

**IDENTIFY THE CONTRIBUTING FACTORS THAT INCREASE
DIABETES PATIENTS
IN MALE' CITY**

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MAY, 2016

**IDENTIFY THE CONTRIBUTING FACTORS THAT INCREASE DIABETES
PATIENTS IN MALE' CITY**

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A PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE OF BACHELORS IN PRIMARY HEALTH CARE

Faculty of Health Sciences
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May, 2016

DECLARATION

Name:

Student number:

“I hereby declare that this project is the result of my own work, except for quotations and summarise which have been duly acknowledged.”

Signature:

Date:

**IDENTIFY THE CONTRIBUTING FACTORS THAT INCREASE
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ABSTRACT

Non communicable disease (NCD) has become a burden to medical practitioners to deal and is leading factor of mortality to world's most population. Diabetes mellitus (DM) is the alarming NCD in the world which affect most of the adults. The main aim of this study is to identify the reasons for rapid increasing type II (T II) diabetes patients in the capital city, Male'. A questionnaire was used to collect data in this study. Statistical software, Statistical Package for Social Sciences (SPSS) was used to analyse data. Hence, these quantitative data can be used policymakers, program implementers and health sector to deal with T II diabetes in future. Moreover, it will help to address the long-term benefit of improving the health status of the country.

ACKNOWLEDGEMENT

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Second, I acknowledge with gratitude the help from associate lecturer Mr. Mohamed Zaid from the faculty of the health sciences public health department for giving his precious time to helping analysing data in this research.

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LIST OF ABBREVIATIONS:

CAMDI – Central America Diabetes Initiative

DM – Diabetes Mellitus

FPG – Fasting Plasma Glucose

HTN – Hypertension

IDF SEA – International Diabetes Federation South East Asia

Mg/dl – milligram per decilitre

NCD – Non Communicable Disease

SPSS – Statistical Package for Social Sciences

T II – Type II

U.S – United States

WHO – World Health Organization

SEA – South-East-Asia

CHAPTER 1

INTRODUCTION

1.1 Background:

Diabetes is a chronic disorder which can cause serious untreated complications to many major organs of the body. DM is defined by World Health Organization (WHO) in 1999 as follows:

”The term "diabetes mellitus" describes a metabolic disorder of multiple aetiology characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both. The effects of diabetes mellitus include long-term damage, dysfunction, and failure of various organs”. (World Health Organization, 1999).

Looking at the global situation, 4.9 million deaths have occurred due to complications of diabetes in the year 2014 (World Health Organization, n.d.). The exact cause is unknown. However, there are genetic and environmental factors that scientist’s suspects to develop T II diabetes; such as smoking, physical inactivity, and unhealthy meal planning choices.

According to WHO statistics, the prevalence of diabetes in Maldives is 6000 in the year 2000, and the amount is rapidly increasing each year and the data says in the year 2030

this amount will increase up to 25, 000. (World Health Organization, n.d.). Hence, the problem is becoming alarming to the entire nation that has to address immediately.

1.2 The problem statement and justification:

The DM prevalence of Maldives is 4.81% with a global rank of 165. Compare to other countries, DM situation in Maldives is similar to United Kingdom, Nepal, Lesotho, Ethiopia, Uganda, Togo, and Greece. (Mecrometer, n.d.)

According to the International Diabetes Federation South-East-Asia (IDF) (SEA) region, there were 17,000 diabetic cases in Maldives in the year 2014. The total adult population (20-79 years) of every 1000s – 109 deaths were due to diabetes and there were 9.1% cases of diabetes in an adult that are undiagnosed. As well, cost per person with diabetes is USD 869.6. (International Diabetes Federation, 2014). Global diabetes scorecard 2013 has mentioned that “A moderate proportion (6.5%) of diabetes-related deaths have been prevented due to previous diabetes-related health expenditures.” (Global Diabetes Scorecard, n.d.)

DM patients also have an increased risk of developing a number of serious health related problems. Moreover, it is a leading cause of blindness, cardiovascular diseases, kidney failure, lower limb amputation and much more. However, DM is a lifelong disease condition; there are a lot of evidence that lifestyle changes can help to prevent the development of its complications.

Therefore, the primary goal is to identify the reasons for increasing DM cases to overcome this devastating disease.

1.3 Purpose of the study:

The main aim of this study is to assess the current status and to identify the contributing factors to increasing DM patients in the capital city of Maldives.

1.4 Objectives of the study

1.4.1 General objective:

Identify the contributing factors that increase diabetes patients in Male' city

1.4.2 Specific objectives

- To identify whether genetic is playing the great role of increasing DM among the age group of 30-65 years in the island.
- To identify whether people with a sedentary lifestyle are more common to develop DM.
- To find out knowledge towards DM in the age group of 30-65 years in Male' city.

1.5 Research question or hypothesis:

- What is the current situation of DM in Male'?
- What are the contributing factors to increasing diabetes in the capital city among the age group of 30-64 years?

1.6 Significance of the study:

The results of this study will be an aid to policy makers, program implementers, and health sector, to deal with existing barriers of increasing DM. It also offers a clear understanding of the knowledge of risk factors for DM and actions that would reduce

the risk. Moreover, it will also help to increase awareness towards DM in the community.

1.7 Delimitation / scope of the study:

This study will include participants between ages 30 and 64 years. Thus, the ability to recognize to the entire population of K. Male' is severely limited. Also, this study only covers 50% of the sample size of the population to constrain time. The sample, however, is similar in nature to the population of the whole study area.

This study will be limited to identify the views and ideas of the whole population of the area.

1.8. Operational Definition of Terms:

Diabetes: Gradually increasing random plasma glucose level equal to or greater than 200 milligrams per decilitre (mg/dl) with symptoms before eating and Fasting Plasma Glucose (FPG) equal to or greater than 126 mg/dl.

Non communicable disease: Chronic disease condition which is caused by non-infection and not transmitted through contact with infected person among people.

Social desirability: Tendency of some individuals' reports, their answer in a way they deem to be more socially acceptable rather than their true answer.

Diabetes Prevalence: Percentage of people affected with diabetes.

CHAPTER 2

LITERATURE REVIEW

This chapter contains the literature review which is appropriate to this study. It includes DM situation at global and SEA Region. The situation of Maldives and also the literature related to variables are included. Other than this, the theoretical framework which guides this study will also be included in this chapter.

2.1 Worldwide literature:

Diabetes mellitus is a combination of heterogeneous disorders commonly presenting with episodes of hyperglycaemia, and glucose intolerance, as a result of lack of insulin, defective insulin action, or both. Symptoms of this disease are high blood glucose levels as a consequence of inadequate pancreatic insulin secretion or poor insulin-directed mobilization of glucose by target cells (Ngugi, Njagi, & Makenzi, 2015).

Symptoms of marked hyperglycaemia include polyuria, polydipsia, weight loss, sometimes with polyphagia, and blurred vision. Other than this, impairment of growth and susceptibility to certain infections may also accompany chronic hyperglycaemia. There are also acute, life-threatening consequences of uncontrolled diabetes such as hyperglycaemia with ketoacidosis or the nonketotic hyperosmolar syndrome. Long-term complications of diabetes comprise retinopathy with potential loss of vision; nephropathy leading to renal failure; peripheral neuropathy with risk of foot ulcers, amputations, and Charcot's joints; and autonomic neuropathy causing gastrointestinal,

genitourinary, and cardiovascular symptoms and sexual dysfunction (American Diabetes Association, 2014).

Moreover, patients with diabetes have an increased incidence of atherosclerotic cardiovascular, peripheral arterial and cerebrovascular disease. Hypertension and abnormalities of lipoprotein metabolism are often found in people with diabetes patient too (American Diabetes Association, 2014).

85 to 95% of all diabetes in high-income countries are type 2 diabetes which is very well associated with improper utilization of insulin by target cells and tissues. The debilitating effects of DM include various organ failures, progressive metabolic impediments such as retinopathy, nephropathy, and neuropathy. Also, it is accompanied by the risk of cardiovascular, peripheral vascular and cerebrovascular diseases (Ngugi, Njagi, & Makenzi, 2015).

DM is also a very expensive disease and has profound implications in terms of long-term micro to macro-vascular complications and their associated cost. These complications diminish both life expectancy and quality of life (Ngugi, Njagi, & Makenzi, 2015).

According to World health Organization, “Current global mortality from non-communicable diseases (NCDs) remains unacceptably high and is increasing. Thirty-eight million people die each year from NCDs, mainly from cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes” (World Health Organization, 2014).

According to United States (U.S), National Diabetes Statistic report 2014, there were 29.1 million people with DM. Out of this 21.0 million people are diagnosed cases and 8.1 million are undiagnosed DM cases (National Diabetes Statistics Report, 2014).

As diabetes is an emerging public health concern in all over the world, it is important to identify the magnitude and associated risks factors of it. A cross-sectional population-based survey was performed in northwest Ethiopia shows the diabetes mellitus is largely high among the urban compared to the rural population. Also, diabetes is considerably undiagnosed and untreated, especially in rural sites (Abebe, Berhane, Worku, & Assefa, 2014).

A study was done by The Central America Diabetes Initiative (CAMDI), in 2011, about a survey of DM hypertension (HTN) and chronic risk factors, has addressed that, DM and HTN occur most frequently among people over 39 years of age (Belize, 2011).

They also have noted that it is important to observe the prevalence of DM for the health status of the population. As well as DM leads to numerous micro to macrovascular complications such as blindness, non-traumatic amputation, and end-stage renal diseases. Besides that, it also doubles the risk of coronary heart disease, stroke, and peripheral vascular disease. All these complications deteriorate the quality of life and impose a substantial direct and indirect economic burden (Belize, 2011).

2.2 South East Asia Region:

Diabetes mellitus has extended epidemic proportions worldwide. South East Asia region also have an increased predisposition for diabetes which has become an important health alarm in the region. A significant epidemic of diabetes is present in the South Asian region with a prompt increase in prevalence over the last two decades. Therefore,

there is a need for urgent preventive and curative strategies to overcome the alarming disease (Jayawardena, et al., 2012).

According to IDF 2014, close to one-fifth of all adults with diabetes in the world lives in SEA Region. The current estimate indicates that, in the year 2011, 71.4 million people live with DM. Out of this 61.3 million of them are in India. They also suggest that this number will increase 120.9 million by 2030. (International Diabetes Federation, 2014).

Raman. R conducted a study in 2014, through multi-cluster sampling technique. The result of that study shows, the prevalence of DM in the rural Indian population was 10.4% and the prevalence of diabetic retinopathy among patients with DM was 10.3%. They also found that the risk of diabetic retinopathy increases among people who lives with DM at longer duration, use insulin, systolic hypertension and people with poor glycemetic control. (Raman, Ganesan, Pal, Kulothungan & Sharma., 2014).

A study published in 2013 says, both DM and HTN present huge challenges in developing countries, particularly in the SEA region. Thus, health care systems should be strengthened for early detection and effective treatment of those affected with both DM and HTN. In the article, they also have mentioned that there is an urgent need to improve monitoring and management of risk factors through primary care linked programmes. Moreover, policy and system changes are vital to reduce risk in populations, including legislation and public education to reduce dietary fat, salt and sugar, food pricing policies, tobacco control, and changes to health care delivery systems to openly support prevention and control of DM and HTN (Mohan, Seedat, & Rajendra, 2013).

2.3 Maldives:

Maldives health profiles 2014 shows that, approximately 50% of women 35 years and above are overweight or obese. For the reason that, the government has given high priority and focuses on, prevention of NCD in The Health Master Plan 2006 – 2015. (Ministry of Health, 2014)

The following line graph shows, DM proportion at different age groups.

The dotted line describes world's diabetes prevalence by ages. The black line shows DM prevalence in SEA region, and the red line shows Maldives's diabetes prevalence. (IDF-SEA, 2014).

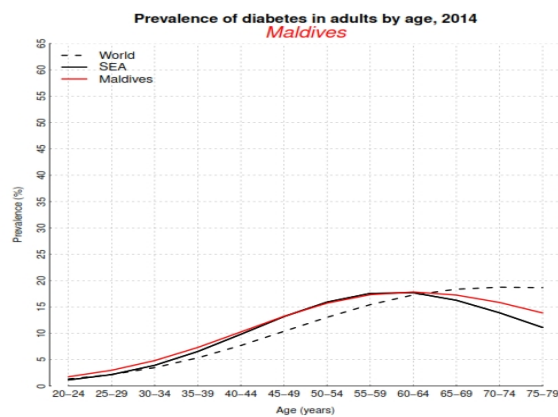


Figure 1. Comparison of DM prevalence in world, SEA region and Maldives

Source: IDF-SEA (IDF-SEA, 2014).

2.4 Variables:

2.4.1 Demographic characteristics:

- **Genetics / family history:**

The risk of T II diabetes increases if an individual's parents, grandparents or siblings have the condition. (Mayoclinic, 2014)

In 2010, American journal of epidemiology has published a journal named improvements in the ability to detect undiagnosed diabetes by using information on family history among adults in the United States. They confirmed that family history of diabetes is an independent risk factor for undiagnosed diabetes. Including this, they also suggest that using a risk model with a family history of diabetes offers significant improvements over a model with common risk factors in detecting undiagnosed diabetes, especially among populations at higher risk. (Yang, Liu, Valdez, Moonesinghe, & Khoury, 2010)

- **Age &sex:**

If a person's age is over 45, the risk of getting DM is high. (Mayoclinic, 2014)In developing countries, most of the people with DM are in the age group of 45-64 years, while in developed countries, the large number is found in those aged 65 years and above. (WHO, N.D).

Women have a higher risk of developing DM if their waist circumference is more than 35 inches. (NHS, 2014)

- **Knowledge / Education:**

Poor knowledge, lack of awareness and poor education increases the risk of developing DM. A study was done by EO Asekun-Olarinmoye and four others, about knowledge, attitude and practice towards DM, among the staff of a university in South Western Nigeria found that 54.6% are having poor knowledge about diabetes and they are at risk of developing DM (2011).

A study done in 2010 shows a greater percentage of the surveyed population including both literate and illiterate was not aware of the risk factors for diabetes.

They also say that it is important to improve knowledge and awareness about diabetes (Naayana, Balachandra, Hiremath, Iyengar, & Anil, 2010).

Knowledge about DM is a requirement for individuals and communities to take action to control the disease. Also, diabetes education, with consequent improvements in knowledge, attitudes, and skills, will lead to better control of the disease, and is widely accepted to be a vital part of comprehensive diabetes care. (Maina, Ndegwa, Njenga, & Muchemi, 2010)

2.4.2 Attitudes / Beliefs:

Some people believe that DM is caused by eating too much sugar. Some also believe that the only connection to another person of DM would be genetics. (Payne, 2010)

William K. Maina and his friends have done a study in 2010 in Kenya, to assess the attitude of the community towards diabetes. It shows only a few percent of respondents agreed with statements relating to a willingness to engage in physical activity, changing eating habits and maintaining good body weights. Also, most of the respondents have bad practice in relation to preventing diabetes and participating regular exercise plus monitoring their body weights. (Maina, Ndegwa, Njenga, & Muchemi, 2010)

2.4.3 Lifestyle / Behaviour:

- **Overweight /obesity:**

Overweight and obesity put a person at a greater risk of developing TII diabetes (NHS, 2014). The persons with a lack of physical activity are more likely to develop T II diabetes. Since physical activity helps to control weight and helps to glucose absorption in the body. (Mayoclinic, 2014)

According to obese facts 2013, 44% of the diabetes burden is attributable to overweight and obesity. Also, they are driving the global diabetes epidemic and affect the majority of adults in most developed countries and are increasing rapidly in developing countries. In the majority of European countries, overweight and obesity are responsible for about 80% of cases of T II diabetes. They also say if current worldwide trends continue, the number of overweight people is projected to increase from 1.3 billion in 2005 to nearly 2.0 billion by 2030. (Fruhbeck, et al., 2013)

An article published in Springer-Verlag Berlin Heidelberg 2012 says, lifestyle intervention like weight reduction, a healthy diet and increased physical activity in high-risk individuals has a long-lasting effect in the prevention of T II diabetes. They also say it may be due to sustained lifestyle changes as well as to the legacy effect of former improvements in glycaemia and such interventions could play an important role in preventing chronic disease during ageing. Their finding emphasizes the importance of early, comprehensive lifestyle change as the primary target of preventing T II diabetes. (Lindstrom, et al., 2012)

2.5 Theoretical framework guiding this study:

As a theoretical framework, Andersen's Behavioural Model of Health Services Utilization will be used to guide this study. This model allows researchers to choose independent variables related to their hypothesis (Wolinsky, F. D., & Johnson, R. J., 1991). This model includes 5 categories; predisposing, enabling, need, health behaviour and outcomes. (Andersen, 1968 & 1995, Gelberg, Andersen & Leake, 2000) From this, predisposing, enabling and need will be used in this study. (Pei-Shu Ho, 2003)

Andersen's Behavioural Model of Health Services Utilization (adapted from Wolinsky, 1988b)

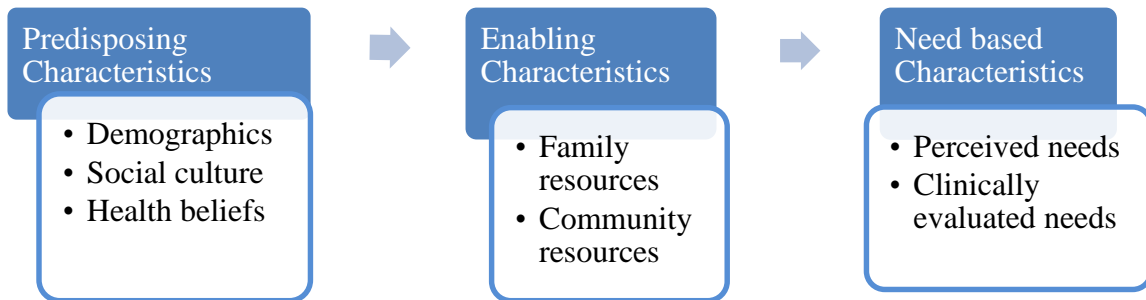


Figure 2. Andersen's Behavioural Model of Health Services Utilization

Source:URL: <http://www.ohsu.edu/xd/research/centers-institutes/institute-on-development-and-disability/public-health-programs/rrtc/sos2003/determinants.cfm>

(Pei-Shu Ho, 2003)

Predisposing:

These are existing conditions that influence or predispose the use of health services. For example; sex, age and psychosocial factors such as attitudes and beliefs etc. (Gucciardi, 2007)

Enabling:

These are the factors that include personal, family and community resources that can either facilitate the use of services. (Gucciardi, 2007)

Need:

This factor refers to the conditions like functional capacity, symptoms, and general health status. (Gucciardi, 2007)

CHAPTER 3

METHODOLOGY

This chapter covers the methodological details that are appropriate to this chapter, which includes: research design, study area, target population, sampling techniques and sample size. Moreover, it also includes research instruments, pre-testing, data collection, data analysis, ethical considerations and conceptual framework and measurement of variables.

3.1 Research design:

A cross-sectional descriptive study design, which includes quantitative research technique, was used to collect data in this study. For the reason that cross-sectional design was the best suited aimed at finding out the prevalence of a phenomenon, situation, problem, attitude or issue, by taking a cross-section of the population, this design was chosen for this study. This design is also useful in obtaining an overall picture as it stands at the time of the study (Kumar, 2010).

A descriptive design was one in which information was collected without changing the environment or without manipulating the study area. In human research, a descriptive study can offer information about the naturally occurring health status, behaviour, attitudes or other characteristics of a specific group. Descriptive studies were also

conducted to demonstrate associations or relationships between things in the world around us (San Diego State University Research Foundation, n.d.).

3.2 Study area:

The study area of this study is the capital city of Maldives, K. Male' where DM patients were recorded more according to statistical information of Diabetes society of Maldives. (DSM, 2014)

3.3 Target population:

The target population in this study was the age group of 30 to 64 years in both sexes. This age group was chosen because they were a high-risk age group, who were most likely to develop T II diabetes.

According to Melissa Conard Stoppler, sedentary lifestyle and increasing age were also risk factors for developing diabetes (Stoppler, 2016). Therefore, the following age group was more likely to be at high risk.

3.4 Sampling techniques:

A simple random sample technique was used to gather information in this study. Therefore, each member of the age group has an equal chance of being selected and the results of sample represent the whole population. In order to select sample, the target population was selected and entered into sample calculating software called Raosoft.

The following diagram is sample framework of this research.

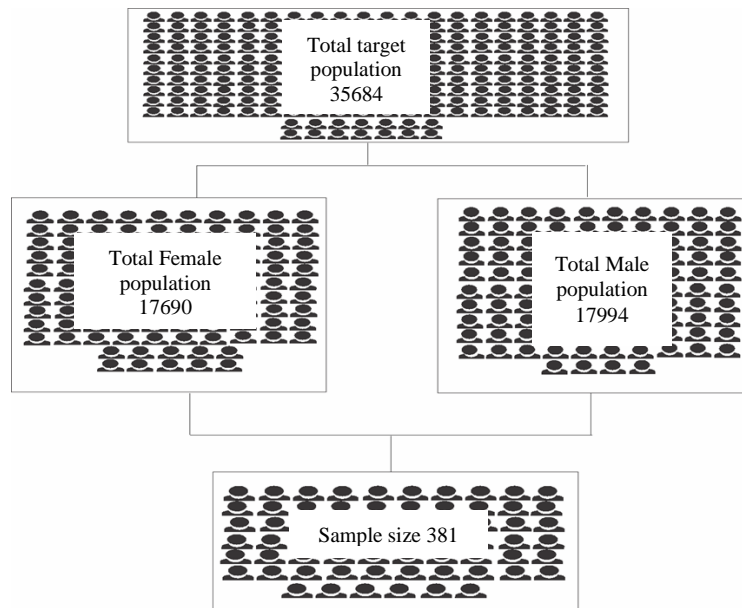


Figure 3. Sample framework

3.5 Sample size:

According to census 2014, the total population of the island is 129381, including 64443 male and 64938 female. The age group of 30 to 64 is 35684, which is 17994 male and 17690 female.

The sample size was calculated by using Raosoft sample size calculator from the website “www.raosoft.com”. The total sample size of this study was 381 individuals including both males and females with 95% confidence interval and 5% of expected error. As this study was an academic purpose and the sample size was too big to finish within the limited time period, 50% of sample size (191 individuals) was chosen for this study.

3.6 Research instruments:

A questionnaire was used as a research instrument in this study, which was divided into 4 sections (Section “A”, “B”, “C” & “D”). Close ended questions were included in section “A”. Section “B” included both multiple choices and close ended questions. Whereas, section “C” and “D” included multiple-choice, likert and dichotomous type question. Likert type scale question which was ranged from 1 (strongly disagree) to 5 or 4 (strongly agree).

Section “A” (6 questions) comprised demographic characters or personal information of the responder and section B (2 questions) include personal and family history or history of illness. Also, section “C” (8 questions) contained knowledge’s about DM in order to identify whether the condition is increasing due to lack of knowledge. Moreover, section “D” (12 questions) was designed to find out the behaviours and attitudes of respondents in order to achieve the main objective of the study.

The questionnaire was attached in APPENDIX A.

3.7 Pretesting:

After developing the questionnaire, it was exposed for pretesting with the age group which has chosen for this study. From the target age group, 10 individual was selected randomly and discussed whether they understand the questionnaire or not. After that, the questionnaire was modified according to their suggestions.

3.8 Validity and reliability:

The questions in the questionnaire were based on the objectives of the study. Also, the questionnaire was pretested and modified according to pretesting group’s suggestions.

Moreover, the questionnaire also was distributed after translating into Dhivehi language to help participants to understand the questions well.

As the questionnaire was based on the objectives of this study, the same results will be obtained, if this study was repeated by selecting the same age group and same characteristics of people, at another time by another researcher.

3.9 Data collection techniques:

Data was collected by using participant-administered questionnaire, which was translated into Dhivehi language and distributed to the target group. The whole process of data collection technique was organized and directly observed by the researcher. Moreover, the researcher has also rechecked the questionnaire in order to make sure, whether the respondents have fully completed it. This whole process was completed within 3 weeks.

3.10 Data analysis:

Once data was collected, specific codes were given to each question and was entered an authorized statistical software called SPSS to analyse data. Frequencies and percentages were used for descriptive statistics in the dependent variable. However, the mean and standard deviation were used for independent variables. The analysis was done to identify the contributing factors for increasing DM in Male' city. All data was presented by using tabular forms in order to find similarities and differences between dependent and independent variables.

3.11 Ethical consideration:

All the data collected from participants was only used for research purposes and there was no physical or psychological harm to participants. An informed consent was provided by explaining rights of the participant before conducting the study. It is a process that researchers respect respondent's autonomy to participate the research and they had the rights to withdraw their participation at any time without prejudice or preconception. Data of this research was presented in a numerical form and individual participants would not be identified in publications, presentation, and the like of.

The consent form of this study was attached in APPENDIX B.

3.12 Conceptual framework and measurement of variables:

In the conceptual framework of this study, there is a dependent and independent variables that interact each other. Independent variables of this study are used to identify the causes of DM and current status on the island. The following is the conceptual framework of this study.

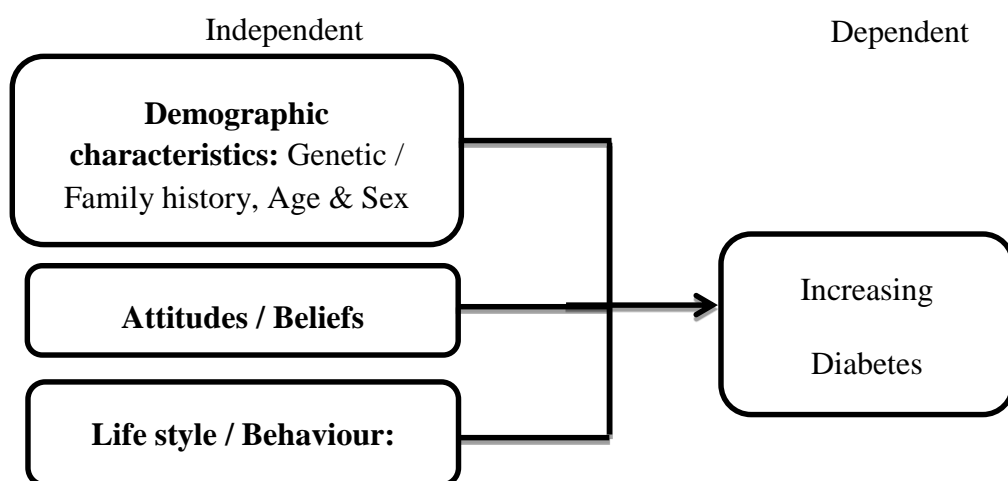


Figure 4. Conceptual framework

CHAPTER 4

RESULTS

This chapter encompasses the results of the study, which includes a brief description of all the results of the question in the questionnaire. Results were shown by using tables and a brief description of major findings in each question were there too.

The following table (Table 1) shows socio-demographic characteristics of respondents. Out of 191 participants, 40.3% (77) were males and 59.7% (114) were females. The majority (53.9%) were in the age group of 45 to 30 years and 46.1% were in the age group of 46 to 65 years. 6.8% (13) were single, 72.8% (139) were married, 12.6% (24) were divorced and 7.9% (15) were widowed. From the participants 33.5% (64) completed basic education, 13.6% (26) completed primary education, 25.1% (48) completed secondary education, 3.1% (6) completed higher secondary education 5.8% (11) completed certificate level, 13.6% (26) completed diploma, 3.7% (7) has completed their bachelor and 1.6% (3) has completed masters and above. Moreover, the majority of (62.8%) participants were employed, 23.6% were out of work, 3.7% were retired and 9.9% were unable to work. Also, looking at the occupation of the respondents, 22.5% works in administrative jobs, 8.4% do hard working such as carpentry, construction, and fishing. Moreover, 31.9% of respondents do other works such as sewing, art, backing, and watcher.

Table 1. Frequency and percentage of patients by socio-demographic characteristics.

Characteristics	Frequency n=191	Percent
Age		
< Mean	103	53.9
> Mean	88	46.1
Gender		
Male	77	40.3
Female	114	59.7
Marital Status		
Single	13	6.8
Married	139	72.8
Divorced	24	12.6
Widowed	15	7.9
Education Level		
Basic education	64	33.5
Primary education	26	13.6
Secondary education	48	25.1
Higher secondary	6	3.1
Certificate level	11	5.8
Diploma level	26	13.6
Bachelor level	7	3.7
Masters and above	3	1.6
Employment status		
Employed	120	62.8
Out of work	45	23.6
Retired	7	3.7
Unable to work	19	9.9
Occupation		
Administrative	43	22.5
Construction site / hard working	16	8.4
Others	61	31.9

Table 2 shows respondent's history of illness or NCDs. Out of 191 respondents, 98 (28.9%) of them has a family history of diabetes. 28% has a family history of hypertension, 20.1% has a family history of high cholesterol, 10% has a family history of heart disease and 3.8 has a family history of chronic kidney diseases. Also, 28.2% (64) of respondents were diabetes patients, 13.2% (30) has high cholesterol, 11.9% (27) has hypertension, 3.1% (7) has heart disease and only 2.2% (5) of them has chronic kidney diseases.

Table 2. Respondent's history of illness

Variables	Number n = 191	Percent
Family history of:		
Diabetes	98	28.9
Hypertension	95	28
Heart disease.	34	10
Chronic Kidney disease	13	3.8
High cholesterol	68	20.1
Chronic condition(s) of:		
Diabetes	64	28.2
Hypertension	27	11.9
Heart disease.	7	3.1
Chronic Kidney disease	5	2.2
High cholesterol	30	13.2

Table 3 shows respondent's knowledge toward diabetes mellitus. Out of 191 respondents, the majority of respondents which is 58.6% (112) says diabetes is increasing blood glucose level. However, 19.4% (37) respondents say diabetes is gaining weight, 12.0% (23) of them says it is craving sugary foods and 9.9% (19) does

not know what diabetes is. More than half of the respondents (63.9%) says that they know high blood glucose level by checking blood glucose level through the screening program. 16.2% (31) says that when they need to eat or drink more water , 6.8% (13) says rapid gaining weight and 13.1% (25) does not know that how they have high blood glucose level.

Out of 191 respondents, only 39.8% (76) received diabetes education. According to 191 respondents, 22.9% (147) says family history is a contributing factor in developing diabetes and 17% (109) says age is also a contributing factor in developing diabetes. 18.7% agreed that obesity is a contributing factor and 15.4% says inactivity is also a contributing factor in developing diabetes. Only 10% of respondents agreed that gestational diabetes is a contributing factor and 4.8% says smoking is also a contributing factor in developing diabetes. Moreover, a very few people say diabetes medication and hypertension is a contributing factor in developing diabetes. More than one-third (75.9%) of the total respondents says diabetes can be prevented.

According to 191 respondents, 19.4% believes that foot ulcer or diabetic foot is the most serious health problem caused by diabetes. 17.3% believes blindness, 15.9% believes kidney diseases, 15.1% believes amputation and 7.9% believes cardiovascular diseases are the most serious health problems caused by diabetes. A very few percentage of respondents believes that heart attack, stroke, impotence, and death are the most serious health problems. Moreover, 18.3% (151) believes regular check-ups is the most important thing a person diagnosed with diabetes can do to reduce the complication of it. 16.3% (135) believes regular exercise, 14.4% (119) believe taking regular medication, and 13.2% (113) believes eating healthy foods are the most

important things to do. However, 7.5% of respondents believes maintaining blood pressure and lowering cholesterol level are the most important things to do.

Table 3. Respondent's knowledge of diabetes mellitus.

Variable	Number n = 191	Percent
Diabetes is		
Increasing blood glucose level	112	58.6
Craving sugary foods	23	12.0
Gaining weight	37	19.4
Don't know	19	9.9
How do you know that you have high blood glucose level:		
through screening program (checking blood glucose level)	122	63.9
When you need to more sugary foods/ drink more water	31	16.2
Rapid weight gain	13	6.8
Don't know	25	13.1
Have you ever receive diabetes education?		
Received diabetes education	76	39.8
Factors that contribute to Diabetes:		
Age	109	17
Family history of diabetes	147	22.9
When I'm too fat	120	18.7
Gestational diabetes	65	10.1
Smoking	31	4.8
High blood pressure	13	2
Diabetic medication	29	4.5
Inactivity	99	15.4
High cholesterol and triglyceride level	30	4.7
Diabetes can be prevented:		
Yes	145	75.9
No	35	18.3

Table 3 continue

Variable	Number n = 191	Percent
The most serious health problem(s) caused by Diabetes:		
Kidney disease	91	15.9
Blindness	99	17.3
amputation	86	15.1
Cardiovascular disease	45	7.9
Foot ulcer	111	19.4
Heart attack	43	7.5
Impotence	28	4.9
Stroke	38	6.7
Death	30	5.3
The most important things a person diagnosed with diabetes can do to reduce the complication(s) of it are / is:		
Eating healthy foods	113	13.7
Regular exercise	135	16.3
Weight maintaining	109	13.2
Quit smoking	76	9.2
Taking regular medication	119	14.4
Maintaining blood pressure	62	7.5
Lower cholesterol level	62	7.5
Regular check-ups	151	18.3

Table 4 shows the respondents belief to control diabetes. Out of 191 respondents, 82 (42.9%) participant believed that diet that takes have some relation to control diabetes. Besides, 38.7% believe very much that diet has relation back to control diabetes. Also, more than half of them believes that the medicine they take, the information they know about diabetes and prevention and treatment have relation too.

Table 4. Respondent's belief to control diabetes.

The following have relation back to control diabetes	4	3	2	1
n = 191	%	%	%	%
Level of beliefs	Very True	Somewhat True	Somewhat Untrue	Very Untrue
Diet you take	38.7	42.9	9.4	8.9
Exercises you do	39.3	44.0	9.4	7.3
The medication you are taking	21.1	50.2	17.9	10.5
Prevention and treatment of diabetes	33.3	49.2	10.6	6.9
The information you know about diabetes	36.5	45.5	12.7	5.3

Score: 4 = Very True, 3 = Somewhat True, 2 = Somewhat Untrue, 1 = Very Untrue

Table 5 shows the frequency that respondents do exercise, fruits and vegetables and regular check-ups. According to 191 respondents, only 1% exercise regularly; 25.7% exercise rarely and 41.9% never exercise at all. Also, only 1% eat fruits every day, 44.5% eat fruits rarely and 2.6 never eat fruits. Other than this, 2.1 respondents eat vegetables every day; 39.3% rarely and 4.7% never eat vegetables. However, 46% of them do health check-ups occasionally and 37.1% do rarely and 16.8% never do regular or health check-ups.

Table 5. Frequency of exercise, fruits and vegetables and regular check-ups.

How often you do the following	5	4	3	2	1
n = 191	%	%	%	%	%
Level Of agreement	Every day	Almost every day	Occasionally	Rarely	Never
Exercise	1	12.6	18.8	25.7	41.9
Eat fruits	1	9.4	42.4	44.5	2.6
Eat vegetables	2.1	11	42.9	39.3	4.7
Regular check-ups	-	-	46.0	37.1	16.8

Score: 5= every day, 4= almost every day, 3= occasionally, 2= rarely, 1=never

Table 6 shows behavioural factors of the respondents. Out of 191 respondents, nearly half of them (49.7%) takes their meals 3 times a day; 30.9% takes twice; 17.8% takes more than 3 times and only a few percentage (1.6%) takes once a day their meal. Also, 46.1% prefers their meal or drink to be an average; 25.1% prefers less sugary; 20.4% prefers sugary and only 8.4% likes their meal or drink with no sugar.

According to 191 respondents, 41.9% does not do any exercise at all; 20.95 do walking as an exercise and 17.8% do jogging. Only a few amount of respondents do gym (6.3%), yoga (0.5%) and go for an exercise class (2.6%). Out of 190 respondents, more than half of the respondents sleep normally 6 to 8 hours. Moreover, out of 188 respondents, 31.4% were smokers; 24.6% were ex-smokers and 42.4% never smoke at all.

Table 6. Behavioural factors of the respondents.

Variable	Number n = 191	Percent
Frequency of meals:		
Once a day	3	1.6
2 times a day	59	30.9
3 times a day	95	49.7
More than 3 times a day	34	17.8
Preference of meal or drink to be:		
Sugary	39	20.4
Average	88	46.1
Less sugar	48	25.1
No sugar	16	8.4
Type of exercise normally do:		
Jogging	34	17.8
Walking	40	20.9
Swimming	10	5.2
Gym	12	6.3
Yoga	1	0.5
Exercise class	5	2.6
No exercise	80	41.9
Number of hours sleep normally:		N=190
More than 8 hours	35	18.3
6 to 8 hours	121	63.4
Less than 6 hours	34	17.8
Are you a smoker?		N=188
Yes	60	31.4
Not now	47	24.6
Never	81	42.4

Table 7 shows respondents barriers to exercise or hard to stick with an exercise plan. According to 191 respondents, 46.1% were strongly agreed that being busy with family or work whereas 11.5% strongly disagreed with this statement. 25.3% of respondents were strongly agreed that they do not exercise due to hesitancy; 21.6% agreed with this statement; 32.6% disagree and 20.5% strongly disagreed. 26.2% strongly agreed and other 26.2% agreed that peer pressure was the barrier to exercise whereas 27.2% disagreed and other 20.4 strongly disagreed with this statement. However, 25% agreed that they feel discouraged due to lack of result whereas 27.2% disagree to that. Also, 13.1% respondents do not exercise due to doctors' advice. More than half of the respondents strongly disagreed that they were healthy and no need to exercise.

Table 7. Respondents barriers to exercise or hard to stick with an exercise plan.

The barriers to exercise or hard to stick with an exercise plan:	4	3	2	1
n = 191	%	%	%	%
Level Of agreement	Strongly agree	Agree	Disagree	Strongly disagree
Being too busy with family or work	46.1	28.3	14.1	11.5
Due to hesitancy	25.3	21.6	32.6	20.5
Due to peer pressure	26.2	26.2	27.2	20.4
Feel discouraged due to lack of results	22.5	25.1	27.2	25.1
Doctor advised not to exercise	13.1	20.9	34.6	31.4
No need, I'm healthy	11.6	7.9	28.4	52.1

Score: 4=strongly agree, 3=agree, 2=disagree, 1=strongly disagree

Table 8 shows respondent's concerns about their health. Out of 191 respondents, 28.2% were not concerned about their health; 27.7% were slightly concerned and 20.7 were extremely concerned about their health. Also, 34.2% of respondent's not at all upset about their health problems though 12.8% were extremely upset about the health problem they have.

Table 8. Respondent's concerns about their health.

How much during the past month, you were	5	4	3	2	1
n = 191	%	%	%	%	%
Level Of concern	Not at all	Slightly	sometimes	Moderately	Extremely
Concerned about your health	28.2	27.7	9.6	13.8	20.7
Upset by your health problems	34.2	28.3	7.5	17.1	12.8

Table 9 shows the frequency and percentage of the items that respondents include in their meals. According to 191 respondents, most of them use tea/coffee (158), Roshi (133) and fish curry (114) for the breakfast. A very few amount of respondents uses fresh juice (8), fruits (10) and vegetable salad (12) in their breakfast. Also, most of them use rice (165), Garudhiya/Rihakuru (154) and fish curry (103) for the lunch. For dinner also, most of the use rice (141) and Garudhiya/Rihakuru (132).

Table 9. Frequency and percentage of items that respondents include in their meal.

Variable	Number n = 191	Percent
Breakfast		
Milk	81	10
Tea/coffee	158	19.5
Cereal	27	3.3
Roshi	133	16.4
Fish curry	114	14.1
Vegetable curry	74	9.1
Vegetable salad	12	1.5
Butter	10	1.2
Egg	55	6.8
Fruits	10	1.2
Fresh juice	8	1
Bread	59	7.3
Jam	38	4.7
Crumpy	30	3.7
Lunch		
Rice	165	19.9
Roshi	59	7.1
Vegetable curry	93	11.2
Fish curry	103	12.4
Vegetable salad	46	5.5
Fresh juice	19	2.3
Tea	43	5.2
Fried chicken/fish	69	8.3
Meat	25	3
Garudhiya / Rihaakuru	154	18.6
Theulufai	53	6.4

Table 9 Continue

Dinner		
Rice	141	21.8
Roshi	52	8
Vegetable curry	58	9
Fish curry	72	11.1
Vegetable salad	19	2.9
Fresh juice	6	0.9
Tea	47	7.3
Fried chicken/fish	59	9.1
Meat	19	2.9
Garudhiya / Rihaakuru	132	20.4
Thekulifai	42	6.5

Table 10 show the frequency and percentage of respondent's meal, sleep and awake time. According to 171 respondents, more than half (65%) of them take their breakfast between 8 to 10 o'clock; 22% takes between 6 to 8 clocks and 12.4% takes between 10 to 12 o'clock. Only 0.6% respondent takes their breakfast after 12 clocks. Out of 189 respondents, 55.6% takes their lunch between 1pm to 2 pm and 4.8% takes after 3 pm. Also, 44.1% takes their dinner between 8 pm to 9 pm; 34.1% takes between 9 pm to 10 pm and 9.5% takes after midnight. Out of 188 respondents, 41.5% sleeps after midnight; 27.1% sleeps between 11 pm to 12 am and 5.9% sleeps between 9 pm to 10 pm. Moreover, out of 191 respondents, 34% wakes between 5 am to 6 am; 23.6% awakes after 7 am and only 11.5% awakes 4 am to 5 am.

Table 10. Frequency and percentage of respondent's meals, sleep and awake time.

Variables	Number n = 171	Percent
Breakfast		
06:00 - 08:00	39	22
08:00 - 10:00	115	65
10:00 - 12:00	22	12.4
After 12:00	1	0.6
Lunch		
	N=189	
12:00 - 13:00	20	10.6
13:00 - 14:00	105	55.6
14:00 - 15:00	55	29.1
After 15:00	9	4.8
Dinner		
	N=179	
19:00 - 20:00	22	12.3
20:00 - 21:00	79	44.1
21:00 - 22:00	61	34.1
After 22:00	17	9.5
Sleep		
	N=188	
21:00 - 22:00	11	5.9
22:00 - 23:00	48	25.5
23:00 - 00:00	51	27.1
After 00:00	78	41.5
Wakeup		
	N=191	
04:00 - 05:00	22	11.5
05:00 - 06:00	65	34
06:00 - 07:00	59	30.9
After 07:00	45	23.6

Table 11 shows an association of diabetes with gender, family history, and lifestyle factors. When diabetes was associated with gender, family history, and lifestyle, a significant association was found between diabetes and family history ($P = 0.001$). Respondents who have a family history have 1.9% chances to develop diabetes than who do not have a family history of diabetes. Also, there is no significant association between diabetes and exercise ($P = 0.147$). However, respondents who do not exercise have a risk to develop diabetes since the odds ratio 1.408. By associating gender and diabetes, there is no weighty relation as a result of p-value is greater than 0.05 (0.381).

Table 11. Association of Diabetes with gender, family history and exercise.

Variables	n	Diabetes		Crude OR	95% CI	X^2	p-value
		Yes (%)	No (%)				
Gender						0.766	< 0.381
Male	64	35.9	42.5	1			
Female	127	64.1	55.5	1.115	0.880-1.412		
Family history						21.624	< 0.001*
No	127	39.4	60.6	1			
Yes	64	75.0	25.0	1.905	1.472-2.466		
Exercise						2.108	< 0.147
Yes	64	65.6	34.4	1			
No	127	75.6	24.4	1.408	0.892-2.223		

CHAPTER 5

DISCUSSION

This research was conducted to understand the contributing factors for increasing diabetes mellitus in Male' city area. A cross-sectional descriptive study design was used to collect data in this study. The target population in this study was the age group between 30 to 64 years in both sexes. A simple random sampling technique was used to accumulate statistics in this study and the total target population of this study was 35684 individuals including both male and female. The sample size was calculated by using software called Raosoft from the website "www.raosoft.com. The total sample size of this study was 381 individuals and 50% of sample size (191 individuals) was chosen for this study. A questionnaire was used as research instrument which includes four sections in this study.

The majority of respondents in this study were in the age group of 45 to 30 years (53.9%), married (75.8%), and women (59.7%), has a basic education (33.5%) plus were employed (62.3%) in the private or public sector. A similar study has conducted in Pakistan shows, the majority of their participants were young (73%), married (55%) women (55%), well-educated (graduated 51%) and housewives (19%) or in private service (44%) (Qidwai & Azam).

Prevalence of DM in South East Asia region is 8.5% of the adult population in 2015 according to IDF. This is equivalent to 78.3 million people living with diabetes. Over half (52.1%) of these are undiagnosed (International Diabetes Federation, 2015). Compare to that study, diabetes prevalence in this study is much high (28.2%) which are diagnosed a case of diabetes living in an urban area where education, job opportunities, and health facilities are available. Moreover, similar results have shown a study done in Bangladesh 2013. Their hypothesis was that the diabetes prevalence would be high in the Bangladeshi urban middle class. In that review, their study showed that prevalence of diabetes was much higher in the urban areas (8.1%) than in the rural areas (4.0%) (Saquib, et al., 2013).

This study shows, men live with diabetes is 35.9% and women live with diabetes is 64.15%. The chi-square test does not show any association between gender and diabetes since P value is greater than 0.05 ($P = 0.381$). However, the risk of developing diabetes is higher in women (1.115) compare to men (odds ratio = 0.845). A study conducted in 2003 in India shows quite a similar result as this study. It shows that, among the Zuni Indians, the prevalence of diabetes was 57% higher among female than male members of the population. According to them, culture, tradition, and lifestyle differences may contribute to the higher prevalence of diabetes and obesity among female Zuni Indians (Scavini, et al., 2003).

A study done by Northern Michigan Diabetes Initiative in 2012, found that over two-thirds of their respondents are reported, either they themselves or an immediate family member has been diagnosed with diabetes (Batler , Nowak, Sommerfield, & Cortville, 2012). Compare to that, in this study 28.9% (98) has reported with a family history of diabetes and 64 people reported with a history of diabetes.

A study done by The Central America Diabetes Initiative (CAMDI), in 2011, found that the great prevalence of risk factors was overweight, large waist circumference, sedentary lifestyle, and hypercholesterolemia (Belize, 2011). Compare to that, the result of this study indicated that, people live with diabetes and do exercise were 65.6% and does not do any exercise were 34.4%. Furthermore, Chi-Square test does not show any relationship between exercise and diabetes ($P = 0.147$), since the P-value for exercise is greater than 0.05. However, people who do not exercise has a greater risk of developing diabetes (odds ratio 1.408).

Poor knowledge and the dietary habit were the major cause of DM, obesity and HTN according to Obirikorang, et al. team in their study. Likewise, participants were asked about the kind of food they considered healthy. The majority of them considered butter, cheese, and cream (56.6%), soft drinks (53.1%), fast foods (40.6%), fibre rich foods (30.7%), and red meat (21.7%), and egg yolk (11.9%) as healthier food. The prevalence of obesity was also assessed in relation to the lifestyle characteristics of study participants. Interestingly, participants who ate snacks in between meals and ate late at night and those who were physically inactive and preferred fast foods were obese irrespective of the anthropometric measures used (Obirikorang, et al., 2015).

Compare to that, in this study, participants asked about numerous knowledge linked questions which include diabetes, contributing factors to diabetes, complications, prevention and treatment. Less than half of the respondents (39.8%) in this study received diabetes education through health education session, screening program or with an expert. More than half (58.6%) of respondents know that diabetes is increasing blood sugar. Also, 63.9% (122) knows that blood glucose level can check by screening. Few amount of respondents only knows that family history (22.9%), obesity (18.7%),

gestational diabetes (10%), inactivity (15.4%) and smoking (4.8%) are contributing factors to developing diabetes. Only 2% of respondents know high blood pressure is a contributing factor.

While respondents were asked about the complication of diabetes through multiple response questions, 19.4% says foot ulcer or diabetic foot was the complication, 17.3% say blindness and 15.9% says kidney disease. A very few percentage of respondent known impotence (4.95%), stroke (6.7%), cardiovascular disease (7.9%) and death (5.3%) is also a complication of diabetes. This study results also found that diabetes knowledge was poor among participants.

Participants were also asked about the most important things a person diagnosed with diabetes can do to reduce the complication of it. In their knowledge, regular check-ups (18.3%) and taking regular medication (14.4%) is the most important thing to do. However, 16.3% also believes that regular exercise, eating healthy foods (13.7%) and weight maintaining (13.2%) are the most important things to do.

Moreover, the majority of participants in this study consider tea / coffee (19.5%), Roshi (16.4%) and fish curry (14.1%) for the breakfast. A very few amount of participants considers fresh juice (1%), fruits (1.2%), vegetable salad (1.5%), butter (1.2%) and egg (6.8%) in their morning meal. Also, most common varieties participants consider in their lunch were rice (19.9%) and Garudhiya or Rihakuru (18.6%). Participants also consider fish curry (12.4%), vegetable curry (11.2%) and fried fish or chicken (8.3%). The same varieties as lunch, people consider in their dinners such as rice (21.8%), Garudhiya or Rihakuru (20.4%), fish curry (11.1%) and fried chicken (9.1%).

Likewise, participant's belief about control diabetes was also asked in this study. They believe that diet (42.9%), exercise (44%), and medicine they take (50.2%), prevention and treatment measures (49.2%), also information they know (45.5%) have some relation back to control diabetes.

According to Maina and team 2010, over 49.3 % of those with good knowledge had poor practices as far as diabetes is concerned. Also, low knowledge of diabetes in the community may result in poor attitude, however; this does not explain the poor practices even in people with good knowledge of the disease. They also say, knowledge does not always result in behaviour change and need to be reinforced (Ndegwa, Maina, Njenga, & Muchem, 2010). Similarly, in this study 41.9% never do any exercise at all and only 25.7% do exercise rarely. Also, 2.6% does not eat fruit and 4.7% does not eat vegetables at all. Only 1% do exercises regularly and eat fruits every day. Other than, exercising regularly and eating fruits and vegetables daily, they do medical check-ups occasionally (46%). There are also respondents who do not do any medical check-ups (16.8). Therefore, it is quite similar that the previous study.

It is worrisome that, overall 41.4% of the participants reported that they do not do know what diabetes is and 36.1% do not know how they have high blood glucose level. Some of the respondents think that diabetes was craving sugary foods (12%) and gaining weight (19.4%). Also, some of the respondents think that increasing blood sugar can identify by increasing weight and when they need to eat sugary foods or drink more water. Moreover, more than half 60.2% of the participants does not receive any information about diabetes. A similar research conducted in India 2014. It shows that overall only 41.5% of the general population reported that they knew about a condition called diabetes. Though overall the knowledge about diabetes was low there was

marked regional variation in unawareness levels varying from 83.5% in rural Jharkhand to 27.7% in urban Tamil Nadu (Deepa, et al., 2014).

This study also assessed several lifestyle characteristics of respondents. Nearly half of the participants (49.7%) take their meals 3 times a day, 65% peoples have their breakfast between 8 am to 10 am and 12.4% have between 10 am to 12 am. Also, 55.6% have their lunch between 1 pm to 2 pm and 29.1% have 2 pm to 3 pm. Most of them have their dinner in between 8 pm to 9 pm (44.1%) and 9 pm to 10 pm (34.1%). 41.5% participants sleep after 12 am and 30.9% awake between 5 am to 6 am. However, looking at risk behaviours, 41.9% does not do any exercise, more than half of the respondents sleep 6 to 8 hours normally, 31.4% were heavy smokers, and 25.1% prefers their meal to be an average amount of sugar. Also, 17.8% sleeps less than 6 hours, 20.4% prefers their meal to be sugary and 17.8% takes more than 3 meals per day. Which include late night snakes, taking snakes in-between. A similar study conducted in Ghana 2015 has assessed several lifestyle characteristics of diabetic patients. The common lifestyle behaviours were taking snacks in between meals (16.8%), eating at late hours on the night (13.3%), regular physical exercise (24.5%), smoking (0.7%), and alcoholic intake (2.8%). From that study, less than 30% of the diabetic patients did regular physical exercise and the most common forms were walking (57.1%) and jogging (42.9%) (Obirikorang, et al., 2015).

Another matter of concern is that overall 75.9% of the participants was aware that diabetes could be prevented. However, awareness of the major risk factors for diabetes such as family history of diabetes (22.9%), overweight/ obesity (18.7%), high blood pressure (2%), high cholesterol and triglyceride level (4.7%), smoking (4.8%), gestational diabetes (10.1%) and lack of physical activity (15.4) was poor. Also, unless

the respondents know that diabetes can be prevented and are somehow aware of risk factors, primary prevention of diabetes is unlikely to become feasible in Male' city. According to health master plan 2016 to 2025, in Male', 15% had obesity 25 (BMI>30kg/m²), 42% had low levels of physical activity. Also, adult health is an area that has not been given adequate attention, predominantly as this age group is a group with lesser health needs. However, they also noted that, with the growing burden of chronic and non-communicable diseases, there is growing recognition of designating health interventions targeting this age group. The Maldives Demographic Health Survey indicated that a number of unhealthy practices such as tobacco use, drug use, physical inactivity and unhealthy diet leading to obesity are prevalent in this age group (Ministry of Health, 2014).

Furthermore, participants were asked about the barriers to exercise or hard to stick to exercise plan. Nearly half of the respondents (46.1%) strongly agreed that being busy with work or family as the biggest barrier. 25.3% also was strongly agreed that due to hesitancy 26.2% says it was due to peer pressure. Moreover, 25.1% agrees that they feel discouraged due to lack of results of exercise and 20.9% says that their doctor advised not exercise. More than half of the respondents also believe that they need to excise to be healthy whereas, 11.6% totally disagreed to that. A similar kind study done in the year 2014, Ramachandran found that nearly 95% of people with diabetes are TII diabetes. According to him, a greater percentage of TII diabetes has been observed in SEA Region, in both urban and rural areas. These people are mostly associated with the lifestyle changes towards urbanization and industrialization. He also suggests that a large portion of TII DM may preventable by lifestyle modification. (Ramachandran, 2014).

A study done in India shows, 80% of the surveyed population was encouraged sedentary in an occupation like teachers, clerk, business skilled workers and homemakers has a higher risk of developing diabetes (Naayana, Balachandra, Hiremath, Iyengar, & Anil, 2010). In the same way, most of the participants in this study were encouraged in administrative works (22.5%), hardworking (8.4%) such as construction site, carpentry, fishing and other works (31.9%) such as sewing, art, teacher, watcher, babysitting, and cake baking.

Limitation:

The major limitation of this study is data collection time constraints were required to 3 weeks as this research was academics purpose. Thus, the findings of this study cannot conclusively represent the whole target population or sample size of the target population in Male' city. However, findings of this study concur well with other previous studies. Another limitation was social desirability in which respondent's answers sometimes was.

Conclusion:

The present study provides a snapshot of the current situation of knowledge, awareness and behaviour toward diabetes in Male' city in the age group of 30 to 64 bracket. Participants have good knowledge and positive attitude over diabetes. Nevertheless, lack of appropriate physical behaviour and practices puts them at risk of developing the disease condition. Moreover, rather than treating the disease, the participants should learn and practice to prevent from it. Appropriate use of medications, dietary advice, and physical activity, maintaining weight and had best BMI values should be included in their treatment. The study reinforces the need to encourage a healthy lifestyle, healthy

food inhibits, and a physically active daily routine, among participants to overcome DM related complications in Male' city. In the meantime, resources should be directed at increasing awareness of diabetes education with an emphasis on encouraging health behaviours that are protective and discouraging behaviours that put people at risk. In addition to that, it is essential to implement health education and screening programs for early detection of diabetes.

CHAPTER 6

RECOMMENDATION

Taking the total target group or full sample size would be more reliable to get actual contributing factors of increasing DM among 30 to 64 years of age group. Also, rather than conducting a quantitative research, it would be much more reliable to conduct qualitative one to find out the actual reasons of increasing DM. Including knowledge, attitude, and behaviour related more question such as open-ended would also be helpful to find more about the target population. Moreover, instead of cross-sectional descriptive study design, a cohort would help to learn more about the study population.

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APPENDIX

APPENDIX A

QUESTIONNAIRE

All the questions contained in this questionnaire are strictly confidential.

Section - A - Demographic characters

1. Sex: a. Male b. Female

2. Age:

3. What is your marital status?

a. Married

b. Single

c. Divorced

d. Widow

4. What is the education level you have completed?

a. No schooling completed

d. Up to O' level

b. Primary school

e. A' level

c. Secondary school

f. Higher studies

5. Are you currently..?

a. Employed

d. Unable to work

b. Out of work

c. Retired

6. If you are employed, what is your occupation or type of work you do?

- a. Administrative
- b. Construction site / hard working
- c. Housewife

Section - B - History of Illness

7. Any member of your family has any of the conditions stated below? (Tick as appropriate)

- a. Diabetes
- b. Hypertension
- c. Heart disease
- d. Chronic kidney disease
- e. High cholesterol
- f. None of them

8. Do you have a chronic condition(s) of?(tick if you have any of the following chronic conditions)

- a. Diabetes
- b. Hypertension
- c. Heart disease
- d. Chronic kidney disease
- e. High cholesterol
- f. Never tested or diagnosed

Section - C - Knowledge

9. In your view what is diabetes?

- a. Increase in blood glucose level
- b. Craving sugary foods
- c. Gaining weight
- d. Don't know

10. How would you know that you have high blood glucose level?

- a. Through screening program (checking blood glucose level)
- b. When you need to eat or drink more water
- c. Rapid weight gain
- d. Don't know

11. Have you ever received diabetes education, for example, attended a health education session with a diabetes educator?

- a. Yes
- b. No

12. What are the factors that contribute to Diabetes? (tick as many as you think is correct)

- | | |
|--|---|
| <input type="checkbox"/> a. Age | <input type="checkbox"/> h. Inactivity |
| <input type="checkbox"/> b. Family history of diabetes | <input type="checkbox"/> i. High cholesterol and triglyceride level |
| <input type="checkbox"/> c. When I'm too fat | <input type="checkbox"/> j. If I take all meals in the day |
| <input type="checkbox"/> d. Gestational diabetes | <input type="checkbox"/> k. Sleeping too much |
| <input type="checkbox"/> e. Smoking | <input type="checkbox"/> l. Drinking more water |
| <input type="checkbox"/> f. High blood pressure | |
| <input type="checkbox"/> g. Diabetic medication | |

13. Can Diabetes be prevented?

- a. Yes
- b. No

14. you think the following have relation back to control diabetes:

Levels of belief	Very untrue 0	Somewhat untrue 1	Neutral 2	Somewhat true 3	Very true 4
a. Diet you take	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Exercises you do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. The medication you are taking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Prevention and treatment of diabetes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. The information you know about diabetes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. In your view, what are the most serious health problems caused by diabetes?

- | | |
|--|--|
| <input type="checkbox"/> a. Kidney disease | <input type="checkbox"/> f. Heart attack |
| <input type="checkbox"/> b. Blindness | <input type="checkbox"/> g. Hypertension |
| <input type="checkbox"/> c. Amputation | <input type="checkbox"/> h. Impotence |
| <input type="checkbox"/> d. Cardiovascular disease | <input type="checkbox"/> i. Stroke |
| <input type="checkbox"/> e. Foot ulcers | <input type="checkbox"/> j. Death |

16. In your knowledge, what are the most important things a person diagnosed with diabetes can do to reduce the complication of it? (tick as many as you think is correct)

- | | |
|--|--|
| <input type="checkbox"/> a. Diet: taking healthy meals | <input type="checkbox"/> c. Lose weight, if overweight |
| <input type="checkbox"/> b. Regular exercises | <input type="checkbox"/> d. Quite smoking |

e. Take prescribed medications

g. Lower cholesterol level

h. Regular check up

f. Lower blood pressure

Section - D – Behaviour and Practice

17. How often do you do the following?

Level of Agreement	Never 0	Rarely 1	Occasionally 2	Almost every day 3	Every day 4
a. Exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Eat fruits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Eat vegetables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Regular check-ups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. How often do you take your meals?

a. Once a day

b. 2 times a day

c. 3 times a day

d. More than 3 times a day

19. How you prefer your meal or drink to be?

a. Sugary

b. Average

c. Less sugar

d. No sugar

20. What are the foods normally you eat for breakfast? (tick as many as you used to eat)

a. Milk

h. Butter

b. Tea/coffee

i. Egg

c. Cereal

j. Fruits

d. Roshi

k. Fresh juice

e. Curry (fish)

l. Bread

f. Curry (vegetable)

m. Jam,

g. Vegetable salad

n. Crumpy,

21. What are the foods normally you eat for lunch? (tick as many as you used to eat)

a. Rice

g. Tea

b. Roshi

h. Fried chicken/ fish

c. Curry (vegetable)

i. Meat

d. Curry (fish)

j. Garudhiya / Rihaakuru

e. Salad (vegetables)

k. Theluli fai

f. Fresh juice

22. What are the foods normally you eat for dinner? (tick as many as you used to eat)

a. Rice

e. Curry (vegetable)

b. Fresh juice

f. Curry (fish)

c. Tea

g. Salad (vegetables)

d. Roshi

h. Fried chicken/ fish

i. Meat

k. Theluli fai

j. Garudhiya / Rihaakuru

23. What time you normally?

	a. Between	b. Between	c. Between	d. After
a. Have your breakfast	6:00-8:00 <input type="checkbox"/>	8:00-10:00 <input type="checkbox"/>	10:00-12:00 <input type="checkbox"/>	12:00 <input type="checkbox"/>
b. Have your lunch	12:00-13:00 <input type="checkbox"/>	13:00- 14:00 <input type="checkbox"/>	14:00-15:00 <input type="checkbox"/>	15:00 <input type="checkbox"/>
c. Have your dinner	19:00-20:00 <input type="checkbox"/>	20:00-21:00 <input type="checkbox"/>	21:00-22:00 <input type="checkbox"/>	22:00 <input type="checkbox"/>
d. Sleep	21:00-22:00 <input type="checkbox"/>	22:00-23:00 <input type="checkbox"/>	23:00-00:00 <input type="checkbox"/>	00:00 <input type="checkbox"/>
e. Wakeup	4:00-5:00 <input type="checkbox"/>	5:00-6:00 <input type="checkbox"/>	6:00-7:00 <input type="checkbox"/>	7:00 <input type="checkbox"/>

24. What type of exercise you do?

a. Jogging

b. Swimming

c. Other exercises (playing football, volleyball etc..)

d. No exercise at all

25. How many hours you sleep normally?

a. More than 8 hours

b. 6 to 8 hours

c. Less than 6 hours

26. What are the barriers to exercise or hard to stick with an exercise plan?

Level of Agreement	Strongly Disagree	Disagree	Neither agree / disagree	Agree	Strongly agree
	0	1	2	3	4
a. Being too busy with family or work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Due to hesitancy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Due to peer pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Feel discouraged due to lack of results	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Doctor advised not to exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a. No need, I'm healthy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

27. How much during the past month, you were

Level of concern	Not at all	Slightly	Sometimes	Moderately	Extremely
	0	1	2	3	4
b. Concerned about your health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Upset by your health problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

28. Are you a smoker?

- a. Yes
- b. Not now
- c. Never

**These are all the questions I have. Thank you very much for taking the time to
take part in this study**

APPENDIX B

Contributing factors of increasing diabetes patients in K. Male' city, among the age group of 30-64years

My name is Khadeeja Yaugoob from The Maldives National University, Faculty of Health Sciences, doing bachelor of Primary Health care. This research is a part of my course identifying the contributing factors of increasing diabetes patients in K. Male' city, among the age group of 30-64years

Your participation in this survey will support me in identifying and understanding factors related to increasing Diabetes mellitus. The data collected from participants will be used only for research purposes and all the answers you gave will be kept strictly confidential. The results of this study will be presented as numerical form and individual participants will not be identified in presentations and publications.

Your participation in this survey is autonomous. Also participant has rights to withdraw his/her participation at any time during the research. Furthermore, participating in this research does not cause any harm to the respondents and there will be nothing that the respondents must be responsible.

I received full information regarding this study. As well as, agree to participate in this study voluntarily and agree to give information for purposes of this study.

Date: _____

Signature: _____