity and societal norms within the UAE and Gulf region.

The perceived severity construct from the HBM links to the Labelling Theory which an individual identifies with the label of a diagnosis (Trice & Roman, 1968), and how the individual is classified by society. Attaching a label to a disease can have both a positive and negative effect on how an individual respond and manages the condition (Bedson et al., 2004). In this research, T2D is normalised in the UAE: when people label themselves or others diabetic, there is not an urgency to change behaviours. While in other cultures where the disease is not normalised this may prompt changes (Mayberry & Osborn, 2012). This research illustrates the impact of T2D on the family unit to be minimal. The majority of the client participants commented that T2D has not impacted other members of the family, primarily because other family members have the disease, the disease is familiar and is considered the norm. The majority of client participants acknowledged support from family members who encouraged a healthy diet and physical activity, and also, in some cases, offered support with medications.

A study conducted by Fisher et al. (2000) found similar socio-ecological perspectives that influence the management of T2D. The study focused on the Hispanic-American community. It found that the four main influences of disease management include: the individual patient's personality and characteristics, health practitioners and the health system, work and community environment and family environment. The findings also illustrated that the family setting plays a vital role in a patient's self-management and that the family's health beliefs and practices are interlinked and influenced heavily by their cultural beliefs and expectations (Fisher et al., 2000). These findings are in line with those of Chesla et al., (2003), who conducted a one-year prospective study reviewing the family predictors of disease management in Latino (n= 57) and European Americans (n =104). They found that family influences both social and illness beliefs, and that each family's cultural patterns influence disease management. The findings of these studies are reinforced by Lawton et al., (2008), who found in their study using in depth interviewing of British Pakistani (n= 23) and Indians (n=9) with T2D that they were acutely aware of the impact their high fat cultural diet had on the management of their T2D. However, they were unable or unwilling to change. The main reasons for their inability to change habits were both social and cultural (Lawton et al., 2008). The sharing of traditional food brought the family together; it was a sign of respect and identity

and was considered compulsory. The study's findings highlight the impact of cultural and family expectations to participate in cultural food sharing and indicates that there is a social and symbolic meaning to food (Lawton et al., 2008).

5.4.2 Conclusion

Overall, the findings of this research illustrate that the family unit is not significantly affected by the diagnosis or management of T2D as the disease is normalised, with many having family and/or friends who also have T2D. Therefore, people are not surprised and, in some ways, are prepared for a diagnosis. For most client participants, although family members are supportive in that they encourage healthy eating, physical activity and regular blood glucose monitoring, most families didn't change their eating and physical activity habits. The overall influence and importance of culture, family values, expectations, and traditions were more imperative and far outweighed the perceived threat and severity of T2D.

5.5 To Explore how UAE Nationals with T2D Manage Cultural Celebrations and how the Muslim Faith Influences Disease Management of T2D

5.5.1 Research Objective 3

Objective Three explored how UAE Nationals with T2D managed cultural celebrations and how the Muslim faith influenced T2D disease management. The Muslim faith and traditions are being challenged by Westernisation in various ways including both environmental and social changes (Nurullah, 2008). The majority of the client participants and health professionals thought that the client participants did not adhere to some of the teachings within the Muslim faith. An example given by one health professional was that the religious teachings encourage Muslims to leave one third of their body for water, one third for food and one third for air; they are also encouraged to take less food and minimize the variety of food intake. However, the majority of client participants commented that food choices are influenced by their culture and acknowledged that, in general, food consumption is higher than it should be. As previously discussed, this could be due to the importance in the Arabic culture of food sharing during socialising and the nature of the traditional foods chosen. These findings are similar to those of Sobh, Belk and Wilson (2013) who found, in their ethnographic study in the UAE and Qatar, that Arab hospitality involves sharing of food with close family, which is a ritual. These findings were in context of American Thanksgiving (Sobh, Belk & Wilson, 2013).

In relationship to managing cultural celebrations, such as *EID* and *Ramadan*, a clear pattern emerged illustrating that the majority of client participants and health professionals observed that there is an increase in food consumption during *Ramadan* and *EID* and that the food consumed contained high fat, sugar and large quantities of carbohydrates, such as rice. Client participant 8F commented:

It's always sweets during EID' and CP2F reiterated this by stating the *EID* celebration is '*too much sugar and too much sweet* [sic].

The majority of health professionals and client participants also discussed that the cooking of food is generally carried out with ghee or Arabic butter and the majority of food is fried. It was, however, agreed that more confectionary is consumed throughout *Ramadan* and *EID* celebrations, and that generosity among family and friends is shown through food. The majority also observed that when sharing food with family and friends throughout *Ramadan* and *EID*, food cannot be rejected as that would be seen as a sign of disrespect. However, a few client participants explained that some of their friends understood their T2D diagnosis and respected their choice to eat responsibly during this time. A few also explained that, to manage *Ramadan* and their T2D, they took leave from their workplace which allowed them to rest or sleep during the day when fasting. This change required a shift in medication administration from daytime to evening.

These findings are similar to those found in a study by Musaiger (1993) that addresses the socio-cultural and economic factors affecting food consumption patterns in the Arab countries. The findings from this study illustrate the dramatic change in lifestyle, changes in food habits and increase in consumption of foods high in fat, sugar and carbohydrates (Musaiger, 1993). Musaiger's (1993) study also found that the individual's eating habits were affected by the migration of different nationalities of people and their cultural foods into the UAE; their religion, culture, and personal beliefs. Others also found culture influenced eating practices and food choices among Jordanians (Bawadi et al., 2012). Some similarities highlighted in both studies that were, when friends are invited for dinner, they are always offered more food after their meal and the portions are always larger than necessary. In the Arabic culture, these are signs of generosity (Bawadi et al, 2012).

Despite the effectiveness of medication therapy and the client participant's knowledge of T2D, poor adherence to disease management is positively correlated with perceived disease severity (Figure 5.4) (DiMatteo, Haskard, Williams, 2007). A study conducted in 2002 in the Netherlands with forty participants using semi structured interviews explored the perceptions of T2D subjects regarding their T2D diagnosis (Adriannse, Snoek, Dekker, Van Der Ploeg, & Heine, 2002). The majority of the participants did not perceive the disease as severe, their

family and friends were not surprised by the diagnosis and the majority commented that the change in diet would be the largest challenge (Adriannse et al., 2002). Findings from this study illustrate similar themes and patterns. Perceived disease severity and the family not being surprised by the diagnosis of T2D correlates to some of the findings within this research.

Cognitive Dissonance Theory demonstrates how individuals change their attitude to suit their behaviour, and how to reduce dissonance, they rationalise their behaviour by justifying their actions (Axsom, 1989). There was evidence of dissonance in this study with client participants justifying their diet although they recognised it was not conducive to good management of their T2D. For example, the majority of client participants agreed that it is culturally disrespectful to not share food with family and friends, particularly throughout *Ramadan* and *EID*. The client participants showed good awareness that healthy eating and regular physical activity is required for good T2D management and to prevent long term complications. The majority of the client participants' families were supportive of healthy eating through encouraging physical activity and assisting with medication. However, the client participants within this study were unwilling to change and the majority of participants justified unhealthy eating by suggesting it would be culturally inappropriate to refuse food during religious festivals. P5M stated:

We visit people and they offer for us food and we cannot reject it. Is that your question? You cannot reject it. It is [a] kind of disrespect [sic].

In contrast, a few participants had adhered to their healthy diet during this period. CPF 16 explained:

For the food [sic], I'm so, so, so careful with the food now. Not like before.

Both the goal and perception of the current situation (CDT) is self-efficacy; one's own belief in oneself to make a behaviour change (SCT) is required for an individual to make changes in their habits, particularly those linked to cultural customs (Grave, Centis, Marzocchi, Ghoch, & Marchesini, 2013).

As highlighted by Bandura (2004) in Figure 5.5, self-efficacy is an important factor in influencing behaviours and plays a pivotal role in SCT. As illustrated in Figure 5.5, the SCT illustrates how individuals acquire knowledge through cognitive processes. The SCT acknowledges that much of an individual's behaviour is influenced by the environment (social) while the cognitive component recognises how individuals are motivated and act. Self-efficacy illustrates human behaviour through individual beliefs and self-confidence. Self-efficacy influences the environment and desired outcome by individual actions. For example, having the self-efficacy to participate in physical activity is an initial step towards intentions.

Self-efficacy influences the individual's consideration to change current habits and promotes overall personal change (Bandura, 2004). Bandura also emphasized the importance that the individual's social system has on one's ability to make behavioural change. Within this culture there is high regard for traditional values and activities and practicing one's cultural religion (Margolis, Carter, Dunn & Reed, 2003). An individual's cultural beliefs and cultural relevance influence an individual's disease perception. Culture affects an individual's attitude towards both health and healthcare, compliance and self-efficacy (Margolis, Carter, Dunn & Reed, 2003).

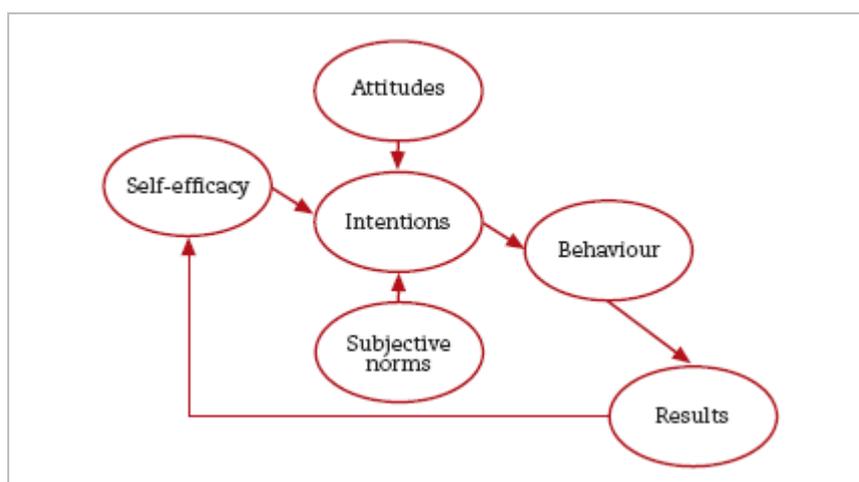


Figure 5.5 Social Cognitive Theory and Self-Efficacy (Bandura, 1989)

Therefore, for behavioural change to be successful within this environment, it would require a cultural shift. The perceptions of the severity of T2D and the long-term complications if continued to be poorly managed, need to be fully understood. Despite this, a few client participants remarked that this attitude was changing; they felt that behaviour change would happen, but over an extended period. Client participant 21M commented:

Maybe they can change [referring to UAE Nationals]. Not our generation. Maybe after two or three generations, it might be a change. Almost 20 to 30 years, really.

These findings relate to the Diffusion of Innovation theory. The Diffusion of Innovation theory illustrates how societal attitudes can change slowly over time. Participants discussed the difficulty in change, especially when change involved family and traditional activities, however as reflected by HP4 change is more likely if embedded in family values and behaviours.

If you are focused on certain things, if you have control you can bring your family in a healthy way and other people will do. Like morality, if you follow your things as your family did and be a role model, you'll put it in practice in your family [sic]. Then the community will change. (HP4)

According to Diffusion of Innovation, innovators make the changes first, followed by the early adopters, the late majority and finally, the laggards (Valente & Rogers, 1995). Community level change can take time and requires a socioecological approach recognising the complexity of factors at various levels including community, family and society. Positive community level change requires a foundation grounded in relevant cultural concepts, cultural engagement and self-determination (Jirojwong & Liamputtong, 2012).

5.5.2 Conclusion

The study's findings illustrate that food choices are influenced by culture and that there is an awareness that food consumption is high in sugar, fat and oil, especially during religious celebrations such as *Ramadan* and *EID*. In some respects, it was highlighted that this behaviour isn't true to the Muslim faith. The importance of socialisation and generosity among the Arabic culture was also highlighted. The overall understanding of T2D was good, however, adherence to disease management was poor and the overall perception of the disease was that it was not severe. The findings illustrated a link to the CDT where individual's attitudes changed to fit their behaviour, to justify their actions. A cultural understanding, and an acceptance and support of positive T2D disease management and of healthy food intake, particularly when participating in cultural customs and celebrations, such as *Ramadan* and *EID*, is paramount.

5.6 To Identify Barriers and Enablers Associated with the Management of T2D Among UAE Nationals with a Diagnosis of T2D

5.6.1 Research Objective 4

As discussed previously, there is a complex range of factors that have influenced the rise in diabetes in the UAE (Boutayeb et al., 2012). Identifying barriers and enablers associated with the management of T2D among UAE Nationals with T2D was the fourth Research Objective of this study. The Theoretical Model '*Influences of T2D*' (Figure 5.6), highlights the barriers and enablers that emerged during this study.

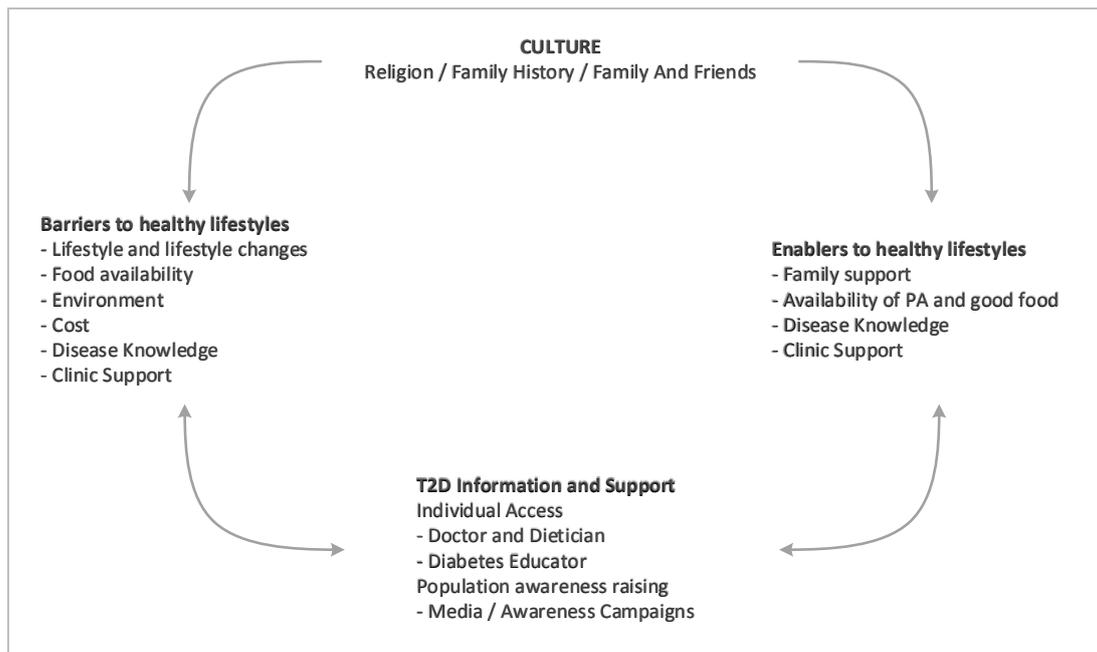


Figure 5.6 Theoretical Model 'Influences of T2D'

Both the health professionals and client participants discussed many barriers to disease management, including the rapid lifestyle change from rural surroundings to an urban environment. Both health professionals and client participants commented on the increased use of transportation (specifically, car use), and home help impacting on incidental physical activity and food consumption. The majority of health professionals and client participants observed the culture as being one of indolence, and in a few cases, the client participants were not being motivated to lead a healthy lifestyle. One health professional made an interesting remark: perhaps there is a lack of knowledge and awareness that living a healthy lifestyle is 'normal' whilst perhaps in this culture, if someone is eating healthy it means the individual is 'sick'.

A similar study by James (2004), reviewed the factors that influence dietary intake among African Americans residing in Florida, USA. Six focus groups were conducted. Both women (n=19) and men (n=21) aged 18–69 years were recruited from various work places, such as beauty salons, churches, social clubs and universities (James, 2004). A common perception among the participants was that eating healthy meant giving up part of their culture and that relatives and friends weren't supportive of dietary changes. Some of the barriers to eating healthily included a loss of cultural and social symbolism of certain foods, the expense and the taste of healthy foods (James, 2004).

A study by Helman (2007), explains that before improvements can be made in the way food is consumed by a culture other than our own, an understanding of the way the culture views its food is vital. In some cultures, and particularly in this culture, food consumption is

based on culture, social interaction, relationships, sharing and generosity and dietary beliefs, rather than nutritional value.

The majority of client participants and health professionals also highlighted food accessibility as a barrier to T2D management. The accessibility and variety of food, especially fast food, was viewed as the main barrier. Food supplied in the work place was also observed to be high fat, high calorie and offered to staff in large quantities. Over the last two years, the local media has covered stories on schools that have made changes to the food available in the school canteen, as well as others that haven't made any changes at all (Nazzal & Taher, 2015). Many client participants commented on the positive changes of the food available in school canteens, while some client participants acknowledged these changes however expressed the need for further improvements. As discussed earlier, the Arabic culture is underpinned by the importance of socialisation and sharing of food; many of their actions are justified by their culture and change in lifestyle (Whale, Gillison, & Smith, 2014). As early as 19 years ago, food consumption patterns were being reviewed and changes in the Gulf regions' access and dependence on fast food was increasing (Miladi, 1998). According to Miladi (1998), the influences on these changes were varied and included an increase in the fast food industry and advertising, economic changes with the discovery of oil, and environmental, social and cultural influences. These findings are comparable to a more recent study by Fortuna (2012), who reviewed the influences of the obesity epidemic in America. Fortuna (2012) found the main reasons for an increase in fast food consumption and dependence was due to an increase in advertising and fast food outlets; they are easily accessible and affordable. Social influences endorse meeting friends and family to share a meal together outside of the home (Fortuna, 2012). Within this study, food availability and, in particular, fast food accessibility has increased overall food consumption. A few client participants discussed the impact the cost of good food has on their ability to choose healthy food options, while the majority of client participants felt that there are many good food options to choose from at a reasonable cost in Abu Dhabi.

A recent study by Barnes et al., (2016) examined the relationship between fast food, body weight and food quality. The cross-sectional study collected data using a survey and dietary information obtained from adults (n= 200) aged 18–60 years. Anthropometric information was also collected. Nutrition intake was recorded using the Healthy Eating Index (2010) and self-reported food consumption was recorded each week. Dietary information was collected at baseline and at 6 months. The overall findings at 6 months indicated minimal change in fast food consumption over a 6-month period. A correlation was found between fast food

consumption and an increased BMI and a lower healthy eating index (Barnes et al., 2016). Regular fast food consumption can contribute to an increased BMI, which can increase an individual's risk of developing T2D. The environment was also identified as a barrier to behaviour change. The impact of urbanisation has been noted earlier, however both the health professionals and client participants suggested that the home environment was challenging to change.

Some health professionals and client participants commented on the inability to change the food choices in the household, given that there are multiple family members living in one house. This environment, which is associated with family behaviour, is embedded culturally and to break the pattern that has been carried out for many years is difficult. To be the sole family member to bring about and encourage change can be challenging (Baglar, 2013).

A few client participants discussed the weather and its impact on their ability to be involved in physical activity. However, the majority felt it was cultural norms and expectations and their own indolence that precluded them from undertaking physical activity, particularly given that there are multiple indoor physical activity options, and many free physical activities available to those residing in the UAE. To cater for the extreme weather conditions, the Emirate of Abu Dhabi offers approximately ten public gym outlets which cater for both men and women separately. Each hotel (there are over 100) also offers a gym and some offer physical activity classes available to both members and non-members, for a fee. There are also multiple boot camps and cross-fit offered both indoors and outdoors, and personal trainers are available for in house private training. Some of the shopping malls also offer walking group activities (Berger, 2012 & Davey, 2014). Some UAE Nationals like watching football and local boat races, while the largest sports they invest in and watch would be horse racing and falconry racing. As previously mentioned, they own and run the most highly regarded horse race in the world (Dubai World Cup), larger than the Melbourne Cup in size and prize money. The Arabic culture and history of sport and familiarity of sport is different to that of the western world (Traditional Sports in Abu Dhabi, 2016). The findings of this study illustrate the importance of cultural values and social relationships, and socialisation and sharing of food, in contrast to the values placed on physical activity and fitness (Kim, Choi-Kwon, Kim, Park & Koh, 2015). Although sport and recreation is promoted, and there are lots of opportunities to participate in physical activity, the majority wouldn't actively participate in sport after work or school; whereas, in western American and Eastern Chinese societies involvement in sport and recreation is promoted and undertaken by children and adults of all genders (Lau, Cheung, & Ransdell, 2011).

The majority of client participants discussed and acknowledged the perceived benefits of participating in physical activity, eating good food and having the motivation to be healthy. Some of the client participants commented on the benefits, including having good blood glucose control, experiencing less overall pain and a sense of feeling good. Therefore, the HBM can inform the findings of this research, that non-adherence to optimal T2D management is due; in part, to the individual's perception of disease severity, lifestyle, and the importance of culture, family life and religion, in particular, the highlighted religious and cultural occasions such as *Ramadan* and *EID* (Al-Maatouq et al., 2014).

The barriers identified within this research are interlinked with the cognitive, environmental and behavioural factors within the SCT. The accepted cultural behaviour and cognitive dissonance, and the minimal lack of social and family support to promote change, all contribute to behavioural change. The perception of T2D seen as the 'norm', and the limited ability to promote change within the home and work environment also impacts an individual's behaviour (Bandura, 2004). It is also demonstrated by Weaver, Lemonde and Goodman (2014), in their exploratory study using both questionnaires and in-depth interviews with individuals (n= 96) with T2D, that those who see themselves as more self-efficacious manage their T2D in a healthier way. The findings suggest that for the UAE to promote behaviour change, a major environmental shift and a transformation in social norms needs to be prioritised by the Government, for the management of T2D to change (Laher, 2014).

Within this research, the enablers that were highlighted by the client participants that promote T2D management are family support, good food, physical activity availability, disease knowledge, and clinic support. The client participants commented that family support offered was through the support of medication management and the promotion of healthy food consumption, although changes are not made. Within the TPB, for an individual to adhere to positive disease maintenance the subjective norms such as social networks, cultural norms and beliefs, and social support all need to be aligned for the change to be instilled and have a positive effect (Ajzen & Driver, 1991).

In this current environment, as confirmed by both the health professionals and client participants, T2D is seen as the 'norm' and indolence is the accepted cultural norm. There are many opportunities to choose good food and participate in physical activity in the UAE, however, the individual requires both social support and support in understanding the benefits of changing behaviour to make positive changes (Watanabe, Berry, Willows & Bell, 2015). Perceived behaviour control also plays a part in whether an individual will be able to display certain behaviour and, for example, participate in physical activity or choose healthy food options (Hankonen et al., 2015).

The majority of client participants expressed the perceived benefits of managing their T2D and the benefits to their overall health, wellbeing and mental health status. However, their behaviour did not correlate to the benefits described. Both the SCT (Bandura, 2002) and TPB highlight the need for all constructs and subjective norms to be aligned for an individual to want and be able to change behaviour (Ajzen, 1985). The most important requirement regarding the individual's mental health is for the subjective norms, including the individual's social networks and family, to offer support and promotion of the behaviour change (Parschau et al., 2012). The findings from this research explain that most of the client participants felt supported by their families, with encouragement to participate in physical activity and the monitoring of food, however, there were issues of food in the house for all the family. The culture of sharing meals is common practice in the Arabic culture, however meal portions is not the norm in the Arabic culture.

While disease knowledge and awareness was evident among most of the client participants, action to change was influenced by perceived disease severity, perceived benefits to change and support from the individual's social environment to promote compliance and adherence (Jalilian, Motlagh, Solhi, & Gharibnavaz, 2014). Perceived disease severity, motivation to actively change behaviour and an individual's social environment can affect an individual's engagement in effectively managing T2D to prevent long term complications. An understanding of an individuals perceived disease severity and perceived benefits such as making a change to diet and physical activity levels assists in understanding human motivation, behaviour and wellbeing.

This behaviour impacts an individual's self-efficacy and the broader communities' social systems. As highlighted throughout this study an individual's behaviour is influenced by all four levels of the socio-ecological model: individual, interpersonal, community and the environment (Bronfenbrenner, 1993). An individual's knowledge, values, beliefs and self-efficacy is influenced by family and friends (interpersonal) access to information and social capital (community), and the environment including religious and cultural values, cultural norms, resources and services (Bronfenbrenner, 1993).

This research illustrates that the diabetes clinic support was seen as both a barrier and enabler to T2D health outcomes. Others have found that to support T2D self-management, the healthcare professionals needed to exhibit good communication skills, listen to the patient's needs, allow enough time for the patient to promote the best environment for self-efficacy and self-management (Ahola & Groop, 2013). Similar findings are also highlighted by DeBenedette (2011), where her study findings illustrated that the promotion of sound communication, respect and engagement brings about an individual who is likely to be more

active in their own self-management (DeBenedette, 2011). By building a relationship of mutual respect and shared decision making, patient compliance and cooperation is heightened (Beck, 2009).

The majority of client participants commented that they attended their diabetes appointments regularly and were supported by the health professional team at the diabetes clinic. In contrast, the health professionals commented that they felt the clients attended the clinic appointments to receive free medication, rather than the health professional's advice. In many western countries, where taxation is used to fund healthcare services, various strategies have been implemented to encourage healthy lifestyles. Some of these include higher insurance premiums for those who live an unhealthy lifestyle (e.g. smoking) and a reduction in health insurance coverage for those who don't comply (Steinbrook, 2006). In some other countries, financial incentives are also offered in the workplace to encourage a healthy lifestyle such as smoking cessation (Hey & Perera, 2005).

5.6.2 Conclusion

The barriers and enablers drawn from the research findings are multilayered and somewhat culturally driven. As discussed, the lifestyle changes and environmental changes over the past forty-five years have seen the promotion of many positive advancements, but also have created a challenging environment for both the client participants and health professionals trying to promote healthy behaviours. The lifestyle changes of increased car use, home help, and maids has had an indirect impact on physical activity levels and food intake. While the client participants have a good understanding of T2D, the benefits of eating healthy, the importance of participating in physical activity and most having family support, knowledge and support doesn't always lead to behaviour change.

The majority of client participants identified that their culture, their indolence and, in some cases, their lack of motivation, perception of lack of time, food accessibility and availability, cultural food behaviours, and rituals and beliefs all impact on their ability to change their lifestyle.

5.7 Limitations of the Research

Limitations are evident in all research studies and need to be acknowledged. Limitations of this research study include the following:

The sample size was consistent with other qualitative studies based on grounded theory. Client participant inclusion criteria meant only UAE Nationals from Abu Dhabi and those

attending the SKMC diabetes clinic participated in the study. However, even though cited as a limitation, focus on very specific groups is common in qualitative research as it enhances the researcher's ability to facilitate a close association with the client participants and health professionals, and to explore issues specific to that group in depth, which enhances the study's validity, richness and in depth enquiry (Crouch & McKenzie, 2006).

The client participants were purposively sampled by the diabetes educators and clinic nurses (supported by the researcher). Purposively sampling is common practice within qualitative studies, as it assists in the selection of information-rich participants, who meet the inclusion criteria and who can assist with the research enquiry (Palinkas et al., 2013). To be eligible to participate, the client participants were required to be between the ages of 40–59 years and be able to converse in English. Despite the UAE Nationals having a requirement to learn English from kindergarten, the ability to converse in English could attract a more educated type of participant and fluency in language needs to be acknowledged.

Within this study an in-depth enquiry was carried out focusing on one of the pillars of Islam *Sawm* which directly relates to fasting throughout the holy month of Ramadan. The purpose of this focus was to gain an understanding of the impact *Ramadan* has on the management of T2D. However, the views on *Ramadan* could have potentially been led by the interview guide, where there could have been more detailed exploration of the Islamic religion and beliefs.

Having one researcher complete all the interviews is a strength but is also seen as a limitation. The relationship between the researcher, the participants and health professionals can be seen as both a strength and a limitation in the realms of qualitative research (Carr, 1994). To reduce bias and strengthen confirmability the research was supported by the research team at SKMC and findings from the data were discussed regularly with supervisors from Curtin University. To promote research validity, triangulation between health professionals and client participant data was undertaken and respondent validation was also carried out (Seale, 1999).

5.8 Chapter Conclusion

In conclusion, overall the client participants had some knowledge and awareness of T2D, the benefits of good management and the consequences of mismanagement. Perceived T2D severity by the client participants could be limited to, one's own self-efficacy and willingness and motivation to change. The findings also suggest that, culturally, T2D is expected and accepted as the norm in the UAE. Cultural behaviour, such as socialisation and family values, are viewed more highly than carrying out physical activity and good nutrition habits. The rapid change in lifestyle has also played a major role in the current lifestyle behaviours and bought

about an overall feeling of cultural indolence. The environmental impacts of both urbanisation and food availability and accessibility have also played their part in poor disease management. The majority of participants also acknowledged some level of family support and also support from the diabetes clinic as being key enablers to TD2 management; however, this did not change overall behaviour.

To promote empowerment and to address this public health challenge in the unique environment of the UAE, the Government will be required to support increased health interventions, policy planning and changes in environmental and cultural attitudes towards T2D. The benefits of these changes in legislation and social norms would promote an overall decrease in morbidity and mortality and support a decrease in the overall prevalence of diabetes among UAE Nationals.

Chapter 6 Recommendations and Conclusion

6.1 Introduction:

This chapter summarises the main findings of the research and presents recommendations for future practice and research. Prevalence data, globally and locally, shows an increase in the incidence of T2D, particularly within the Middle Eastern North African region (MENA) (International Diabetes Federation, 2011). With prevalence rates for T2D at epidemic proportions, the increase of T2D globally is recognised as an important public health issue, particularly within the Middle East region and more, specifically, the UAE.

UAE Nationals are a unique population group living in a distinctive environment with lifestyles that emphasise the importance of social acceptability, values and cultural norms. UAE Nationals face multiple environmental and cultural challenges which impact behaviour change. This research used Grounded Theory as the qualitative methodology to develop a Theoretical Model '*Influences of T2D*' which demonstrates the findings of T2D among UAE Nationals within this research. Through this qualitative research, the voice of UAE National client participants and health professionals has been presented with the aim of using this information to inform the development of prevention and management interventions with this at-risk population group.

6.2 Summary of Research Findings

This study highlighted the complexity associated with the increased prevalence of T2D among UAE Nationals. The client participants and health professionals have given many reasons and personal self-explanations illustrating the drivers behind their behaviour, which has been captured through the development of the research Theoretical Model '*Influences of T2D*'. The key themes identified by the client participants and health professionals are clearly illustrated in the research Theoretical Model '*Influences of T2D*'. The main themes identified in the research were Culture, Barriers and Enablers to Healthy Lifestyles and T2D information and support.

The model demonstrates Culture and the sub-themes of religion, family history and family and friends as being the most important factors that influence behaviour associated with T2D management. The Barriers and Enablers to Healthy Lifestyle are also described within the Theoretical Model '*Influences of T2D*' as two of the key themes identified from the research findings. The barriers and enablers are connected and influenced by the main theme of Culture and its sub-themes. The Theoretical Model '*Influences of T2D*' also illustrates the

main avenues to T2D information and support. These findings are interlinked to the themes Barriers and Enablers to Healthy Lifestyles and influenced by cultural norms and behaviour. Individual health, illness and behaviour is influenced by social groups (including family), society and social institutions. Beliefs, values and practices are influenced by culture and history (Germov, 2005).

For future policy development and the implementation of health interventions, it is important to understand which beliefs and practices influence lifestyles and health behaviours (Jirojwong & Liamputtong, 2012). For the majority of the client participants within this research, cultural norms, including time with family and friends, socialisation and social acceptance are accepted as the most important standards that influence values and attitudes.

Associated with, and influenced by, the theme of Culture, the two themes Barriers and Enablers to a Healthy Lifestyle emerged as main themes within the Theoretical Model '*Influences of T2D*'. Although many participants discussed the need to positively change behaviours to enhance their health, participants identified a range of barriers towards implementing these changes. The key sub-themes for Barriers to a Healthy Lifestyle included: lifestyle and lifestyle changes, food availability, environment, the cost of healthy food, physical activity options, disease knowledge and clinic support. The majority of client participants and health professionals commented that the rapid change in lifestyle, from a rural to an urbanised environment, home help, lack of motivation and indolence were the main influences and barriers to behaviour change.

Few client participants recognised or labelled the disease as *Allah's* will. Although there was good knowledge and awareness of T2D among most client participants, the theory of cognitive dissonance was identified through the common justification of behaviour through religious and cultural means (Festinger, 1962). An example of this is evident through the majority of client participants expressing that they are eating beyond their needs throughout the holy month of *Ramadan and EID*. Within this research, the perceived severity of T2D was complacent potentially due to multiple family members having T2D and the disease being considered to be the 'norm' (Janz & Becker, 1984).

The main sub-themes to Enablers of a Healthy Lifestyle included: family support, availability of good food, physical activity options, disease knowledge and clinic support. The majority also commented positively on the support received from the diabetes clinic. Most of the client participants had good knowledge of T2D, however, T2D was viewed as the norm among family— therefore, their perceived disease severity could potentially be undervalued.

It is important to highlight that both disease knowledge and clinic support have been classed as sub-themes for both Barriers and Enablers to a Healthy Lifestyle. As discussed, the majority of client participants had good knowledge of T2D, however, there were some participants whose knowledge was limited. This lack of knowledge and understanding could potentially impact on their ability to self-manage the disease and also future adherence to T2D management. It was important for this sub-theme to be acknowledged in both barriers and enablers of the Theoretical Model '*Influences of T2D*'. In addition, knowledge alone about healthy lifestyles does not necessarily result in better practices or behaviour change (Green & Murphy, 2014). The majority of the client participants also commented on the good support they received from the diabetes clinic and are made more aware of the benefits of the diabetes educator, however, it was also considered a barrier, as the majority of the health professionals remarked that the client participants attended the diabetes clinic for free medication, rather than education and advice on disease management.

T2D information and support was also a key theme within the Theoretical Model '*Influences of T2D*' that influences and impacts behaviour change. The majority of client participants described the noteworthy health professionals they obtain information and education from are the doctor, dietitian, and diabetes educator. The client participants noted that information was also obtained through other strategies, including the media and public awareness campaigns.

These key findings illustrate some of the primary determinants within the cultural, social and physical environment that impact on the Barriers and Enablers to Healthy Lifestyles. These influences of Culture, together with Barriers and Enablers to Healthy Lifestyles and T2D information and support are important factors when individuals are considering behavioural intention (Jirojwong & Liamputtong, 2012).

6.3 Study Implications

The UAE is a unique environment with an inimitable population group. For UAE Nationals, personal, social, cultural, behavioural and environmental factors all play a role in impacting on the way UAE Nationals manage their T2D. Understanding the barriers to, and enablers of, healthy lifestyles are important to ensure the effectiveness of interventions to improve the long-term health outcomes of those UAE Nationals with T2D and to decrease the overall prevalence, morbidity and mortality impacted by T2D in the UAE.

The value of this qualitative research enriches our understanding and allows us to appreciate the core reasons that influence behaviour and T2D management among UAE

Nationals. These findings could also be used within the wider Gulf Cooperation Council (GCC) and other specific cultural groups impacted by globalisation and urbanisation.

T2D is one of the main public health problems in the UAE. This has occurred due to many factors, including changes in lifestyle and socio-economic status. Implications of this study impact many organisations, including the healthcare sector, the community, health authorities, education departments and local stakeholders. The healthcare sector in the UAE is a unique and diverse environment with multiple nationalities working together for one common goal. Effective outcomes are brought about when the organisational culture is supportive and co-operative and has strong leadership to progress the status of non-communicable diseases, such as T2D, as a priority. A commitment is needed from healthcare organisations, the Health Authority Abu Dhabi (HAAD) and the Department of Education to raise awareness and develop culturally-appropriate health programs to prevent and reduce T2D. A change in overall policy and guidelines is necessary to reflect the importance of T2D management and the promotion of physical activity and healthy food options in schools. Encouragement towards a change in familiar habits, such as sedentary and poor dietary behaviours, is required, in addition to an increase in professional training programs at both undergraduate and post-graduate levels, to ensure that chronic disease management is imbedded in such programs. A collaborative partnership with the Ministry of Trade is suggested to discuss guidelines pertaining to the types of fat and oils used in restaurants and also restaurant opening hours, to reduce access (Angell et al., 2009).

6.4 Recommendation for Practice

The Fifth and final Objective of this research encompasses recommendations for practice. The recommendations are outlined under the areas of interventions, policy and recommendations for future study.

6.4.1 Interventions

Health interventions and strategies are developed to meet the local needs, considering various social and cultural distinctiveness of the UAE National population group.

The health of a population group is influenced by their social, physical, demographic and cultural environment. All these factors need to be considered when developing health interventions to address any health issue, and in this case, T2D among UAE Nationals (Jirojwong & Liamputtong, 2012). Health interventions can be delivered at the individual, group or society/community level; however, the characteristics of an environment need to be

assessed to develop and implement the most effective interventions (Jirojwong & Liamputtong, 2012).

As discussed earlier, for health promotion to be successful and effective, multiple factors need to be addressed as outlined in the socio-ecological model, including the social, cultural, physical, political and economic factors that impact an individual's life (Whittemore et al., 2004). Strategies to decrease the risk factors for developing T2D and address current T2D management need to be identified to promote greater overall change (Chan & Ryan, 2009). These strategies need to consider that lifestyle and environmental changes in any population group occur slowly, over a long period (Chan & Ryan, 2009).

The development of future planning and interventions for the prevention of T2D require consideration and understanding of the UAE Nationals' complex cultural beliefs, norms and lifestyle barriers and enablers, as discovered within this research. These findings are paramount to support long term behaviour change. The proposed health interventions and strategies that have emerged from this research that could be utilised to improve the overall health outcomes of UAE Nationals with T2D are detailed below.

Education of T2D to be increased for UAE Nationals and the wider community.

Communities working in partnership with health practitioners, such as doctors, diabetes educators, dietitians, Government Authorities and private sector partnerships in the promotion of healthy lifestyles, promotes empowerment and community ownership (World Health Organisation, 2014). This promotes a potential decrease in prevalence and improves long term outcomes.

The results of this research highlight the need for health sector partnerships and the promotion of healthy lifestyles. This can be achieved by an increase in education about the risk factors for T2D and the consequences of mismanagement. This includes a focus on the benefits of regular physical activity, good nutrition, healthy foods, the importance of early screening and detection for T2D and the consequences of mismanagement. The client participants recommended that this education should be delivered in multi-faceted settings, including education in schools, workplaces, public settings and in the home environment. Education in the home environment should include education to the UAE National family and support staff (i.e. maids and cooks). An increase in primary prevention strategies can be achieved through health education and awareness programs and the training of health promotion specialists to deliver successful healthy lifestyle campaigns and also tailored group-based education for families and friends (Loney et al., 2013).

The client participants communicated that specific education could be delivered in a variety of ways, including healthy meal recipe books in Arabic, videos of meal preparation and health advertising on radio, television, and during the advertisements in the cinema. Utilising mass media to communicate health messages and health information to a wider diverse audience also strengthens and supports community action (Hajet et al., 2012).

Physical activity to be promoted for UAE Nationals.

Creating supportive environments for the promotion of healthy lifestyles within the UAE is a key strategy of the UAE's Vision 2021 (Vision2021, n.d.) and is supported by the results of this research as a health strategy for reducing T2D. Included in the key themes of Vision 2021 are a focus on the need for increased physical activity opportunities and improvement of the overall environment to encourage physical activity, such as: shaded walking paths, access to an increased area of green space and parks for activities outside the home (Roberto et al., 2015).

In addition to the above, other strategies were discussed by the client participants and the health professionals within this research, which included the promotion of increased physical activity within the school environment, the home setting and diabetes clinic, and also a reduction in the cost of gymnasium memberships.

Healthy food options to be promoted for UAE Nationals and the wider community.

It is vital for workplaces, schools, family homes and the built and natural environments to be places in which individuals can make healthy choices (Roberto et al., 2015). Some examples of strategies discussed by the client participants and health professionals within this study included a reduction in the price of healthy food, and a review and regulation of the fats and oils used and the hours of operation of fast food restaurants.

An example of a successful health promotion intervention that could be adopted by the UAE Government to support and promote food awareness, food education and healthy lifestyles (which has been utilised in the UK and Australia to promote healthy food options) is the Traffic Light system. In 2006, the UK food standards agency developed a Traffic Light system (TL) which ranked food per their contents of fat, saturated fat, sugar and sodium (Kelly et al., 2009). The food was ranked high (red), medium (amber) and low (green). In 2007, 'total energy' was added and in Australia, labelling was added detailing energy per serving (Kelly et al., 2009). This system and front-of-pack labelling has been supported by consumers and research proves that it makes identification of high fat/low fat foods easier (Kelly et al., 2009).

Multiple health interventions and strategies are required to be developed and implemented.

Multiple health interventions and strategies are known to be more effective than single interventions. The health interventions and strategies identified above need to be implemented in a multi-factorial approach to ensure that the best outcome is achieved for reducing T2D and the overall morbidity and mortality rates for this population group. A multiple strategy approach strengthens organisational links, develops leadership and promotes ownership and empowerment (Jirojwong & Liamputtong, 2012).

6.4.2 Policy

Federal legislation to support T2D public health interventions

Successful implementation of environmental changes requires federal legislation to support T2D public health interventions (Loney et al., 2013). Public health policy incorporates the Government and health authority's decisions made towards health improvement. Some of these include legislation, policies, and organisational change, including recreation and education.

There have been some improvements in the health and wellbeing of the UAE population through public health policies, such as the introduction of seat belts and the banning of tobacco use in public shopping malls. Compulsory health policy and legislation, regular monitoring of legislation and consequences if legislation is not adhered to needs to be introduced. This ensures a positive impact on the wider community (Brownie et al., 2014). Legislation awareness can be instilled through media campaigns and community and health organisational support.

Specific legislation and policies to be developed to support T2D public health interventions

As discussed in previous chapters, an existing legislation which is in the process of being implemented in the UAE is the Abu Dhabi Vision for 2030 and the UAE Vision 2021. This legislation addresses future city planning to include the promotion of physical activity outside the home. This is evident through the proposed development and increase of open spaces, parks, and covered walk ways, and walking paths to encourage walking outside all year round. This is a positive progression towards the promotion of a healthier community.

This research has identified policy-based changes which are required to support T2D public health interventions. Policy development is required to promote the need for increased participation in physical activity by both children and adults. This would include a review of

the barriers to physical activity participation, such as socio-cultural factors, motivation, lack of time and support from the home, work and school environments (Musaiger et al., 2013).

Within the school and workplace environments, legislation addressing the need for an increase in healthy food options is required to ensure these changes are implemented and that there are consequences if legislation is not adhered to (Loney et al., 2013) and monitored (Nazzal & Taher, 2015).

Other examples of policy change which have been successfully implemented in other countries include the food industry in Denmark, who have taxed foods high in fat (Kaplan, 2011), which has bought about long term sustainability and an overall improvement in quality of life (Hajet et al., 2012). Another example of a positive policy change is seen through the collaboration between fast food outlets and local Governments to develop guidelines for healthy food options, including the regulated use of good oils and fats, and the display of calorie contents of meals which has been successful in the USA. It has been proven that when the energy contents of meals are displayed, lower calorie choices are made by some patrons of fast food restaurants (Dumanovsky et al., 2011).

Health System redesign to promote T2D prevention and management

UAE healthcare spending is allocated to healthcare services and facilities whose primary function is to treat illness rather, than prevention. A reorientation of health services to promote the health and wellbeing of the whole person complements diagnosis and treatment. A redesign of health services requires change in the organisation of health delivery, education, training and research (World Health Organisation, 2014).

Progressing from a medical model and enhancing policy change (Berwick et al., 2008) to incorporate health promotion initiatives produces long term sustainability and improves overall health and wellbeing of a community or population (Hajet et al., 2012). In the case of the UAE, this would contribute to the promotion of prevention, management and potential reduction of T2D.

Through the promotion of health policy and legislation, development of early detection strategies and ongoing surveillance on overall improvement in health, and a reduction in overall expenditure on treatment could be achieved (Brownie et al., 2014) for T2D. In conjunction with the health system redesign, the development and sustainability of local health data sets and census data would provide information on the trends and occurrence of T2D within the UAE. This would enable healthcare professionals and government organisations to work together to provide appropriate healthcare interventions (Hunter et al., 2014). A primary care redesign would provide an opportunity to improve the process of care delivery to provide

early detection and improve long term outcomes and overall prevalence of, morbidity and mortality related to T2D.

6.5 Research and Recommendations for Future study

Recommendations for future research include a variety of research that would extend the existing findings of this research and add to the body of knowledge of existing research on the Arabic culture, specifically relating to the UAE and T2D.

The recommendations for future research includes:

- To address food knowledge and understanding, including awareness of daily consumption and portion sizes: this would be useful, given the importance of food sharing and socialisation within the Arabic culture.
- Food options available in schools, restaurants and workplaces, also hours of operation, and fat used within cooking to assist in making environmental changes.
- Addressing the behaviours of indolence and lack of motivation among the UAE Nationals to support change and promotion of increased adherence to disease management.
- Understanding shortcomings in the T2D data within the UAE to ensure that affective and appropriate health interventions are carried out.
- Exploring the frequency and use of mass media awareness campaigns, television and radio among UAE Nationals and the impact these have had on behaviour.
- Further exploration of this topic with non-English speaking Emiratis.
- Exploration of other aspects of Islamic beliefs other than Ramadan to understand their impact on healthy behaviours.
- The association between mental health and T2D: it can be culturally challenging for some Muslims to express their emotions publicly (Sayed, 2002), however, by discussing the barriers to self-management with individuals with T2D, addressing their mental health status and ensuring a mental health plan is incorporated into the overall management plan provides a holistic approach to the client.

6.6 Chapter Conclusion

The prevalence of T2D in the UAE remains one of the highest in the world (International Diabetes Federation, 2011). Addressing the high prevalence of T2D among UAE Nationals is essential to reduce overall morbidity and mortality rates (Mathers & Loncar, 2006). This supports the UNs' sustainable development Goal Three, which ensures healthy lives and the promotion of wellbeing for all, at all ages (United Nations, 2015). The WHO has also endorsed

a global action plan (2013-2020) for the prevention and control of non-communicable diseases (World Health Organisation, 2013). This action plan relates to the UAE and to the findings in this study. To achieve a decrease in T2D prevalence among UAE Nationals they require specific prevention strategies to meet their cultural needs, with specific attention to the social and environmental factors that impact their ability to change (Green & Kreuter, 2005).

Through rich qualitative data, this research has provided a unique insight into the impact culture and lifestyle has on UAE Nationals with T2D. The methodology of Grounded Theory was used as the main framework for the study and the HBM and SCT were used to inform the interview guide. The literature review was a comprehensive overview of UAE culture and a critical appraisal of T2D globally, including the Gulf Cooperation Council (GCC), and the UAE itself. The literature review also addressed factors influencing T2D, strategies to address T2D and intervention and prevention programs.

The results chapter gave representation to the client participants and health professionals who shared their stories and a Theoretical Model '*Influences of T2D*' was developed from the data. The main themes of the Theoretical Model '*Influences of T2D*' include Culture, Barriers and Enablers to Healthy Lifestyles and T2D information and support. Many existing theories such as the CDT, Theory of Planned Behaviour, Labelling theory, and the Socio-ecological model were linked to the findings and discussed in greater detail in the results and discussion chapters.

The discussion chapter brought together the findings from the literature review and results and related it to the first four objectives of the research. This chapter concludes the thesis by addressing the final objective and presenting a summary of the findings, study implications, and recommendations for practice, including an overview of interventions, policy and recommendations for future research. I hope that some of these recommendations are taken forward to support a decrease in the overall prevalence of T2D among UAE Nationals.

APPENDICES

Appendix A Individual Client Participant Interview Guide



Interview Guide

01. Diagnosis, Disease Knowledge and Disease prevention

01. How long have you been diagnosed with Type 2 Diabetes

02. What age were you when you were diagnosed with Type 2 Diabetes

03. Can you tell me what it was like when you found out (how did you feel**) you were diagnosed with Type 2 Diabetes**

03A. Have your feelings changed since then

04. Can you tell me what you know about Type 2 diabetes; how and why it happens

05. Can you tell me what the **risk factors are for developing type 2 diabetes- **how do you think people get it****

06. Can you tell me how you manage your type 2 diabetes. (Ie drugs only or nutrition and exercise)

07. What motivates (helps you**) you to adhere to a treatment plan**

08. What are for you the most important treatment objectives

09. What do you think are some of the consequences of type 2 diabetes

02. Family Response

10. What support do you receive from your family in relation to your type 2 diabetes

11. Can you describe how your diabetes has impacted/affected the family unit

> If multiple family members with diabetes mentioned-

11A. What are their feelings about this?

11. B Have any of your family members with diabetes had complications such as problems with their eye sight or their kidneys? If yes, how has it affected them?

03. Cultural Response

12. Can you tell me how your religion (Muslim faith) plays a part in the management of your diabetes

13. Can you describe the impact your culture has on managing your diabetes

14. Can you describe how you manage cultural celebrations such as EID and Ramadan in relation to type 2 diabetes

14A. Can you explain to me how you think fasting is good for your religion

14B. Can you tell me how you think fasting is good for your diabetes

14C. In your culture its seen as an offence not to accept food and drink from friends- can you describe how you manage that

14D. In the Quran prophet Mohammad- talks about how many miles he walked for kilometers and how he ate milk and dates and very little meat. How is this so different to what we do today.

04. Barriers and Enablers to physical Activity and Nutrition

15. Do you think UAE Nationals (Emirat's) participate in physical activity, why/why not

15A. Do you think UAE Nationals exercise as much now as in the past (i.e. grandparents)

16. Can you describe to me how (Emirat's) UAE Nationals access physical activity opportunities

16A. Can you tell me about Emirati children participate in physical activity/sport at school

16. B If lazy culture mentioned- what does this mean to people? Do you think this is just related to physical activity or life in general?

- 16.C What was it like for you as a child?
- 16. D What was it like for you growing up?
- 16. E Do children do a lot of physical activity?
- 16. F Do you think there's a difference between boys and girls?

17. What do you think are (Emirati's) UAE Nationals attitudes towards good nutrition/food- do they take it seriously

17A. What do you think are the changes in eating from your grandparents until now

18. How do you maintain good health, if not, why

19. What would/does motivate you to be healthy

20. Can you describe the healthy food options available at your workplace or in Abu Dhabi (what places can you go to, to get healthy food)

21. Do you participate in physical activity? If yes what physical activity do you participate in

21A. if you are walking, do you walk to and from work? Or do you drive and then walk?

22. Do you think in general (Emirati's) UAE Nationals make an effort towards preventing diabetes, if not, why- what do you think are the barriers to diabetes prevention for (Emirati's) UAE Nationals

05. Service Provision

23. What do you believe could have helped you prevent the onset of diabetes

24. Do you attend your clinic appointments, if not, why

24.a Do you make your clinic appointments or does the clinic remind you?

25. What would be the reasons for you possibly discontinuing with your appointments

26. Looking back what has helped you the most



27. From your perspective had there been good communication and continuity in the treatment process

28. What sort of services should hospitals and the wider community be offering to people with type 2 diabetes

Thank-you for your time and sharing your knowledge, its greatly appreciated.

Jen Cooper

Appendix B Healthcare Providers Focus Group Interview Guide



Health Care Providers Focus Group Interview Guide

Disease, Disease Knowledge, Diabetes Prevention

1. Can you tell me how well your patients understand what diabetes is
2. Can you tell me about your patients understanding of the risk factors for diabetes
3. What do you think their understanding is about complications/consequences
4. Do you think they understand the benefits of exercise and good nutrition
5. Can you explain to me whether there is any difference in the way male patients manage their diabetes as opposed to women patients

Family Response

1. Can you explain to me your understanding of your patients family support
2. Can you describe how the disease can impact on the family unit
3. Can you tell me about whether adhering to a treatment regime might be viewed by the family as self-indulgent
4. Can you tell me about whether the level of family support would be different for males and females patients

Cultural Response

1. Can you tell me how religion (Muslim Faith) plays a part in the management of their diabetes
2. Can you describe how they manage cultural celebrations such as EID and Ramadan in relation t their diabetes
3. Do you think this would be different for males and females, if so, why

Barriers and Enablers to physical activity and nutrition

1. Do you think UAE Nationals participate in physical activity, why, why not
2. Do you think they have an attitude towards good nutrition/ do you think they take it seriously
3. Can you tell me what you think are the barriers to diabetes prevention among UAE Nationals

4. Can you explain to me your understanding of whether the barriers would be different for males as opposed to females patients?

Service Provision

1. Can you tell me if your UAE National patients adhere to their clinic appointments, if not, why
2. Can you explain to me about the importance of the patient- provider relationship/ do you think this is important to their diabetes management, if so, why

Discuss with staff the summary of findings from the individual patient interviews

Appendix C Information Sheet



My name is Jennifer Cooper and I have been working at SKMC in the nursing education and research department for 6 years. I am now studying my PhD full time and I am conducting research with UAE Nationals on type 2 diabetes and I am interested to find out the impact lifestyle and culture has on the management of type 2 diabetes.

I believe you can help me by telling me what you know about diabetes, explaining your health practices, explaining to me about your nutrition and exercise, and your family and culture. I want to learn from you, so that health services can be improved.

The research would involve your participation in a one on one face to face discussion that would take about 45 minute to one hour at the SKMC diabetes clinic or anywhere that was convenient for you.

You are being invited to participate in this research because I feel that your experience as a UAE National with type 2 diabetes can contribute to the understanding and knowledge of the management of this disease.

Your participation in this research is voluntary. It is your choice whether to participate or not. If you choose not to participate all the services you receive at SKMC will continue and nothing will change.

If you accept, you will be asked to answer questions regarding your diagnosis, your knowledge of type 2 diabetes, your families' response to the disease, cultural impacts on the disease, barriers and enablers to physical activity and good nutrition and what services you feel could help Arabic people with diabetes. The interview will be guided by myself; I will ask you each question and give you time to share your knowledge. The discussion will be tape recorded, but no one will be identified by name on the tape. The information will be kept confidential and I will be the only one who has access to the tapes.

There is no direct incentive offered to be involved in this research, but your participation will help us to find out more about UAE Nationals who live and manage type 2 diabetes and this new knowledge, if implemented could improve services for the Arabic population with type 2 diabetes.

Following the completion of the interviews, the information gathered will be analyzed and the results will be published so that other interested people may learn from the research.



If you have any questions or are interested in participating in the research you may contact myself: Jennifer Cooper via phone: +971501417270 or email: jenniferlouisecooper@outlook.com.

This proposal has been reviewed and approved by SKMC International Research Board (IRB) and Curtin University Ethics committee which are two committees whose task it is to make sure that research participants are protected from harm.

If you wish to find out more about the IRB you may contact, Ms. Linda Haskins, Associate Director of Nursing and IRB board member on lhaskins@skmc.ae

With Kind Regards

Jennifer Cooper RN, BSN, MSN, PhD student

Appendix D Consent Forms

D.1 Focus Group Information Statement and Consent Form

Human Research Ethics Office



Curtin University

Template for Participant Information and Consent Forms

Informed consent is required by all research participants. This means that a participant's decision must be voluntary and based on adequate understanding of the research. The NHMRC National Statement on Ethical Conduct in Human Research paragraph 2.2 states: "Respect for human beings involves giving due scope to people's capacity to make their own decisions. In the research context, this normally requires that participation be the result of a choice made by participants – commonly known as 'the requirement for consent.'"

This template is based on the requirements of the National Statement as well as the requirements of the ICH Harmonised Tripartite Guideline for Good Clinical Practice.

The Headings are to guide you for content that should be included. To ensure the information statement is easy to read we suggest you use the headings as they are in bold and provide the relevant information underneath. The Headings also help break up the text to make the information more readable and ensure all relevant points are included.

In the template there are prompts for content in the dot points and suggested text in *blue italics*. Please address the dot points but it is not intended that they be answered as questions. Select the most appropriate suggested text in blue italics and format to standard type. Delete any blue italic statements that are not relevant to your project.

The *red italics* are details you must enter relevant to your project. Delete the red italics prior to submission for review.

Additionally please:

- Ensure you use plain language, short sentences and use "we" and "you". It addresses the person directly, it is familiar and friendly and the tone is warmer.
- Use active rather than the passive voice
 - The active voice is more to the point and lively.
 - The passive voice makes your writing more long-winded.
 -

PASSIVE	ACTIVE
A summary of results will be sent to all study participants	We will send you a short report of the results
A small blood sample will be needed from your child	We will take a small blood sample from your child

Once you have finished please proof read your document. Get a friend or colleague to proof read as well to ensure consistency, spelling, simplicity and readability. Remember you need to aim your information sheet to a 13 year old reading level. The best guide is to get someone unfamiliar with your research to read it and make sure it can be easily understood.

PARTICIPANT INFORMATION STATEMENT

HREC Project Number:	<i>The Ethics Office will advise you of this number after you have submitted your project</i>
Project Title:	<i>Health Behavior in a cultural context. A qualitative study of the impact of culture and lifestyle has on the management of Type 2 Diabetes Mellitus among UAE Nationals</i>
Principal Investigator:	<i>Associate Professor Sharyn Burns, Director of Health Promotion and Sexology and a Co-Director of the Collaboration for Evidence, Research and Impact in Public Health within the School of Public Health at Curtin University</i>
Student researcher:	<i>N/A</i>
Version Number:	<i>0</i>
Version Date:	<i>31-May-15</i>

What is the Project About?

- The current management of type 2 diabetes mellitus (type 2 diabetes) among United Arab Emirates (UAE) Nationals is through a medical model approach, with little focus on prevention and early intervention. Research shows there is good evidence that prevention strategies reduce the prevalence and incidence of type 2 diabetes. In addition, type 2 diabetes is a complex chronic disease that requires careful management to limit long term complications for the individual and to reduce health care costs.
- A systematic review of published papers found 27 published studies that focused on the prevalence of type 2 diabetes in the Gulf Region. However, within this review, there was no research that explored the impact of culture and lifestyle has on the prevention and management of type 2 diabetes among the UAE National population.
- The prevalence of type 2 diabetes in the UAE is very high and should be preventable. Some of the main contributing factors to the high levels of type 2 diabetes in the UAE are the rise in obesity rates and lack of physical activity. The modern epidemic of type 2 diabetes and its association with the rising prevalence of obesity are well established. The WHO predicts the number of individuals in the world with type 2 diabetes will double between the years 2000-2025. with cardiovascular disease and type 2 diabetes in the top 5 leading causes of death among UAE Nationals.
- There is little known regarding the behavioural, cultural, and environmental barriers for type 2 diabetes prevention and management amongst UAE nationals. New information arising from this study can inform treatment policies and guidelines to assist in the prevention and disease management and will allow for a better quality of life and in turn provide better health outcomes to this population group and the wider Arabic population given the high prevalence of type 2 diabetes amongst this population group.



Health Behavior in a cultural context

- This qualitative research study will begin to address this gap, with the aim of gaining a deeper understanding of the UAE National culture, what impact culture has on prevention, disease management, and the barriers to prevention and disease management.
- The findings will inform health practitioners and health service organizations to tailor prevention and health care to more appropriately meet the needs of this cultural group in addition to informing policy at an organizational level within the UAE. This study will also be of interest to neighbouring Arabic countries with similar cultural backgrounds such as Saudi Arabia, Qatar, Oman, Bahrain and Kuwait.

Who is doing the Research?

- The project is being conducted by Jennifer Cooper.
- The results of this research project will be used by Jennifer Cooper to obtain a Doctor of Public Health at Curtin University and is funded by the University.
- There will be no costs to you and you will not be paid for participating in this project.

Why am I being asked to take part and what will I have to do?

- You have been asked to take part because you are working with individuals who have the condition we are researching.
- The study will take place at a mutually convenient location most likely the diabetes clinic at the hospital where the research is being undertaken- Sheikh Khalifa Medical City.
- The focus group interview will take approximately 60 minutes in duration.
- There will be no cost to you for taking part in this research and you will not be paid for taking part.
- We will make a digital audio recording so we can concentrate on what you have to say and not distract ourselves with taking notes. After the focus group we will have the recording translated so no words or meaning are lost.

Are there any benefits' to being in the research project?

- Sometimes, staff appreciate the opportunity to discuss their opinions/ feelings.
- We hope the results of this research will allow us to add to the knowledge we have about this condition

Are there any risks, side-effects, discomforts or inconveniences from being in the research project?

- There are no foreseeable risks from this research project.
- Apart from giving up your time, we do not expect that there will be any risks or inconveniences associated with taking part in this study.

Who will have access to my information?

- Only the research team have access to the code to match your child's name if it is necessary to do so. Any information we collect will be treated as confidential and used only in this project unless otherwise specified. The following people will have access to the information we collect in this research: the research team and the Curtin University Ethics Committee

Health Behavior in a cultural context

- Electronic data will be password-protected and hard copy data (including video or audio tapes) will be in locked storage.
- The information we collect in this study will be kept under secure conditions at Curtin University for 7 years after the research has ended and then it will be destroyed/kept indefinitely.
- You have the right to access, and request correction of, your information in accordance with relevant privacy laws.
- The results of this research may be presented at conferences or published in professional journals. You will not be identified in any results that are published or presented.
- Whilst all care will be taken to maintain privacy and confidentiality of any information shared at a focus group or group discussion, you should be aware that you may feel embarrassed or upset if one of the group members repeats things said in a confidential group meeting.

Will you tell me the results of the research?

- We will write to you throughout the research process (in about 6 months) and let you know the results of the research. Results will not be individual but based on all the information we collect and review as part of the research.

Do I have to take part in the research project?

- Taking part in a research project is voluntary. It is your choice to take part or not. You do not have to agree if you do not want to. If you decide to take part and then change your mind, that is okay, you can withdraw from the project.

What happens next and who can I contact about the research?

- If you have any questions about the project or about being a participant, you can contact Associate Professor Sharyn Burns on +61 8 9266 4123 or S.Burns@curtin.edu.au.
- If you decide to take part in this research we will ask you to sign the consent form. By signing it is telling us that you understand what you have read and what has been discussed. Signing the consent indicates that you agree to be in the research project and have your health information used as described. Please take your time and ask any questions you have before you decide what to do. You will be given a copy of this information and the consent form to keep.

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number XX/XXXX). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

Health Behavior in a cultural context

CONSENT FORM

HREC Project Number:	<i>The Ethics Office will advise you of this number after you have submitted your project</i>
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Student researcher:	<i>N/A</i>
Version Number:	<i>0</i>
Version Date:	<i>31-May-15</i>

- I have read the information statement version listed above and I understand its contents.
- I believe I understand the purpose, extent and possible risks of my involvement in this project.
- I voluntarily consent to take part in this research project.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I understand that this project has been approved by Curtin University Human Research Ethics Committee and will be carried out in line with the National Statement on Ethical Conduct in Human Research (2007) – updated March 2014.
- I understand I will receive a copy of this Information Statement and Consent Form.

Participant Name	
Participant Signature	
Date	

Declaration by researcher: I have supplied an Information Letter and Consent Form to the participant who has signed above, and believe that they understand the purpose, extent and possible risks of their involvement in this project.

Researcher Name	
Researcher Signature	
Date	

Note: All parties signing the Consent Form must date their own signature.

D.2 Participant Information Statement and Consent Form

Human Research Ethics Office



Curtin University

Template for Participant Information and Consent Forms

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Additionally please:

- Ensure you use plain language, short sentences and use "we" and "you". It addresses the person directly, it is familiar and friendly and the tone is warmer.
- Use active rather than the passive voice
 - The active voice is more to the point and lively.
 - The passive voice makes your writing more long-winded.
 -

PASSIVE	ACTIVE
A summary of results will be sent to all study participants	We will send you a short report of the results
A small blood sample will be needed from your child	We will take a small blood sample from your child

Once you have finished please proof read your document. Get a friend or colleague to proof read as well to ensure consistency, spelling, simplicity and readability. Remember you need to aim your information sheet to a 13 year old reading level. The best guide is to get someone unfamiliar with your research to read it and make sure it can be easily understood.

PARTICIPANT INFORMATION STATEMENT

HREC Project Number:	<i>HR 119/2015</i>
Project Title:	<i>Health Behavior in a cultural context. A qualitative study of the impact of culture and lifestyle has on the management of Type 2 Diabetes Mellitus among UAE Nationals</i>
Principal Investigator:	<i>Associate Professor Sharyn Burns, Director of Health Promotion and Sexology and a Co-Director of the Collaboration for Evidence, Research and Impact in Public Health within the School of Public Health at Curtin University</i>
Student researcher:	<i>N/A</i>
Version Number:	<i>0</i>
Version Date:	<i>31-May-15</i>

What is the Project About?

- The current management of type 2 diabetes mellitus (type 2 diabetes) among United Arab Emirates (UAE) Nationals is through a medical model approach, with little focus on prevention and early intervention. Research shows there is good evidence that prevention strategies reduce the prevalence and incidence of type 2 diabetes. In addition, type 2 diabetes is a complex chronic disease that requires careful management to limit long term complications for the individual and to reduce health care costs.
- A systematic review of published papers found 27 published studies that focused on the prevalence of type 2 diabetes in the Gulf Region. However, within this review, there was no research that explored the impact of culture and lifestyle has on the prevention and management of type 2 diabetes among the UAE National population.
- The prevalence of type 2 diabetes in the UAE is very high and should be preventable. Some of the main contributing factors to the high levels of type 2 diabetes in the UAE are the rise in obesity rates and lack of physical activity. The modern epidemic of type 2 diabetes and its association with the rising prevalence of obesity are well established. The WHO predicts the number of individuals in the world with type 2 diabetes will double between the years 2000-2025. with cardiovascular disease and type 2 diabetes in the top 5 leading causes of death among UAE Nationals.
- There is little known regarding the behavioural, cultural, and environmental barriers for type 2 diabetes prevention and management amongst UAE nationals. New information arising from this study can inform treatment policies and guidelines to assist in the prevention and disease management and will allow for a better quality of life and in turn provide better health outcomes to this population group and the wider Arabic population given the high prevalence of type 2 diabetes amongst this population group.

Health Behavior in a cultural context

- This qualitative research study will begin to address this gap, with the aim of gaining a deeper understanding of the UAE National culture, what impact culture has on prevention, disease management, and the barriers to prevention and disease management.
- The findings will inform health practitioners and health service organizations to tailor prevention and health care to more appropriately meet the needs of this cultural group in addition to informing policy at an organizational level within the UAE. This study will also be of interest to neighbouring Arabic countries with similar cultural backgrounds such as Saudi Arabia, Qatar, Oman, Bahrain and Kuwait.

Who is doing the Research?

- The project is being conducted by Jennifer Cooper.
- The results of this research project will be used by Jennifer Cooper to obtain a Doctor of Public Health at Curtin University and is funded by the University.
- There will be no costs to you and you will not be paid for participating in this project.

Why am I being asked to take part and what will I have to do?

- You have been asked to take part because you have the condition we are researching.
- The study will take place at a mutually convenient location most likely the diabetes clinic at the hospital where the research is being undertaken- Sheikh Khalifa Medical City.
- The interview will take approximately 60 minutes in duration.
- There will be no cost to you for taking part in this research and you will not be paid for taking part.
- We will make a digital audio recording so we can concentrate on what you have to say and not distract ourselves with taking notes. After the interview/focus group we will have the recording translated so no words or meaning are lost.
- Access to Medical Records: in this project we will collect and use health information that is in your medical records at Sheikh Khalifa Medical City diabetes Clinic Abu Dhabi, UAE for research purposes. The information we collect includes: age, gender, occupation, residence, diagnosis, treatment.

Are there any benefits' to being in the research project?

- Sometimes, people appreciate the opportunity to discuss their opinions/ feelings/condition
- We hope the results of this research will allow us to add to the knowledge we have about this condition

Are there any risks, side-effects, discomforts or inconveniences from being in the research project?

- There are no foreseeable risks from this research project.
- Apart from giving up your time, we do not expect that there will be any risks or inconveniences associated with taking part in this study.

Who will have access to my information?

- The information collected in this research will be re-identifiable (coded). This means that the stored information will be re-identifiable which means we will remove identifying

Health Behavior in a cultural context

information on any data or sample and replace it with a code. Only the research team have access to the code to match your child's name if it is necessary to do so. Any information we collect will be treated as confidential and used only in this project unless otherwise specified. The following people will have access to the information we collect in this research: the research team and the Curtin University Ethics Committee

- Electronic data will be password-protected and hard copy data (including video or audio tapes) will be in locked storage.
- The information we collect in this study will be kept under secure conditions at Curtin University for 7 years after the research has ended and then it will be destroyed/kept indefinitely.
- You have the right to access, and request correction of, your information in accordance with relevant privacy laws.
- The results of this research may be presented at conferences or published in professional journals. You will not be identified in any results that are published or presented.
- Whilst all care will be taken to maintain privacy and confidentiality of any information shared at a focus group or group discussion, you should be aware that you may feel embarrassed or upset if one of the group members repeats things said in a confidential group meeting.

Will you tell me the results of the research?

- We will write to you throughout the research process (in about 6 months) and let you know the results of the research. Results will not be individual but based on all the information we collect and review as part of the research.

Do I have to take part in the research project?

- Taking part in a research project is voluntary. It is your choice to take part or not. You do not have to agree if you do not want to. If you decide to take part and then change your mind, that is okay, you can withdraw from the project. You do not have to give us a reason; just tell us that you want to stop. Please let us know you want to stop so we can make sure you are aware of any thing that needs to be done so you can withdraw safely. If you chose not to take part or start and then stop the study, it will not affect your relationship with the University, staff or colleagues.

What happens next and who can I contact about the research?

- If you have any questions about the project or about being a participant, you can contact Associate Professor Sharyn Burns on +61 8 9266 4123 or S.Burns@curtin.edu.au.
- If you decide to take part in this research we will ask you to sign the consent form. By signing it is telling us that you understand what you have read and what has been discussed. Signing the consent indicates that you agree to be in the research project and have your health information used as described. Please take your time and ask any questions you have before you decide what to do. You will be given a copy of this information and the consent form to keep.

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number 119/2015). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.



Health Behavior in a cultural context

CONSENT FORM

HREC Project Number:	HR119/2015
Project Title:	<i>Health Behavior in a cultural context. A qualitative study of the impact of culture and lifestyle has on the management of Type 2 Diabetes Mellitus among UAE Nationals</i>
Principal Investigator:	<i>Associate Professor Sharyn Burns, Director of Health Promotion and Sexology and a Co-Director of the Collaboration for Evidence, Research and Impact in Public Health within the School of Public Health at Curtin University</i>
Student researcher:	N/A
Version Number:	0
Version Date:	31-May-15

- I have read the information statement version listed above and I understand its contents.
- I believe I understand the purpose, extent and possible risks of my involvement in this project.
- I voluntarily consent to take part in this research project.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I understand that this project has been approved by Curtin University Human Research Ethics Committee and will be carried out in line with the National Statement on Ethical Conduct in Human Research (2007) – updated March 2014.
- I understand I will receive a copy of this Information Statement and Consent Form.

Participant Name	
Participant Signature	
Date	

Declaration by researcher: I have supplied an Information Letter and Consent Form to the participant who has signed above, and believe that they understand the purpose, extent and possible risks of their involvement in this project.

Researcher Name	
Researcher Signature	
Date	

Note: All parties signing the Consent Form must date their own signature.

D.3 SKMC Consent Form for Participants & Focus Groups



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SKMC Research Ethics Committee Consent to Participate in a Research Study

Name of
Participant: _____

Study title: Health Behavior in a cultural context. A qualitative study of the impact culture and lifestyle has on the management of Type 2 Diabetes Mellitus among UAE Nationals

Principal Investigators: Jennifer Cooper-Doctor of Public Health candidate
Associate Professor Sharyn Burns-Director of Health promotion and Sexology Curtin University, Western Australia and Co-Director of the Western Australian Centre for Health Promotion Research
Associate Professor Linda Selvey-MBBS and Director of Epidemiology and Biostatistics Curtin University, Western Australia

Sponsor: Not applicable

Please carefully review this consent document. The purpose of a consent document is to provide you with information to help you decide whether you wish to participate in this research study. Your decision is completely **voluntary** and **will not affect your medical care if you choose not to participate**. It is important for you to ask questions and understand the **research risks, benefits and alternatives**.

Your health care provider may be an investigator in this research study, and as investigator, is interested in both your welfare and in the conduct of the study. Before entering this study or at any time during this research, you may ask for a second opinion about your care from another doctor who is in no way associated with the research study. You are not under any obligation to participate in any research project offered by your doctor.

Lay Summary

In order to provide an improved service, it is important to understand the cultural and lifestyle impacts that influence the management of type 2 diabetes mellitus among UAE Nationals. This research project will gain an understanding of the individual's knowledge of the disease and of disease prevention. It will explore the impact diabetes has on the family unit, how the Arabic culture impacts the management of the disease and the barriers and enablers to physical activity and nutrition. In turn this will provide us with the information to assist service providers to improve our service to this clientele group.

Confidentiality and data storage

All data will be treated as strictly confidential and will be stored anonymously in locked filing cabinets. The data entered on the computer will be identified only by subject's code number and will be password protected. Completed consent forms and identifying data (list of participants' names, contact details and code number) will be stored in a separate locked filing cabinet accessible only to the PI. Pseudonyms will be used in publications

arising from the research. On completion of the data collection, all data will be kept in a secure password protected directory for five years, after which, all identifying information and data will be destroyed.

Benefits to participants

A better understanding of the influence culture and lifestyle has on the management of Type 2 Diabetes among UAE Nationals which has the capacity to provide service improvements to this clientele group.

Further information

Any further questions you have regarding the study may be directed to the project Principle Investigator, Ms. Jennifer Cooper: jenniferlouisecooper@outlook.com

Ethics Clearance Statement

This project involves a team consisting of a local UAE Nurse and global academic and practice-based research collaborators. Ethics clearance has been sought from the Sheikh Khalifa Medical City (SKMC) Research and Ethics Committee, SEHA and Curtin University, Western Australia

Proposed Project Timeline

- Application submitted to SKMC- December 2014
- Ethics clearance gained January 2015
- Participants purposively sampled October/November 2015
- Interviews October/November 2015 & May or October 2016
- Focus groups- May or October 2016
- Analysis and write up-October 2015-November 2017

If you would like to speak to a representative of the SKMC Research and Ethics Committee not involved in the study, you may contact Ms. Linda Haskins, Associate Director of Nursing on 028193045.

1. I confirm that I have read and understand this consent form.
2. I have had the opportunity to ask questions.
3. I understand that my participation is voluntary and that I am free to withdraw
4. I understand that if I withdraw from the study it will not adversely affect my access to health care
5. I understand that the data I have provided is de-identified data agreed for analysis and inclusion in the published documents that will emanate from this study.

- 6. I understand that the researchers will keep the data in a safe place
- 7. I agree to take part in the above study

Name of participant	Date	Signature
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Name of person taking consent	Date	Signature
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Name of witness (if subject unable to read/write)	Date	Signature
------------------------------------------------------	------	-----------



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Consent to Participate in a Research Study

نموذج موافقة على المشاركة في دراسة بحثية

(Copy of this form will be kept in the patient's medical record file)
(سوف يتم وضع نسخة من هذا النموذج في ملف السجل الطبي للمريض)

Study Title: _____
اسم الدراسة:

Principal Investigator: _____
الباحث الرئيسي:

Sponsor: _____
الراعي:

Statement of Participant

I have read and have had verbally explained to me the above information and have had all my questions answered to my satisfaction. I understand that my participation is voluntary and that I may stop my participation in the study at any time. Signing this form does not waive any of my medical and legal rights. I understand that a copy of this consent will be provided to me and this information will be kept confidential.

By signing below, I agree to take part in this research study.

Consenting Party:

Name Signature Date

Translator:

Name Signature Date

Statement of Person Conducting Informed Consent Discussion

SKMC Research Ethics Committee
Consent Form (English) 20-Jun-2010

I have discussed the information contained in this document with the participant and it is my opinion that the participant understands the risks, benefits, alternatives and procedures involved with this research study.

Person Obtaining Consent:

Name Signature Date

تصريح المشارك

لقد قرأت المعلومات المذكورة أعلاه وتم شرحها لي شفهيًا، كما أنه قد تمت الإجابة على كافة تساؤلاتي بشكل كامل. إنني أتفهم أن مشاركتي هي محض طوعية وأنه بإمكانني التوقف عن المشاركة في هذه الدراسة في أي وقت. إن التوقيع على هذا النموذج لا يعني بأي حال من الأحوال تنازلي عن أي من حقوقي الطبية والقانونية، كما أنني سأحصل على نسخة من هذه الموافقة وسيتم الحفاظ على خصوصيتي بالنسبة لهذه المعلومات. إن توقيعي أدناه يعني أنني أوافق على أن أكون جزءاً من هذه الدراسة البحثية.

الطرف الموافق:

التاريخ	التوقيع	الاسم
_____	_____	_____
التاريخ	التوقيع	الاسم
_____	_____	_____

المترجم:

تصريح الشخص الذي يقوم بشرح نص الموافقة على المشاركة

لقد ناقشت المعلومات الموجودة في هذه الوثيقة مع المُشارك، وحسب رأيي فإنَّ المُشارك قد فهمَ المخاطر والفوائد والبدائل والإجراءات المُتضمنة في هذه الدراسة البحثية.

الشخص المخول بالموافقة

التاريخ	التوقيع	الاسم
_____	_____	_____

Appendix E Interview Introduction

E.1 Interview Introduction for Focus Groups



Interview introduction

Good morning/afternoon and welcome. Thanks for taking the time to join our discussion about the impact culture and lifestyle has on the management of Type 2 Diabetes among UAE Nationals. My name is Jennifer Cooper, and I will be coordinating the focus group today. The purpose of today's discussion is to understand more about your knowledge of what impacts a UAE Nationals diabetes management, and how the family and culture influences the way they manage their diabetes. We will also discuss physical activity and nutrition. There are no right or wrong answers to the questions I will be asking.

I am here to ask questions, listen, and to make sure you have a chance to share your thoughts and experiences. We will be recording our discussion today to help us remember what is said and so we don't want to miss any of your comments. No names will be included in any reports or publications arising from this research.

Thankyou

Jennifer Cooper

RN, Post Grad Comm Health, BSN, MSN, Doctor of Public Health Candidate

E.2 Interview Introduction for Individuals



Interview introduction

Good morning/afternoon and welcome. Thanks for taking the time to join our discussion about the impact culture and lifestyle has on the management of Type 2 Diabetes among UAE Nationals. My name is Jennifer Cooper, and I will be coordinating the interview with you today. The purpose of today's discussion is to understand more about your knowledge and understanding of diabetes, what impact it has on your family and how your culture influences the way you manage your diabetes. We will also discuss physical activity and nutrition. There are no right or wrong answers to the questions I will be asking.

I am here to ask questions, listen, and to make sure you have a chance to share your thoughts and experiences. We will be recording our talk today to help us remember what is said and so we don't want to miss any of your comments. No names will be included in any reports or publications arising from this research.

Thankyou

Jennifer Cooper

RN, BSN, MSN, PhD Student

Appendix F Ethics Approval – SKMC



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 Clinic**

Institutional Review Board
 Research Ethics Committee

APPROVAL LETTER

15 January 2015

Ms Jennifer Cooper

Student - The Doctorate of Public Health
 Curtin University, Western Australia



Ethics Approval Reference No: <i>Please quote this ref # in all correspondence</i>	REC-15.01.2015 [RS-332]
Research Title:	Health Behavior in a Cultural Context: A qualitative study of the impact culture and lifestyle has on the management of Type 2 Diabetes Mellitus among UAE Nationals

Dear Ms Cooper,

Thank you for submitting your research project for ethical approval.

Submitted research documents were presented for full IRB review and discussed at the last IRB/REC meeting held on 18th December 2014.

On review and discussions, some minor concerns were noted by the committee members; these were communicated to you and the response clarified the issue and modifications were made as suggested.

As the response found acceptable and no ethical issue from IRB's perspective was noted, approval was granted to carry out this project, as designed.

Committee members present at the IRB meeting during its discussion on 18th December 2014 were as follows:

#	Member Name	Designation
1.	<i>Jaishen Rajah, FCPaed(SA), Crit Care, DA</i>	<i>Chair, IRB/Research Ethics Committee</i>
2.	<i>Huda Mustafa, MBBS, MRCP</i>	<i>Consultant, Endocrinology, Institute of Medicine</i>
3.	<i>Mohammed Al Garhy, MBBCh, MSc, Fellowship Arab Board of Psychiatry</i>	<i>Consultant Psychiatrist, Behavioural Science</i>
4.	<i>Tahcin Ibrahim, MB, Ch.B, MD, M.Sc</i>	<i>Consultant, Department of Anesthesia</i>
5.	<i>Sabahat Wasti, MBBS, MRCPI, CST (Rehab. Med)</i>	<i>Independent IRB/REC Member, Consultant, Cambridge Medical and Rehabilitation Center, AUH</i>
6.	<i>Christelle Du Plessis</i>	<i>Assistant Director of Nursing</i>
7.	<i>Doree Lacson</i>	<i>Acting Lay Person, Admin Asst - Research</i>

Kindly note that approval is given on the understanding that the research team complies on the applicable guidelines and regulations governing the conduct of clinical trials¹ particularly as to the following:

- *It is the responsibility of the investigator to provide the committee with, at least, an **annual update** on the progress of the research by submitting a **Progress Report Form** (Attachment 1).*
- *Any amendments or significant change which occurs in connection with this study and/or which may alter its ethical consideration, premature suspension or termination of the study must be reported immediately to the Research Ethics Committee Office.*
- *IRB has an authority to suspend or terminate approval of research that is not being conducted in accordance with the IRB's requirements or that has been associated with unexpected serious harm to subjects.*
- *The investigator should provide the Research Ethics Committee office with a **final report** within **three (3) months** after Termination or Completion of a research study or the investigator's part of the research study.*
- *The investigator should comply with the REC's request for progress report whenever the future audits on any REC approved studies are required. A completed **Progress Report Form** should be submitted to the REC office.*
- *Research office should also be notified of the arrangements for publication or dissemination of the research including any feedback to participants.*

SKMC Institutional Review Board/Research Ethics Committee has been organized and operates according to the Good Clinical Practice (GCP) Guidelines.

- Granted an authorization to conduct human subjects research by Health Authority Abu Dhabi (HAAD) - Research Authorization #2011.01.
- Received accreditation from the Office for Human Research Protections (OHRP), US Department of Health and Human Services (HHS). <http://ohrp.cit.nih.gov/search/search.aspx>
 - Institution Registration # IORG0006896 expires 22 May 2015
 - IRB Registration # 00008262
 - Federal Wide Assurance (FWA) # FWA00018992 expires 14 June 2017

On behalf of the IRB/REC members wishing you all the best towards smooth accomplishment of this research project.

Sincerely,



Dr. Jaishen Rajah, FRCR(FSA), Crit Care, DA
Chairman, Institutional Review Board/Research Ethics Committee
Sheikh Khalifa Medical City, Abu Dhabi, UAE

Attachment: 1. Progress Report Form

JR/doree

¹ <http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html>

Appendix G Ethics Approval – Curtin

MEMORANDUM



To:	A/Prof Sharyn Burns School of Public Health
CC:	Jennifer Louise Cooper
From	Professor Peter O'Leary, Chair HREC
Subject	Reciprocal ethics approval Approval number: HR119/2015
Date	03-Jul-15

Office of Research and
Development
Human Research Ethics Office

TELEPHONE 9266 2784
FACSIMILE 9266 3793
EMAIL hrec@curtin.edu.au

Thank you for your application submitted to the Human Research Ethics Office for the project: 5212
A qualitative study of the impact of culture and lifestyle has on the management of Type 2 Diabetes
Mellitus among UAE Nationals

Your application has been approved through Curtin University Human Research Ethics Committee (HREC)
through a reciprocal approval process with the lead HREC.

The lead HREC for this project has been identified as Institutional Review Board/Research Ethics
Committee Sheikh Khalifa Medical City, Abu Dhabi,

Approval number from the lead HREC is noted as: REC-15.01.2015 [RS-332]

Please note the following conditions of approval:

1. Approval is granted from **07-Jul-15** to **30-Mar-17**
2. Research must be conducted as stated in the approved protocol.
3. Any amendments to the approved protocol must be approved by the Ethics Office.
4. An annual progress report must be submitted to the Ethics Office annually, on the anniversary of approval.
5. All adverse events must be reported to the Ethics Office.
6. A completion report must be submitted to the Ethics Office on completion of the project.
7. Data must be stored in accordance with WAUSDA and Curtin University policy.
8. The Ethics Office may conduct a randomly identified audit of a proportion of research projects approved by the HREC.

Should you have any queries about the consideration of your project please contact the Ethics Support
Officer for your faculty, or the Ethics Office at hrec@curtin.edu.au or on 9266 2784. All human
research ethics forms and guidelines are available on the ethics website.

Yours sincerely,

Professor Peter O'Leary
Chair, Human Research Ethics Committee

Appendix H Local Newspaper Articles Related to T2D and Risk Factors Associated with T2D

1. The National: Staff, school canteens banned from junk and fast food advertising to be controlled in UAE. The National, 2013

The article outlined a cabinet meeting held with council ministers, the Vice President and Ruler of Dubai and specialists in the field to discuss a plan regarding food in school canteens. The cabinet agreed on the following: display calorie counts to all food products, the size of soft drinks sold is to be limited and school canteens will be prevented from selling junk food. Documented and available information will be easier to understand if these agreements have been implemented.

2. Salem, O.: New York size soda ban for UAE as nation battles obesity. The National, 2013.

On the second day of the cabinet meeting, as outlined in the article above, the restriction of the size of soda drinks allowed to be sold was agreed. Agreements on health screening, accreditation of physicians, integration and evaluation were discussed. Agreements included: health screening for all UAE Nationals at regular intervals, certification of doctors, and the implementation of a national health database which can be accessible by any health care provider, in both hospital and clinic settings. Evaluation of health standards included the development of a system for assessing health centres, mobile health services to deliver rural and remote health care and partnerships formed between hospitals and local universities.

3. Cleland, E.: Children and parents to benefit from advice on new UAE health website. The National, 2013.

This article outlines information for a new health website initiative that has been launched by the Abu Dhabi Health Services Authority (SEHA). The website aims to provide awareness on health issues for students and parents. Some of the topics covered on the website include nutrition information, physical activity, personal health, smoking, anxiety and peer pressure. The website is in both Arabic and English and also has a “talk to us” functionality where students or parents can ask health-related questions. The website address is: www.shs.ahs.ae. After searching online, this website directs you to the main SEHA website which has a section for “health education” and “school health” with no available information.

4. The National: Staff, UAEs anti-obesity school programme wins UNICEF praise. The National, 2013.

A prevention program was introduced in eight state schools across the UAE involving 3000 children throughout 2011-2012 and received good results. The program is discussed further under ‘Prevention’.

5. National editorial: In the UAE, diabetes education must start at home. The National, 2013.

This article discussed the benefits of eating habits, attitude and behaviour patterns instilled in children in the home. It promoted the importance of an active lifestyle being encouraged from an early age and that these behaviours need to start at home with the children's parents.

An initiative by Du telecommunication company in the UAE 2013, called "Every Step Counts" was carried out for two years from 2013-2015. The company has access to six million customers and the objective of the initiative was to raise awareness of healthy lifestyles through an online platform of shared information (Du, 2013).

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