

**IMPACT OF OUT OF POCKET HEALTH EXPENDITURE
ON HEALTH STATUS AMONG DIABETESE
PATIENTS IN THE MALDIVES**

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November, 2016

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A Project submitted in partial fulfillment of the requirements for the award of the
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November, 2016

DECLARATION

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

Signature:

Date: 13th November 2016

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ABSTRACT

Diabetes Mellitus (DM) is a one of the leading causes of mortality globally and nationally which has considerable impact on health expenditure and health status. The main purpose of this study was to identify the linkage between out of pocket expenditure and health status among DM patients in Maldives. A cross-sectional descriptive study was conducted, using 100 patients diagnosed with DM selected through systematic sampling. Interviewer-administered questionnaires were used to collect the data on socio-demographics, out of pocket expenditures, health status, comorbidities, and management of DM. Data was analyzed using excel spreadsheets, SPSS statistical software version 20 and the open source R software, version 3.1.0. This Study revealed that, OOPE is very low among Maldivian DM patients where majority of them preferred government health facilities for treatment. Health status of most of the DM patient were good whereby majority were mobile, able to self-care themselves, able to do usual activities and free from pain or discomfort and also free from anxiety or depression. Comorbidities common to Maldivians DM patients were HTN, CVD, kidney disease and Thyroid. Majority of the DM patient do not exercise or limit their diet to manage the disease. Instead majority depended on medications to manage their blood sugar. A significant relationship was found between out of pocket expenditure on travel and the ability to conduct usual activities and out of pocket expenditure on investigations and self-care level of the DM patient. Findings from this study present evidence on the need to create awareness among patients on the importance of adjusting diet, increasing exercise and limiting dependence on medicines. Preference of Maldivian DM patients to use public health facilities is an indication of affordability and trust in the public health system. However, low utilization of free health care provided by NGOs can be further researched.

Keywords: DM, Out of pocket expenditure, health status, Maldives

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Aminath Jameel

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LIST OF ABBREVIATIONS

COPD	Chronic Obstructive Pulmonary Disease
CRD	Chronic Respiratory Disease
CVD	Cardiovascular Disease
DM	Diabetic Mellitus
DSM	Diabetes Society of Maldives
HTN	Hypertension
MOH	Ministry of Health
NCDs	Non- Communicable Diseases
OOPE	Out of Pocket Expenditure
SPSS	Statistical Package for Social Sciences
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Background to the Study

Non communicable diseases (NCDs) are a global burden, as it is the leading threat to the health and development of the country. The four main types of NCDs are CVD, for instance, heart attacks and strokes, cancer, CRD (such as COPD and asthma) and DM. However, there are many more NCDs Such as HTN, Cholesterol, obesity etc. Ischemic heart disease and cerebrovascular disease are among the top six causes of the global burden of disease (WHO, 2008). Diabetes Mellitus (DM) is one of the biggest health problems in the world. In 2014, 8.5% of adults aged 18 years and older had diabetes and in 2012 diabetes was the direct cause of 1.5 million deaths and high blood glucose was the cause of another 2.2 million deaths (WHO, 2016). Diabetes is a major cause of blindness, kidney failure, heart attacks, stroke and lower limb amputation (WHO, 2016). WHO projects that DM will be the 7th leading cause of death in 2030 (WHO, 2016).

As noted by WHO Non communicable diseases (NCDs) mainly cardiovascular diseases, chronic respiratory diseases, diabetes and cancer are top killers in the South-East Asia Region, claiming an estimated 8.5 million lives each year (WHO, n.d.). Narain et al (2011) in 2008, estimated

totaldeaths in the South-East Asia region at 14.5 million, with cardiovascular diseases accounting for 25%, chronic respiratory diseases 9.6%, cancer 7.8% and diabetes 2.1% (Narain, Garg, & Fric, 2011). NCDs kill people at a relatively younger age in South East Asian Region compared to the rest of the world; one-third (34%) of the 7.9 million deaths in South East Asian Region occur in those below the age of 60 years compared to 23% in the rest of the world (WHO, 2011). “According to the International Diabetes Federation, 77.6 million people had DM in South Asian countries in 2011 and the region represents one-fifth of the world’s population with DM. Bangladesh had the highest prevalence of DM adults in the region at 10.7%, with Maldives next at 9.4%” (Bergman, 2014). In India, 25% of total family income is allocated to the patient care in a low-income family with one diabetic adult (Spinaci S, Currat L, Shetty P, Crowell V, Kehler J., 2006 as cited in (Tol, Sharifirad, Shojaezadeh, Tavasoli, & Azadbakht, 2013).

Cardiovascular diseases (CVDs), chronic respiratory diseases, accidents and injuries, diabetes and cancers are the leading causes of death in the Maldives (MOH, 2016a). According to (IDF, 2015) in 2015 there were 17,100 cases of DM in Maldives. In 2011, the 9th leading cause of death in Maldives is DM with 29 deaths (MOH, 2012). And in 2014 also DM was the 9th leading cause of death (MOH, 2016a). The government of Maldives introduced ‘Aasandha’ health insurance program whereby all Maldivians are able to get free health care at public health facilities. However, the National health accounts (2013) reports that household out-of-pocket spending in the Maldives represented 49% of total health expenditure.

Increasing health care spending from out of pocket remains an important barrier to accessing health care and finally affects the health status of people living with diseases.

1.2 Problem Statement

Increasing NCDs in Maldives causes the government to bear high financial burden to provide health care, medicine and insurance, to all citizens of Maldives. Maldives has the highest per capita expenditure on health in the south East Asia region (WHO, 2007) and it has one of the highest out of pocket expenditure on health rates in the region too. Hence, this study is of relevance to the country situation. In 1948, WHO defined health from a new perspective, stating that health was defined not only by the absence of disease and infirmity, but also by the presence of physical, mental and social well-being (WHO, 1948). People with DM often feel challenged by their disease and must deal with their health all day. Darvishpoor Kakhki, and Abed saeedi (2013) argue that Health-related quality of life is an important factor for self-management behaviors of diabetic patients. These behaviors have special importance in preventing complications of diabetes (Darvishpoor Kakhki & Abed saeedi, 2013). Similarly, Jain, Shivkumar, and Gupta stressed that quality of life is an important aspect in diabetes because poor quality of life leads to diminished self-care, which in turn leads to worsened glycemic control, increased risks for complications, and exacerbation of diabetes overwhelming in both the short run and the long run (Jain, Shivkumar, & Gupta, 2014). One cross-sectional survey found that out-of-pocket medication costs pose a significant burden to many adults

with diabetes and contribute to decreased treatment adherence (Piette, Heisler, & Wagner, 2004). Therefore, it is important to know the out of pocket expenditure and its impact on the health status of DM patients.

1.3 Objectives of the study

1.3.1 General objective

- ✓ To identify the out of expenditure outflows on DM in Maldives.
- ✓ To determine the health status of DM patients.
- ✓ To explore the linkages between health expenditure and health status of DM patients in Maldives.

1.4 Research Questions

What is the impact of out of pocket health expenditures on health status among DM patient in Maldives?

1.5 Significance of the Study

There has been no survey conducted in Maldives that identified the impact of health expenditures on health status among DM patients. Also, there is no previous study that explored the health status of DM patients in the Maldives. Therefore, this study is important to identify the relationship between health expenditure on health status among DM patients. Findings from this study can be valuable for the MOH, DM clinic at IGMH and DSM for the future research and control interventions.

1.6 Scope of the study

This study focused on Maldivians who were diagnosed with DM. However, this study did not cover all age groups. The study was, also limited to Male' and another atoll which may restrict the ability to generalize the findings to the whole population. The literature review done for this study is limited to areas which focus on out of pocket expenditures and health status of DM and these literatures were limited especially in Maldives. The period of this study was three months.

1.7 Definitions of Terms

DM

Diabetes mellitus diagnosed if the (venous) fasting plasma glucose(FPG) value is ≥ 7.0 mmol l⁻¹ (126 mg dl⁻¹), or if the casual plasma glucose value is ≥ 11.1 mmol l⁻¹(200 mg dl⁻¹), or if the plasma glucose value 2 hours after a 75g oral load of glucose ≥ 11.1 mmol l⁻¹ (200 mg dl⁻¹) (WHO, 2003).

EQ5D

EuroQOL five dimensions questionnaire is a standardized instrument for use as a measure of health outcome (EuroQol Group, n.d.).

Expenditure

An amount of money spent on something (Merriam-Webster, n.d.).

Health

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO, 1948).

Health Status

A holistic concept that is determined by more than the presence or absence of any disease (AIHW, n.d.).

NCDs

Non-communicable diseases also known as chronic diseases are those diseases that do not pass from person to person.

Out of pocket

Paid for with your own money rather than with money from another source.

CHAPTER 2

LITRETURE REVIEW

Many researches have been conducted around the world to explore, describe and explain the facts and evidence of the different aspects of diabetes. This literature review would demonstrate evidence for understanding the current study. The theoretical framework of the study will be highlighted along with the gaps in the literature reviewed for the study. The theoretical framework provides the background that supports this research and together with other existing literature, it offers a justification to conduct this study.

2.1 Theoretical Framework

This study is based on Translating Research into Action for Diabetes (TRIAD) conceptual model (TRIAD, 2009). TRIAD is a national, multicenter prospective study that provides useful information about effective treatments and better care for people with diabetes in managed care settings. TRIAD was launched in 1998 to evaluate whether managed care organizations' structures and strategies affect the processes and outcomes of diabetes care among adults, and to identify the barriers to and facilitators of high-quality care and optimal health outcomes. TRIAD findings indicated that health system interventions only modestly affected patient outcomes. Figure 1 shows a chart to represent all the factors of this model.

Figure 3. TRIAD conceptual model of relationships among patient factors, patient-system interactions, processes, and outcomes of care

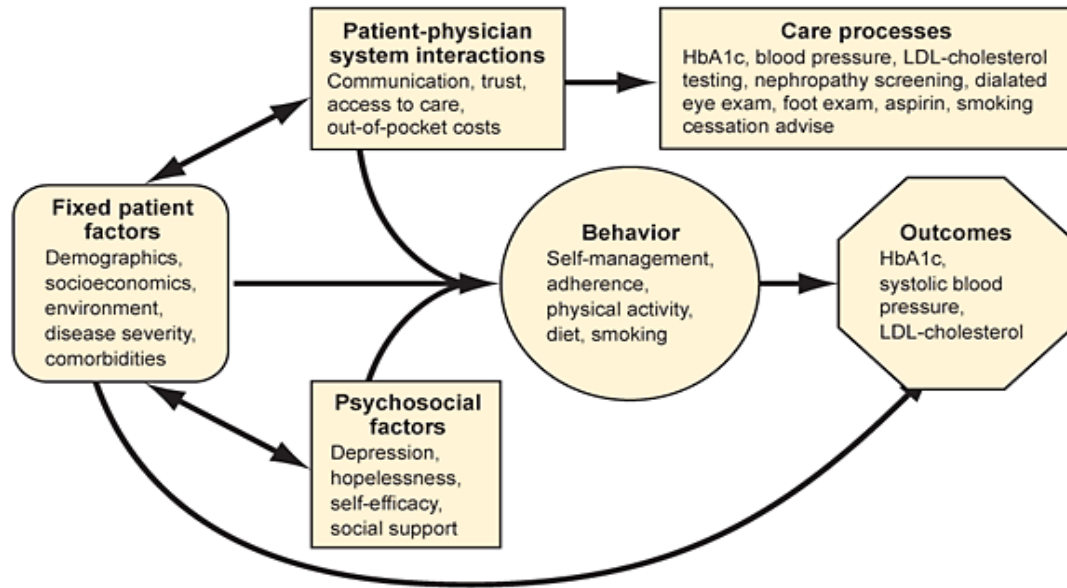


Figure 1 TRIAD conceptual model of relationship among patient factors, patient-system interactions, process and outcomes of care

2.2 Existing literature

2.2.1 Socio-demographic Factors

According to (WHO, 2011) people of lower social and economic positions fare far worse. Vulnerable and socially disadvantaged people get sicker and die sooner as a result of NCDs than people of higher social positions; the factors determining social positions are education, occupation, income, gender and ethnicity. Similarly Ian (2013) stressed that NCDs plays important role in increasing the financial on Ministries of Health and Ministries of Finance (Ian, 2013). He added that there is strong evidence for the correlation between a host of social determinants, especially education, and prevalent levels of NCDs and risk factors. WHO identifies that the costs to health-care systems from NCDs are high and projected to increase. Significant costs to individuals, families, businesses, governments and health systems add up to major macroeconomic impacts (WHO, 2011). WHO highlights heart disease; stroke and diabetes cause

billions of dollars in losses of national income each year in the world's most populous nations. Economic analysis suggests that each 10% rise in NCDs is associated with 0.5% lower rates of annual economic growth (WHO, 2011).

It is argued that the people with diabetics are prone to low socioeconomic status, low educational status, being unmarried, urban dwelling, and unemployment. These Socio-demographic risk factors may be influenced by the depression associated with diabetics (Habtewold, Alemu, & Haile, 2016).

This view is in some way supported by Tol et al. (2013) who writes that there was a statistically significant relationship between diabetes complications, age group, educational level, job status, relationship with family members, number of family visits and the reassurance provided by the family, type of leisure time activities, health status, years with diabetes, smoking, type of treatment, fried food consumption and income ($P < 0.001$), sense of security and communication in living environment ($P < 0.002$) and daily intake of vegetables ($P < 0.02$) (Tol, Sharifirad, Shojaezadeh, Tavasoli, & Azadbakht, 2013).

2.2.2 Medical History

Researchers believe that to treat type 2 diabetic's mellitus, controlling glycemic is vital. This could be achieved by regular physical activity and exercising. Similarly, physical inactivity may decrease the quality of life of the diabetic patients. A planned exercise education program and incorporation of exercise into the lifestyle can improve the quality of life of patients with type 2 diabetes mellitus (Çolak et al., 2016).

American diabetic Association argued that "Regular exercise has been shown to improve blood glucose control, reduce cardiovascular risk factors, contribute to weight

loss and improve well-being. Furthermore, regular exercise may prevent type 2 diabetes in high-risk individuals” (American Diabetes Association, 2002).

In her study Harris (2000) identified that the most DM patients were treated with insulin or oral agents for their diabetes (76%), and 45% of those patients taking insulin monitored their blood glucose at least once per day the patients were frequently screened for retinopathy (52%), hypertension (88%), and dyslipidemia (84%) (Harris, 2000).

Barnett and Kumar (2009) also supports the role played by physical activity in controlling diabetics. They stated that by carrying out regular moderate intensity physical activity carried out three times a week will improve blood glucose level. Although this improvement is relatively small, the improvement is quite significant. In their research it showed that two randomized trials have showed that life style interventions including 150 minute a week of physical activity and diet-induced weight loss of 5-7% reduced the risk of progression from impaired glucose tolerance (IGT) to type 2 diabetes by 58% (Barnett & Kumar, 2009)

Comorbidity, defined as the occurrence of one or more chronic conditions in the same person with an index-disease, occurs frequently among patients with diabetes. Currently, integrated diabetes care programs focus on diabetes-related comorbidities like cardiovascular diseases, retinopathy, nephropathy and diabetic foot. However, patients with diabetes do not only have diabetes-related comorbidity but also have non diabetes-related comorbidity, such as depression and musculoskeletal diseases (Struijs, Baan, Schellevis, Westert, & van den Bos, 2006).

Thommasen and Zhang ranks coronary artery disease (16%) as the number one complication as a result of diabetics. Their research showed that coronary artery disease

is followed by retinopathy (15%) and cerebrovascular accidents (9%), neuropathy (9%). Peripheral vascular disease (7%), and nephropathy (6%) are also significant consequence of diabetics (Thommasen & Zhang, 2006).

People with diabetes and multiple co-existing chronic medical conditions have poorer health related quality of life than those without these condition. For example, subjects with diabetes and co-existing cardiovascular diseases reported significantly lower scores on RAND-36 social functioning, vitality and health-change scales (Wee, Cheung, Li, Fong, & Thumboo, 2005).

According to World Health Organization diabetic retinopathy is a leading cause of blindness and visual disability (WHO, n.d.). Diabetic retinopathy is estimated to be the most frequent cause of new cases of blindness among adults aged 20–74 years (American Diabetes Association, 2002). In a study which set out to determine the prevalence of diabetic retinopathy among adults in the United States, Ophthalmol (2004) found that among an estimated 10.2 million US adults 40 years and older known to have DM, the estimated crude prevalence rates for retinopathy and vision-threatening retinopathy were 40.3% and 8.2%, respectively. The estimated US general population prevalence rates for retinopathy and vision-threatening retinopathy were 3.4% (4.1 million persons) and 0.75% (899 000 persons) (Ophthalmol, 2004).

Diabetes is among the leading causes of kidney failure. In addition to this chronic kidney disease (CKD) is a common comorbidity in patients with type 2 diabetes mellitus (T2DM) and both conditions are increasing in prevalence. CKD is estimated to affect ~50% patients with T2DM globally, and its presence and severity markedly influences disease prognosis (Thomas, Cooper, & Zimmet, 2016). Joslin and Khan argue that diabetic nephropathy occurs in 30% to 50% of patient with DM (Joslin &

Kahn, 2005). In a study which set out to determine Prevalence of chronic kidney disease in patients with type 2 diabetes mellitus treated in primary care, Lou Arnal et al., (2010) found that of the 16,814 patients enrolled, 3,466 (20.6%) had DM2. In DM2 patients, the prevalence of CKD was 34.6% (IC 95%, 33-36.2). GF <60 ml/min/m² was recorded in 25.2% of DM2 patients (Lou Arnal et al., 2010).

Diabetic neuropathy is probably the most common complication of diabetes. Diabetic foot disease, due to changes in blood vessels and nerves, often leads to ulceration and subsequent limb amputation (WHO, n.d.). Likewise, American Diabetes Association (2002) holds the view that amputation and foot ulceration are one of the most common consequences of diabetic neuropathy and a major cause of morbidity and disability in people with diabetes. Early recognition and management of independent risk factors can prevent or delay adverse outcomes (American Diabetes Association, 2002).

“Heart disease accounts for approximately 50% of all deaths among people with diabetes in industrialized countries” (WHO, n.d.). Cardiovascular disease (CVD) is the major cause of mortality for persons with diabetes. It is also a major contributor to morbidity and direct and indirect costs of diabetes. Type 2 diabetes is an independent risk factor for macro vascular disease and its common coexisting conditions (e.g., hypertension and dyslipidemia) are also risk factors (American Diabetes Association, 2002). In his review of Prevalence of and risk factors for coronary heart disease in diabetes mellitus, Nesto (2014) identifies people with diabetes have a higher prevalence of coronary heart disease (CHD), a greater extent of coronary ischemia, and are more likely to have a myocardial infarction (MI) and silent myocardial ischemia, compared to individuals without diabetes (Nesto, 2014). A cohort study of Jeremiah Stamler et al., (1993) reports that among 5163 men who reported taking medication for diabetes, 1092 deaths (603 CVD deaths) occurred in an average of 12 years of follow-up and

absolute risk of CVD death was much higher for diabetic than non-diabetic men (Jeremiah Stamler, Olga Vaccaro, James D Neaton, Deborah Wentworth, & Multiple Risk Factor Intervention Trial Research Group, 1993).

Hypertension (blood pressure $\geq 140/90$ mmHg) is a common comorbidity of diabetes, affecting 20–60% of people with diabetes, depending on age, obesity, and ethnicity. Hypertension is also a major risk factor for cardiovascular disease and micro vascular complications such as retinopathy and nephropathy (American Diabetes Association, 2002a). Surveys such as that conducted by J Hypertens (1993) have shown that thirty-nine per cent of the patients (35% of the males, 46% of the females) were hypertensive (mean blood pressure $>$ or $= 160$ systolic and/or $>$ or $= 90$ mmHg diastolic 2 and 9 months after diagnosis of diabetes, or taking antihypertensive therapy) (Hypertens, 1993).

According to (WHO, 2014) total deaths of Maldives is 1300, from this NCDs are estimated to account for 81% of total deaths. That is 39% of CVD, 12% cancer, 10% CRD, 2% DM and other NCDs 18%. The probability of dying between ages 30 and 70 years from the 4 main NCDs is 16%.

2.2.3 Health care access

In the study conducted by Harris almost all patients had 1 source of primary care (95%), 2 or more physician visits during the past year (88%), and health insurance coverage (91%) (Harris, 2000).

American Diabetes Association (2002) categories diabetes as a chronic illness. They stated that diabetics requires ongoing medical care and education to prevent acute complication and reduce the risk of long term complications. And continuing care is

essential in the management of every patients with diabetes (American Diabetes Association, 2002).

In the study conducted Beckles et al., in 1998 it has shown that, 72% of the subjects visited a health care provider for diabetes care at least once, 61% had their feet inspected at least once, and 61% received a dilated eye examination (Beckles et al., 1998).

In an analysis of health-care seeking behaviour among persons with diabetes in Uganda, Hjelm and Atwine (2011) found that many are unaware of the diabetes, as a result of this people seek health services at very late stage with DM when they have unknowingly had the disease for years. He added that females more often focused on follow-up of DM and chronic pain in joints, while males described fewer problems and females used more free-of-charge governmental institutions (Hjelm & Atwine, 2011).

“The relation between treatment-seeking behaviour and compliance of diabetic patients in a rural area in South India showed that both government and private clinics were used by a large proportion of patients” (Srinivas et al., 2002 as cited by (Hjelm & Atwine, 2011).

People with diabetes who are treated with insulin shots generally should see their doctor at least every three to four months. People with diabetes who are treated with pills or who are managing diabetes through diet should be seen at least every four to six months. More frequent visits may be necessary if your blood sugar is not controlled or if complications of diabetes are worsening (Cleveland Clinic, 2015).

2.2.4 Health Status and Outcomes

According to Jerant, Bertakis, & Franks the optimal BMI category for physical health status (but not mental health status) was higher among diabetic than non-diabetic

persons (Jerant, Bertakis, & Franks, 2015). This was supported by Maureen who said that health status and outcome measures for patients with diabetes are at least 58% had an HbA1c value $>7.0\%$, which is the recommended treatment goal for blood glucose control, including 73% of the insulin-treated patients, 61% of the patients taking oral agents, and 35% of those treated with diet alone (Maureen, 2000). She added that the majority of patients were treated with insulin or oral agents for their diabetes; only 4% were treated with both insulin and oral agents. Insulin use increased from 18% among the patients with, <5 years since diagnosis of diabetes to 56% among those with ≥ 15 years' duration (Maureen, 2000).

Of the patients, 22% were current cigarette smokers and 42% assessed their health status as fair or poor, with only 20% having excellent or good health. One fourth had conditions that required hospitalization during the prior year (Maureen, 2000). Diabetes has detrimental effects on a range of health outcomes including health-related quality of life (HRQoL). For example, in the Medical Outcomes Study, diabetes was found to impair all dimensions of health except mental health and pain.

As stated by (Joslin & Kahn, 2005) the health status of some patients with DM is very poor because of pre-terminal illnesses, advanced dementia, or significant comorbid problems and functional difficulties.

2.2.5 Expenditures for Diabetes

It is perceived that health related quality of life is lower for individuals suffering from diabetics. It is the result of financial pressure on individuals who pays out of pockets payments for diabetes medications. This is further worsened by time resources spend for the management of the disease physical stress (Safita et al., 2016).

As stated by (Tol et al., 2013) reason for the importance of considering diabetes is the high expense of DM and it was estimated that the whole diabetes cost is almost 91.8 billion dollars per year in the USA which includes 49% direct and 51% indirect costs.

Surveys such as that conducted by Mahal, Karan and Engelgau (2010) has shown that in 2004, Indians spent nearly INR 846 billion out of pocket on health care expenses, amounting to 3.3 percent of India's GDP for that year. The share of NCDs in out of pocket health expenses incurred by households increased over time, from 31.6 percent in 1995-96 to 47.3 percent in 2004. They added that for purchases of medicine, diagnostics test and medical appliance more than one-half of the out-of-pocket expenses on health care were incurred. Thus far they have mentioned in 2004, assuming that all care-givers and sick individuals above the age of 15 years were productive yielded an annual income loss from NCDs of one trillion rupees. More than one-third of all income losses were due to CVD and hypertension (Mahal, Karan, & Engelgau, 2010).

In 2004, Piette, demonstrated that one of the most common and costly chronic illnesses, and a condition for which many patients face high out-of-pocket medication costs are cost-related medication underuse in the context of treatment of diabetes (Piette, John, Wagner, Todd, Potter, Michael, & Schillinger, Dean, 2004).

As per (WHO, n.d.) National health-care budgets are being increasingly allocated to treatment of cardiovascular disease, cancer, diabetes and chronic respiratory disease. Costs for treating diabetes ranged from 1.8% of gross domestic product in Venezuela to 5.9% in Barbados (42). For the Latin America and Caribbean region, diabetes health-care costs were estimated at US\$ 65 billion annually, or between 2% and 4% of gross domestic product (GDP) (43) and 8% to 15.0% of national health-care budgets.

As specified by (WHO, 2011) Cost-of-illness approach: estimates of direct and indirect costs of ill health for five distinct disease categories are: Cancer: an estimated US\$ 290

billion in 2010 rising to US\$ 458 billion in 2030, Cardiovascular disease: an estimated US\$ 863 billion in 2010 rising to US\$ 1.04 trillion in 2030, COPD: an estimated US\$ 2.1 trillion in 2010 US\$ rising to US\$ 4.8 trillion in 2030, Diabetes: an estimated nearly US\$ 500 billion in 2010 rising to at least US\$ 745 billion in 2030 and Mental illness: an estimated US\$ 2.5 trillion in 2010 rising to US\$ 6.0 trillion by 2030.

2.2.6 Existing literature on diabetes and associated risk factors in the Maldives

According to the Maldives health profile 2016, diabetes mellitus is the ninth leading cause of death in the Maldives (MOH, 2016)

The latest demographic health survey of Maldives (DHS) reported that three percent of the respondents had been diagnosed with diabetes out of which 455 were diagnosed at the age of 30 -39, ten percent of the diabetics were using insulin to manage their sugar level, while 47% took pills to lower their blood sugar. Two percent of them had a heart attack and another two percent had experienced a stroke (MOH, 2009).

The DHS also reported data on related risk factors of diabetes such as physical activity, which showed that 61% of the respondents did not walk, run or engage in any form of exercise. It also reported that physical activity was higher among people living in urban areas and people who were more educated.

WHO STEPS survey on risk factors for non communicable diseases (2011) showed low levels of physical activity, 8.6% men and 14.5% women being obese, 16.6% of Maldivians having raised blood pressure (WHO, 2011)

CHAPTER 3

METHODOLOGY

This chapter highlights the methodological details used in the study which includes; research design, study area, target population, sampling techniques and sample size. It also includes description about the research instrument, pre-testing, validity and reliability of the instrument. The data collection techniques, data analysis, ethical considerations, and the conceptual framework will also be explained in this chapter.

3.1 Research Design

The main purpose of this study is to identify the impact of out of pocket expenditures on health status of DM patients. Therefore, a descriptive cross sectional study was designed to identify socio-demographic characteristics, medical history, out of pocket expenditures and health status of DM patients. This study design was chosen because it is relatively quick and easy to conduct as data on all variables is only collected once and no long periods of follow-up is required.

3.2 Study Area

The study was mainly conducted at the DM clinic of IGM hospital which is the tertiary hospital in Maldives where majority of Maldivian patients visit for treatment.

However, due to time constraints other sources were also used to gather the required sample size during the available time for data collection.

3.3 Target Population

The target population for this study was the entire Maldivian citizens who are diagnosed with DM. According to (IDF, 2015) in 2015 there were 17,100 cases of DM in Maldives.

3.4 Sampling Techniques

The Sampling technique used for the study is convenience sampling. Reason for the use of this technique is fastness, inexpensive, easy and the samples are readily available.

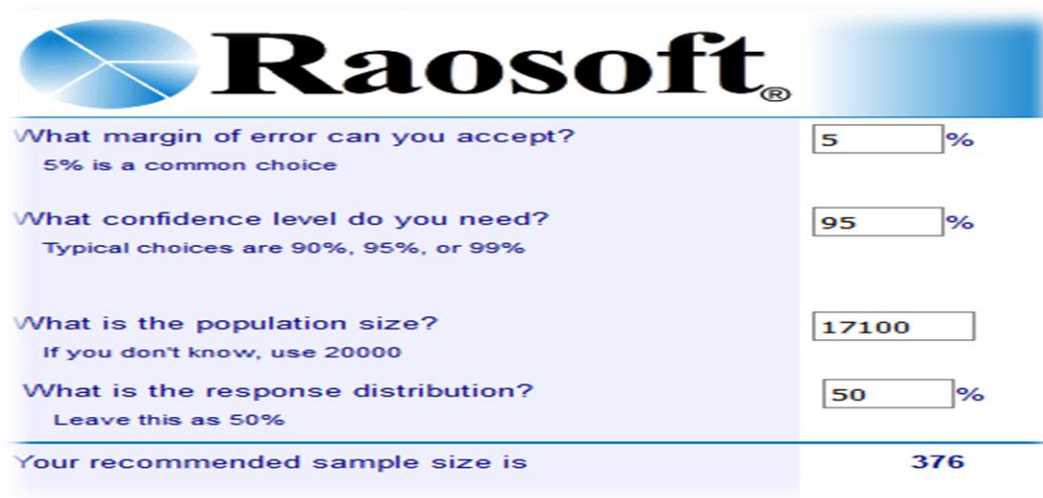
3.5 Sample Size

The standard Sample calculating formula is:

$$n = \frac{Z^2pq}{D^2}$$

To derive the sample size for this study, an online sample calculator available at www.raosoft.com was used. 17,100 diabetes patients were taken as the target population with a confidence interval of 95%, and response rate of estimated 50%. The sample size calculated was 376. Due to time constraints 26.5% of the sample was collected which was 100 respondents. To select 376 diabetes patients from the target

population systemic sampling was used. Below figures shows how the sample size was calculated (Figure 2).



The image shows a screenshot of the Raosoft sample size calculator. The interface is light blue and white. At the top left is the Raosoft logo, a blue circle with a white cross. To the right of the logo is the text "Raosoft®". Below the logo, there are four input fields with labels and a final output field. The input fields are: "What margin of error can you accept?" with a value of 5, "What confidence level do you need?" with a value of 95, "What is the population size?" with a value of 17100, and "What is the response distribution?" with a value of 50. The output field is "Your recommended sample size is" with a value of 376. Each input field has a percentage sign next to it, except for the population size which is a plain number.

Question	Value
What margin of error can you accept? <small>5% is a common choice</small>	5%
What confidence level do you need? <small>Typical choices are 90%, 95%, or 99%</small>	95%
What is the population size? <small>If you don't know, use 20000</small>	17100
What is the response distribution? <small>Leave this as 50%</small>	50%
Your recommended sample size is	376

Figure 2 Sample size calculation

3.6 Research Instruments

A structured interviewer administered the survey questionnaire (Appendix B) which was formulated to assess the impact of out of pocket expenditure on health status of the DM patients. A survey questionnaire was chosen as the main instrument, as it is easily built, understood, and time saving for both the parties, as well it is able to extract necessary information if done correctly.

The questionnaire was prepared in English. Questionnaire contained a combination of dichotomous questions, questions based on level of measurement and filter or contingency questions. The questionnaire used in this study consisted of three sections (Section A, B and C). Section A contained five items that collected socio demographic information. Section B includes medical history of the DM patient. Total 18 questions collected information on complications faced by DM patients, how they managed their sugar level, health seeking behaviour of the patient and out of pocket expenditure they

spend for DM. Section C contains a set of standard questions from the EQ-5D-3L questionnaire (EuroQol five dimensions three levels questionnaire) which is the standardized instrument for measuring generic health status of patients (EuroQol Group, n.d.). The five dimensions are mobility, self-care, usual activities, pain or discomfort and depression or anxiety. The three levels are no problems, some problems and extreme problems.

3.7 Pre-testing

Sample questionnaire was pretested among 10 DM patients, other than those which are already in the sample, to assess the validity of the questionnaire. The pretest was conducted for 5 days.

The pretest revealed no misconceptions in interpreting the questions, and that it was able to derive intended outcome of the study. Accuracy and the potential to derive targeted information was assessed and no further changes were made to the questionnaire. After confirming the findings from the pretesting, it was then sent for expert review by the supervisor. A few changes were made to ensure finest quality for the final survey questionnaire.

3.8 Validity and Reliability of the research

The questionnaire was developed following a well-established theoretical framework. Pretesting showed no further need for changes, which highlighted that the questionnaire was a reliable tool to achieve the objectives of the study. Moreover, the questionnaire was finalized with professional help from supervisor and conformation on whether the questionnaire was providing answers to achieve the specific research questions was tested to establish validity of the instrument.

3.9 Data Collection Techniques

In this study, data were collected using an interviewer-administered questionnaire. Three research assistants were selected for data collection. Before collecting the data research assistants were trained on the different section of the questionnaire and other relevant ethical measures to maintain during the data collection. They were given enough information and chance to ask questions about the research.

The data collection was carried out by visiting IGMH for three weeks every Thursday which was when the DM clinic was open. Additional data needed to complete the sample size was carried out through a phone interview.

Before starting with the questionnaire detailed information about the study was given to participants. The total sample size collected was 100. Sixteen participants were from IGMH, forty-four from home visits and remaining forty were from phone interview. Five participants refused to participate in the study. It took approximately one month to collect all the data from the sample.

3.10 Data Analysis

Collected data were analyzed by using excel, SPSS 20 software (Statistical Package for the Social Sciences) and the open source R software, version 3.1.0. Before analysis, the data was first cleaned and coded. For descriptive statistics the data was analyzed by using frequency, percentage, mean, mode, maximum, minimum and standard deviation. For Inferential statistics cross tabulations was used and relative frequencies were calculated. To assess the strength of the relationship between variables, Pearson chi-square test was conducted. The P value was set at 0.05, whereby a P value less than 0.05 were considered as showing a statistically significant relationship.

3.11 Ethical Considerations

All the relevant information was shared with the relevant authorities such as the management of IGM Hospital. For the confidentiality of the patient information, respondents were assured that their information will not be disclosed individually but only the aggregate data of all respondents together will be used in this research.

Written informed consent was obtained from the respondents after explaining the objectives of the survey for all face to face interviews and verbal informed consent was acquired from the respondents of the phone interviews. Explanations about the benefits of the study that is being conducted were shared with participants. Participation was voluntary and confidentiality was maintained of the personal information of the participants. Likewise, they were informed that even after participation in the study they will have their right to withdraw any time they wished.

3.12 Conceptual Framework management of variable

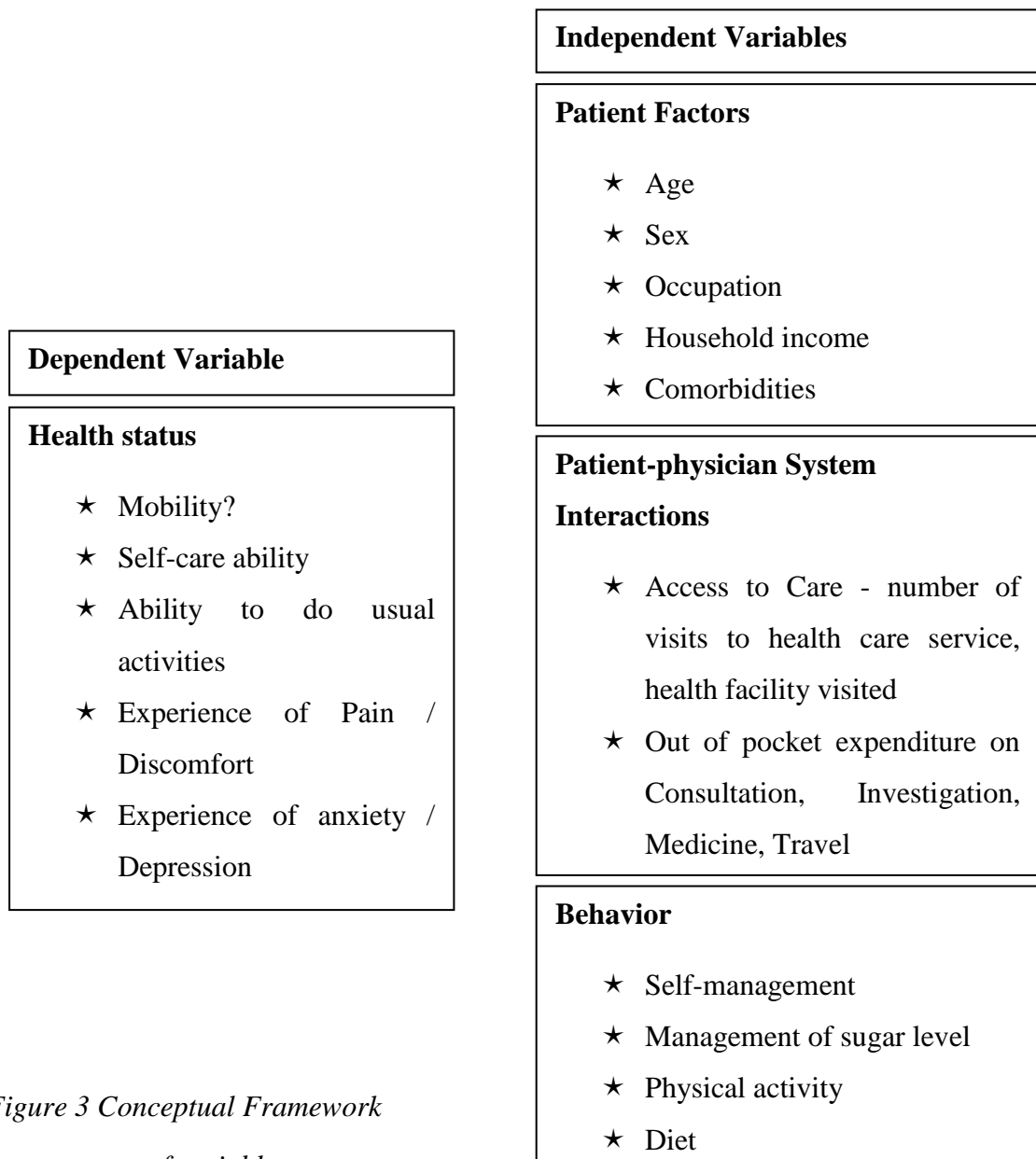


Figure 3 Conceptual Framework management of variable

Figure 3.2 shows the conceptual framework of this study. The dependent variable is the health status of the patient which has five levels namely mobility of the patient, ability to take care of self, ability to do usual activities, experience of pain/ discomfort, anxiety and depression. The explanatory variables are the patient Factors, the patient-physician System Interactions, out of pocket health expenditures and behavior of the patient variables.

CHAPTER 4

DATA ANALYSIS AND RESULTS

Data was analyzed in two ways; namely descriptive statistics and inferential statistics. In descriptive statistics frequencies and percentages were calculated and presented in tables and a pie chart. As the response variable and many of the explanatory variables were categorical, Pearson's chi-square test was used to analyze the associations between out of pocket expenditure and health status. Additional inferential statistics was done using cross tabulations and by calculating relative frequencies across the different levels of the response variable "health status" and the explanatory variables.

4.1 Descriptive Statistics

4.1.1 Socio demographic characteristics

Table 1 Socio demographic characteristics of participants

Characteristics	Frequency n = 100	Percent
Age		
Median = 52 SD = 14.38 Min = 20 Max = 80 Mean = 51.54		
Gender (n = 100)		
Female	64	64
Male	36	36
Occupation (n = 100)		
Farming	1	1
Government Employee	15	15
Others	19	19
Own Business	8	8
Self Employed	5	5
Unemployed	52	52
House Hold Income (n = 100)		
Below 10,000	59	59
10,000-20,000	18	18
20,000-30,000	9	9

30,000-40,000	6	6
40,000-50,000	1	1
Above 50,000	7	7

Table 1 shows the demographic and socio economic status of the study participants. The mean ages of respondent were 51.54, the youngest participant was 20 years and the oldest was 80 years old. Majority of them were female (64%) and males represented (36%). Among them 52% were unemployed. More than half of the participants (59%) had a monthly house hold income of less than 10,000 MVR indicating that these participants were poor.

4.1.2 Medical History

Figure 4.1 Pie chart of Maldivian DM patients by age at first diagnosis

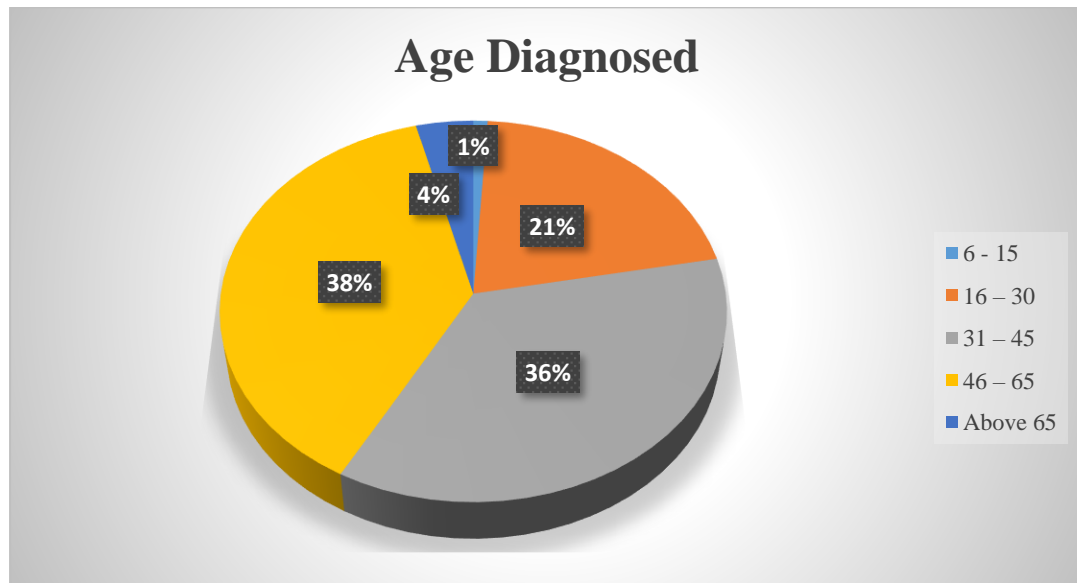


Figure 4.1 shows that the majority (38%) of the DM patients were first diagnosed at the age between 46 to 65. Another 36% of the DM patients were diagnosed the age between 31 to 45.

4.1.3 Comorbidities among Maldivian DM patients

Table 2 Frequency and percentage of co-existing diseases among DM patients of Maldives

Co-Existing Disease	Number n = 100	Percent
CVD	11	20.4
Kidney Disease	5	9.3
HTN	27	50
Thyroid	3	5.6
Other	8	14.8
CVD & Kidney Disease	2	2
CVD & HTN	5	5
Kidney Disease & HTN	2	2
HTN & Thyroid	1	1

* *Multiple responses*

Table 2 shows the complications that Maldivian DM patients lived with. 50% of the patients are suffering from HTN, 20.4% of them had CVD, 9.3% of them had kidney disease, 5.6% of them had Thyroid and 14.8% of them are suffering from other complications. 2 patients were suffering from both CVD and kidney disease, 5 patients suffered from both CVD and HTN, 2 patients were suffering from kidney disease and HTN and only one patient are suffering from HTN and Thyroid.

Table 3 Frequency and percentage of DM patient suffered from vision Problem and amputation of any organ

Vision Problem	Number n = 100	Percent
No	63	63
Yes	37	37
Amputation	Number n = 100	Percent
No	100	100
Yes	0	0

Table 3 shows the frequency and percentage of participants who suffered from vision problems. Majority of the DM patient did not have any vision problem. While, one third (37%) of DM patient suffered from vision problem. None of the study participants had to undergo amputation of any of their organ due to DM.

4.1.4 Management of sugar levels among Maldivian DM patients

Table 4 Frequency and percentage of ways DM patients manage their sugar level

Ways Manage Sugar level	Number n = 100	Percent
Exercise		
No	63	63
Yes	37	37
Diet		
No	60	60
Yes	40	40
Medicine		
No	13	13
Yes	87	87
Insulin		
No	87	87
Yes	13	13
Pills		
No	14	14
Yes	86	86

Table 4 shows that 37% of the DM patient exercise to manage sugar level, while 40% of the DM patient use their diet to manage sugar level. Furthermore, 87% of people use medicine to manage their sugar level. Among them, 13% of DM patient use insulin and 86% of DM patient use pills to manage their sugar level.

4.1.5 Health seeking behavior of Maldivian DM patients

Table 5 Frequency and percentage of Health seeking behavior of the DM patient

No of visits to a health facility	Number n = 100	Percent
No. of visits to a government facility		
0 times	4	4
1-3 times	26	26
4-6 times	23	23
7-9 times	4	4
10-12 times	31	31
more than 12 times	12	12
No. of visits to a private facility		
0 times	53	53
1-3 times	29	29
4-6 times	11	11
7-9 times	2	2
10-12 times	2	2
more than 12 times	3	3
No. of visits to abroad for treatment		
0 times	77	77
1-3 times	22	22
4-6 times	1	1
7-9 times	0	0
10-12 times	0	0
more than 12 times	0	0
No. of visits to the clinic at DSM (NGO)		
0 times	97	97
1-3 times	2	2
4-6 times	1	1
7-9 times	0	0
10-12 times	0	0
more than 12 times	0	0

Table 5 shows the health seeking behavior of the DM patients. A third of the DM patient have visited the government hospitals 10-12 times (31%) in the past year. More than 53% did not visit any private health facility but 29% have visited private facilities 1-3 times in the past year. Travel abroad for treatment was not common among DM patients

as 77% did not travel abroad for treatment. Yet, 22% have traveled abroad 1-3 times in the past year. Majority of the patient did not visit the clinic run by non-governmental organization specializing in DM such as the Diabetes Society of Maldives during the past year (97%).

4.1.6 Out of pocket health expenditure of Maldivian DM patients

Table 6 Frequency and percentage of out of pocket expenditure on travel, medicine, investigation and consultation

Out of pocket Expenditure	Number n = 100	Percent
OOPE Travel		
None	53	53
Below 1,000	6	6
1,000 – 2,000	2	2
2,000 – 3,000	5	5
3,000 – 4,000	6	6
4,000 – 5,000	2	2
Above 5,000	26	26
OOPE Medicine		
None	61	61
Below 1,000	10	10
1,000 – 2,000	10	10
2,000 – 3,000	7	7
3,000 – 4,000	3	3
4,000 – 5,000	1	1
Above 5,000	8	8
OOPE Laboratory		
None	63	63
Below 1,000	16	16
1,000 – 2,000	4	4
2,000 – 3,000	3	3
3,000 – 4,000	4	4
4,000 – 5,000	3	3

Above 5,000	7	7
OOPE Consultation		
None	46	46
Below 500	19	19
500 - 1,000	14	14
1,000 – 1,500	6	6
1,500 – 2,000	3	3
2,000 – 2,500	0	0
Above 2,500	12	12

Table 6 shows the out of pocket expenditure of DM by the amount they spend on travel, on medicine, for clinical investigations and for consultations. More than half of the patient (53%) did not spend any thing for the travel. however, 26% of patient spent more than 5,000 MVR during last year for the travel. 61% of the people have paid nothing on the medicine. Out of pocket expenditure on investigation was also very low whereby 63% of the DM patient had paid nothing on investigation. Likewise, out of pocket expenditure on consultation also was low. Majority (46%) of the patient have done their medical consultations free of charges. However, very few patients (19%) have spent below 500 MVR in the past year on consultation and 14% have spent between 500 – 1000 MVR on consultations in the past year.

4.1.7 Health Status of Maldivian DM patients

Table 7 Health status of the DM patients

Health Status	Number n = 100	Percent
EQ Mobility		
I have no problems in walking about	75	75
I have some problems in walking about	24	24
I am confined to bed	1	1
EQ Self-Care		
I have no problems with self-care	91	91

I have some problems with washing or dressing my self	8	8
I am unable to wash or dress my self	1	1
EQ Activity		
I have no problems with performing my usual activities	78	78
I have some problems with washing or dressing my self	22	22
I am unable to Perform my usual activities	0	0
EQ Pain		
I have no pain or discomfort	56	56
I have moderate pain or discomfort	40	40
I have extreme pain or discomfort	4	4
EQ Anxiety		
I am not anxious or depresses	66	66
I am moderately anxious or depressed	31	31
I am extremely anxious or depressed	3	3

Table 7 shows the health status of the DM patients. In the mobility of DM patient, majority of the DM patients did not have any problem in walking about (75%), in managing their self-care (91%) and in performing their usual activities (78%). And the majority of the patient did not have pain or discomfort (56%). More than 66% of the DM patient did not suffer from any anxiety or depression. However, 31% of the patient expressed that they had moderate anxiety or depression and few (24%) expressed some problems in walking about.

4.2 Inferential Statistics

Pearson's chi-square tests were done on all the explanatory variables. However, statistical significance was seen from between the following relationships:

4.2.1 Relationship between out of pocket expenditure on clinical investigations and the patient's ability for self-care

Table 8 Association between out of pocket expenditure on Investigations and Self-care level of the DM Patient

OOPE Investigation	Self-Care			Total N (%)	p- value
	No problems N (%)	Some problems N (%)	Extreme N (%)		
None	57 (90.5)	6 (9.5)	0 (0)	63 (100)	0.005
Below 1,000	15 (93.8)	1 (6.2)	0 (0)	16 (100)	
1,000 - 2,000	4 (100)	0 (0)	0 (0)	4 (100)	
2,000 - 3,000	2 (66.7)	1 (33.3)	0 (0)	3 (100)	
3,000 - 4,000	3 (75)	0 (0)	1 (25)	4 (100)	
4,000 - 5,000	3 (100)	0 (0)	0 (0)	3 (100)	
Above 5,000	7 (100)	0 (0)	0 (0)	7 (100)	

Table 8 shows the association between out of pocket expenditure on investigations and self-Care level of the patients. The result shows that there is a significant association between out of pocket expenditure on investigations and Self-Care level shown by the significant p-value of 0.005, at the level of p-value <0.05. The relative frequencies between levels of the response variable shows that the number of people who paid nothing were relatively higher among the people who had no problems with self-Care (90.5%) compared to the number of people who had some problems with self-Care (9.5%).

4.2.2 Relationship between out of pocket expenditure on travel and the patient's ability to do usual activities of life

Table 9 Association between OOPE on Travel and Usual activities of the DM Patient

OOPE Travel	Usual Activities			Total N (%)	p value
	No problems N (%)	Some problems N (%)	Extreme N (%)		
None	45 (84.9)	8 (15.1)	0 (0)	53 (100)	0.007
Below1,000	6 (100)	0 (0)	0 (0)	6 (100)	
1,000 - 2,000	2 (100)	0 (0)	0 (0)	2 (100)	
2,000 - 3,000	2 (40)	3 (60)	0 (0)	5 (100)	
3,000 - 4,000	3 (50)	3 (50)	0 (0)	6 (100)	
4,000 - 5,000	0 (0)	2 (100)	0 (0)	2 (100)	
Above 5,000	20 (76.9)	6 (23.1)	0 (0)	26 (100)	

Table 4.8 shows the association between out of pocket expenditure on travel and the patient's ability to do usual activities. The result shows that there is a significant association between out of pocket expenditure on travel and patient's ability to do usual activities. The p-value was 0.007, which is significant at $p < 0.05$. comparison of relative frequencies shows that a significantly large proportion of patients who spend more money (76.9%) for their travel have no problems in doing their usual activities compared with only 23.1% patient who spend more money for their travel have some problems in doing their usual activities.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Summary of Main Findings

Using a cross-sectional descriptive study design that interviewed 100 participants aged between 20 to 80 years old from Maldives, this study highlighted that the out of pocket expenditure on health among DM patients in Maldives was very low and the health status of them was considerably good.

This study also highlighted that the majority of the Maldivian DM patients are diagnosed at the early stage of life and were suffering from exiting comorbidities such as hypertension, cardiovascular disease, kidney disease and thyroid. Moreover, significant association was found between out of pocket expenditure on investigations and Self-Care level and out of pocket expenditure on travel and patient's ability to do usual activities.

5.2 Discussion

Age at first diagnosis of Maldivian DM patients show that DM is diagnosed at early stage of life in majority of the patients whereby many were diagnosed beginning from 16 to 30 years (21%) and others between 31-45 years (36%). According to Joslin and Kahn (2005), among the American population with DM, 5% to 10% who had type 1 DM were usually diagnosed before the age of 40 years. However, the majority of DM patient in this study had type 2 DM which was usually diagnosed after the age of 40 years (Joslin & Kahn, 2005). Much evidence have been established that show the

importance and benefits of early detection of DM for the individual patient, the health system and for the society in general (WHO, 2016, Kaveeshwar & Cornwall, 2014, and BAILEY et al., 2005).

Maldivian DM patients were mostly suffering from complications of HTN, CVD, thyroid, and kidney disease. Vision problems and amputation of organs due to diabetes was very low among Maldivian DM patients. According to the Medical Expenditure Panel Survey, 25% of patients with multi-morbidity have more than 6 chronic conditions and the most frequent conditions which appeared in multi-morbidity in the past decade were CVD, musculoskeletal, malignant, psychological and metabolic diseases (Piette & Kerr, 2006). Most adults with diabetes have at least one comorbid chronic disease and as many as 40% have at least three (Piette & Kerr, 2006). Another study shows that the most prevalent T2DM related comorbidities were HTN (82.5% and 87.2%) and CVD (26.9% and 22.3%) in 2008 and 2013, respectively (Pantalone et al., 2015). In general, therefore, HTN and CVD are the most common comorbidities in of DM and comorbidities among Maldivian DM patients follows a similar pattern.

Results of this study indicate that majority of Maldivian DM patients do not exercise nor limit their diet to manage the disease. They depend mostly on medicines for the management of DM. A study among United States people has shown that more than 50% patients used to exercise (30 minutes of brisk walk for at-least 5 days in a week), not all of them used to exercise daily and only 1.85% of the respondents used to follow a diet plan “frequently” at home. The study revealed that 36.% patients were not taking any treatment for diabetes (Kishore, Kohli, Gupta, Kumar, & Sharma, 2015). Among privately insured adults in the United States, use of insulin among patients with type 2 diabetes increased from 10% in 2000 to 15% in 2010 (Lipska et al., 2014). A cluster - randomized trial found that diet alone, exercise alone and combined diet and exercise

were equally effective in reducing the progression from impaired glucose tolerance to diabetes (Barnett & Kumar, 2009). The principles of diabetes management laid out by the WHO includes a combination of interventions such as maintaining a healthy diet, physical activity, avoid tobacco and alcohol, perform regular examinations and medications (WHO, 2016). Hence this study shows the importance of creating awareness among Maldivian patients on the management of DM using lifestyle changes.

Government health facilities were the type of health facility most commonly visited by DM patients. Use of private health facilities and non-governmental clinics and travel abroad for treatment was not common among DM patients. In a study done in Uganda which is a low income country, males more often preferred private for-profit clinics while females more often used free governmental institutions (Hjelm & Atwine, 2011). In another study which studied Indian patients with a history of DM 53.3% patients utilized private health agencies, 36.7% patients utilized government health agencies, 10% patients sought health service from traditional healers and 03.3% patients were on self-medication (Khongbuh, Walia, & Kapoor, 2005). It has shown that in India 41% DM patient visits physician in the previous year between four and nine. About 92% reported seeing a particular health professional for usual care, 98% of whom were physicians. In addition, for each category of physician visit, ~82–90% of the visits included visits to primary care physicians (Egede, 2003). The fact that the health system is organized in the Maldives in such a way that majority of health facilities are public health facilities have made it more accessible and affordable for Maldivian DM patients to seek care at public health facilities while in other countries patients have preferred specific physicians for usual care or private facilities.

Out of pocket health expenditure among DM patients were very low. Majority of DM patients in this study has not spent anything on their consultations, investigations, medicines and for travel for treatment. This outcome is contrary to that of Lipska et al out-of-pocket expenditures increased from a median of \$19 to \$36 (Lipska et al., 2014). In 2013, individuals diagnosed with diabetes spent \$1,922 out of pocket on health care services, an increase of \$75 (4.1%) over that of 2012 (HCCI, 2015a). Although insulin is on WHO's list of essential medicines, statistics show that low-income countries generally pay the highest price for insulin while high and middle-income countries pay least (WHO, 2016) In Maldives financial access to care and medicines were found to be good among DM patients as out of pocket expenditure was very low. This pattern maybe explained by the fact that the majority of the DM patient used the national health insurance scheme (Aasandha) for their treatment for which all Maldivian citizens are eligible.

Health status of DM patients showed that most patients were mobile, and able to self-care for themselves, able to do usual activities, and free from pain and discomfort and free from anxiety as well. Previous study has shown Japan that for the five dimensions of EQ-5D, the number of patients responding as having "some problem" was (21.2%) for mobility, (2.8%) for self-care, (17.3%) for usual activities, (35.7%) for pain/discomfort, and (19.7%) for anxiety/depression (Sakamaki et al., 2006). There were no responses of "extreme problem" for any of the dimensions. The frequency for "some problem" was high for pain/discomfort and low for usual activities (Sakamaki et al., 2006). Another study showed that most problems were reported in the dimensions pain/discomfort 58%, and anxiety/depression 47%, followed by mobility 25%, usual activities 14%, and self-care 10% (Safita et al., 2016). These findings differed from the health status of Maldivian DM patients.

This study found a significant relationship between out of pocket expenditure on travel and the ability to conduct usual activities and out of pocket expenditure on investigations and self-care level of the DM patient. There was no evidence among existing literature relating to the association between out of pocket expenditure on travel and the ability to conduct usual activities and out of pocket expenditure on investigation and self-care level of the DM patient. However, there has been evidence that out of pocket expenditure and catastrophic expenditure among diabetics were differentially higher than non-diabetics in a study of 35 countries (Smith-Spangler, Bhattacharya, & Goldhaber-Fiebert, 2012). Another study among diabetics showed that the relationship between cost and utilization were similar across income level and other characteristics of patients (Karter et al., 2003). Another study that compared diabetics and non-diabetics from 2009 to 2013 showed that diabetics spent on average 2.5 times more out of pocket than people without diabetes (HCCI, 2015). Future research can be done to explore the relationship between out of expenditure and different components of the health status measurements among diabetic patients.

5.3 Conclusion and Implications

This study aimed to identify the out of pocket expenditures and health status of DM patient and to determine the relationship between them. It can be concluded that out of pocket expenditure among Maldivian DM patients was very low, which can be explained by the fact that the majority of the patients were using the national health insurance scheme ‘Aaasandha’ for the treatment of diabetes which was free of charge. Moreover, majority of Maldivian DM patients’ health status were good, even though a few experienced pain or discomfort. In addition, this study identified that in Maldives

most of the people diagnosed with DM was at very early age which shows that the necessary systems for screening and diagnosing DM were in place.

This study did not calculate a total out of pocket expenditure amount nor did it calculate a total Health status score. Hence the relationship between out of pocket expenditure and health status was identified between different levels of health status and out of pocket expenditure on different cost categories such as for travel, medication, consultations etc. A significant relationship was found between out of pocket expenditure on travel and the patient's ability to conduct usual activities and out of pocket expenditure on investigations and self-care level of the DM patient. These findings have important implications for developing health policies related to the preventive measures. It also identifies strengths in the current health system and health financing mechanism available for Maldivian DM patients.

5.4 Limitations of the Study

Although the research has achieved its aim, there were some unavoidable limitations. These limitations and biases within the study must be taken into consideration, when interpreting the study results. There were some methodological limitations of the study. This research was conducted on a small sample size of only 100 (26.5%) due to the time limit. Another methodological limitation was that two types of interview techniques were used in this research due to the difficulty to reach the whole target population which may have affected the responses from the participants. Furthermore, the study required participants to recall information from their past. The extent to which recall bias influenced these findings is unknown. Moreover, the patient population was selected by convenience sampling, rather than by randomly selected or sampled for demographic representation.

5.5 Recommendation (Directions for Future Research)

Although this research has its limitations, the results of this study can guide future policy, practice and research. Further research should be undertaken to investigate in-depth the reasons why people were dependent on medication to manage diabetes instead of depending on changes to diet and exercise. More awareness on balanced diets and the need for exercise among DM patients is needed. None of the DM patients in this study visited the Diabetes Society of Maldives which is the most active NGO in the Maldives in conducting awareness and providing treatment free of charge for diabetic patients throughout Maldives. Hence, underutilization of free care and medicine needs to be explored to identify barriers to access. In addition, exploration of the relationship between out of expenditure and specific components of the health status measurement of diabetic patients is important.

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APPENDIX B Questionnaire (English Version)

Questionnaire

Date: ____/____/____

Client ID:-----

SECTION A: SOCIO DEMOGRAPHIC INFORMATION

QUESTION	RESPONSE
1. Sex	Male <input type="checkbox"/> Female <input type="checkbox"/>
2. Age	<input type="text"/> Years
3. Atoll	<input type="text"/>
4. Occupation	Government employee <input type="checkbox"/> Farming <input type="checkbox"/> Self employed <input type="checkbox"/> Tourism <input type="checkbox"/> Own bussiness <input type="checkbox"/> Construction <input type="checkbox"/> Unemployed <input type="checkbox"/> Others (specify)----- ----
5. House hold income	Below 10,000 <input type="checkbox"/> 10,000 – 20,000 <input type="checkbox"/> 20,000 – 30,000 <input type="checkbox"/> 30,000 – 40,000 <input type="checkbox"/> 40,000 – 50,000 <input type="checkbox"/> Above 50,000 <input type="checkbox"/>

SECTION B: MEDICAL HISTORY

QUESTIONS	RESPONSES
<p>6. How old were you when you were first diagnosed with diabetes?</p>	<p>Below 5 <input type="checkbox"/> 6-15 <input type="checkbox"/> 16-30 <input type="checkbox"/> 31-45 <input type="checkbox"/> 46-65 <input type="checkbox"/> Above 65 <input type="checkbox"/></p>
<p>7. Have you been treated for any of the following disease? (tick all that apply)</p>	<p>Cardiovascular disease <input type="checkbox"/> Kidney disease <input type="checkbox"/> HTN <input type="checkbox"/> Thyroid <input type="checkbox"/> None of the above <input type="checkbox"/> Others (Specify)-----</p>
<p>8. How many times do you consult doctor per year?</p>	<p>0 times <input type="checkbox"/> 1-3 times <input type="checkbox"/> 4-6 times <input type="checkbox"/> 7-9 times <input type="checkbox"/> 10-12 times <input type="checkbox"/> more than 12 <input type="checkbox"/></p>
<p>9. During the past year, did you obtain health care services on government hospitals/health center, or private hospitals/clinic or abroad, DSM? (tick all that apply)</p>	<p>Government <input type="checkbox"/> Private <input type="checkbox"/> Abroad <input type="checkbox"/> DSM <input type="checkbox"/> None of the above <input type="checkbox"/></p>

<p>10. How many times did you obtain health services form the government hospital / health center per year?</p>	<p>0 times <input type="checkbox"/> 1-3 times <input type="checkbox"/> 4-6 times <input type="checkbox"/> 7-9 times <input type="checkbox"/> 10-12 times <input type="checkbox"/> more than12 <input type="checkbox"/></p>
<p>11. How many times did you obtain health services from a private hospital / clinics per year?</p>	<p>0 times <input type="checkbox"/> 1-3 times <input type="checkbox"/> 4-6 times <input type="checkbox"/> 7-9 times <input type="checkbox"/> 10-12 times <input type="checkbox"/> more than12 <input type="checkbox"/></p>
<p>12. How many times did you obtain health services from abroad per year?</p>	<p>0 times <input type="checkbox"/> 1-3 times <input type="checkbox"/> 4-6 times <input type="checkbox"/> 7-9 times <input type="checkbox"/> 10-12 times <input type="checkbox"/> more than12 <input type="checkbox"/></p>
<p>13. How many times did you obtain health services form the DSM per year?</p>	<p>0 times <input type="checkbox"/> 1-3 times <input type="checkbox"/> 4-6 times <input type="checkbox"/> 7-9 times <input type="checkbox"/> 10-12 times <input type="checkbox"/> more than12 <input type="checkbox"/></p>
<p>14. Currently, how do you manage your sugar level? (tick all that apply)</p>	<p>Exercise (Skip question 15 & 16) <input type="checkbox"/> Diet (Skip question 15 & 16) <input type="checkbox"/> Medicine (Skip question 17) <input type="checkbox"/> Others (Specify)-----</p>
<p>15. Are you taking insulin at this time?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>16. Are you taking Pills (medicine) to lower your blood sugar?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>17. If you are not on medication, have you ever taken medication for diabetes?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> If Yes (how long)-----</p>

18. Have you ever suffered from vision problem due to DM?	Yes <input type="checkbox"/> No <input type="checkbox"/>
19. Did you have to amputate any part of your body due to diabetes?	Yes <input type="checkbox"/> No <input type="checkbox"/> If Yes (Specify which organ)-----
20. How much money do you spend from out of pocket on the treatment of diabetes per year for consultation?	Below 500 <input type="checkbox"/> 500 – 1,000 <input type="checkbox"/> 1,000 – 1,500 <input type="checkbox"/> 1,500 – 2,000 <input type="checkbox"/> 2,000 – 2,500 <input type="checkbox"/> above 2,500 <input type="checkbox"/> None of the above <input type="checkbox"/>
21. How much money do you spend from out of pocket on the treatment of diabetes per year for treatment (laboratory test and investigation)?	Below 1,000 <input type="checkbox"/> 1,000 - 2,000 <input type="checkbox"/> 2,000 – 3,000 <input type="checkbox"/> 3,000 – 4,000 <input type="checkbox"/> 4,000 - 5,000 <input type="checkbox"/> above 5,000 <input type="checkbox"/> None of the above <input type="checkbox"/>
22. How much money do you spend from out of pocket on the treatment of diabetes per year for medicine?	Below 1,000 <input type="checkbox"/> 1,000 - 2,000 <input type="checkbox"/> 2,000 – 3,000 <input type="checkbox"/> 3,000 – 4,000 <input type="checkbox"/> 4,000 - 5,000 <input type="checkbox"/> above 5,000 <input type="checkbox"/> None of the above <input type="checkbox"/>
23. How much money do you spend from out of pocket on the treatment of diabetes per year for travelling?	Below 1,000 <input type="checkbox"/> 1,000 - 2,000 <input type="checkbox"/> 2,000 – 3,000 <input type="checkbox"/> 3,000 – 4,000 <input type="checkbox"/> 4,000 - 5,000 <input type="checkbox"/> above 5,000 <input type="checkbox"/> None of the above <input type="checkbox"/>

SECTION C: Health status (EQ-5D-3L Health Questionnaire)

QUESTIONS	RESPONSES
24. Mobility	I have no problems in walking about <input data-bbox="1501 510 1576 573" type="checkbox"/> I have some problems in walking about <input data-bbox="1501 589 1576 651" type="checkbox"/> I am confined to bed <input data-bbox="1501 667 1576 730" type="checkbox"/>
25. Self-Care	I have no problems with self-care <input data-bbox="1501 788 1576 851" type="checkbox"/> I have some problems with washing or dressing myself <input data-bbox="1501 866 1576 929" type="checkbox"/> I am unable to wash or dress myself <input data-bbox="1501 945 1576 1008" type="checkbox"/>
26. Usual Activities (e.g. work, study, housework, family or leisure activities)	I have no problems with performing my usual activities <input data-bbox="1501 1052 1576 1115" type="checkbox"/> I have some problems with performing my usual activities <input data-bbox="1501 1131 1576 1193" type="checkbox"/> I am unable to perform my usual activities <input data-bbox="1501 1209 1576 1272" type="checkbox"/>
27. Pain / Discomfort	I have no pain or discomfort <input data-bbox="1501 1377 1576 1440" type="checkbox"/> I have moderate pain or discomfort <input data-bbox="1501 1456 1576 1518" type="checkbox"/> I have extreme pain or discomfort <input data-bbox="1501 1534 1576 1597" type="checkbox"/>
28. Anxiety / Depression	I am not anxious or depressed <input data-bbox="1501 1641 1576 1704" type="checkbox"/> I am moderately anxious or depressed <input data-bbox="1501 1720 1576 1783" type="checkbox"/> I am extremely anxious or depressed <input data-bbox="1501 1798 1576 1861" type="checkbox"/>

Thank You!

