

PREVALENCE AND RISK FACTORS OF HYPERTENSION
AND TYPE 2 DIABETES AMONG ADULTS OF
BAA.KAMADHOO

AMINATH SHEREEN

The Maldives National University

November, 2016

PREVALENCE AND RISK FACTORS OF HYPERTENSION AND TYPE 2
DIABETES AMONG ADULTS OF BAA.KAMADHOO

AMINATH SHEREEN

A Project submitted in partial fulfillment of the requirements for the degree of
Bachelors in Primary Health Care

Faculty of Health Sciences
The Maldives National University

November, 2016

DECLARATION

Name: Aminath Shereen

Student Number: 17919

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

Signature:

Date: 13th November 2016

PREVALENCE AND RISK FACTORS OF HYPERTENSION AND TYPE 2
DIABETES AMONG ADULTS OF BAA.KAMADHOO

AMINATH SHEREEN

November 2016

ABSTRACT

This is a cross sectional descriptive study, to identify the prevalence and risk factors of Hypertension and Type 2 Diabetes among adults in Baa.Kamadhoo. A structured interviewer administered questionnaire was used to identify the prevalence and risk factors of Hypertension and Type 2 Diabetes among adults in Baa.Kamadhoo. The sample size of this study was 125 samples. For data analysis Microsoft excel and SPSS were used. Descriptive statistics, frequency and percentage, cross tabulation and Chi-square were used in analysis. All the participants in this study are aged 18 years and above. Most of the participants are aged between 18 to 34 years and most of the participants are working in tourism industry. The Chi-square test revealed that there is a significant association between Hypertension and age (p -value=0.001) and also a significant association was seen between Type 2 DM and age (p -value=0.02). Furthermore, this study has identified a significant association between HTN and exercise (p -value=0.04). The results of this study will be valuable for Kamadhoo Health Centre, Baa.Kamadhoo Council Idhaaraa and Baa Atoll Hospital to prevent the community of Baa.Kamadhoo from risk of Hypertension and Type 2 Diabetes.

Keywords: Non-communicable diseases, Hypertension, Type 2 Diabetes Mellitus, blood pressure and Baa.Kamadhoo.

ACKNOWLEDGEMENTS

I would like to acknowledge the efforts, support, guidance and encouragement of various people who have made it possible for me to carry out this study. Firstly, I would like to express my sincere gratitude to my supervisor, Mr. Muthaau Shaheem for the support of my study. His guidance helped me in all the times of this dissertation. I would like to thank him for spending valuable time and providing valuable comments and ideas which helped to shape the focus and content of this study. I am grateful to all lecturers, for the support and encouragement throughout the study. I would also like to thank, my friends and family for supporting me throughout the study.

TABLE OF CONTENTS

DECLARATION	ii
ABSTRACT.....	iii
ACKNOWLEDGEMENTS	iv
LIST OF TABLES.....	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS.....	ix
CHAPTER 1 INTRODUCTION	1
1.1 Background to the Study.....	1
1.2 Problem Statement	3
1.3 Objectives of the study.....	4
1.3.1 General Objectives.....	4
1.3.2 Specific objectives.....	4
1.4 Research Questions.....	4
1.5 Significance of the Study	4
1.6 Scope of the Study	5
1.7 Definitions of Terms	5
CHAPTER 2 LITERATURE REVIEW	7
2.1 Theoretical Framework.....	7
2.2 Previous Studies.....	8
2.2.1 Hypertension (HTN)	8
2.2.2 Diabetes Mellitus (DM) Type 2	9
2.2.3 Socio demographic factors.....	10
2.2.3.1 Age	10
2.2.3.2 Gender	10
2.2.3.3 Occupation.....	11
2.2.3 Risk factors of non communicable diseases	12
2.2.3.1 Tobacco use	12
2.2.3.2 Unhealthy diet and physical inactivity.....	13
2.2.3.3 Overweight/ Obese.....	14
2.2.3.5 Family History	14
CHAPTER 3 METHODOLOGY	16
3.1 Research Design.....	16
3.2 Study Area	16

3.3 Target Population.....	17
3.4 Sampling Techniques.....	17
3.5 Sample size	17
3.6 Research Instrument.....	18
3.7 Pre Testing	19
3.8 Validity and Reliability of the Research	19
3.9 Data Collection Techniques	20
3.10 Framework of Data Analysis	20
3.11 Ethical Considerations	21
3.12 Conceptual framework and management of variables	22
CHAPTER 4 DATA ANALYSIS AND RESULTS.....	23
4.1 Demographic characteristics.....	23
4.2 Physical measurements	24
4.3 Medical history and Family history	26
4.4 Eating habits	26
4.5 Tobacco use	29
4.6 Physical activity and sedentary behaviour	30
4.7 Association between HTN and age.....	32
4.8 Association between Type 2 DM and age	32
4.9 Association between HTN and exercise	33
4.10 Association between Type 2 DM and exercise.....	34
CHAPTER 5 DISCUSSION AND CONCLUSION	35
5.1 Summary of Main Findings	35
5.2 Discussion.....	36
5.3 Conclusion	43
5.4 Implications	44
5.5 Limitations of the Study.....	45
5.6 Directions for future research and Recommendations	45
REFERENCES	48
APPENDICES.....	59
Appendix A: Consent form.....	59
Appendix B: Questionnaire.....	60
Appendix C: Consent form (in Dhivehi)	65
Appendix D: Questionnaire (in Dhivehi).....	66

LIST OF TABLES

Table 3.1 Summary of analytical framework.....	21
Table 4.1 Frequency and percentage of participants by socio demographic characteristics.....	23
Table 4.2 Frequency and percentage of participants by physical measurements.....	24
Table 4.3 Frequency and percentage of participants by eating habits.....	26
Table 4.4 Frequency and percentage of participants by tobacco use.....	29
Table 4.5 Frequency and percentage of participants by physical activity and sedentary behavior	30
Table 4.6 Association between HTN and age.....	32
Table 4.7 Association between Type 2 DM and age.....	32
Table 4.8 Association between HTN and exercise.....	33
Table 4.9 Association between Type 2 DM and exercise.....	34

LIST OF FIGURES

Figure 2.1 The Causation Pathway for Chronic Disease.....	7
Figure 3.1 Conceptual framework to identify the prevalence and risk factors in HTN and Type 2 DM among adults of Baa.Kamadhoo.....	22
Figure 4.1 Percentage of participants by their medical history and family history.....	26

LIST OF ABBREVIATIONS

NCDs – Non-Communicable Diseases

HTN – Hypertension

DM – Diabetes Mellitus

BMI – Body Mass Index

MOH – Ministry of Health

WHO – World Health Organization

BP – Blood pressure

SPSS – Statistical Package for Social Science

CHAPTER 1

INTRODUCTION

1.1 Background to the Study

At the beginning of third millennium, Non-communicable diseases (NCDs) are widespread the entire world, with a growing trend in developing countries. In two thousand twenty, it is expected that these diseases will be causing seven out of every 10 deaths in developing countries (Boutayeb.A & Boutayeb.S, 2005). Many of the NCDs like, hypertension (HTN) and Type 2 diabetes mellitus (Type 2 DM) can be prevented by confronting related risk factors (Boutayeb.A & Boutayeb.S, 2005). Around eighty percent of NCD deaths are arising in low and middle-income countries. Additionally, NCDs were accountable for almost half of the burden of diseases in 2005, equally worldwide and in low/middle-income countries the worldwide prevalence of NCDs is growing, with the majority of cases arising in developing countries (Esteghamati, et al., 2009).

“In developing countries, high blood pressure is one of the risk factors for cardiovascular diseases, and the estimated 7.1 million deaths especially among middle, and old-age adults is due to high BP” (WHO, 2002 as cited in Mungreiphy, Kapoor, & Sinha, 2011).

Hypertension or elevated blood pressure is a major public health problem. It causes various other life-threatening situations like heart disease, stroke and kidney failure. It

extremely affects most of the time, where health systems are weak (WHO, A global brief on hypertension, 2013). Globally in a year, 17 million people die as a result of cardiovascular disease (WHO, 2008 as cited in WHO, A global brief on hypertension, 2013). From this 9.4 million deaths are deaths due to hypertension (Lim,et al., 2012 as cited in WHO, A global brief on hypertension, 2013).

HTN and Type 2 DM are mostly connected with older age group, but evidence shows that huge amount of HTN and Type 2 DM related deaths arise before the age of seventy. From this most of the early deaths occur in developing countries. All the age groups (children, adults and old age group) are all vulnerable to the risk factors that contribute to HTN and Type 2 DM. Common risk factors includes unhealthy food habits, physical inactivity, smoking, whether active smoking or passive smoking or the effects of alcohol consumption (WHO, 2015).

In 2015, there were 415 million people with diabetes around the world and most of the people (78 million people) are in South East Asia region (IDF, 2015). DM cases have arisen 108 million (in 1980) to 422 million (in 2014) around the world and the prevalence of Type 2 DM among 18 years and above adults has risen from 4.7% in 1980 to 8.5% in 2014 (WHO, Diabetes, 2016). The ways to avoid or to delay the onset of Type 2 DM is avoiding the risk factors of it; unhealthy diet, physical inactivity, overweight or obesity and tobacco use (WHO, Diabetes, 2016).

1.2 Problem Statement

In 2010, 209 new cases of hypertension were diagnosed in Maldives (MOH, The Maldives health statistics, 2012). In addition in 2010, 29 new diabetes mellitus cases were diagnosed in Maldives (MOH, The Maldives health statistics, 2012).

Due to development of the country, associated with changes in lifestyle, chronic non-communicable diseases arisen and is the main cause for morbidity and mortality in the country. Cardiovascular diseases, chronic respiratory diseases and cancers are the principal causes of death in Maldives. Deaths due to NCDs are about 78% of total disease burden. Only 22% comes from communicable diseases and other diseases (Ministry of Health & Gender, 2014).

According to Ministry of Health (MOH), NCD risk factor survey conducted in Male' in 2004, shows that smoking is the major cause of NCD in Maldives. Which was the highest among in South Asia with 45% of males are smokers and 12% of females are smokers (Ministry of Health & Gender, 2014). Moreover it found that obesity is also high in females. The result of the survey shows that 50% of females 35 years and above are obese or overweight (Ministry of Health & Gender, 2014).

In 2012, 85 new cases of hypertension were diagnosed (MOH, Maldives health profile, 2014). Furthermore, in the same year 39 new cases of diabetes mellitus were diagnosed (MOH, Maldives health profile, 2014). According to International Diabetes Federation (2015), meanwhile, in Maldives there were 17,100 cases of diabetes (IDF, 2015).

1.3 Objectives of the study

1.3.1 General Objectives

The objective of this study was to identify the prevalence and risk factors of Hypertension and Type 2 Diabetes in Baa.Kamadhoo.

1.3.2 Specific objectives

The objectives are:

- To determine the prevalence of Hypertension and Type 2 Diabetes among adults.
- To identify common risk factors of Hypertension and Type 2 Diabetes.

1.4 Research Questions

What is the prevalence of Hypertension and Type 2 Diabetes among adults of Baa.Kamadhoo?

What are the risk factors associated with Hypertension and Type 2 Diabetes among adults of Baa.Kamadhoo?

1.5 Significance of the Study

There were few studies conducted to identify risk factors on Hypertension and Type 2 Diabetes in Maldives. But to date there were no study conducted in Baa.Kamadhoo to identify risk factors associated with Hypertension and Type 2 Diabetes. Therefore this study was important to conduct, to identify the risk factors on Hypertension and Type 2 Diabetes to build a healthy population. Findings from this study can be valuable for

the Kamadhoo Health Centre, Baa.Kamadhoo Council Idhaaraa and Baa Atoll Hospital to build a healthy population. It will enable health care providers to work for reduction of risk factors associated with Hypertension and Type 2 Diabetes in Baa.Kamadhoo.

1.6 Scope of the Study

This study was focused to Baa.Kamadhoo only and it does not represent any other islands of Maldives. In this study 18 years and above adults in Baa.Kamadhoo were used as the sample. Since this is the age in which most of the risk factors arise. The study was focus on the prevalence and risk factors of Hypertension and Type 2 Diabetes.

1.7 Definitions of Terms

Hypertension (HTN):

HTN refers to high blood pressure; it is a lifelong disease, where the pressure in the arteries is persistently elevated.

Type 2 Diabetes Mellitus (Type 2 DM):

Type 2 DM is a lifelong disease which your body doesn't produce enough insulin, which leads to increase in glucose level in the blood.

Adults:

Adults are people who aged 18 years and above.

Risk factors:

Risk factors are the factors which increase the chance of getting HTN or Type 2 DM; smoking, eating habits, physical inactivity, overweight or obesity and family history.

Tobacco use

Tobacco use refers to consumption of tobacco in any form; either by eating tobacco or smoking tobacco.

Physical inactivity

Physical inactivity refers to the people who do not exercise regularly.

Overweight

Overweight is anyone who's BMI is between 25.0 to 29.9.

Obesity

Obesity is anyone who's BMI is 30.0 and above.

Family history

Family history is the presence of a history of either Hypertension or Type 2 Diabetes in any of the family member.

CHAPTER 2

LITERATURE REVIEW

This chapter of the study consists of literature on HTN, Type 2 DM, socio demographic factors and risk factors that are contributing to HTN and Type 2 DM. More over this chapter will consist of the theoretical frame which will define the theoretical basis used to conduct this research.

2.1 Theoretical Framework

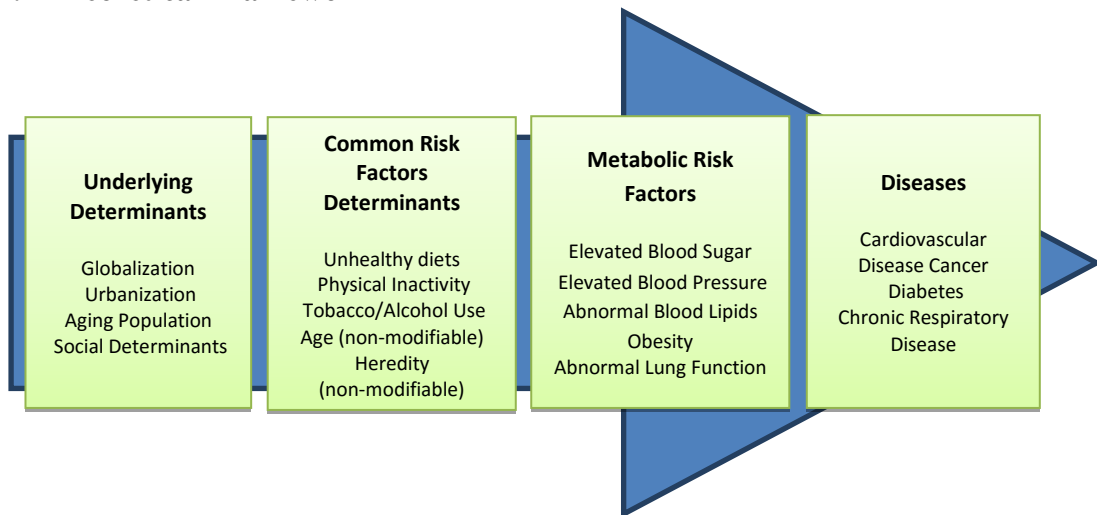


Figure 2.1 The Causation Pathway for Chronic Disease (CDC, Selecting effective interventions, 2013)

Casual map for NCDs is important because, health professionals may need to understand the causes of disease. Health professional can identify the casual factor by

an in-depth study of the disease and its risk factors. Many factors can be associated with a serious medical condition. Causal pathway is a visual illustration of a hypothesis. Moreover it shows the link between cause and the outcome of the factors. Causal map can be used to identify factors and model the treatment of a disease. It also helps people to understand the importance for identifying the risk factors (CDC, Selecting effective interventions, 2013).

2.2 Previous Studies

2.2.1 Hypertension (HTN)

In developed and developing countries HTN is the key to cause other NCDs. Hypertension is the principal cause for stroke, heart diseases, kidney failure and coronary artery disease (Joshi, et al., 2014). HTN is one of the cause which leads to mortality in South Asia. Though a systemic review on prevalence of risk factors leading to HTN in the South Asian region has not carried out in the past (Neupane, at el., 2014).

HTN varied from study to study with a range from 13.6% to 47.9% and studies have shown that HTN is high among people from urban areas than rural areas. The latest study conducted in South Asia region shows that prevalence of HTN among Maldivian population is 31.5%. Eight out of Nineteen studies regarding prevalence of HTN conclude that among both sexes, the prevalence was higher among females (Neupane, at el., 2014).

According to Mayo clinic (2015), for adults' systolic blood pressure under 120 mmHg and diastolic blood pressure below 80 mmHg considered as normal blood pressure.

Systolic blood pressure between 120 to 139 mmHg and diastolic blood pressure 80 to 89 mmHg considered as prehypertension. Systolic blood pressure 140 to 159 mmHg and diastolic blood pressure between 90 to 99 mmHg considered as stage 1 hypertension. Moreover systolic blood pressure between 160 mmHg and higher and diastolic blood pressure 100 mmHg and higher considered as stage 2 hypertension (Mayo, 2015).

2.2.2 Diabetes Mellitus (DM) Type 2

DM is a worldwide burden on health care services. Before it is believed that diabetes is a disease among people living in developed countries and it is increasing among rich people. Whereas recent estimations show that the burden of DM is spreading all over the world, especially in developing countries (Jayawardena, Ranasinghe, Byrne, Soares, Katulanda, & Hills, 2012).

India is one of the most densely populated country in the world with many diverse ethnic, linguistic and religious group. Countries in South Asia region are India, Pakistan, Bangladesh, Nepal, Sri Lanka, Bhutan and Maldives. Type 2 DM is increased among South Asians and is an important health concern in the region (Jayawardena, et al., 2012).

According to WHO (2016), 8.5% of the Maldives population is having diabetes. 27.4% of the population is overweight and 7% of the population is obese. Moreover, 30.3% of the population is physically inactive (WHO, Maldives, 2016).

2.2.3 SOCIO DEMOGRAPHIC FACTORS

2.2.3.1 Age

A study conducted in Northeast India show that mean BP was higher among people with high BMI and older age people. BMI has a significant association with age independently (Mungreiphy, Kapoor, & Sinha, 2011).

In U.S. population more than 25% of the elderly population has Type 2 DM (Centers for Disease Control and Prevention, 2011 as cited in Kirkman, et al., 2012). The aging of the population is a high risk for increasing DM (Kirkman, et al., 2012).

DM in working age group is also increasing but mortality due to DM is higher among older adults (Brown, Mangione, Saliba, & Sarkisian, 2003 as cited in Kirkman, et al., 2012). Furthermore, old age is a period of several diseases and causes disabilities most of time. A survey conducted in India shows that 14.1% old age people reported that they were having at least one NCD. From them 91.7% seek medical help in the past one year, of these 89.8% consult to doctors and take treatment regularly. Moreover this survey illustrates that younger aged male, who received better education have better health seeking attitude concerning NCD (Hegde, Agrawal, Fathima, & Amar, 2015).

2.2.3.2 Gender

A study conducted by using the technique of 24-hour ambulatory BP monitoring have illustrated that high BP is higher in men than women of the same age group (Reckelhoff, 2001).

According to Pan American Health Organization, Worldwide, the NCD rates will rise by 17% in the following ten years, largely due to increasing elderly population,

globalization, and development (Pan American Health Organization, n.d).The highest rate of NCDs like HTN and Type 2 DM will see from women. Women and man have different level of exposure to risk factors of NCDs and women are more likely to be overweight or obese than in man (Pan American Health Organization, n.d).

According to a study conducted by using 18 countries of Latin America and the Caribbean results that 40% of women in Canada and over 70% of women in Nicaragua and Belize are overweight or obese (Pan American Health Organization, n.d). This shows that higher rate of obesity leads to higher vulnerability to NCDs (Pan American Health Organization, n.d).

2.2.3.3 Occupation

Occupational stress is a factor which increases the risk of HTN and Type 2 DM. A study conducted among middle-aged men and women in different occupations show that stress at work is associated with risk of HTN and DM (Djindjic, Jovanovic, Djindjic, Jovanovic, & Jovanovic, 2012).

A cross sectional study, conducted in the college of science at Taibah University, to find out the prevalence of diabetes among the working personnel in the faculty, shows that 14.1% of the working personnel in the faculty is diabetic. All of those staff is age above 30 years and 50% of them eat fast food more than 3 days a week. In addition 78.6% of the participants who have DM have a family history of Type 2 DM (Abou-Gamel, et al., 2014).

Moreover, another cross-sectional study carried out among male bus drivers in North Kerala, India, shows that prevalence of HTN is high among bus drivers. Age 35 years old and above, increased BMI and supporting a large family associated with the

occupation has illustrated significant association with HTN (Lakshman, Manikath, Rahim, & Anilakumari, 2014).

2.2.3 RISK FACTORS OF NON COMMUNICABLE DISEASES

Poor health, such as rapid development, persistent poverty and discrimination, lower educational levels, and increased consumption of tobacco and fast foods are social factors which are linked to NCD risk behaviors (Baldwin, Kaneda, Amato, & Nolan, 2013).

2.2.3.1 Tobacco use

Smoking causes many lifelong diseases. There were large volume of published studies describing the negative effects of smoking for DM. Smoking increases the chances of developing Type 2 DM and also it is associated with insulin resistance and it is highly associated diabetic nephropathy (Chang, 2012).

According to Baldwin et al., 2013, world's tobacco use is a worldwide public health concern that kills around 6 million people each year. Studies from the United States have shown that tobacco use had spread widely among teenage girls and boys.

Another study regarding tobacco use conducted in South and Southeast Asia shows that smoking among women is very low. The type of tobacco use varied between men and women. When comparing the gender wise, smoking females are lower than the males all around the world. As well as in Maldives smoking among males is much higher than females and also in South Asia region chewing tobacco is common in Nepal, Bangladesh, Maldives and Cambodia. Usage of tobacco is relatively high

among people such as who are aged, less educated and poverty (Sreeramareddy, Pradhan, Mir, & Sin, 2014).

2.2.3.2 Unhealthy diet and physical inactivity

Results of a study shows that over 80% of teenagers had unhealthy diets, 54% of teenagers are physically inactive (Khuwaja, at el., 2011). Result of that study also shows that 3.1% participants were with a preventable life style risk factor (Khuwaja, at el., 2011).

Physical inactivity can cause many NCDs such as HTN, DM, breast and intestinal cancers and short life expectancy. Studies had shown that much of the world's population is physically inactive and is a key public health concern (Lee, et al., 2012). As the countries become more developed and individual become older, it leads to physical inactivity among the community (Baldwin, et al., 2013).

Physical inactivity and unhealthy diet can cause elevation of blood pressure and obesity and these are generally associated with NCDs, like Type 2 DM, HTN and heart disease (Baldwin, et al., 2013).

The result of a survey shows that physical inactivity of South Asian population was characterized by several socio demographic factors. Most of the adults from South Asia region were inactive in their leisure time (Ranasinghe, Ranasinghe, Jayawardena, & Misra, 2013).

The primary causes for overweight and obesity is overeating and physical inactivity. Physical inactivity increases premature mortality, dying of cardiovascular diseases, Type 2 DM, HTN and colon cancer (Nik, et al., 2009; Katzmarzyk, Janssen & Ardem, 2003, as cited in Ghrayeb, & Al Rifai, 2014). Regular physical activity can prevent

from NCDs and also it helps to prevent osteoporosis (Yakubo et al., 2013; Ikeda et al., 2012; Wolf et al., 1999 as cited in Ghrayeb, & Al Rifai, 2014).

2.2.3.3 Overweight/ Obese

A study conducted among Punjabi girls of Delhi shows a significant correlation of BMI and HTN (Kapoor, 2000 as cited in Mungreiphy, Kapoor, & Sinha, 2011).

Studies have proved that foods we eat and physical activity can play a vital role to prevent our body from HTN and DM and other NCDs. Physical inactivity and inactive behavior, consuming fried foods and drinking fizzy drinks, skipping meals and advanced technologies are the main risk factors for overweight and obesity (Ghrayeb & Al Rifai, 2014).

Moreover a cross sectional study conducted in Tarqumia, Palestine had proved that there is an opposite relationship between increased BMI and intake of breakfast. People who skip breakfast increase the chances of being overweight or obese than people who consume breakfast regularly. People who take breakfast regularly have less chance of developing Type 2 DM than those who skipped breakfast (Ghrayeb & Al Rifai, 2014).

According to CDC (2015), BMI below 18.5 indicates underweight, BMI 18.5 to 24.9 indicates normal or healthy weight, BMI 25.0 to 29.9 indicates overweight and BMI 30.0 and above indicates obesity (CDC, About adult BMI, 2015).

2.2.3.5 Family History

The National Health and Nutrition Examination Survey conducted in the U.S. population from 1999–2004 shows that the adults of U.S. have 7.5% higher the risk of

having Type 2 DM if they have a family history (Valdez, Yoon, Liu, & Khoury, 2007). Family history of Type 2 DM has a significant association with prevalence of Type 2 DM. The association between family history of Type 2 DM and prevalence of Type 2 DM remains even after accounting for sex, age, BMI, HTN, financial status, and education level (Valdez, et al., 2007).

Furthermore, a cross-sectional study conducted among 5000 Sri Lankan adults' shows that, prevalence of HTN is higher among people who have family history of HTN (29.3 %) than those without (24.4%)(Valdez, et al., 2007). Moreover, the results of the study illustrated that family history of HTN was also associated with obesity (Ranasinghe, Cooray, Jayawardena, & Katulanda, 2015).

CHAPTER 3

METHODOLOGY

3.1 Research Design

The design of the study was cross sectional descriptive design.

Cross sectional studies are relatively less expensive and take little time to conduct. It is usually conducting to estimate prevalence of outcome of an interest. Through a cross sectional study many of the risk factors and outcomes can be assessed. It provides a snapshot of outcomes of the given population (Levin, 2006).

I chose this design because I believed that I could get most appropriate information by using the design, which I have mentioned above. Moreover cross sectional descriptive design is easy to analyze the result.

3.2 Study Area

Study area of this research was prevalence and risk factors of HTN and Type 2 DM.

The study setting of this study was focused on an island. Most of the islands risky population for HTN and Type 2 DM is very high. Therefore Baa Atoll Kamadhoo was selected for the population to study. The island was chosen because, according to Baa.Kamadhoo Health Centre, risk factors for HTN and Type 2 DM were increasing among adults nowadays (Shafeenaz, 2016).

3.3 Target Population

The target population of this study was adults of Baa.Kamadhoo. The participant's was 18 years and above. According to Baa Kamadhoo Council Idhaaraa, there were 337 people registered in the island who are 18 years and above (Shazmeena, 2016).

3.4 Sampling Techniques

The sampling technique used in this study was convenience sampling technique. In convenience sampling participants have to select in the means of availability and willingness of them.

The main advantages of this is convenience sampling is very easy to carry out and cost and time require to carry out a convenience sample is very less. This allows that the researcher to achieve the sample size in a cheap and fast way (Dissertation Laerd, 2012).

The sample was selected among 18 years and above adults of Baa.Kamadhoo. The total population of this study was 337 and the sample size of the study was 125.

3.5 Sample size

Sample size of this study was calculated by using a sample size calculator (Raosoft). The target population of this study was all the adults age 18 years and above of Baa.Kamadhoo. There were 337 adults in Baa.Kamadhoo. To use this calculator I have to know the margin of errors and confidence level of the study. Margin of errors is amount of errors that the researcher can tolerate. For lower margin of errors, it requires a large population to study (Raosoft, 2004). So for this study I have kept 5% as margin of errors.

Moreover confidence level is the amount of uncertainty you can accept if the researcher choose a higher confidence level, it requires a large population to study (Raosoft, 2004). For this particular study I have kept 95% as confidence level and 50% as response distribution and the sample size generated was 180. But due to limitation of time I have selected 69.4% from the actual sample size. That was 125 samples.

3.6 Research Instrument

The participants were interviewed by using a questionnaire on the prevalence and risk factors of HTN and Type 2 DM among adults in Baa.Kamadhoo. An interviewer administered questionnaire was used as an instrument for data collection. The questionnaire was prepared in English and then it was translated to Dhivehi (local language).

The questionnaire was divided into 7 main areas. Section A contains socio demographic information. Section B contains physical measurements like, checking blood pressure, height and weight of the participants. Section C contains medical and family history and section D consists of eating habits like amount of sugar, salt, oil and fizzy drinks intake and use of fruits and vegetables in their diet. Section E asks some questions related to tobacco use and Section F asks questions related to physical activities and sedentary behaviour. All the questions in the questionnaire were close ended. Detail of the interview questionnaire was provided in APPENDIX B.

3.7 Pre Testing

To check the validity of the questionnaire I had pre tested the questionnaire with 10 people from the target population. It is to check whether the participants understand the questions in the questionnaire easily or not. After pre testing, the questionnaire was modified before final data collection.

3.8 Validity and Reliability of the Research

“Validity is defined as the extent to which a concept is accurately measured in a quantitative study” (Heale & Twycross, 2015). For example if the survey is designed to check the depression but actually it checks the level of anxiety, so the questionnaire is not valid. Another quality of a quantitative study is reliability or accuracy of an instrument which is using in the study, the extent to which a research instrument regularly has the same result, if it is using in the similar situation on repetitive instances. It is very important to consider validity and reliability of research instrument when conducting a research (Heale & Twycross, 2015).

During the study I have used a questionnaire. At the beginning it may not be valid. Therefore to check the validity of the research instrument, I have pre tested the instrument by using 10 people from the target population and the research instrument was shown to the research supervisor and brought necessary changes before doing the final data collection.

To make the research instrument reliable, I have selected samples from same island and same age group. If I have collected data from another island or used another age group, the instrument will not be reliable.

To increase the validity and reliability of the research, instrument was made by strictly concentrating on achieving the purpose and the objectives of the study.

3.9 Data Collection Techniques

In this research an interviewer administered face to face questionnaire was used for data collection. The data collection was carried out by visiting different houses of the island.

Before starting with the questionnaire, a written consent form was given to participants with detail information. Assurance was given to the participants that information obtained would be kept confidential and their participation would not harm them in any way. None of the participants refuse to participate in the study. The collected sample size was 125 samples.

3.10 Framework of Data Analysis

As soon as the data was collected, the collected data was analysed by using Microsoft Excel and Statistical Package for Social Sciences (SPSS). The quantitative data was prepared with the descriptive method by using SPSS to analyse the frequency, mean, mode and median. Chi square test was used to find out the association between different variables (dependent and independent variable). The results were presented in the mean of graphs and tables.

Table 3.1 Summary of analytical framework

Objective	Question	Source of Data	Types of data	Technique of Analysis
To determine the prevalence of HTN and Type 2 DM among adults.	What is the prevalence of HTN and Type 2 DM among adults of Baa.Kamadhoo?	Self-designed questionnaire	Primary	Microsoft Office Excel and SPSS
To identify common risk factors of HTN and Type 2 DM.	What are the risk factors associated with HTN and Type 2 DM among adults of Baa.Kamadhoo?	Self-designed questionnaire	Primary	Microsoft Office Excel and SPSS

The above table (Table 3.1) shows the summary of analytical framework used in this study.

3.11 Ethical Considerations

Before collecting data from the participants, the aim and procedures of the survey was explained to the participants and written consent was taken from the participants. Confidentiality and privacy was strictly maintained. Individual views and social values of the participants were respected throughout the study. The answers provided by the participants were remained unidentified throughout the study. The participant had the right to autonomy and was free to withdraw from the study at any time during the study.

3.12 Conceptual framework and management of variables

Below figure shows the conceptual framework of the study. It shows the relationship between independent variables and dependent variable. Independent variable is divided into 2 main categories. Those are socio demographic factors and risk factors for HTN and Type 2 DM.

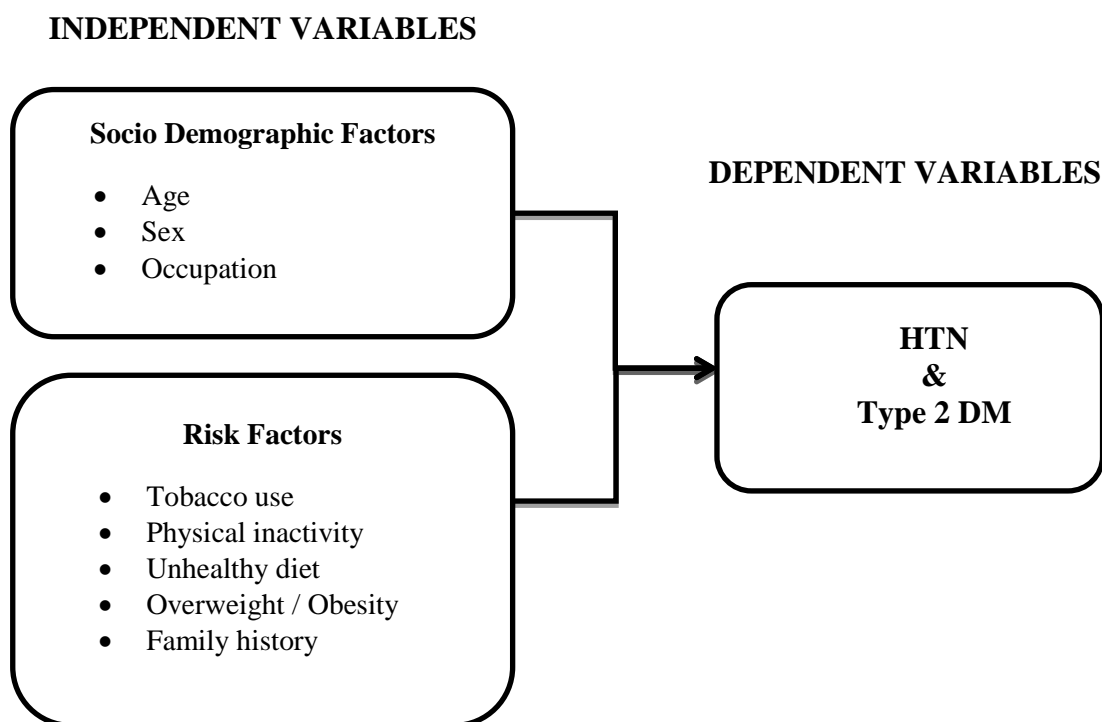


Figure 3.1 Conceptual framework to identify the prevalence and risk factors in HTN and Type 2 DM among adults of Baa.Kamadhoo.

CHAPTER 4

DATA ANALYSIS AND RESULTS

A descriptive cross-sectional study was conducted to identify the prevalence and risk factors of hypertension (HTN) and type 2 diabetes (Type 2 DM) among adults of Baa.Kamadhoo. The sample size of this study was 125 people (86 females and 39 males).

4.1 Demographic characteristics

Table: 4.1 Frequency and percentage of participants by socio demographic characteristics

Demographic characteristics	Frequency (n=125)	Percent (%)
Age		
18-34 years	60	48.0
35-64 years	55	44.0
65 years and above	10	8.0
Gender		
Female	86	68.8
Male	39	31.2
Occupation		
Government	33	26.4
Farming	2	1.6
Self employed	11	8.8
Tourism	36	28.8
Coconut palm leaf weaving	3	2.4
Construction	1	0.8
Unemployed	31	24.8
Others	8	6.4

The frequency and percentage of participants by socio demographic characteristics of participants are shown in Table 4.1. The table 4.1 illustrates 48% of the participants are aged between 18 to 34 years, 44% of them are 35 – 64 years and the rest 8% are aged above 65 years. Moreover, 68.8% of the participants are females and 31.2% of participants are males. Based on occupation, the majority of participants (28.8%) are working in tourism industry, 26.4% of participants are working in government places, 1.6% of the participants are farmers, 8.8% of participants are self-employed and 2.4% of participants are weaving coconut palm leaf as a source of income, 0.8% of participants are working in construction industry, 6.4% of participants are working in other sectors and the rest, 24.8% participants are unemployed.

4.2 Physical measurements

Table: 4.2 Frequency and percentage of participants by physical measurements

Physical Measurements	Frequency (n=125)	Percent (%)
Body mass index (BMI)		
Under weight	5	4.0
Normal weight	69	55.2
Over weight	36	28.8
Obese	15	12.0
Mean BMI 24.8	Median 24.2	Mode 23.1
Systolic Blood Pressure (BP)		
Systolic BP below 120	67	53.6
Systolic BP between 120 – 139	24	19.2
Systolic BP between 140-159	21	16.8
Systolic BP above 160	13	10.4
Mean 121.92	Median 119	Mode 117
	Minimum 85	Maximum 200

Table 4.2, continued.

Physical Measurements	Frequency (n=125)	Percent (%)
Diastolic Blood Pressure (BP)		
Diastolic BP below 80	88	70.4
Diastolic BP between 80 – 89	23	18.4
Diastolic BP between 90 – 99	11	8.8
Diastolic BP above 100	3	2.4
Mean 75.48 Median 74 Mode 74 Minimum 50 Maximum 116		

The results of physical measurements of the participants are presented in Table 4.2 by frequency and percentage. The top of the table shows body mass index (BMI) of the participants. Most of the participants have a normal BMI (55.2%). 4% of the participants are underweight, 28.8% of the participants are overweight and 12% of the participants are obese. The mean BMI is 24.8, median BMI is 24.2 and the mode BMI is 23.1.

Furthermore, the middle part of the table shows systolic blood pressure (BP) of the participants. Among them 53.6% are having a normal systolic BP (Systolic BP below 120), 19.2% of the participants are systolic BP between 120 to 139, 16.8% are having systolic BP 140 to 159 and 10.4% of the participants systolic BP are 160 and above. The mean Systolic BP is 121.92, median 119, mode 117, minimum systolic BP is 85, and the maximum is 200.

The bottom of the table illustrates the diastolic BP of the participants. 70.4% of the participants diastolic BP is below 80, 18.4% of the participants diastolic BP is between 80 to 89, 8.8% of the participants diastolic BP is between 90 to 99 and the rest 2.4% participants diastolic BP is above 100. The mean diastolic BP is 75.48, median 74, mode 74, minimum diastolic BP is 50 and the maximum is 116.

4.3 Medical history and Family history

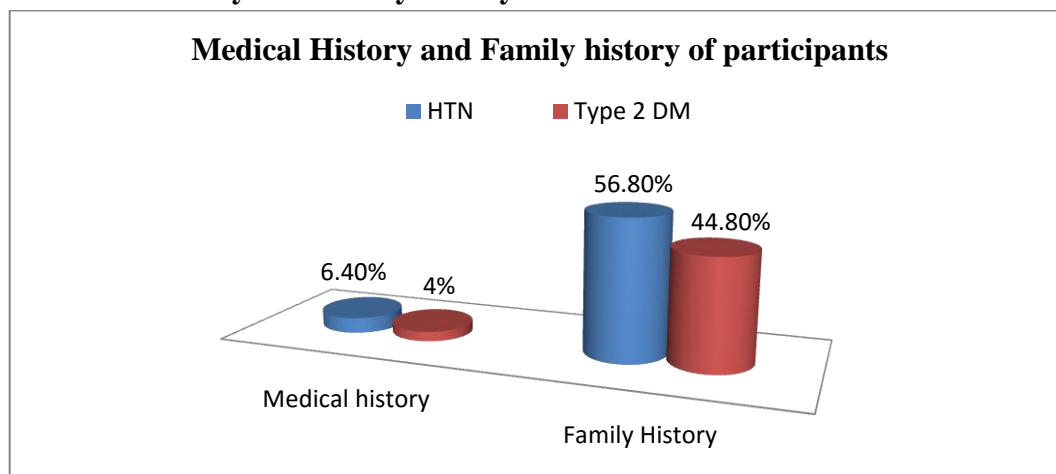


Figure 4.1 Percentage of participants by their medical history and family history

The above figure (Figure 4.1) shows the percentage of participants by their medical history. 6.4% of participants are having HTN and 4% of participants are having Type 2 DM. Moreover, 56.8% of participants in this study are having family history of HTN and 44.8% of participants are having family history of Type 2 DM.

4.4 Eating habits

Table 4.3 Frequency and percentage of participants by eating habits

Eating Habits	Frequency (n=125)	Percent (%)
In a week how many servings of fruits do you eat?		
No fruits consumption at all	19	15.2
1-2 servings	42	33.6
3-6 servings	18	14.4
More than 7 servings	46	36.8
In a week how many servings of vegetables do you eat?		
No vegetables consumption at all	10	8.0
1-2 servings	35	28.0
3-6 servings	24	19.2
More than 7 servings	56	44.8

Table 4.3, continued.

Eating Habits	Frequency (n=125)	Percent (%)
How much sugar do you consume per day?		
No sugar consumption	7	5.6
Less than 2 tea spoon	38	30.4
3-6 tea spoon	54	43.2
More than 7 tea spoon	26	20.8
What is your preference for salt in your diet?		
Less than 1 tea spoon	98	78.4
2-4 tea spoon	26	20.8
More than 5 tea spoon	1	.8
How much oil do you consume per day?		
No oil consumption	1	.8
Less than 2 tea spoon	76	60.8
3-5 tea spoon	44	35.2
More than 6 tea spoon	4	3.2
If you consume oil, what kind of oil do you usually use? (n=124)		
Vegetable oil	46	37.1
Olive oil	5	4.0
Sunflower / Corn oil	71	57.3
Others	2	1.6
Do you consume soft drinks?		
Yes	63	50.4
No	62	49.6
Do you consume energy drinks?		
Yes	41	32.8
No	84	67.2
If “yes” how often you consume energy drinks? (n=41)		
Everyday	8	19.5
2-3 times a week	13	31.7
Once a week	8	19.5
Occasionally	12	29.3

Frequency and percentage of participants by eating habits are shown in Table 4.3.

Among 125 participants, majority of the participants (36.8%) consume more than 7

servings of fruits every week, 33.6% consume 1 to 2 servings in a week, 14.4% consume 3 to 6 servings every week and 15.2% do not consume fruits at all.

As well as 44.8% participants consume more than 7 servings of vegetables every week, 28% of participants consume 1 to 2 servings of vegetables every week, 19.2% participants consume 3 to 6 servings every week and 8% of participants do not consume vegetables at all.

Moreover, 43.2% of the participants consume 3 to 6 tea spoon of sugar every day, 30.4% consume less than 2 tea spoon of sugar every day, 20.8% of participants consume more than 7 tea spoon of sugar every day and 5.6% of participants do not consume sugar.

The preference of salt intake of participants, majority of participants (78.4%) use less than 1 tea spoon of salt every day, 20.8% use 2 to 4 tea spoon of salt every day and 0.8% consume more than 5 tea spoon of salt every day.

Furthermore, 60.8% of the participants consume less than 2 tea spoon of oil every day, 35.2% consume 3 to 5 tea spoon of oil, 3.2% participants consume more than 6 tea spoon of oil every day and 0.8% of participants do not consume oil at all. Among the 124 participants who consume oil every day, 57.3% of them consume sunflower / corn oil, 37.1% consume vegetable oil, 4% of participants consume olive oil and the rest 1.6% consume others types of oil.

Meanwhile, percent of participants who consume soft drinks are 50.4% and who do not consume soft drinks are 49.6%. Participants who consume energy drinks are 32.8% and who do not consume energy drinks are 67.2%. Among the 41 participants who consume energy drinks, 19.5% of them consume energy drinks every day, 31.7%

of them consume energy drinks 2-3 times a week, 19.5% of them consume energy drinks once a week and 29.3% of them consume energy drinks occasionally.

4.5 Tobacco use

Table 4.4 Frequency and percentage of participants by tobacco use

Tobacco use	Frequency (n=125)	Percent (%)
Do you eat tobacco?		
Yes	18	14.4
No	107	85.6
Do you smoke?		
Yes	25	20.0
No	100	80.0
If “yes” how many sticks of cigarettes you smoke per day? (n=25)		
Less than 5 sticks	2	8.0
6-10 sticks	4	16.0
11-20 sticks	15	60.0
More than 21 sticks	4	16.0
If smoking, how long have you been smoking? (n=25)		
1-5 years	6	24.0
6-10 years	7	28.0
More than 11 years	12	48.0

Frequency and percentage of participants by tobacco use are shown in Table 4.4. Among 125 participants, 14.4% of the participants eat tobacco and 85.6% do not eat tobacco. Also 20% of the participants in this study are smokers and 80% do not smoke. Among 25 participants who smoke, 8% of them smoke less than 5 sticks of

cigarettes per day, 16% of them smoke 6 to 10 sticks per day, 60% of them smoke 11 to 20 sticks per day and 16% of them smoke more than 21 sticks in every day. The results also shown among participants who smoke (n=25) 48% of them smoke for more than 11 years. 24% of them smoke for 1 to 5 years and 28% of them smoke for 6 to 10 years.

4.6 Physical activity and sedentary behaviour

Table 4.5 Frequency and percentage of participants by physical activity and sedentary behavior

Physical activity and sedentary behaviour	Frequency (n=125)	Percent (%)
Do you exercise regularly?		
Yes	51	40.8
No	74	59.2
What kind of exercise you prefer to do? (n=51)		
Bicycling	1	2.0
Aerobics	2	3.9
Swimming	2	3.9
Walking	13	25.5
Running	4	7.8
Strenuous sports	21	41.2
Others	8	15.7
How much time do you spend for exercise in a typical day? (n=51)		
Less than 15 minutes	5	9.8
16-30 minutes	14	27.5
31-45 minutes	5	9.8
More than 46 minutes	27	52.9

Table 4.5, continued.

Physical activity and sedentary behaviour	Frequency (n=125)	Percent (%)
In a week how many days do you exercise? (n=51)		
Everyday	38	74.5
Less than 3 days a week	4	7.8
4-6 days a week	9	17.6
How much time do you spend sitting or reclining in a day?		
Less than 5 hours	66	52.8
6-10 hours	49	39.2
11-15 hours	10	8.0
What kind of transport you prefer?		
Walking	108	86.4
Bicycle	12	9.6
Motorcycle	5	4.0

The table (Table 4.5) shows the frequency and percentage of participants by physical activity and sedentary behavior. 59.2% participants who participated in the study do not exercise and 40.8% of the participants exercise regularly. Among the 51 participants exercise, majority of them (41.2%) prefer strenuous sports, 2% of them prefer bicycling, 3.9% of them prefer aerobics and 3.9% prefer swimming, 25.5% prefer walking, 7.8% prefer running and the rest 15.7% prefer others types of exercises. Moreover among those who exercise regularly (n=51), 74.5% exercises every day, 7.8% exercises less than 3 days a week and 17.6% exercises 4 to 6 days a week.

Furthermore the bottom part of the table illustrates the sedentary behavior of the participants. 52.8% of the participants spend less than 5 hours sitting or reclining in a day, 39.2% spends 6 to 10 hours sitting or reclining in a day and 8% of the participants spends 11 to 15 hours sitting or reclining in a day. The main kind of the

transport that participants are using are walking (86.4%), 9.6% use bicycle as a main kind of transport and 4% of the participants use motorcycle as a main kind of transport.

4.7 Association between HTN and age

Table 4.6 Association between HTN and age

HTN	Age			Total N (%)	<i>p</i> -value
	18-34 years N (%)	35-64 years N (%)	65 years and above N (%)		
Yes	0 (0.0)	5 (62.5)	3 (37.5)	8 (100)	0.001
No	60 (51.3)	50 (42.7)	7 (6.0)	117 (100)	

The table above (table 4.6) illustrates the association between HTN and age. 62.5% of the participants who have HTN are age between 35 to 64 years and 37.5% of the participants who have HTN are age above 65 years. The result of the test showed the *p*-value as 0.001. Therefore, in this study, there is a significant association between HTN and age.

4.8 Association between Type 2 DM and age

Table 4.7 Association between Type 2 DM and age

Type 2 DM	Age			Total N (%)	<i>p</i> -value
	18-34 years N (%)	35-64 years N (%)	65 years and above N (%)		
Yes	1 (20)	2 (40)	2 (40)	5 (100)	0.02
No	59 (49.2)	53 (44.2)	8 (6.7)	120 (100)	

Table 4.7 above shows the association between Type 2 DM and age. 40% of the participants who have Type 2 DM are aged between 35 to 64 years, 40% of the

participants who have Type 2 DM are age 60 years and above and only 20% of the participants who have Type 2 DM are aged between 18 years to 34 years. The result of the test showed the p -value as 0.02. Therefore, in this study, there is a significant association between Type 2 DM and age.

4.9 Association between HTN and exercise

Table 4.8 Association between HTN and exercise

HTN	Exercise		Total N (%)	p -value
	Yes N (%)	No N (%)		
Yes	6 (75)	2 (25)	8 (100)	0.04
No	45 (38.5)	72 (61.5)	117 (100)	

Table 4.8 above shows the association between HTN and exercise. 75% of participants who have HTN exercise regularly and 25% of participants who have HTN do not exercise regularly. The result of the test showed the p -value as 0.04. Therefore, in this study, there is a significant association between HTN and exercise.

4.10 Association between Type 2 DM and exercise

Table 4.9 Association between Type 2 DM and exercise

Type 2 DM	Exercise		Total N (%)	<i>p</i> -value
	Yes N (%)	No N (%)		
Yes	3 (60)	2 (40)	5 (100)	0.37
No	48 (40)	72 (60)	120 (100)	

Table 4.9 above shows the association between Type 2 DM and exercise. 60% of the people who have Type 2 DM exercise regularly and 40% of the people who have Type 2 DM do not exercise regularly. The result of the test showed the *p*-value as 0.37. Therefore, the Chi-square test did not show any significant differences between Type 2 DM and exercise.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Summary of Main Findings

The present cross-sectional study included 125 participants aged 18 years and above from the residents of Baa.Kamadhoo. The research question was what is the prevalence and risk factors of HTN and Type 2 DM among adults of Baa.Kamadhoo. The main objective of this study is to understand the prevalence and risk factors of HTN and Type 2 DM in Baa.Kamadhoo. A convenience sampling techniques was used for data collection. Data was collected by interviewer, by using a structured questionnaire and Microsoft Excel and SPSS was used for data analysis.

The analysis of this study findings noted that 68.8% of the participants in this study are female and 31.2% are males. Majority of the participants are working in tourism industry. The mean BMI of the participants of this study was 24.8. Most of the participants have a normal BMI.

Moreover, 6.4% of participants have HTN and 4% of participants have Type 2 DM. Participants who have family history are more among participants who have HTN (6.4%) than participants who have Type 2 DM. The result illustrated that 20% of the participants are smokers and 59.2% does not exercise. The results of the study also show, there is a significant association between HTN and age. Moreover, the result shows, Type 2 DM and age also have a significant association.

5.2 Discussion

In this cross-sectional descriptive study, samples were taken from 125 adults of Baa.Kamadhoo. Studies have proven that adult age group is more risky for HTN and Type 2 DM to arise. The majority (48%) of the people participated in the study are age between 18 years to 34 years. 44% of them are 35 – 64 years and the fewer (8%) participants are in age 65 years and above. Moreover, number of females participated in this study is more than number of males participated. 68.8% of the participants are females and 31.2% of participants are males.

Based on occupation, the majority of participants (28.8%) are working in tourism industry, 26.4% of participants are working in government places, 1.6% of the participants are farmers, 8.8% of participants are self-employed and 2.4% of participants are weaving coconut palm leaf as a source of income, 0.8% of participants are working in construction industry, 6.4% of participants are working in other sectors and the rest, 24.8% participants are unemployed. The result indicated that very few percentages of the people are unemployed.

Most of the participants have a normal BMI (55.2%). 4% of the participants are underweight, 28.8% of the participants are overweight and 12% of the participants are obese. The mean BMI is 24.8. A cross-sectional study carried out in Northeast India, shows that mean BP increased with increasing BMI. Moreover, another study conducted among Punjabi girls of Delhi, also shows a significant association of BMI and HTN (Kapoor, 2000 as cited in Mungreiphy, Kapoor, & Sinha, 2011).

Furthermore, among the participants in this study, 53.6% are having a normal systolic BP (Systolic BP below 120), 19.2% of the participants are systolic BP between 120 to 139, 16.8% are having systolic BP 140 to 159 and 10.4% of the participants systolic

BP are 160 and above. The mean Systolic BP was 121.92, minimum systolic BP was 85, and the maximum was 200.

The study has shown that 70.4% of the participants diastolic BP was below 80, 18.4% of the participants diastolic BP was between 80 to 89, 8.8% of the participants diastolic BP was between 90 to 99 and the rest 2.4% participants diastolic BP was above 100. The mean diastolic BP was 75.48, minimum diastolic BP was 50 and the maximum was 116.

Among all the participants in this study (n=125) 6.4% of participants were having HTN and 4% of participants were having Type 2 DM. Moreover, 56.8% of participants in this study were having family history of HTN and 44.8% of participants were having family history of Type 2 DM.

Among 125 participants, majority of the participants (36.8%) consume more than 7 servings of fruits weekly, 33.6% consume 1 to 2 servings in a week, 14.4% consume 3 to 6 servings every week and 15.2% do not consume fruits at all. As well as 44.8% participants consume more than 7 servings of vegetables weekly, 28% of participants consume 1 to 2 servings of vegetables weekly, 19.2% participants consume 3 to 6 servings every week and 8% of participants do not consume vegetables at all.

A study has shown there is no relation between intake of fruits and vegetables and risk of Type 2 DM, but for overweight women high intake of green leafy or dark yellow vegetables reduces risk of Type 2 DM (Liu, et al., 2004). Another study also has shown there is no relation between total intake of fruits and vegetables and increase in risk of Type 2 DM; however, intake of whole fruits and green leafy vegetables was inversely related (Bazzano, Li, Joshipura, & Hu, 2008). Another study has revealed higher intake of all types of fruits reduced the risk of hypertension after

the modification for lifestyle and dietary factors but not all the types of vegetables are associated (Wang, Manson, Gaziano, Buring, & Sesso, 2012).

The result of this research shows that most of the people take very less amount of fruits and vegetables in their daily diet. The literatures show that there is no association between intake of fruits and vegetables and the risk of Type 2 DM and also intake of fruits and vegetable do not have a significant association with HTN. But most of the research results shows that, intake of fruits and vegetables reduce the risk of Type 2 DM.

Moreover, 43.2% of the participants consume 3 to 6 tea spoon of sugar daily, 30.4% consume less than 2 tea spoon of sugar every day, 20.8% of participants consume more than 7 tea spoon of sugar daily and 5.6% of participants do not consume sugar. A previous study has shown that increasing the intake of sugar sweetened beverages increases the risk of Type 2 DM (Wang, Yu, Fang, & Hu, 2015). In this study also most of the people use a high amount of sugar.

The preference of salt intake of participants, majority of participants (78.4%) use less than 1 tea spoon of salt daily, 20.8% use 2 to 4 tea spoon of salt every day and 0.8% consume more than 5 tea spoon of salt every day. Studies have shown that reduction in salt intake reduces the chances of developing HTN. Reduction of salt to recommended level (less than 5-6 gram/day) have also improves cardio vascular health (Sung, 2014). In this study most of the people use less than 1 table spoon (5-6 gram) of salt.

Furthermore, 60.8% of the participants consume less than 2 tea spoon of oil every day, 35.2% consume 3 to 5 tea spoon of oil, 3.2% participants consume more than 6 tea spoon of oil every day and 0.8% of participants do not consume oil at all. Among

the 124 participants who consume oil every day, 57.3% of them consume sunflower / corn oil, 37.1% consume vegetable oil, 4% of participants consume olive oil and the rest 1.6% consume others types of oil. A study has revealed in taking higher amount of olive oil instead of butter, margarine and mayonnaise reduces the risk of Type 2 DM in women(Guasch, et al., 2015).Another study has shown intake of degradation of vegetable oils has direct relation between risks of hypertension (Soriguer, et al., 2003). In this study only 4% of the people are using olive oil and 37.1% uses vegetable oil. Most of the participants uses less than 2 table spoon of oil every day.

Meanwhile, percent of participants who consume soft drinks are 50.4% and who do not consume soft drinks are 49.6%. Participants who consume energy drinks are 32.8% and who do not consume energy drinks are 67.2%. Among the 41 participants who consume energy drinks, 19.5% of them consume energy drinks every day, 31.7% of them consume energy drinks 2-3 times a week, 19.5% of them consume energy drinks once a week and 29.3% of them consume energy drinks occasionally. A study has shown consuming sugary drinks regularly have positive relation between risks of having Type 2 DM than people who consumes less sugary drinks, besides young adults has highest risk of developing Type 2 DM (Malik, Popkin, Bray, Despres, Willett,& Hu, 2010 as cited in Harvard, n.d). In this study the number of people who consume soft drinks are quite high. According to the literature high intake of soft drinks have higher chances of developing Type 2 DM.

The results of this study shows that, among 125 participants, 14.4% of the participants eat tobacco and 85.6% do not eat tobacco. Also 20% of the participants in this study are smokers and 80% do not smoke. Among 25 participants who smoke, 8% of them smoke less than 5 sticks of cigarettes per day, 16% of them smoke 6 to10 sticks per day, 60% of them smoke 11 to 20 sticks per day and 16% of them smoke more than

21 sticks in every day. The results also shown among participants who smoke (n=25) 48% of them have been smoking for more than 11 years. 24% of them have been smoking for 1 to 5 years and 28% of them have been smoking for 6 to 10 years. A previous study has shown that HTN was associated with smoking when characterized as the number of years of smoking and the period of smoking. But the result does not associate with the current smoking status of the participants (Thuy, Blizzard, Schmidt, Luc, Granger, & Dwyer, 2010). The result of this study illustrated that among the people who smoke (n=25) most of the people smoked for more than 11 years (48%).

The results indicated that 59.2% of those who were interviewed do not exercise and 40.8% of the participants exercise regularly. Among the 51 participants exercise, majority of them (41.2%) prefer strenuous sports, 2% of them prefer bicycling, 3.9% of them prefer aerobics and 3.9% prefer swimming, 25.5% prefer walking, 7.8% prefer running and the rest 15.7% prefer others types of exercises. Moreover, among those who exercise regularly (n=51), 74.5% exercises daily, 7.8% exercises less than 3 days a week and 17.6% exercises 4 to 6 days a week.

Among the 125 participants who completed the questionnaire, 52.8% of the participants spend less than 5 hours sitting or reclining in a day, 39.2% spends 6 to 10 hours sitting or reclining in a day and 8% of the participants spend 11 to 15 hours sitting or reclining in a day. The main kind of the transport that participants are using are walking (86.4%), 9.6% use bicycle as a main king of transport and 4% of the participants use motorcycle as a main kind of transport. A prospective study result shows the relationship between physical activity and HTN (Diaz & Shimbo, 2013). Another study shows that sports activity was independently associated with Type 2 DM (Defay, Delcourt, Ranvier, Lacroux, & Papoz, 2001). In this study number of

people who do not exercise is more than people who exercise. Moreover, in this study most of the people prefer walking as main kind of transport.

In this study 62.5% of the participants who have HTN are age between 35 to 64 years and 37.5% of the participants who have HTN are age above 65 years. The result of the Chi-square test shows a significant association between HTN and age (p -value=0.001). The results of a study show that, increase in age have a significant association with HTN. Mostly the prevalence was high in people who have systolic HTN and aged above 60 years (Anderson, 1999). Evidence has shown that most common type of HTN among people aged above 50 years is elevated systolic BP, but not diastolic BP. The blood pressure among old age people was increasing due to structural changes in the arteries. Various studies show that hypertension is also associated with cardiovascular diseases. Among old aged people the most influential risk is increased pulse pressure. This is due to decreased in diastolic BP and increasing systolic BP. Studies show that by treating HTN of old age people can reduce cardio vascular diseases (Pinto, 2007).

In this study 40% of the participants who have Type 2 DM are age between 35 to 64 years, 40% of the participants who have Type 2 DM are age 60 years and above and only 20% of the participants who have Type 2 DM are age between 18 years to 34 years. The result of the Chi-square test shows a significant association between Type 2 DM and age (p -value=0.02).As like metabolic conditions, the prevalence of Type 2 DM increases with rising age. In United States, 3.7% of people aged 20 years and above with diagnosed and undiagnosed Type 2 DM is increasing with age. In addition among people aged 65 years and above, 26.9% have Type 2 DM (Centers for Disease Control and Prevention, 2011 as cited in (Suastika, Dwipayana, Semadi, & Kuswardhani, 2012)). According to Shelton, 2006 studies have revealed that in

England also prevalence of Typ2 2 DM is increasing with age. The most prevalent age group was 65 to 74 years (15.7% are men and 10.4% are women) (Shelton, 2006 as cited in Suastika, Dwipayana, Semadi, & Kuswardhani, 2012).

The results of this study illustrated that, 75% of participants who have HTN exercise regularly and 25% of participants who have HTN do not exercise regularly. The result of the Chi-square test shows a significant association between HTN and exercise (p -value=0.04). The results of a previous studies show that, the correlation of the physical activity and BP indicates a positive association of moderate exercises with diastolic BP of males but among females no association between exercise and BP were seen. It also concluded that higher level of exercise lowers the BP (Durrani & Fatima, 2015). This study also shows that there is a significant association between HTN and exercise.

The results of this study show that, 60% of the people who have Type 2 DM exercise regularly and 40% of the people who have Type 2 DM do not exercise regularly. The result of the Chi-square test do not show a significant association between HTN and exercise (p -value=0.37). A clinical trial shows the effectiveness of physical activity for improving blood glucose control (Sigal, Kenny, Wasserman, & Sceppa, 2004). Another study also reveals that regular physical activity improves glycemic control, mostly among people who are aged above 65 years and above (Velasco, Ricart, Monereo, Moreno, & Marrugat, 2003). But this study does not show any significant association of HTN and exercise.

5.3 Conclusion

Hypertension (HTN) and Type 2 Diabetes Mellitus (Type 2 DM) are mostly connected with older age group, but evidence shows that huge amount of HTN and Type 2 DM related deaths arise before the age of seventy. 68.8% of the participants are females and 31.2% of participants are males.

A descriptive cross-sectional study was conducted to identify the prevalence and risk factors of hypertension (HTN) and type 2 diabetes (Type 2 DM) among adults of Baa.Kamadhoo. Among 125 participants in this study, 53.6% are having a normal systolic BP (Systolic BP below 120). The study also shown that 70.4% of the participants diastolic BP is below 80. Among all the participants in this study (n=125) 6.4% of participants are having HTN and 4% of participants are having Type 2 DM. Moreover, 56.8% of participants in this study are having family history of HTN and 44.8% of participants are having family history of Type 2 DM.

The result of this study shows that 44.8% participants consume more than 7 servings of vegetables every week and 43.2% of the participants consume 3 to 6 tea spoon of sugar every day. Furthermore, 60.8% of the participants consume less than 2 tea spoon of oil every day and 35.2% consume 3 to 5 tea spoon of oil.

The results of this study illustrated that, 75% of participants who have HTN exercise regularly and 25% of participants who have HTN do not exercise regularly. The results of this study also show that, 60% of the people who have Type 2 DM exercise regularly and 40% of the people who have Type 2 DM do not exercise regularly. The result also shows that, among 125 participants, 14.4% of the participants eat tobacco and 85.6% do not eat tobacco.

The result of the Chi-square test shows a significant association between Type 2 DM and age (p -value=0.02). As like metabolic conditions, the prevalence of Type 2 DM increases with rising age. In addition, the result of the Chi-square test shows a significant association between HTN and age (p -value <0.001). The results of a study show that, increasing age have a significant association with HTN. Study shows that the prevalence is high with people who are having systolic HTN and aged above 60 years (Anderson, 1999).

This study illustrated that increasing age has a strong relation with HTN and Type 2 DM.

5.4 Implications

Hypertension is a condition in which the long-term force of the blood against the walls of artery is very high. It can cause various health problems (Mayo, High blood pressure (hypertension), 2016). Moreover Diabetes is a condition which, the glucose in the blood is very high. This is because the pancreas of our body is unable to produce enough insulin. There are two types of diabetes; Type 1 Diabetes (there is no insulin to unlock the cells) and Type 2 Diabetes (not enough insulin is produced from the pancreas or the insulin is not working properly) (UK, n.d).

The purpose of this study is to identify the prevalence and risk factors of HTN and Type 2 DM among adults of Baa.Kamadhoo. The results of this study show there are some of the risk factors which have high prevalence. So these risk factors need to be minimized in order to reduce the prevalence of HTN and Type 2 DM from the community. If these issues are neglected, there could be serious consequences such as increasing other NCDs among the community. The study result found high necessity

to increase the awareness campaign among the community, as there is a high risky behavior of HTN and Type 2 DM in the community. Furthermore, to reduce further risks, Baa.Kamadhoo Health Centre and Baa.Kamadhoo island council should work together to increase the awareness of the community. Baa.Kamadhoo Health Centre and Baa.Kamadhoo island council should not overlook the problem in order to prevent further consequences.

5.5 Limitations of the Study

The total population of this study is 337. The sample size of this study was 180. To select final sample 69.4% of 180 was taken as a sample. That was 125 samples. The sample size was reduced due to limitation of time and some of the people may not be willing to take part in the study. There is a difference between number of male and female take part in this study. Among 125 people, 86 are females and 39 are males. Due to this difference the result may not be applied for males in the island. There is no way to check whether respondent is telling the truth. Since, they would not be thinking about the questions and give their answers based on thoughts, so this may bias the result.

5.6 Directions for future research and Recommendations

This study is the beginning of a diagnosis of the prevalence and risk factors in HTN and Type 2 DM among adults of Baa.Kamadhoo. This study was conducted using a very small sample from the island. Therefore, the result cannot be generalized to any other islands in the atoll. It is possible to carry out the same study in the future with a larger sample size, which could be on a regional scale in order to see how prevalent

this phenomenon is throughout the atoll. In this study number of male and female participants is not balanced, so the study could be carried out by balancing the number of males and females. Moreover, there is significant need to do broader research on risk factors of HTN and Type 2 DM, and to identify the causes of increasing risk behavior. Furthermore, it is essential to investigate, socio economics status of participants and how it is related to increase the risk factors of HTN and Type 2 DM.

In order to prevent and minimize the prevalence and risk factors of HTN and Type 2 DM, Baa.Kamadhoo Health Centre and Baa.Kamadhoo island council should play a major role. To achieve this Baa.Kamadhoo Health Centre and Baa.Kamadhoo council, should work together to reduce the risk factors for HTN and Type 2 DM. In order to achieve this goal Baa.Kamadhoo Health Centre and Baa.Kamadhoo council should strive to:

- Maintain NCD register up to date.
- Conduct NCD clinics regularly and encourage people to participate in the clinic.
- Conduct screening programmes (blood pressure and blood sugar level testing) at least twice a year for early detection, before the onset of the disease.
- Educate the community about risk factors of HTN and Type 2 DM.
- Educate the students, teachers and parents regarding healthy eating and importance of physical activity.
- Educate the community about the benefit of locally grown foods.

- Coordinate with government authorities and other associated organizations to organize and conduct awareness programs and sports events for youths to reduce the risk of HTN and Type 2 DM.
- Coordinate with government authorities and other associated organizations to establish enough places or play grounds for the people of the community to enjoy sports activities.

REFERENCES

- Abou-Gamel, M., Abdul-Nassir, M., Rajeh, A., Makhdoom, A., Surrati, A., Kateb, A., et al. (2014). The prevalence of diabetes mellitus among working personnel in the faculty of science, Taibah University, Almadinah Almunawwarah, KSA. *Journal of Taibah University Medical Sciences*, 9(1), 85-88.
- Alireza. E et al., A. M. (2009, May 29). Third national surveillance of risk factors of non-communicable diseases (SuRFNCD-2007) in Iran: methods and results on prevalence of diabetes, hypertension, obesity, central obesity, and dyslipidemia. *BMC Public Health*, 10.
- Anderson, G. H. (1999). Effect of Age on Hypertension: Analysis of Over 4,800 Referred Hypertensive Patients. *Saudi journal of kidney diseases and transplantation*, 10(3), 286-297.
- Baldwin, W., Kaneda, T., Amato, L. & Nolan, L. (2013). Noncommunicable diseases and youth: *A critical window of opportunity for Latin America and the Caribbean*. Retrieved from Population reference bureau: <http://www.prb.org/pdf13/noncommunicable-diseases-latin-america-youth-policybrief.pdf>
- Bazzano, L. A., Li, T. Y., Joshipura, K. J., & Hu, F. B. (2008). Intake of fruit, vegetables, and fruit juices and risk of diabetes in women. *American Diabetes Association*, 1311-1317.
- Boutayeb, A., & Boutayeb, S. (2005). International Journal for Equity in Health. *International journal for equity in health*, 4, 2. Retrieved from <http://www.equityhealthj.com/content/4/1/2>

- Boutayeb. A & Boutayeb. S. (2005, January 14). *The burden of non communicable diseases in developing countries*. Retrieved August 23, 2015, from NCBI: <http://www.ncbi.nlm.nih.gov/pubmed/15651987>
- CDC. (2013). *Selecting effective interventions*. Retrieved 10 31, 2016, from CDC: https://www.cdc.gov/globalhealth/healthprotection/fetp/training_modules/7/selecting-interventions_ppt_final_09252013.pdf
- CDC. (2015, 05 15). *About adult BMI*. Retrieved 10 29, 2016, from CDC: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/
- Chang, S. A. (2012, 12 12). *Smoking and type 2 diabetes mellitus*. Retrieved 10 30, 2016, from NCBI: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3530709/>
- Collinge, W. (1993). *Recovering from chronic fatigue syndrome: a guide to self-empowerment*. Perigee. Retrieved from <http://www.collinge.org/RecovCFSch1.html>
- Defay, R., Delcourt, C., Ranvier, M., Lacroux, A., & Papoz, L. (2001, 04 25). *Relationships between physical activity, obesity and diabetes mellitus in a French elderly population: the POLA study*. Retrieved from PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/11319655>
- Diaz, K. M., & Shimbo, D. (2013, 12 15). *Physical activity and the prevention of hypertension*. Retrieved from NCBI: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3901083/>
- Dissertation Laerd.(2012). *Convenience sampling*. Retrieved from <http://dissertation.laerd.com/convenience-sampling.php>

- Djindjic, N., Jovanovic, J., Djindjic, B., Jovanovic, M., & Jovanovic, J. J. (2012, 09 17). Associations between the occupational stress index and hypertension, type 2 diabetes mellitus, and lipid disorders in middle-aged men and women. *Oxford Journals*, 56(9), 1051-1062.
- Durrani , A. M., & Fatima, W. (2015). Effect of physical activity on blood pressure distribution among school children. *Advances in Public Health*, 4 pages.
- Esteghamati, A., Meysamie, A., Khalilzadeh, O., Rashidi, A., Haghazali, M., Asgari, F., Kamgar, M., Gouya, M.M. &Abbasi, M. (2009). Third national surveillance of risk factors of non-communicable diseases (surfncd-2007) in iran: *methods and results on prevalence of diabetes, hypertension, obesity, central obesity, and dyslipidemia*. Retrieved from BioMed Central: <http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=0762c6d4-cf0f-4cdf-9957-a690b91a8e1f%40sessionmgr4003&vid=0&hid=4101>
- Feng, L., Li, P., Wang, X., Hu, Z., Ma, Y., Tang, W., ...& Wang, F. (2014). *Distribution and determinants of Non communicable diseases among elderly Uyghurethnic group in Xinjiang, China*. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4139371/>
- Ghrayeb, F. A., & Al Rifai, A. (2014).Public health.*Prevalence of lifestyle-related risk factors contributing to non-communicable diseases among adolescents in Tarqumia, Palestine*. *InternationalMedical Journal*,21(3). Retrieved from <http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=a521074c-0fbc-411d-8427-bc749eb8ead4%40sessionmgr4002&vid=0&hid=4101>
- Guasch, M. F., Hruby, A., J, S. S., MA, M. G., Sun, Q., WC, W., et al. (2015). *Olive oil consumption and risk of type 2 diabetes in US women*. Retrieved 11 01, 2016, from PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/26156740>

Harvard. (n.d). *Sugary drinks and obesity fact sheet*. Retrieved 11 01, 2016, from
Harvard school of public health:

<https://www.hsph.harvard.edu/nutritionsource/sugary-drinks-fact-sheet/#references>

Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence Based Nursing*, ebnurs-2015. Retrieved from

<http://ebn.bmj.com/content/early/2015/05/15/eb-2015-102129>

Hegde, S. K. B., Agrawal, T., Fathima, F. N., & Amar, D. S. (2015). *Factors associated with health seeking behaviour regarding non-communicable diseases among elderly in a rural community in Karnataka (India)*. *Indian Journal of*, 29(3), 283-293. Retrieved from

<http://web.b.ebscohost.com/ehost/detail/detail?sid=d44d60b2-9e58-4f19-935e-eb2dfa504c31%40sessionmgr112&vid=0&hid=106&bdata=JnNpdGU9ZW hvc3QtbGl2ZQ%3d%3d#AN=108414136&db=aph>

IDF. (2015). *Maldives*. Retrieved 10 31, 2016, from International diabetes federation:
<http://www.idf.org/membership/sea/maldives>

Jayawardena, R., Ranasinghe, P., Byrne, N. M., Soares, M. J., Katulanda, P., & Hills, A. P. (2012). Prevalence and trends of the diabetes epidemic in South Asia: *a systematic review and meta-analysis*. *BMC public health*, 12(1), 380. Retrieved from

<http://web.b.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=4c396be5-2cdf-40d9-a325-5583b55a088e%40sessionmgr110&vid=1&hid=123>

- Joshi, M. D., Ayah, R., Njau, E. K., Wanjiru, R., Kayima, J. K., Njeru, K.K., & Mutai, K. K. (2014). Prevalence of hypertension and associated cardiovascular risk factors in an urban slum in Nairobi, Kenya: A *population-based survey*. Retrieved from <http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=e4aa85cc-0fa3-4ac2-91aa-c0ca9442f65c%40sessionmgr4005&vid=0&hid=4101>
- Khuwaja, A. K., Khawaja, S., Motwani, K., Khoja, A. A., Azam, I. S., Fatmi, Z., ...&Kadir, M. M. (2011). *Preventable lifestyle risk factors for non-communicable diseases in the Pakistan adolescents schools study 1 (pass-1)*. *Journal of Preventive Medicine and Public Health*, 44(5), 210-217. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3249258/>
- Kirkman, M. S., Briscoe, V. J., Clark, N., Florez, H., Haas, L. B., Halter, J. B., (2012). Diabetes in older adults. *American Diabetes Association*.
- Lakshman, A., Manikath, N., Rahim, A., & Anilakumari, V. P. (2014, 04 23). *Prevalence and risk factors of hypertension among male occupational bus drivers in North Kerala, South India: A cross-sectional study*. Retrieved 10 30, 2016, from NCBI: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4045462/>
- Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., Katzmarzyk, P. T., & Lancet Physical Activity Series Working Group. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: *an analysis of burden of disease and life expectancy*. *The lancet*, 380(9838), 219-229. Retrieved from <http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736%2812%2961031-9.pdf>

- Levin, K. A. (2006). Study design III: Cross-sectional studies. *Evidence-based dentistry*, 7(1), 24-25. Retrieved from <http://www.nature.com/ebd/journal/v7/n1/full/6400375a.html>
- Li, M., Fan, Y., Zhang, X., Hou, W., & Tang, Z. (2014). Fruit and vegetable intake and risk of type 2 diabetes mellitus: meta-analysis of prospective cohort studies. *BMJ*, 4(11).
- Liu, S., Serdula, M., Janket, S.-J., Cook, N. R., Sesso, H. D., Willett, W. C., et al. (2004). A prospective study of fruit and vegetable intake and the risk of type 2 diabetes in women. *American Diabetes Association*.
- Maldives Health Profile*. (2014, March). Retrieved August 11, 2015, from Ministry of Health and Gender:
http://www.health.gov.mv/publications/13_1395305886_Maldives_Health_Profile_2014_final_final.pdf
- Mayo. (2015, 02 21). *High blood pressure (hypertension)*. Retrieved 10 30, 2016, from Mayo clinic: <http://www.mayoclinic.org/diseases-conditions/high-blood-pressure/in-depth/blood-pressure/art-20050982>
- Mayo. (2016, 09 09). *High blood pressure (hypertension)*. Retrieved 11 06, 2016, from Mayo Clinic: <http://www.mayoclinic.org/diseases-conditions/high-blood-pressure/basics/definition/con-20019580>
- Ministry of Health & Gender.(2014). *Maldives Health Profile 2014*. Retrieved from http://www.health.gov.mv/publications/13_1395305886_Maldives_Health_Profile_2014_final_final.pdf

MOH. (2012). *The Maldives health statistics*. Retrieved 10 31, 2016, from Ministry of Health:

http://www.health.gov.mv/publications/10_1371553027_The_Maldives_Health_Statistics_2012_FINAL_May_2013_To_BE_PUBLISHED.pdf

MOH. (2014). *Maldives health profile*. Retrieved 10 31, 2016, from MOH:

http://www.health.gov.mv/publications/13_1395305886_Maldives_Health_Profile_2014_final_final.pdf

Mungreiphy, N. K., Kapoor, S., & Sinha, R. (2011). Association between BMI, blood Pressure, and age: Study among Tangkhul Naga Tribal males of Northeast India. *Journal of Anthropology*, 2011, 6.

Neupane, D., McLachlan, C. S., Sharma, R., Gyawali, B., Khanal, V., Mishra, S.

R. & Kallestrup, P. (2014). Prevalence of hypertension in member countries of South Asian Association for Regional Cooperation (SAARC): *systematic review and meta-analysis*. *Medicine*, 93(13), e74. Retrieved from <http://web.ebscohost.com/ehost/detail/detail?sid=f4701d14-eaf1-4dfb-9424-be2a424b9f20%40sessionmgr110&vid=0&hid=123&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#AN=2012735722&db=rzh>

Noncommunicable disease. (2015, January). Retrieved August 11, 2015, from WHO:

<http://www.who.int/mediacentre/factsheets/fs355/en/>

Pan American Health Organization.(n.d). *Non-communicable diseases and gender*.

Retrieved from

http://www.paho.org/hq/index.php?option=com_docman&task=doc_view&gid=17118&Itemid=

Pinto, E. (2007, 02). *Blood pressure and ageing*. Retrieved 10 31, 2016, from NCBI:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2805932/>

Ranasinghe, C. D., Ranasinghe, P., Jayawardena, R., & Misra, A. (2013). Physical activity patterns among South-Asian adults: *a systematic review*. *Int J*

BehavNutrPhys Act, 10, 116. Retrieved from

<http://ejournals.ebsco.com/Direct.asp?AccessToken=959QDIM8XQQ1DX54M94ZEMII91EE81X55M&Show=Object>

Ranasinghe, P., Cooray, D. N., Jayawardena, R., & Katulanda, P. (2015, 06 20). *The influence of family history of hypertension on disease prevalence and*

associated metabolic risk factors among Sri Lankan adults. Retrieved 10 29, 2016, from BMC Public Health:

<http://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-015-1927-7>

Raosoft.(2004). *Sample size calculator*. Retrieved from

<http://www.raosoft.com/samplesize.html>

Reckelhoff, J. F. (2001). Gender differences in the regulation of blood pressure.

Hypertension, 37(5).

Shafeenaz, A. (2016, August 14). Risk factors of HTN and Type 2 DM in

Baa.Kamadhoo. (A. Shereen, Interviewer)

Shazmeena, A. (2016, September 02). Population of Baa.Kamadhoo. (A. Shereen,

Interviewer)

- Sigal, R. J., Kenny, G. P., Wasserman, D. H., & Sceppa, C. C. (2004). Physical activity / exercise and type 2 diabetes. *American Diabetes Association*, 2518-2539.
- Soriguer, F., Martínez, G. R., Dobarganes, M. C., Almeida, J. M., Esteva, I., Beltrán, M., et al. (2003). Hypertension is related to the degradation of dietary frying oils. *The American Journal of Clinical Nutrition*, 1092-1097.
- Sreeramareddy, C. T., Pradhan, P. M. S., Mir, I. A., & Sin, S. (2014). Smoking and smokeless tobacco use in nine South and Southeast Asian countries: prevalence estimates and social determinants from demographic and health surveys. *Popul Health Metr*, 12, 22. Retrieved from [http://web.b.ebscohost.com/ehost/detail/detail?sid=aaf43ee6-3890-4a25-858f-b5d0be675aaf%40sessionmgr115&vid=0&hid=123&bdata=JnNpdGU9ZW hvc3QtbGl2ZQ%3d%3d#AN=2012711184&db=rzh](http://web.b.ebscohost.com/ehost/detail/detail?sid=aaf43ee6-3890-4a25-b5d0be675aaf%40sessionmgr115&vid=0&hid=123&bdata=JnNpdGU9ZW hvc3QtbGl2ZQ%3d%3d#AN=2012711184&db=rzh)
- Suastika, K., Dwipayana, P., Semadi, M. S., & Kuswardhani, R. T. (2012). Age is an important risk factor for type 2 diabetes mellitus and cardiovascular diseases. In S. Chackrewarthy, *Glucose Tolerance*. CC BY 3.0 license.
- Sung, K. H. (2014). Dietary salt intake and hypertension. *Electrolytes and blood pressure*, 7–18.
- Thuy, A., Blizzard, L., Schmidt, M., Luc, P., Granger, R., & Dwyer, T. (2010, 02). *The association between smoking and hypertension in a population-based sample of Vietnamese men*. Retrieved from PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/19829145>

- UK, D. (n.d). *What is diabetes?* Retrieved 11 04, 2016, from Diabetes UK:
<https://www.diabetes.org.uk/Guide-to-diabetes/What-is-diabetes/>
- Valdez, R., Yoon, P. W., Liu, T., & Khoury, M. J. (2007, 10 30). *Family history and prevalence of diabetes in the U.S. population*. Retrieved 10 29, 2016, from American Diabetes Association:
<http://care.diabetesjournals.org/content/30/10/2517>
- Van der Sande, M. A., Walraven, G. E., Milligan, P. J., Banya, W. A., Ceesay, S. M., Nyan, O. A., &McAdam, K. P. (2001). *Family history: an opportunity for early interventions and improved control of hypertension, obesity and diabetes*. *Bulletin of the World health organization*, 79(4), 321-328.
Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11357211>
- Velasco, P. P., Ricart, W., Monereo, S., Moreno, B., & Marrugat, J. (2003). The relation between physical activity and metabolic control in type 2 diabetes with <20 years of evolution. *American Diabetes Association*, 1648-1650.
- Wandera, S. O., Kwagala, B., &Ntozi, J. (2015). Prevalence and risk factors for self-reported non-communicable diseases among older Ugandans: *a cross-sectional study*. *Global health action*, 8. Retrieved from
<http://www.globalhealthaction.net/index.php/gha/article/view/27923>
- Wang, L., Manson, J., Gaziano, J., Buring, J., & Sesso, H. (2012, 02 15). *Fruit and vegetable intake and the risk of hypertension in middle-aged and older women*. Retrieved 11 01, 2016, from NCBI:
<https://www.ncbi.nlm.nih.gov/pubmed/21993367>

- Wang, M., Yu, M., Fang, L., & Hu, R. Y. (2015). Association between sugar-sweetened beverages and type 2 diabetes: A meta-analysis. *Journal of Diabetes Investigation*, 360–366.
- WHO. (2010). Background Paper: *Non-communicable diseases in low- and middle income countries*. Retrieved from http://www.who.int/nmh/events/2010/Tehran_Background_Paper.pdf
- WHO. (2013). *A global brief on hypertension*. Retrieved 10 31, 2016, from WHO: http://ish-world.com/downloads/pdf/global_brief_hypertension.pdf
- WHO. (2016). *Maldives*. Retrieved 10 31, 2016, from WHO: http://www.who.int/diabetes/country-profiles/mdv_en.pdf?ua=1
- WHO. (2016, 06). *Diabetes*. Retrieved 10 31, 2016, from WHO: <http://www.who.int/mediacentre/factsheets/fs312/en/>
- WHO.(2015). *Noncommunicable diseases*. Retrieved from <http://www.who.int/mediacentre/factsheets/fs355/en/>

APPENDICES

Appendix A: Consent form

PREVALENCE AND RISK FACTORS IN HYPERTENSION AND TYPE 2 DIABETES, AMONG ADULTS OF BAA.KAMADHOO

My name is Aminath Shereen (Student ID 017919). I am a student currently studying Bachelors of Primary health care course in Faculty of Health Sciences, Maldives National University. As part of my course I need to do a dissertation, for which I have taken “Prevalence and risk factors of hypertension and type 2 diabetes among adults of Baa.Kamadhoo”.

This is a survey about your behavior (eating habits, physical activity, etc.) you do that may affect your health. The questionnaire involves taking some measurements from your body (like checking blood pressure, waist circumference and height and weight) and answering some questions about prevalence and risk factors related to hypertension and type 2 diabetes. The data collection of this questionnaire would be strictly used for academic purposes only. Participation of this survey is voluntary and it will take about 10 minutes to complete this questionnaire.

Contact information

If you have any further queries regarding this study, please feel free to contact me.

Aminath Shereen

Mobile: 9911918

I hereby, have no objection to participate in this survey.

Name: _____ **Sign:** _____

Appendix B: Questionnaire

**PREVALENCE AND RISK FACTORS IN HYPERTENSION AND
TYPE 2 DIABETES, AMONG ADULTS OF BAA.KAMADHOO**

Date: ____/____/____

SECTION A: SOCIO DEMOGRAPHIC INFORMATION

QUESTION	RESPONSE
1. Age	<input type="text"/> years
2. Sex	Male <input type="checkbox"/> Female <input type="checkbox"/>
3. Occupation	Government employee <input type="checkbox"/> Farming <input type="checkbox"/> Self employed <input type="checkbox"/> Tourism <input type="checkbox"/> Coconut palm weaving <input type="checkbox"/> Construction <input type="checkbox"/> Unemployed <input type="checkbox"/> Others (specify)-----

SECTION B: PHYSICAL MEASURES

4. Height	<input type="text"/> cm
5. Weight	<input type="text"/> kg
6. BMI	<input type="text"/> kg/m ²
7. Blood pressure	-----/-----mmHg

SECTION C: MEDICAL HISTORY

QUESTIONS	RESPONSES
8. Do you have any of the disease?	Hypertension <input type="checkbox"/> Diabetes <input type="checkbox"/> None of the above <input type="checkbox"/>
9. Do you have family history of any of the disease?	Hypertension <input type="checkbox"/> Diabetes <input type="checkbox"/> None of the above <input type="checkbox"/>

SECTION D: EATING HABIT

QUESTIONS	RESPONSES
10. In a week how many servings of fruit do you consume? * one serving is equal to half cup (tick the appropriate box)	No fruit consumption at all <input type="checkbox"/> 1 - 2 servings <input type="checkbox"/> 3 - 6 servings <input type="checkbox"/> More than 7 servings <input type="checkbox"/>
11. In a week how many servings of vegetables do you consume? * one serving is equal to half cup (tick the appropriate box)	No vegetable consumption at all <input type="checkbox"/> 1 - 2 servings <input type="checkbox"/> 3 - 6 servings <input type="checkbox"/> More than 7 servings <input type="checkbox"/>
12. How much sugar do you consume per day? (tick the appropriate box)	No sugar consumption at all <input type="checkbox"/> Less than 2 tea spoon daily <input type="checkbox"/> 3-6 tea spoon daily <input type="checkbox"/> More than 7 tea spoon daily <input type="checkbox"/>

<p>13. What is your preference for salt in your diet? (tick the appropriate box)</p>	<p>No salt consumption at all <input type="checkbox"/></p> <p>Less than 1 tea spoon daily <input type="checkbox"/></p> <p>2-4 tea spoon daily <input type="checkbox"/></p> <p>More than 5 tea spoon daily <input type="checkbox"/></p>
<p>14. How much oil do you consume per day? (tick the appropriate box)</p>	<p>No oil consumption at all <input type="checkbox"/></p> <p>Less than 2 tea spoon daily <input type="checkbox"/></p> <p>3-5 tea spoon daily <input type="checkbox"/></p> <p>More than 6 tea spoon daily <input type="checkbox"/></p>
<p>15. What kind of oil do you usually use? (tick all that apply)</p>	<p>Coconut Oil <input type="checkbox"/> Vegetable Oil <input type="checkbox"/></p> <p>Olive Oil <input type="checkbox"/> Sunflower Oil/ Corn Oil <input type="checkbox"/></p> <p>Others (specify)-----</p>
<p>16. How often you drink fizzy drinks?</p>	<p>Daily <input type="checkbox"/> 3 times a week <input type="checkbox"/></p> <p>Once a week <input type="checkbox"/> occasionally <input type="checkbox"/></p> <p>I don't drink <input type="checkbox"/></p>
<p>17. Do you drink any energy drinks?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>(If no go to section E)</p>
<p>18. How often you use energy drinks?</p>	<p>Daily <input type="checkbox"/> 2-3 times a week <input type="checkbox"/></p> <p>Once a week <input type="checkbox"/> Occasionally <input type="checkbox"/></p>

SECTION E: TOBACCO USE

QUESTIONS	RESPONSES
19. Did you ever eat tobacco?	Yes <input type="checkbox"/> No <input type="checkbox"/>
20. Did you ever smoke?	Yes <input type="checkbox"/> No <input type="checkbox"/> (If No go to Section F)
21. How many sticks you smoke per day?	Less than 5 sticks <input type="checkbox"/> 6 – 10 sticks <input type="checkbox"/> 11 – 20 sticks <input type="checkbox"/> More than 21 sticks <input type="checkbox"/>
22. How long have you been smoking?	1-5 years <input type="checkbox"/> 6-10 years <input type="checkbox"/> More than 11 years <input type="checkbox"/>

SECTION F: PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOR

QUESTIONS	RESPONSES
23. Do you exercise regularly?	Yes <input type="checkbox"/> No <input type="checkbox"/> (If no go to question 28)
24. What kind of exercise you prefer to do? (Tick all that apply)	Bicycling <input type="checkbox"/> Aerobics <input type="checkbox"/> Swimming <input type="checkbox"/> Walking <input type="checkbox"/> Running <input type="checkbox"/> strenuous sports <input type="checkbox"/> Others (specify)-----

<p>25. How much time do you spend for exercise in a typical day?</p>	<p>Less than 15 minutes <input type="checkbox"/> 16-30 minutes <input type="checkbox"/> 31-45 minutes <input type="checkbox"/> More than 45 minutes <input type="checkbox"/></p>
<p>26. In a week how many days do you exercise?</p>	<p>Every day <input type="checkbox"/> Less than 3 days a week <input type="checkbox"/> 4-6 days a week <input type="checkbox"/></p>
<p>27. How much time do you spend sitting or reclining in a day?</p>	<p>Less than 5 hours <input type="checkbox"/> 6-10 hours <input type="checkbox"/> 11-15 hours <input type="checkbox"/> More than 16 hours <input type="checkbox"/></p>
<p>28. What mode of transport you use?</p>	<p>Walking <input type="checkbox"/> Bicycling <input type="checkbox"/> Cycling <input type="checkbox"/></p>

Thank you!

<input type="checkbox"/> 5 كے ہر گروہ کے ذریعے <input type="checkbox"/> 6 - 10 کے ہر گروہ کے ذریعے <input type="checkbox"/> 11 - 15 کے ہر گروہ کے ذریعے <input type="checkbox"/> 16 کے ہر گروہ کے ذریعے	<input type="checkbox"/> 5 کے ہر گروہ کے ذریعے <input type="checkbox"/> 6 - 10 کے ہر گروہ کے ذریعے <input type="checkbox"/> 11 - 15 کے ہر گروہ کے ذریعے <input type="checkbox"/> 16 کے ہر گروہ کے ذریعے	<p>27. ترقی یافتہ ممالک میں تعلیم کی سطح کیا ہے؟</p>
<input type="checkbox"/> ہر گروہ کے ذریعے	<input type="checkbox"/> ہر گروہ کے ذریعے <input type="checkbox"/> ہر گروہ کے ذریعے	<p>28. ترقی یافتہ ممالک میں تعلیم کی سطح کیا ہے؟</p>

تعمیراتی نوٹ!