PREVALENCE AND ASSOCIATED FACTORS RELATED TO OVERWEIGHT AND OBESITY AMONG ADULTS IN DH.KUDAHUVADHOO

THAVEELA MOHAMED

THE MALDIVES NATIONAL UNIVERSITY

November, 2016

PREVALENCE AND ASSOCIATED FACTORS RELATED TO OVERWEIGHT AND OBESITY AMONG ADULTS IN DH. KUDAHUVADHOO

THAVEELA MOHAMED

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: Thaveela Mohamed

Student Number: 000021481

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: 13/11/2016

PREVALENCE AND ASSOCIATED FACTORS RELATED TO OVERWEIGHT AND OBESITY AMONG ADULTS IN DH.KUDAHUVADHOO

THAVEELA MOHAMED

November, 2016

ABSTRACT

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Even though overweight and obesity is escalating problem around the world and in the Maldives, the prevalence of overweight and obesity among adults are increasing as well. 65% of the world's populations live in countries where overweight and obesity kills more people than underweight. The main purpose of this study is to determine prevalence and associated factors related with overweight and obesity among adults in Dh. Kudahuvadhoo. A cross-sectional descriptive study was conducted, using a stratified random sampling of 45 males and 45 females of aged 25 to 55 years were selected. Data was collected on socio-economic factors of the 90 participants, their physical activity and dietary intake patterns, as well as anthropometric measurements. Body Mass Index (BMI) was used to determine the prevalence of overweight and obesity and the data were then analyzed using Statistical Package for Social Sciences (SPSS) version 20 software. The study revealed that, more than one third of populations were overweight and obese and there was high chance of being overweight and obese with socio-demographic and socio-economic status, physical activity as well as sedentary life style of the participants. The results of the present study can contribute to the literature and have significant implications for practitioners.

Key words: Overweight, Obesity, Prevalence, BMI, Adults, Dh.Kudahuvadhoo

ACKNOWLEDGEMENTS

This research study was authorized by Maldives National University (MNU), Faculty of Health Sciences (FHS). The research was carried out under the supervision of Mrs. Aishath Shaheen Ismail. Since this is my first research project, it was quite challenging. However, 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.

I wish to express my heartfelt gratitude to my supervisor, Mrs. Aishath Shaheen Ismail for her patience, guidance, encouragement and support in supervising the outlook of this dissertation. I sincerely thank her for spending valuable time and providing valuable comments and ideas which helped to shape the focus and content of this study. Without her support, this study will not be successful. In addition to that, special thanks to be given to all lecturers for the support and encouragement throughout the studies. Especially Mr. Mohamed Zaid, lecturer at MNU FHS, who had given his precious time to help in data analysis of my research project.

Kindly I would like to thank field officers who were given assistants for collecting filed data and all the respondents for answering my questions and allowing me to complete this study.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATION

ACE – American Council of Exercise

BIA – Bioelectrical Impedance Analysis

BMI - Body Mass Index

CDC – Center for Disease Control

CHD – Coronary Heart Disease

DHA – Dh. Atoll Hospital

DM – Diabetes Mellitus

HTN – Hypertension

NCD – Non-Communicable Diseases

NIH – National Institute of Health

MDHS – Maldives Demographic Health Survey

MoHF – Ministry of Health and Family

SEAR - South East Asia Region

SPSS – Statistical Package for Social Scientists

WHO – World Health Organization

CHAPTER 1: INTRODUCTION

1.1 Background to the Study

Overweight and obesity are defined as abnormal or extreme fat accumulation in the body that can cause harm to the health. (WHO, 2016). Obesity is now recognized as a key and rapidly growing public health problem. Obese adults are at high risk for many serious health conditions, comprising hypertension (HTN), dyslipidemia, diabetic mellitus (DM) type -2 and its complications, coronary heart disease (CHD), stroke, gallbladder illness, sleep apnea, osteoarthritis and respiratory complications, as well as cancers such as breast, colon, endometrial and prostate cancers. (Benjamin, 2010).

Body mass index (BMI) is a simple index of weight-for-height that is usually used to classify overweight and obesity in adults. It is defined as an individual's weight in kilograms and divided by the square of his or her height in meters (kg/m2) (CDC, 2016). The WHO classification of overweight is BMI greater than or equal to 25 and BMI greater than or equal to 30 as obese (WHO, 2016). The central cause of obesity and overweight is an energy disparity between calories consumed and calories expended. BMI delivers the most beneficial population-level measure of overweight and obesity as it is the alike for both sexes and for all ages of adults (WHO, 2016).

A survey done by Ministry of Health and Gender, about “Non-Communicable Disease (NCD) risk factor” which was conducted in Male’ in 2004 found that obesity is high particularly among women – 17% of females compared to 9% of males are obese. The results of the survey show approximately 50% of the women 35 years and above are overweight and/or obese.

Obesity assessment done in 2008 showed 12.9% people are obese from total population of Maldives (The World Factbook, 2016). After 2008 there is no obesity assessment done in Maldives for whole country and if preventive measures are not put in place, the problem may escalate and overburden the health care system in in Maldives. Hence there is need to put measures in place to address the problem of overweight and obesity and prevent the negative consequences.

1.2 Statement of the Problem and Justification

Overweight and obesity is becoming one of the main public health problems in developing regions of the world and is escalating especially among adult in urban areas. Worldwide obesity has nearly doubled between 1980 and 2014 (WHO, 2016). In 2008, more than 1.4 billion adults, 20 and older, were overweight. Of these over 200 million men and nearly 300 million women were obese. 35% of adults aged 20 and over were overweight in 2008, and 11% were obese. 65% of the world's populations live in countries where overweight and obesity kills more people than underweight (Ministry of Health & Gender, 2014).

Variations in prevalence of overweight and obesity have been found in Maldives attained the highest position with 30% in males and 52% in female (Sharma, 2011). Strikingly, Maldives records the highest proportion of overweight and obese women among all the studied South-Asian countries (Sharma, 2011).

Even though overweight and obesity is enormously harmful to health, the prevalence and the associated factors among adults are high around the world as well as in the Maldives. According to Public Health Unit of Kudahuvadhoo hospital (2016) the overweight and obesity adults are expected to be high in the island. Besides, there is no current study which has been under taken in Kudahuvadhoo to identify the prevalence and the associated factors. Therefore, it is very essential to find out the prevalence and the associated factors in Dh. Kudahuvadhoo.

1.3 Purpose of the Study

The purpose of this study is to determine the prevalence of overweight and obesity among adults in Dh. Kudahuvadhoo. Also to identify how socio demographic and socio-economic factors, physical activity and dietary intake are associated with overweight and obesity.

1.4 Objectives of Study

1.4.1 General Objectives

To assess the prevalence and associated factors of overweight and obesity among adults age between 25 to 55 in Dh. Kudahuvadhoo.

1.4.2 Specific Objectives

To identify the prevalence of overweight and obesity among adults age between 25 to 55 in Dh. Kudahuvadhoo.

To identify the relationship between overweight and obesity in socio demographic and socio economic factors in Kudahuvadhoo’s adults.

To identify the relationship between overweight and obesity in physical activity in Kudahuvadhoo’s adults age between 25 to 55.

To determine the relationship between overweight and obesity with dietary intake among adults age between 25 to 55 in Dh. Kudahuvadhoo.

1.5 Research Questions

What are the prevalence rate of overweight and obesity among adults age between 25 to 55 in Dh. Kudahuvadhoo?

What are the relationship between overweight and obesity in socio demographic and socio economic factors in Kudahuvadhoo's adults?

What are the relationship between physical activity with overweight and obesity in that island?

What are the relationship between dietary intake with overweight and obesity in that island?

1.6 Significance of the Study

As there is no specific study done on this topic with mentioned population, this study is aimed to establish the status of overweight and obesity among adults age between 25 to 55 years of Dh. Kudahuvadhoo. Findings of this study would be helpful to rising or conduct awareness and preventive programs at island and atoll level. In addition, it will be used in understanding the problem of overweight and obesity, and to identify the main causative factors among adults. The result of this study will also valuable information to health sector and program implementers to establish the policies to control and prevent overweight and obesity. Moreover, this study could be helped to develop intervention strategies to improve the health of the people in the island as well as the others in similar circumstance in the country.

1.7 Delimitations/Scope of the Study

This study did not represent all the islands of Maldives. The study was carried out in Dh. Kudahuvadhoo and only included adults who are aged between 25 and 55 years old. To find out the ability of entire population of the island is severely limited. Since this study will only focus on obesity and overweight among adults, this will not give the whole picture of the entire population.

1.8 Definitions of Terms

Hypertension: High blood pressure

Dyslipidemia: High cholesterol

Type 2 diabetes: non-insulin dependent diabetes.

Stroke: A sudden and severe attack; stroke syndrome; stroke syndrome reflecting the infarction of the vascular territory that is put at risk by a stenosis or occlusion of a feeding vessel. (Medical dictionary definition)

Gallbladder disease: Diseases related to gallbladder (the reservoir for bile on the poster inferior surface of the liver) (Medical dictionary definition)

Arthritis: Inflammation of a joint.

Sleep apnea: Sleep apnea is a potentially serious sleep disorder in which breathing repeatedly stops and starts.

Endometrial: pertaining to the endometrial (the mucus membrane lining to the uterus)

Colon: The part of the large intestine extending from the cecum to the rectum. (Medical dictionary definition)

CHAPTER 2: LITERATURE REVIEW

2.1 Definition and Development of Overweight and Obesity

Overweight and obesity, are circumstances of abnormal or excessive body fat buildup in adipose tissue, to the extent that health may be impaired (WHO, 2016). A person is considered to be overweight when their BMI ≥ 25 kg/m2, and obese if the BMI ≥ 30 kg/m2. Overweight and obesity prevalence generally increased universal and there were differences between men and women in some regions and countries (Stevens, et al., 2012).

The development of overweight and obesity is generally attributed to genetic tendency, and it has been recommended that, main promoting factor considered to be an obesogenic environment (WHO, 2002). The key cause of obesity and overweight is an energy imbalance between calories expended and calories consumed. In worldwide, there has been an increased consumption of energy dense foods which contains more fat. Likewise, an increase in physical sedentariness due to the gradually inactive nature of many forms of work, increasing urbanization and changing modes of transportation (WHO, 2016).

2.2 Prevalence and trends of Overweight and Obesity

2.2.1 Global Trends in Overweight and Obesity

Over recent years, overweight and obesity rate have intensified rapidly in worldwide to epidemic extents, reflecting increased consumption of energy dense diets high in fats and sugars, complexed by decreasing levels of physical activity (Stevens, et al., 2012). Additional body weight is contributing health problems and risk factor for mortality and morbidity from NCD’s such as; cardiovascular diseases, diabetes, cancers, and musculoskeletal disorders causing nearly three million annual deaths worldwide (Stevens, et al., 2012).

A study by Stevens, et al, on 2008, showed that one in every 3 adults in the world was overweight and 1 in every 9 was obese. Beyond this global average, at least 1 in 5 women were overweight or obese in 117 countries and in73 countries, at least 1 in 5 men were overweight or obese. Notably, the increase in the prevalence of obesity has accelerated in the last decade compared to the 1980s and 1990s.

According to WHO in 2016, it shows that in 2008, 34% men and 35% of women aged above 20 were overweight (BMI ≥ 25 kg/m2). The worldwide prevalence of obesity has nearly doubled between 1980 and 2008. In 2008, 14% of women and 10% of men in the world were obese (BMI ≥30 kg/m2), compared with 5% for men and 8% for women in 1980. In all WHO regions women were more likely to be obese than men. In the WHO regions countries like Africa, Eastern Mediterranean and South East Asia, women had roughly double the obesity prevalence of men (WHO, 2015). In 2014, the prevalence of obesity again increased. More than 1.9 billion adults were overweight and 600 million adults were obese. In general, about 13% of the world’s adult population (11% of men and 15% of women) were obese in 2014 (WHO, 2016).

A small, insistent imbalance between energy intake (food and drinks) and energy expenditure (including physical activity) lead to weight gain over time. While genetics contributes to individual susceptibility to obesity, the quick increase in the global prevalence of overweight and obesity can only be explained by widespread changes in lifestyle and the environment (Queensland Health, 2011).

2.2.2 Prevalence of Overweight and Obesity in South East Asia Region

In the South-East Asia Region (SEAR), 300,000 die of overweight and obesity. The occurrence of overweight in countries across the region ranges from 7.6% in male adults in Bangladesh to 53% female adults in Maldives (WHO, 2011).

Apart from Nepal, differences in prevalence of overweight and obesity have been found in females and males (in females 8% to 52% and in males 8% to 30%). Maldives reached the highest position with 52% in females and 30% in males followed by Thailand with 36% and 26% respectively (Medindia, 2016).

A study by Sharma on 2011, showed that the quantity of overweight and obesity in Nepal in 2006 was 8% which has increased to 14% in 2011. In 1999, nearly, one tenth (12%) of women were overweight and obese in India. Though, it has increased to more than 15% in 2006. In Bangladesh, the prevalence of overweight and obesity among women has raised to 18% in 2011 from less than 14% in 2007. Maldives records the highest proportion of overweight and obese women among all the studied South-Asian countries (Sharma, 2011).

The prevalence of obesity was absolutely connected with age, wealth and urban residence. Among males, obesity prevalence increased from 23% in 2004 to 29% in 2009 where as among females 35% in 2004 to 41% in 2009 in Thailand (Medindia, 2016). According to the WHO, due to be overweight and obesity nearly 0.35 million deaths occurred in SEAR countries (WHO, 2011).

2.2.3 Prevalence of Overweight and Obesity in Maldives

In Maldives, overweight and obesity was found to be high mostly among women. Overall, about 17% of females compared to 9% of males are obese. The results of the survey show roughly 50% of the women at the age of 35 years and above was overweight and/or obese. For this reason, the Maldives government has given high importance and attentions on, prevention of NCD in The Health Master Plan 2006 to 2015 (Ministry of Health & Gender, 2014). In Maldives, among young people and adults' risk factors are high for NCDs such as physical inactivity, hypertension (16% in Male' in 2011) and diabetes (Ministry of Health, 2014).

According to Maldives Demographic Health Survey (MDHS) shows that, 46% of women in Maldives were overweight and obese (BMI 25 or higher). The percentage of overweight or obese women is higher in urban areas (51 percent) than in rural areas (43 percent) Overweight and obesity decrease with increasing level of education (MOHF, 2010).

2.3 Factors Influencing the Development of Overweight and Obesity

Overweight and obesity are influenced by a number of factors which includes genetic predispositions, environmental and behavioral factors, ageing and pregnancies. Overweight and obesity is not always just a result of excessive indulgence in extreme palatable foods or a lack of physical activity as is frequently incorrectly thought. Socio-economic factors, physical activity patterns and dietary intakes are the three main areas that this study focused on.

2.3.1 Age

Age has often been reported as a predictive factor contributing to the development of overweight and obesity in both sex. Age effects on body weight are assigned to physiological changes that arise with ageing such as reduced energy requirements at rest. However, even without body weight changes, age-linked modifications in body arrangement happen where fat-free mass gradually decreases after accomplishment of its highest level at the age of 20, and fat mass increases accomplishment of its highest level at the age of 60 to 70 years (Chamieh & Claire, 2013).

Midlife weight gain in women is mostly due to aging and physical activity, but menopause also plays an important role in overweight and obesity. Most of the women gain around 5 pounds during menopause and have extra fat around the waist than they did before (National Instution of Health, 2012).

2.3.2 Gender

There is a determined gender difference in risk patterns to overweight and obesity expansion reflecting the characteristic effects of health, cultural beliefs and body weight insights on body weight position. Women could have different attitudes toward body weight status than men, and may stretch more value to practices such as mostly diet, food choices and physical activity to control body weight and have improved health consequences (k.Giskes, et al., 2006). Therefore, women are more likely than men to use their possessions, whether economic, cultural or social in nature, to change their diet and activity patterns in follow of a healthier body weight (Zhang & Y.Wang, 2004).

2.3.3 Marital Status

Significant events in a person’s emotional life can cause changes in food consumption and body weight. Marital status has been shown to be associated with BMI and most cross-sectional studies found that married people are more often overweight and obese than those living alone. However, significant differences exist according to gender and culture. It is still not clear how and under what circumstances marital status is related with obesity while interesting hypotheses connecting these two outcomes have been elevated recently (Tzotzas, et al., 2010). Research findings are however unpredictable particularly among cross-sectional studies. Longitudinally, evidence is more reliable, suggesting that marriage predicts weight gain in both women and men, whereas marital termination (through widowhood or divorce) predicts weight loss (Crawford & Jeffery, 2005). The current study required to found if the marital status of the adults in both sex in the study had any association with the prevalence of overweight and obesity.

2.3.4 Genetics

Genetics plays an important role in determining a person’s susceptibility to overweight and obesity. Overweight and obesity tend to run in families. Researchers have found that there are chances of existence overweight are greater if one or both of the parents are overweight or obese (National Instution of Health, 2012). Even if genes do cause obesity, genetic factors may affect the food consumption and activity patterns that lead to it and metabolic trails that maintain it.

Genes influence the capacity of body fat you store and where that fat is circulated. Although, genetics play a role in how efficiently the body converts food into energy and how the body burns calories during exercise or physical activities. Even when someone has a genetic predisposition, environmental factors ultimately make you gain more weight (Mayo Clinic Staff, 2014).

2.3.5 Physical Activity

Most of the people are not very physically active. Modern technology has further reduced physical activity at home, at work, and in transportation. Purpose of many people spend hours in front of television, playing games and computers doing work and leisure activities in other words, it is mainly due to the sedentary lifestyle (O'Neil, et al., 2012).

Young adults tend to skip breakfast, consume foods away from home or consume energy-dense foods or drinks with large portion sizes. These eating habit may result in poor nutrient capability or diet quality and may contribute to the development of overweight and obesity. Later, Physical activity and exercise levels tend to decline with growing age and the percentage of those being "inadequately active" (ie, 10 to 149 min/week) raises from young adulthood to late adulthood (O'Neil, et al., 2012).

2.3.6 Dietary Intake

Dietary intake has been associated with overweight and obesity not only in terms of the dimensions of food consumed but also in terms of the composition and quality of diet. Moreover, eating habits have also altered and present behaviors contain low consumption of fruits, green vegetables, and milk; increasing consumption of snacks, sweets, and soft drinks and skipping breakfast. These eating habits result in continuous increase in adiposity (Tawfik, Ibrahim, & Ayub, 2008). More people are eaten food away from home or at restaurants more and foods are served in larger portion size than those served at home. As a result, they shifted from very simple diets to much more complex ones. The added spices and flavorings along with the additional fats from vegetable and animal origins have helped in the process of weight gain and obesity.

2.3.7 Social and Economic Issues

Certain social and economic issues may be linked to obesity. Such as; people do not have safe areas to exercise, people may not be aware of healthy ways of cooking or may not have money to buy healthier foods. On the other hand, increase in income tends to be associated with increased away-from-home consumption of high- fat food items. In addition, the people you spend time with may influence your weight. People are more likely to become obese if you have obese friends or relatives (Mayo Clinic Staff, 2014).

2.3.8 Environmental Issues

The environment has a role to play as far as overweight and obesity are concerned. The environment includes all the conditions that we encounter daily that push us toward to weight gain or weight loss. Our environment does not support healthy lifestyle habits; in fact, it inspires obesity due to their work schedules. People often say that they don't have time to exercise because of long work hours and time spent traveling. Most of the people skip a meal and take oversized food portions which contains with high calories, high fat foods that are willingly available, heavily advertised, relatively inexpensive, and reasonably tasty foods. Some of these meals and snacks can feed two or more people. Eating large size portions means too much excess energy in. Over time, this will cause weight gain if it is not balanced with physical activity (National Instution of Health, 2012).

2.4 Theoretical Framework

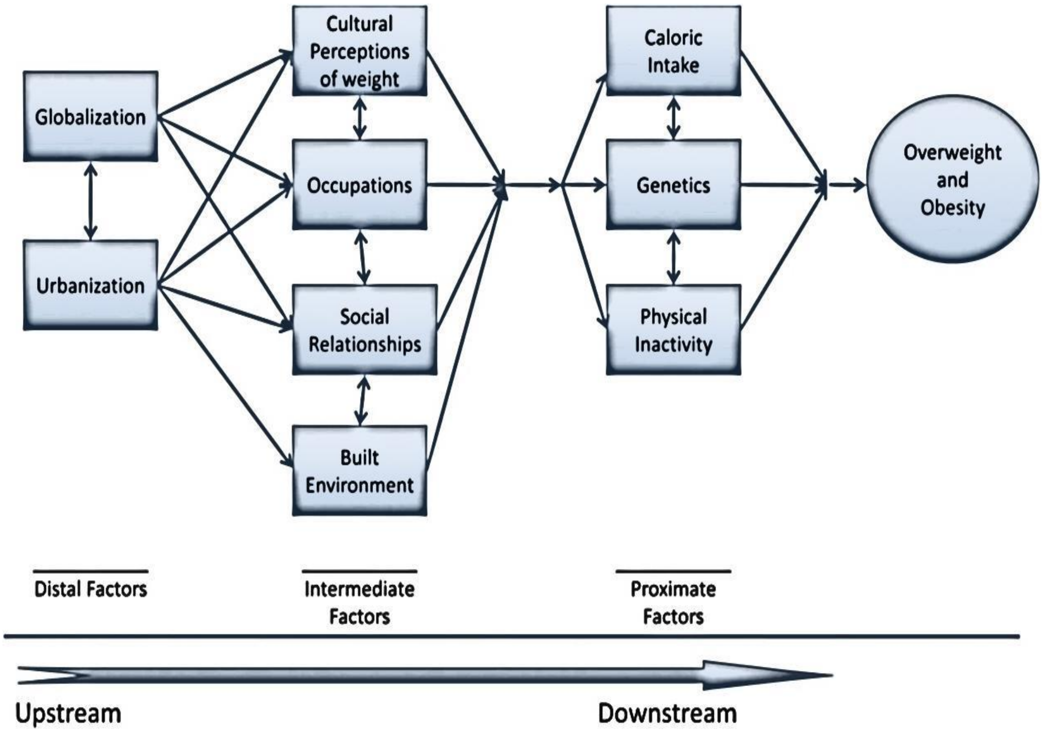


Figure 0.1: A causality continuum model for overweight and obesity

Source: Scott, Ejikeme, Clottey, & Thomas, (2012).

The theoretical framework (Figure 2.1) includes distant, intermediate and proximate forces essential to the increases in overweight and obesity rates. These forces, while offered separately, interrelate and overlap in several cases, with distant forces such as globalization directly impacting on forces at other levels, such as occupation and diet.

The distant forces combined comprise globalization and urbanization, with sedentary occupations, built environment, cultural perceptions of weight and social relationships at the intermediate level.

Physical inactivity and caloric intake lie at the proximate level and imitate the health behaviors most straightly associated to the overweight and obesity. These behaviors are, however, influenced deeply by the distant and intermediate forces listed above. Genetics is also proximate force that may stance risk of overweight and obesity. While by definition a biological problem, the environment has been shown to play an important role in how genes are expressed, engaging genetics inside the causality range that produces overweight and obesity (Scott, Ejikeme, Clottey, & Thomas, 2012).

CHAPTER 3: METHODOLOGY

This chapter covers the methodological detail 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. Moreover, data collection techniques, data analysis, ethical considerations, and the conceptual framework will also come under this chapter.

3.1 Research Design

This study employed a cross-sectional descriptive design to explain overweight and obesity. Quantitative method is used to find the prevalence and reasons as well as the factors for overweight and obesity among the adults in Dh. Kudahuvadhoo. Cross sectional design is used because it is relatively quick and easy to conduct as data on all variables during a short period of time. Moreover, it is less expensive compare to other study designs and useful for measuring current condition as well as magnitude of the associated factors affected among the adults age between 25 to 55 was easy to analyze.

3.2 Study Area

This study was conducted in Dh. Kudahuvadhoo of Maldives. The total population of the island is 2994 people of which 1505 are females and 1489 are males (Secretariate of Kudahuvadhoo council, 2016). The main reasons for choosing this island to conduct this study was, until now the social determinants of obesity in this island are not clear and there is no research carried out to find the reason for it. According to Dh. Atoll Hospital (DAH), prevalence rates of overweight and obesity among adults is high in Dh. Kudahuvadhoo as compared to other islands in the atoll.

3.3 Target Population

The target population of this research is adults between the ages 25 to 55 in both sexes of Dh. Kudahuvadhoo island. There are 699 males and 699 females in the target population (Secretariate of Kudahuvadhoo council, 2016). The age group was chosen because most people tend to add weight around this time.

3.4 Sampling Techniques

The stratified random sample method is used in this study to obtain the total number of adults required. The population will be divided into two groups male and female. Members will be selected randomly from a register and each group in proportion to the group's size. Therefore, each member from both genders has an equal chance of being selected. Furthermore, the results of sampling represent the whole population of target age group.

3.5 Sample Size

The target population if this study is all the adults aged 25 to 55 years of Dh. Kudahuvadhoo island. To derive the sample size, an online sample calculator provided in www.raosoft.com has been used (Raosoft, 2004).

Target Population =1398
Expected margin of error = 10%
Confidence interval = 95%
Estimated response rate = 50%
Sample Size generated was = 90

Group 1: Sample size of male adult

$$\text{Total number of male adults} \div \text{Total number of adults} \times \text{Total sample size}$$

$$699 \div 1398 \times 90 = 45 \text{ male adults}$$

Group 2: Sample size of female adult

Total number of female adults ÷ Total number of adults × Total sample size

699 ÷ 1398 × 90 = 45 female adults

The sample size of this study is 45 males and 45 females.

3.6 Research Instruments

A self-administered questionnaire was used for data collection. (Questionnaire will be attached in appendix 4). The questionnaire was prepared in English and then translated into local language (Dhivehi). The main reason for translating the questionnaire is some adults might not have English background to answer such questions. Therefore, to reduce such difficulties questionnaire was translated into Dhivehi language.

The questionnaire was developed based on the research objectives and it was the combination of both close-ended and open-ended questions and it is divided into four parts. The first part was used to collect socio-demographic and socio-economic data of the participants. The second part was used to collect data on physical activity during work, transportation and leisure time in a typical week. The third part was used to collect information on dietary intake and feeding habits. This was done using the food frequency questionnaire and the 24-hour dietary recall. The final part of the questionnaire will be used to collect anthropometric data (Weight, height, waist circumference, and body fat percentage).

3.7 Pre-Testing

Before data collection process, pre-test was done by using the anonymous self-administered questionnaire among 20 randomly selected samples with similar characteristics with the actual sample used in the study. However, the sample used for pretesting was not included in the final study. The results of the pre-testing were used to adjust the original questionnaire according to problem identified.

3.8 Validity and Reliability

The confidentiality and anonymity was maintained throughout the research. Before conducting the research there was pre-testing with translated version of the questionnaire in Dhivehi language. Moreover, the content validity of the research tool for its completeness and celerity was maintained through literature review and consultation with concerned supervisor. The questionnaire was pre-tested using randomly selected 20 participants who have similar characteristics as the target study group for this study. Also the questionnaires that was found insufficient will be revised and adjusted accordingly.

3.9 Data Collection Techniques

In this study, field data were collected using a self-administered questionnaire. Two research assistants were recruited for the survey. They were trained for two days on the objectives of the study and survey procedures. In order to ensure familiarization and clarity of the questions, each question was read and explain to them. Emphasizing of the questions was realized through repetitive reading to ensure proper understanding of the content of research.

The questionnaire was divided into four parts: socio-demographic and socio-economic part, physical activity part and dietary intake part. Those part were filled with their own. While filling the questionnaire, participants were provided with privacy (if they need). The whole procedure was finished within one weeks.

The fourth part, anthropometric measurements of height, weight, waist circumference and body fat percentage were taken to determine nutritional status. Height (in meters) was measured using a steel tape which was anchored to a flat wall, and the respondent was asked to stand on a flat surface. A wooden head rest was placed on the head, which allowed the measurement to be taken at the point perpendicular to the top of the head.

Weight was measured to the nearest 100 grams (0.1kg) using a Soehnle bathroom scale, after calibrating it to zero, and after removal of shoes and excess clothing.

Percentage of body fat was measured using a body fat scale which estimates the body fat percentage by the Bioelectrical Impedance Analysis (BIA) method. Data on height, weight, sex and age of the participant was fed to the unit. Weight and body fat percentage values were read from the display unit of the device.

Waist circumference was measured using a non-stretchable tape halfway between the lower border of ribs and the iliac crest on a horizontal plane, while ensuring that the tape was level around the body and parallel to the floor. The tape was tightened around the body without depressing the skin.

3.10 Data Analysis

Completed questionnaires were checked and they were cleaned and coded before data entry. All the data were entered and analyzed by using the Statistical Package for Social Sciences (SPSS) version 20 software. This software was useful for descriptive statistics analysis of frequency, percentage, mean, median, standard deviation of the individual characteristics. Chi square test was used to find out the association between different variables and other statistical information to find out the prevalence and associated factors related to be overweight and obesity. So that information of the study was summarized and organized. To find the association between independent and dependent variable, logistic regression was used. All statistical analysis considered on significance if the P value of less than 0.05 was considered significant and all analyzed data will be presented in the tables.

3.11 Ethical Considerations

The study was conducted after explaining the participants about the purpose and procedure of the study. Information was given to all the participants about the research being conduct as a printed information sheet. All the participants were informed of their rights when participating in this survey as well as about the questionnaire used. And then answers were as a choice, all possible answers were included. To secure privacy of the participants, names and other means of identity were not used during the research. The respondents have rights to leave the session after starting, even before completing the questionnaire. Everything will be clarified for the respondent in order to build confidentiality. Furthermore, vulnerability group of people were not included in this research. An informed consent form was provided by explaining rights of the participant before conducting the study and was attached on appendix 3.

3.12 Conceptual Framework and Measurement of Variables

These are some of the factors related to obesity including dependent and independent variables. This conceptual framework was developed based on causality continuum model theoretical framework. The dependent variable is overweight and obesity whereas independent variables are socio-demographic characteristics, socio-economic characteristics, physical activity, dietary intake and anthropometry measurements. All the variables in the conceptual framework will be included in the questionnaire.

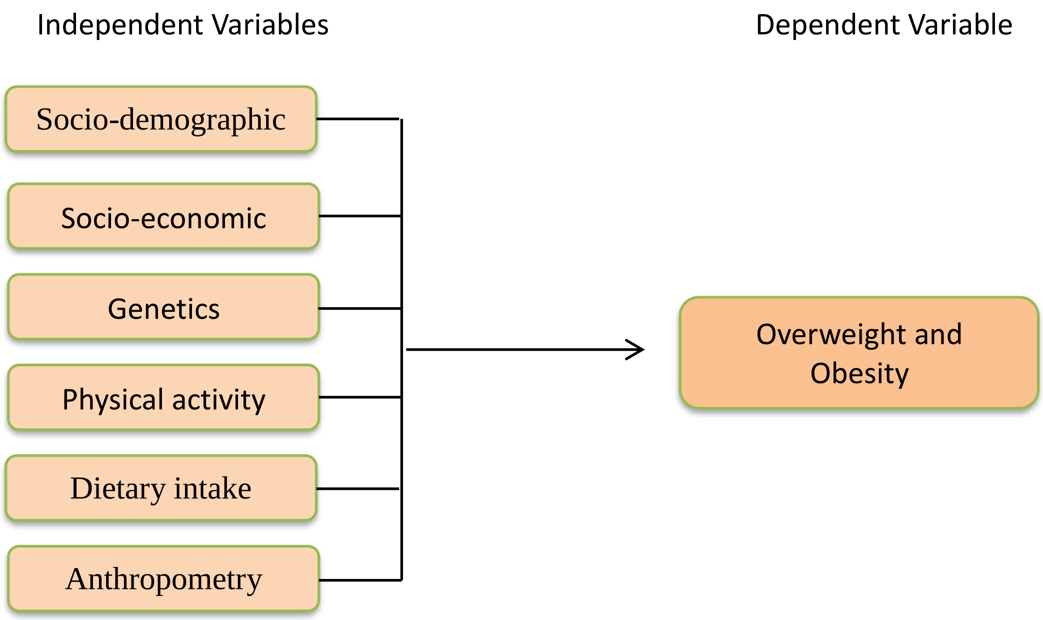


Figure 0.1: Conceptual framework

CHAPTER 4: DATA ANALYSIS RESULTS

This chapter presents the findings of the study as per the objectives. The prevalence rate, socio-economic factors, physical activity of the adults (25 to 55 years) and the dietary intake have been described. A descriptive and cross-sectional study was conducted to identify those factors. The sample size of this study is 90 people (45 males and 45females) were participated in this study making the response rate to be 100%.

4.1 Descriptive Statistics

4.1.1 Socio-demographic Characteristics of the Respondent

Table 0.1: Frequency and percentage of socio-demographic characteristics

Socio-demographic Factors	Frequency (n = 90)	Percent (%)
Age Group		
25-34 years	44	48.9
35-44 years	33	36.7
45-55 years	13	14.4
Gender		
Male	45	50
Female	45	50
Marital Status		
Single	5	5.6
Married	83	92.2
Divorce	2	2.2
Educational Level		
Primary incomplete	22	24.4
Primary complete	53	58.9
Secondary school	14	15.6
Certificate level	1	1.1

Table 4.1, continued.

Socio-demographic Factors	**Frequency (n = 90)**	**Percent (%)**
Occupation		
Employed	30	33.3
Unemployed	**60**	**66.7**

The table above (Table 4.1) shows the socio-demographic characteristics of the research respondents. The result showed that, the majority (48.9%) of the respondents' age varies from 25 to 34 years. As for other age groups, there were 36.7% of respondents among the age groups of 35 to 44 and the rest (14.4%) was among the age group of 45 to 55 years. In addition, 50% of participants were male and another 50%% people were female. Based on the marital status, the majority (92.2%) of the respondents were married, 5.6% have never been married or single and 2.2% of respondents were divorced. The result (Table 4.1) indicate that most of the adults complete their primary education (58.9%) and 24.4% did not complete their primary level. Since,15.6% had achieved their secondary school education and 1.1% of the respondent complete the certificate level. Among the 90 participants, the large group of respondents (66.7%) was unemployed. The rest of the respondents (33.3%) were unemployed.

4.1.2 Socio-economic Characteristics of the Respondent

Table 0.2: Frequency and percentage of socio-economic factors

Socio-economic factors	Frequency (n= 90)	Percent (%)
Socio-economic factors		
Television		
Yes	90	100
No	0	0
Fridge		
Yes	89	98.9
No	1	1.1
Mobile phone		
Yes	89	98.9
No	1	1.1
Microwave oven		
Yes	78	86.7
No	12	13.3
Vehicle (Cycle)		
Yes	54	60
No	36	40
Computer		
Yes	75	83.3
No	15	16.7

The frequency and percentage table above (Table 4.2) shows socio-economic factors among the research respondents. Important household goods and assets such as Television, Fridge, Mobile phone, Microwave oven, cycle and computer which were considered important in the interviewees who in turn were to state if they owned them or not. Among the 90 participants, all of them own television, 89 (98.9%) participants have Fridge and Mobile phone whereas only 1 (1.1%) participants did not have those items. Furthermore, 78 (86.7%) participants have Microwave oven and 12 (13.3%)

participants did not have it. The result also showed that, 54 (60%) participants own cycle but 36 (40%) participants did not own and most of the participants have computer, that is 75 (83.3%) and the rest 15 (16.7%) did not have it.

4.1.3 Physical Activity

Table 0.3: Frequency and percentage of physical activity

Physical activity	**Frequency (n= 90)**	**Percent (%)**
Work		
Vigorous-intensity activity (n= 88)		
Yes	57	63.3
No	31	34.4
Moderate-intensity activity (n= 89)		
Yes	71	78.9
No	18	20
Transport		
walk or use a bicycle		
Yes	63	70
No	27	30
Recreational		
Do you play any sport?		
Yes	65	72.2
No	25	27.8
Vigorous-intensity sports (n= 89)		
Yes	58	64.4
No	31	34.4
Moderate-intensity sports (n= 88)		
No	60	66.7
Yes	28	31.1

Table 4.3, continued.

Physical activity	**Frequency (n= 90)**	**Percent (%)**
Time spend sitting or reclining on a typical day (n= 81)		
1 Hour	10	11.1
2 Hours	24	26.7
3 Hours	25	27.8
4 Hours	19	21.1
6 Hours	3	3.3

The table above (Table 4.3) shows the frequency and percentage of participants' physical activity. Physical activity at work was established by asking the respondents if their work involved activities that require hard physical effort (vigorous physical activity) or moderate physical effort (moderate physical activity). The results indicated that, (n=88) 63% of respondents whose work involved vigorous-intensive physical activity and 34.4% of respondents did not do work that involved vigorous-intensive physical activity. From 89 participants, most of the people work involved moderate-intensive activity (78.9%) whereas 20% of them did not involve. The participants were asked to state if they walked or used a bicycle for at least 10 minutes while moving from one place to another. The results (Table 4.3) indicate that more than two thirds (70%) participants walk for at least 10 minutes per day in a typical day and the rest (30%) did not used either bicycle or walk. In the table above (Table 4.3) the recreational physical activities include sports, fitness and leisure activities. 65 (72.2%) participants take parts in playing sport and 25 (27.8) did not play any sports. Among 89 participants, 58 (64.4%) do, but 31 (34.4%) did not do vigorous-intensity recreational activities. Among 88 participants, two third (66.7%) do moderate-intensity leisure activities, but 31.1% did not do moderate-intensity leisure activities. Usually most of the people spend time on sitting or reclining at work reading and watching television, playing cards with friends excluding time spent sleeping on a typical day. The results indicate that among 81 respondents, 11.1% of people spent one hour, 26.7% of people spent two hours, 27.8% of people spent three hours, 21.1% of people spent four hours and 3.3% of people spent six hours on sedentary behaviors per day.

4.1.4 Dietary Intake of the Respondent

4.1.4.1 Dietary Intake in the Preceding 7 Days

Table 0.4: Frequency of selected foods daily with BMI

Food items	**BMI (n=90)**		
	n	**Yes (%)**	**No (%)**
Cereals			
White rice			
Never	52	80.8	19.2
Daily	38	76.3	23.7
Roshi			
Never	34	79.4	20.6
Daily	44	78.6	21.4
Dairy Products			
Whole milk			
Never	48	79.2	20.8
Daily	42	78.6	21.4
Low-fat milk			
Never	76	77.6	22.4
Daily	14	85.7	14.3
Meat and Eggs			
Fish			
Never	72	76.4	88.9
Daily	18	23.6	11.1
Eggs			
Never	84	77.4	22.6
Daily	6	100	0

Table 4.4, continued.

Food items	**BMI (n=90)**		
	n	**Yes (%)**	**No (%)**
Vegetables and Fruits			
Carrot			
Never	72	76.4	23.6
Daily	18	88.9	11.1
Cucumber			
Never	71	76.1	23.9
Daily	19	89.5	10.5
Coconut			
Never	42	81	77.1
Daily	48	19	22.9
Sugar/food/drink			
Sugar			
Never	41	85	15
Daily	49	75.5	24.5
Biscuits			
Never	71	77.1	22.9
Daily	19	84.2	15.8
Juice			
Never	61	77	23
Daily	29	82.8	17.2

The table above (Table 4.4) shows the frequency of participants' dietary intake in the preceding 7 days. Among the food items, that shows the foods respondents were taken every day. The results indicated that *Roshi* (44) and white rice (52) were the main staples consumed by the participants (78.6%and76.3%) respectively in cereals group. Among the dairy products, whole milk registered the highest frequency of consumption (78.6%) while the most consumed meat was fish (23.6%). In sugar/food/drinks group most of the participants used sugar (75.5%) in different forms and 82.6% of participants used drink juice every day.

4.1.4.2 Type of Oil and Milk Used

Table 0.5: Frequency and percentage of oil and milk used

Factors	Frequency (n=90)	Percent (%)
Type of oil mostly used to cook (n=79)		
Vegetable oil	79	87.8
Type of vegetable oil (n=78)		
Corn	1	1.1
Olive	13	14.4
Sunflower	64	71.4
Type of milk mostly used (n=87)		
Packed	1	1.1
Powder	86	95.6
Type of powdered milk (n=86)		
Al-mudish	6	6.7
Anchor	3	3.3
Coast	75	83.3
Nedo	1	1.1
Milgro	1	1.1

The table above (Table 4.5) shows the frequency and percentage of oil and milk used among the participants. Among 90 participants, 79 (87.8%) adults used vegetable oil to cook and the rest did not know the type of oil used in their home. Among them most of the participants used sunflower oil (71.4%) and the other used olive oil and corn oil (14.4% and 1.1%). Among 90 participants, 87 used milk and other did not used it. 86 (95.6%) used powder milk and 1.1 used packed milk. The result shows that, mostly the participants prefer Coast milk (83.3%). The other types of includes; Al-mudish (6.7%), anchor (3.3%), Nedo (1.1%) and Milgro (1.1%).

4.1.4.3 Eating Away from Home

Table 0.6: Frequency and percentage of eating patterns of respondents

Times (on average) do you eat away from home	Frequency	Percent
1 time	10	11.1
2 times	0	0
3 time	9	10
Never	71	78.9

The table above (Table 4.6) shows the frequency and percentage of eating patterns of respondents. In the study shows, 78.9% of the respondents did not ate from outside and 11.1% of respondents reported that they ate at least once in a day outside the home. The rest of the respondents (10%) consumed food away from home for 3 times in a day.

4.1.4.4 Meal Consumption Pattern in the Past Three Months

Table 0.7: Food intake frequency for the past three months (%)

	Frequency (n=90)		
Time	Regularly	Sometimes	Rarely/never
Breakfast	93.4	4.4	2.2
Mild-morning	35.6	60	4.4
Lunch	65.6	33.3	1.1
Evening tea	48.9	46.7	4.4
Dinner	80	16.7	3.3
Bed time	1.1	0	98.9

The table above (Table 4.7) shows the frequency of the meal consumption patterns of the respondents in the three months. The result shows that, among the 90 participants (93.4%) takes their breakfast regularly and 4.4% takes sometimes while 2.2% of participants takes either rarely or never. 60% of adults takes sometimes at mild-morning meals and 35.6% adults take this meal regularly but the rest (4.4%) of them did not take the mild-morning meal. More than two third (65.6%) of adults consumed lunch regularly while 33.3% of adults sometimes consumed lunch. Almost half (48.9%) of the participants takes evening tea regularly and 46.7% of them take it sometimes. Most of the participants (80%)takes dinner regularly, 16.7% takes sometimes and very few of the participants (3.3%) never takes. Except one participants (1.1%, regularly) all other (98.9%) never or takes food very rarely at bed time.

4.1.5 Prevalence Rate of Overweight and Obesity

Table 0.8: BMI and fat percentage of the research participants

Variable	**Frequency n = 90**	**Percent (%)**
Body Mass Index (kg/m2)		
Normal	19	21.1
Overweight	42	46.7
Obesity	29	32.2
Body Fat (%)		
Healthy	8	8.9
Over fat	29	32.2
Obese	53	58.9

Table 4.8 shows the BMI and body fat percentage of the research respondents to determine the prevalence of overweight and obesity. The result shows among the 90 participants, 19 (21.1%) of respondents were normal however, 42 (46.7%) were overweight and 29 (32.2%) were obese. This was calculated according to WHO classification. Moreover, the body fat percentage result shows 8 (8.9%) were healthy, 29 (32.2%) were over fat and most of the participants 53 (58.9%) were obese according to their age group.

4.2 Associated Factors of Overweight and Obesity

Table 0.9: Relationship between socio-demographic factors with BMI

Variable	n	BMI Yes (%)	BMI No (%)	Crude OR	95% CI	X^2	p-value
Age Group						0.135	0.713
< Mean age	46	80.4	19.6	1			
> Mean age	44	77.3	22.7	1.099	0.300-2.279		
Gender						0.067	0.796
Male	45	77.8	22.2	1			
Female	45	80	20	1.029	0.318-2.411		
Marital status						2.155	0.142
Single	7	80.7	19.3	1			
Married	83	57.1	42.9	2.803	0.065-1.566		
Educational level						0.271	0.603
Higher education	1	100	0	1			
Lower education	89	78.7	21.3	1.014	0.986-1.043		
Occupation						0.33	0.855
Employed	30	80	20	1			
Un-employed	60	78.3	21.7	1.021	0.305-2.675		

Table 4.9 shows the result of the Chi-Square Test by significance level for association between socio-demographic factors with overweight and obesity among the research respondents. The result showed there were no significant relationship (p-value = > 0.05) with respondents' age, gender, marital status, educations and occupation. There was high chance of being overweight and obesity with respondents those who were more than mean age group (Mean = 35.8444), females rather than males. Moreover, married people, unemployed and lower educational respondents have high chance.

4.2.1 Socio-economic Characteristics of the Respondent

Table 0.10: Relationship between physical activity with BMI

Variable	BMI			Crude OR	95% CI	X^2	p-value
	n	Yes (%)	No (%)				
Work							
Vigorous-intensity activity						2.164	0.141
Yes	57	84.2	15.8	1			
No	31	71	29	1.187	0.160-1.313		
Moderate-intensity activity						0.010	0.919
Yes	71	78.9	21.1	1			
No	18	77.8	22.2	1.014	0.269-3.268		
Transport							
walk or use a bicycle						1.681	0.195
Yes	63	82.5	17.5	1			
No	27	70.4	29.6	1.173	0.176-1.438		
Recreational							
Do you play any sport?						0.543	0.461
Yes	65	76.9	23.1	1			
No	25	84	16	1.658	0.467-5.308		
Vigorous-intensity sports						0.043	0.461
Yes	58	79.3	20.7	1			
No	31	77.4	22.6	1.344	0.312-2.568		
Moderate-intensity sports						0.851	0.356
Yes	60	83.3	16.7	1			
No	28	75	25	1.099	0.201-1.788		

Table 4.10 shows the result of the Chi-Square Test, significance level for association between physical activity with overweight and obesity among the research respondents. The study result showed there were no significant relationship (p-value = > 0.05) with respect of day-to-day activities; during work, transport, and recreational physical activities. Whereas, there were more chance of being overweight and obesity who do not involved the physical activities during their work, as well as recreational physical activities. Although there is higher chance (odds: 1.573) who do not walk or use a bicycle during their transportation while moving one place to another.

Table 0.11: Relationship between BMI with genetic factors

Variable	BMI			Crude OR	95% CI	X^2	p-value
	n	Yes (%)	No (%)				
Family history of obesity						0.061	0.804
No	31	24	7	1			
Yes	59	47	12	1.090	0.305-2.511		

Table 4.11 shows the relationship between BMI with genetic factors. The result state that there is no significant relationship with genetic factors but people who were having the family history of obesity are more prone to be overweight and obese than who are not having the family history (odds: 1.090).

CHAPTER 5: DISSCUSSION AND CONCLUSION

5.1 Discussion

This research was conducted in Dh. Kudahuvadhoo, mainly to identify the prevalence and associated factors of overweight and obesity. The present cross-sectional study included 90 participants aged between 25 to 55 years of old from the residents. This chapter presents the findings of the study and discussions as per the objectives. Additionally, factors that predict the prevalence of overweight and obesity were also discussed. The chapter also includes comparison of the study with similar studies that have been done in other parts of the world on overweight and obesity among adults.

Total number of 90 participants who were screened for their height, weight and thus BMI were calculated. The mean age group of in this study was 35.8 and overweight and obese adults was high in < mean age group (80.4%) than compare to > mean age group (77.3%). This may due to most of the participants belongs to < mean age group. However, the result shows there was odd risk (OR: 1.009, CI: 0.300-2.279) in > mean age group. A study done by Rossmond in 2004 state that, prevalence of overweight and obesity were significantly higher in middle-age groups than in lower ages. The expanse of muscle-mass starts to reduce and the amount of adiposity continuously increases with age growths (Rossmond, 2004). The high chances of overweight and obesity could be hence related to age-affected body adiposity (Sen, Monda, & Dutta, 2013). Therefore, persons belonging to the old age groups have more adiposity that leads to a higher prevalence of overweight-obesity (Suder, 2009).

Many studies have found that the prevalence of obesity among women was higher than men. A study done at Kerala in India, it was found that in men the prevalence of overweight and obesity was 47% and for women it was 58%. (H.Rajendra & B.Jeffy, 2014). In another study, also the prevalence of obesity was found to be high for females (31%), when compared to male (11.9%) (Carter et al., 2006). The age range of 25–44 years (women of childbearing age) is the time when women tend to gain the greatest amount of weight (gestational weight gain) (Siega-Riz, Evenson, & Dole, 2004). The current study, out of 90 participants 45 (50%) were women and another 45 (50%) were men. The overall prevalence of overweight and obesity was found to be 71(78.9%). It was found that 35 (49.3%) of males and 36 (50.7%) of females were overweight and obese. There is high percentage of prevalence of overweight in females than compared to males (odds: 1.029). Also this studies found that, more than one fourth of the adults were unhealthy due to be overweight and obesity.

In this study it was found that 83(92.2%) of participants were married and the rest of the participants were either single (5.6%) or divorced (2.2%). To added, it shows married people are more prone to presence of overweight and obese rather than single people (odds: 2.803). Its acknowledge a few studies found that the married persons have more chance of being overweight and obese rather than a single person. A cross sectional studies in done in Kisumu East Sub-County, Kisumu County, Kenya found, regard to marital status, married persons were 60% more likely than single persons to be overweight or obese (Ondicho, Omondi, & Onyango, 2016).

Furthermore, 78.3% of the adults who have overweight and obesity had achieved education below higher secondary level. For educational level Chi-square testing does not show an association with the dependent variable, risk (odds: 1.014) of being overweight and obese was higher for adults with lower education. Among the overweight and obese people, most of the respondents unemployed, indicating that higher chance (odds: 1.021) of being overweight and obese. Other studies also showed that respondents with no formal education had a higher prevalence of obesity than those with formal education (Sherina & Lekhraj, 2009). This finding is similar to the study done by Parkes in 2003, which found that participants with no schooling and no formal education had significantly higher BMI compare to those with qualifications.

The present study, indicator of socio-economic status was not associated with overweight and obesity (p value is more than 0.05). So the association between socioeconomic activities and overweight and obesity was not included. Whereas the finding is conflicting to similar studies done in developing countries, where higher socio economic status has been positively associated with overweight and obesity (Shayo & Mugusi, 2011). Historically, most of the populations suffering from obesity exist in high-income, developed countries (Caballero, 2007). However, according to WHO in 2011, the greatest affected in the prevalence of overweight and obesity was seen in low-income countries such as India, Maldives and Thailand in the recent decades.

A study done by Arya Sharma in 2011, found that Maldives prevalence of overweight and obesity is much higher for old age, with higher education, media exposure, physical activity and eating habits of the population. In addition, working women in Maldives as compared to the housewives in India, Bangladesh and Nepal have highest proportion of overweight and obesity.

The possible reasons behind increasing overweight and obesity in most of the Asian countries were the increasing economy, urbanization and standard of living of people.

Also reduced physical activity at work due to modernization, better motorized transport and preferences of viewing television for longer duration (Parizkova, Chi, Chia, & Yang, 2007).

However, there were direct influences such as; occupation, physical activity and sedentary lifestyle in the prevalence of overweight and obesity as they tend to increase adiposity among adults in question. A report done by Wang, Chen, Shaikh, & Mathur, in 2009 stated that the people having less physical activity and sedentary lifestyle show greater overweight-obesity.

The present study physical activity was evaluated by asking the adults to state the physical activities they involved in, in a typical week. By their work, during transportation (movement from one place to another) and recreational physical activity. In this part there were no significant (Chi-square test, P = 0.195).

Activities that involve hard physical exertion and cause large increases in breathing or heart rate define as vigorous physical activity which includes lifting, standing or walking while carrying heavy loads or very hard physical labor. On the other hand, moderate physical activity was defined as activities that entail small increases in breathing or heart rate. These activities include brisk walking, moderate household work, general home exercise, frequent use of arms, legs and total body movement. Of the few whose work involved physical activity the odds of being overweight and obesity were found in those who did not involve in the vigorous intensive activity (OR: 1.187, CI: 0.160-1.313) as well as those who do not involve in moderate intensive activity (OR: 1.014, CI: 0.269-3.268). Some researchers did not find any association between physical inactivity and overweight and obesity either for male or female participants (Arroyo, et al., 2000).

In addition, the result shows that there is higher chance (OR: 1.173, CI:0.176-1.438) who do not walk or use a bicycle during their transportation while moving from one place to another. Some studies show that the association between BMI and physical activity occurs only among men (Gómez, Ruiz, García, Granero, & Piéron, 2009). Despite these differences the relation between obesity and a sedentary lifestyle has been established.

Recreational physical activities are activities involved in during leisure, include sports, fitness and leisure activities. They do not include activities mentioned in the area of work and transport. Likewise, the two part mentioned in above (physical activities during work and during transportation) this part also participate who did not recreational physical activity have more chance of being overweight and obese. People having odds by play sports (1.658), people involves vigorous intensity sports (1.344) and people involves moderate intensity sports (1.099).

Having a regular physical activity and taking healthy diet is important for long term health benefits as well as prevention of chronic diseases such as Type 2 diabetes and heart disease (CDC, 2016). When a person used to eat and drinks more calories than she or he burns, the energy balance tips toward weight gain, overweight, and obesity (NIH, 2012).

The present research, different foods from various food groups were read out to the respondents, who in response were to state the number of times they had consumed the foods in the preceding 7 days. The results indicated that participants' main staples consumed carbohydrate food such as *Roshi* 78 (78.6%) and white rice 52 (76.3%). Next most participants used food contains sugar, protein, fat and fiber. Also it shows people were taking energy dense food and it lead to be overweight and obesity.

Concerning the eating out behavior of adult, no significant association was found in this study. Similarly, a nationally representative study found no association between BMI and food eating out (Lin, Haung, & French, 2004). However, other researchers have found a significant positive association between the frequencies of eaten away from home and increased in body weight (Chacar & Salameh, 2011).

A survey done by Aboobakuru et al, on 2010 was found that the Maldives has the highest prevalence of overweight, obesity and belly fat in the region with 60.8% of males and 65.5% of females being overweight and obese. The prevalence of overweight and obesity was determined using by BMI and age-adjusted fat percentage approvals, based on WHO and NIH. The results indicate that 91.1% were classified as either over fat or obese. Among them, most of the adults were classified as obese by fat percentage.

Total body fat percentage is the total weight of the individual's fat divided by the individual's weight and reflects both important fat and storage fat (Jennifer R. Scott, 2016). For the demands of childbearing and other hormonal functions, extra percentage of fat is needed for women than for men. According to the American Council on Exercise (ACE), essential or important fat is 2–5% in men, and 10–13% in women.

Classification of fat percentage are not well standardized and to calculate the healthy fat percentages, different sources give different values. According to a WHO expert team; there is no agreement about cut-off points for the percentage of body fat that establishes obesity (Flegal et al, 2009). According to Health Check Systems, the American Council on Exercise has categorized ranges of body fat percentages as presented in appendix 6.

Research shows that obesity tends to run in families, suggesting that genes may contribute to obesity. Likewise, families share diet and lifestyle behaviors that may affect weight. Though, it is possible to manage a persons' weight even if obesity is common in the family (National Instution of Health, 2012). In this study the family history of being overweight and obesity chances were (odds: 1.090, CI:0.305-2.511).

5.2 Conclusion

A descriptive cross-sectional study method was used to conduct this research. This research was conducted mainly to identify the prevalence of overweight and obesity among adults and to understand the associated factors. Overall, this study highlighted and explored the association of different linked factors with the prevalence of overweight and obesity among adults. Most of the socio-economic and demographic and lifestyle related factors were significantly negatively associated with the prevalence of overweight and obesity. Higher socioeconomic status, low levels of physical activity, frequent consumption of meal and being female were significantly associated with a higher prevalence of overweight and obesity. The prevalence of obesity within a population is considered a risk factor for non-communicable diseases.

5.3 Study Limitation and Generalizability

The obtained results cannot be generalized on the whole Maldives because the study was conducted only among the adults of Dh. Kudahuvadhoo island with the age group of 25 to 55 years. The small sample size may have limited the ability to detect significant findings. The other limitations include the time frame and the sample selected for the study. There was a limited time (3 months) to conduct this research. Therefore, a descriptive cross-sectional study method was used. Descriptive research is conclusive in nature, as opposed to be exploratory. It means, that a descriptive research gathers quantifiable information that can be used for statistical inference on your target population through data analysis. The study required participants to recall information from their past. The extent to which recall bias influenced these findings is unknown.

5.4 Recommendation

The high rates of overweight and obesity in the study point to a need for behavior change related to improved lifestyle through amplified physical activity and improved dietary practices. This would help to prevent the development of overweight and obesity among the adults, or manage it for those who are already overweight or obese. This may perhaps through increasing their physical activity, both planned and unplanned, for occurrence by walking or enrolling in facilities that offer planned physical activity.

There is need to create awareness on the problem of overweight and obesity. The awareness could focus on areas like making healthy food choices. There were many food vendors along the pathways who sold fatty foods which were mostly prepared using the deep frying methods.

The low levels of physical activity in this study could be an indication that this could be the situation even in other geographical locations and population groups. Hence there is need for concerted effort to promote increased physical activity. Interventions on lifestyle changes should especially target the people who are better in terms of socio-economic status. This is justified by the rising levels of overweight and obesity up the socio-economic ladder, and the low levels of physical activity.

4. REFERENCES

Arroyo, P., Loria, A., Fernandez, V., Flegal, K., Kuri-Morales, P., Olaiz, G., & Tapia-Conyer, R. (2000). Prevalence of pre-obesity and obesity in urban adult Mexicans in comparison with other large surveys. *Obes. Res.*, 8:179–185.

Benjamin, R. M. (2010). *The Surgeon General's Vision for a Healthy and Fit Nation.* Association of Schools of Public Health.

Caballero, B. (2007). The global epidemic of obesity. *An overview*, 29: 1-5.

Carter, A., Hambeton, I., Broane, H., Fraster, H., & Hennis, A. (2006). Prevalence and risk factors associated. *Aging Health*, 18(2): 240-258.

CDC. (2016, June 16). *Defining Adult Overweight and Obesity.* Retrieved from Centers for Disease Control and Prevention: https://www.cdc.gov/obesity/adult/defining.html

CDC. (2016, August 15). *Overweight & Obesity.* Retrieved from Centers for Disease Control ad Prevention web site: https://www.cdc.gov/obesity/adult/causes.html

Chacar, H., & Salameh, &. P. (2011). Public schools. *Lebanese Medical Journal adolescents' obesity and growth curves in Lebanon*, 59(2): 81.

Chamieh, & Claire, M. &. (2013, June 4). *Demographic, socioeconomic, dietary and physical activity determinants of obesity in a large nationally representative sample of the lebanese adult population.* Retrieved May 02, 2015, from Durham University: http://etheses.dur.ac.uk/7321/2/Marie_Claire_Chamieh.pdf?DDD45+

Crawford, D., & Jeffery, &. R. (2005). *Obesity prevention and public health*. Retrieved from Oxford University Press, Oxford, England.: http://www.deakin.edu.au/dro/view/DU:30010369.

Gómez, M., Ruiz, F., García, M., Granero, A., & Piéron, M. (2009). Reasons mentioned by university student who practice physical and sporting activities. *Latinoamer. Psicol.*, 41: 519–532.

H.Rajendra, & B.Jeffy, &. (2014). A Study on the prevalence of overweight and obesity and its influencing factors among rural geriatric population in Kerala. *International Journal of current Microbiology and Applied Science*, 284-293.

Jennifer R. Scott. (2016, August 15). *Percent Body Fat—Definition and Examples.* Retrieved from verywell web site: https://www.verywell.com/percent-body-fat-3496124 k.Giskes, G.Turrell, Lenthe, Van, J.Brug, & JP.Mackenbach. (2006, February 09). *A multilevel study of socio-economic inequalities in food choice behaviour and dietary intake among the Dutch population: the GLOBE study.* Retrieved April 29, 2015, from PubMed Web site: http://www.ncbi.nlm.nih.gov/pubmed/16480537

Lin, B., Haung, C., & French, &. S. (2004). Factors associated with women’s and children’s body mass indices by income status. *Int.J.Obes,* 28: 536–542.

Mayo Clinic Staff. (2014, May 13). *Mayo Clinic*. Retrieved May 03, 2015, from Disease and conditions Obesity: http://www.mayoclinic.org/diseases-conditions/obesity/basics/risk-factors/con-20014834

Medindia. (2016). *Overweight and Obesity*. Retrieved from medindia website: http://www.medindia.net/health_statistics/sear_countries/overweight-and-obesity.asp

Ministry of Health & Gender. (2014). *Maldives Health Profile.* Male': Ministry of Health & Gender.

Ministry of Health. (2014). *Maldives Health Master Plan 2016-2025.* Male': Ministry of Health.

National Instution of Health. (2012, July 13). *Explore Overweight and Obesity*. Retrieved April 30, 2015, from National Heart and Blood Institute: http://www.nhlbi.nih.gov/health/health-topics/topics/obe/causes

NIH. (2012, December). *Understanding Adult Overweight and Obesity.* Retrieved from The National Institute of Diabetes and Digestive and Kidney Diseases: https://www.niddk.nih.gov/health-information/health-topics/weight-control/understanding/Pages/understanding-adult-overweight-and-obesity.aspx#a

Ondicho, Z., Omondi, D., & Onyango, &. A. (2016). Prevalence and Socio-demographic Factors Associated with Overweight and Obesity among Healthcare Workers in Kisumu East Sub-County, Kenya. *American Journal of Medicine and Medical Sciences*, 6(3); 66-72.

O'Neil, C. E., Deshmukh-Taskar, P., Mendoza, J. A., Nicklas, T. A., Liu, Y., Relyea, G., & Berenson, a. G. (2012). Dietary, Lifestyle, and Health Correlates of Overweight and Obesity in Adults 19 to 39 Years of Age. *American Journal of Lifestyle Medicine*, 1-4. Retrieved from http://www.medscape.com/: http://www.medscape.com/viewarticle/766333

Parizkova, J., Chi, M., Chia, M., & Yang, &. J. (2007). An international perspective on obesity, health and physical activity: current trends and challenges in China and Asia. *Journal of Exercise Science and Fitness*, 5 (1): 7–23.

Parkes, K. (2003). Demographic and lifestyle predictors of body mass index among offshore oil industry workers: cross-sectional and longitudinal findings. *Occupational Medicine*, 53(3):213–22.

Queensland Health. (2011, September). *Overweight and Obesity 2011.* Retrieved April 27, 2015, from Queensland health website: http://www.health.qld.gov.au/epidemiology/documents/overweight-2011-fs.pdf

R.Jayawardena, M.Byrne, N., J.Soare, M., & P.Hills, P. K. (2013, Octorber 8). Prevalence, Trends and Associated Socio-Economic Factors of Obesity in South Asia. *Obesity Fact*, pp. 405-414.

Raosoft. (2004). *Sample size calculator*. Retrieved from raosoft: http://www.raosoft.com/samplesize.html

Rossmond, R. (2004, November). Aetiology of obesity: a striving after wind? *PubMed*, pp. 5(4): 177-181. Retrieved from PubMed: https://www.ncbi.nlm.nih.gov/pubmed/15458392

Scott, A., Ejikeme, C. S., Clottey, E. N., & Thomas, &. J. (2012, August 29). Health Promotion International. *Oxford Journals*, 4-16.

Secretariate of Kudahuvadhoo council. (2016). *Secretariate of Kudahuvadhoo council.* Dh. Kudahuvadhoo.

Sen, J., Monda, N., & Dutta, &. S. (2013). Factors affecting overweight and obesity among urban adults; a cross-sectiona study. *Epidemiology Biostatistics Public Health*, 10(8): 1-8.

Sharma, A. (2011, May 1). *A comparative assessment of obesity and its association with reproductive outcomes among women in four selected South-Asian countries.* Retrieved May 03, 2015, from Pampa website: http://paa2014.princeton.edu/papers/140295

Shayo, G., & Mugusi, &. F. (2011). *Prevalence of obesity and associated risk factors among adults in Kinondoni municipal district.* Dar es Salaam Tanzania: BMC Public Health.

Sherina, M., & Lekhraj, R. (2009, April 9). *The prevalence and factors associated with obesity among adult women in Selangor, Malaysia.* Retrieved from BioMedCentral: https://apfmj.biomedcentral.com/articles/10.1186/1447-056X-8-2

Siega-Riz, A., Evenson, K., & Dole, N. (2004). Pregnancy-related Weight Gain- A Link to Obesity? *Nutrition Reviews*, 62(7):105-111.

Stevens, G. A., Singh, G. M., Lu, Y., Danaei, G., Lin, J. K., Finucane, M. M., . . . Ezzati, M. (2012, November 20). *National, regional, and global trends in adult overweight and obesity prevalences.* Retrieved May 01, 2015, from Population Health MetricS: http://www.pophealthmetrics.com/content/10/1/22

Suder, A. (2009, January). Body fatness and its social and lifestyle determinants in young working males from Cracow, Poland. *PubMed*, pp. 41(1): 139-154.

Tawfik, A. T., Ibrahim, A. A., & Ayub, &. A. (2008). Overweight and Obesity and their Association with Dietary Habits, and Sociodemographic Characteristics Among Male Primary School Children in Al-Hassa, Kingdom of Saudi Arabia. *Indian Journal of Coomunity Medicine*, 172-181.

The World Factbook. (2016, October 8). *Maldives Obesity - adult prevalence rate.* Retrieved May 01, 2015, from Index mudi web site: http://www.indexmundi.com/maldives/obesity_adult_prevalence_rate.html

Tzotzas, T., Vlahavas, G., Papadopoulou, S. K., Kapantais, E., Kaklamanou, D., & Hassapidou, &. M. (2010, November 26). *Marital status and educational level associated to obesity in Greek adults: data from the National Epidemiological Survey*. Retrieved from BMC Public Health: http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-10-732

Wang, Y., Chen, H., Shaikh, S., & Mathur, P. (2009, March 6). Is obesity becoming a public health problem in India? Examine the shift from under- to overnutrition problems over time. *PubMed*, pp. 10(4): 456-474.

WHO. (2011). *Non-Communicable Disease (NCD) Deaths Vs Overweight and Obesity.* Jeneva: World Health Organization.

WHO. (2011, September). *Overweight and Obesity fact sheet.* Retrieved April 29, 2015, from World Health Organazation web site: http://www.searo.who.int/entity/noncommunicable_diseases/media/non_communicable_diseases_obesity_fs.pdf?ua=1

WHO. (2015). *Global Health Observatory (GHO) data.* Retrieved April 28, 2015, from World Health Organization web site: http://www.who.int/gho/ncd/risk_factors/obesity_text/en/

WHO. (2016, January). *Overweight and Obesity*. Retrieved May 5, 2015, from World Health Organization: http://www.who.int/mediacentre/factsheets/fs311/en/

Zhang, Q., & Y.Wang, &. (2004, March). *Socioeconomic inequality of obesity in the United States: Do gender, age, and ethnicity matter? Social Science & Medicine.* Retrieved May 29, 2015, from Pub Med Website: http://www.ncbi.nlm.nih.gov/pubmed/14723911

5. APPENDICES

Appendix 1: consent form (English version)

Title of research proposal: Prevalence and associated factors related with overweight and obesity among adults in Dh. Kudahuvadhoo.

Read confirm as follows:

By participating in this study, you will not be liable for any illegal offence, and no harm will be caused, for this is only a study conducted in partial fulfillment of subject ‘Research for Health’ in Faculty of Health Sciences; Maldives National University.

The aim of the survey is to determine the prevalence of overweight and obesity among adults to determine the relationship between overweight and obesity and socio-economic factors, physical activity and dietary intake. In order to collect the information, number of questions will be asked and some measurements taken from you.

The questionnaire is divided into 4 distinct parts: The socio-economic factors part, physical activity part, dietary intake and the last part will involve taking of your weight, height, waist circumference measurement and the fat percentage.

All the information that you provide for this study will be highly confidential, and this information will only be used for research purpose. Although you can refuse to participate in the research or can stop answering the questions at any time during the interview, without being disadvantaged in any way, and it will not be held against you.

Declaration by participant: I read the consent voluntarily to participate in the above mentioned study.

Name: ………………………… **Sign:** …………… **Date:** …………………

Appendix 2: questionnaire (English version)

PREVALENCE AND ASSOCIATED FACTORS RELATED TO OVERWEIGHT AND OBESITY AMONG ADULTS IN DH. KUDAHUVADHOO

PERSONAL BIO-DATA:

Interview date: **Age:**

Participant code: **Gender:**

PART 1: SOCIO-ECONOMIC STATUS DATA ADMINISTRATIVE DETAILS:

1. What is your marital status?

a) Single b) Married c) Divorced d) Widowed

2. What is your highest education level?

a) Literacy b) Secondary school
c) Primary incomplete d) College (Certificate/diploma)
e) Primary complete f) Any other (specify)

3. Are you working at present to earn an income? (If yes, how much you get)

a) Yes ……………… MRF b) No

4. How much money do you spend per month on the following items for the house? (In MRF)

a) Food: ……………………..…. b) Phone bill: …………….

c) Current bill: ……………… d) Education: ……………….

e) Clothes (self) …………….

5. Do you own the following? (Circle if available)

Television Refrigerator Mobile phone

Microwave oven Vehicle Computer

PART 2: PHYSICAL ACTIVITY

Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person.

In answering the following questions: '**Vigorous-intensity activities'** are activities that require hard physical effort and cause large increases in breathing or heart rate**.** **'Moderate-intensity activities'** are activities that require moderate physical effort and cause small increases in breathing or heart rate.

6. Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like (*carrying or lifting heavy loads, digging or construction work, running, skipping, heavy house work, carrying heavy loads, standing or walking while carrying heavy loads, very hard physical labor*) for at least 10 minutes continuously? a) Yes b) No

7. Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as (*brisk walking or carrying light loads, aerobic dancing, moderate household work, general home exercise, recreational swimming, tasks requiring frequent use if arms, legs*) for at least 10 minutes continuously?

a) Yes b) No

8. In a typical week, on how many days do you do vigorous-intensity activities as part of your work? …………. Days

9. In a typical week, on how many days do you do vigorous-intensity or moderate-intensity Activities as part of your work? ……….. Days

10. Do you walk or use a bicycle (pedal cycle) for to get to and from places? If yes, how much time do you spend? a) Yes ………… (hours) b) No

11. Do you pay any sports? a) Yes b) No

12. Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like (*running, aerobics*) for at least 10 minutes continuously? a) Yes b) No

13. Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking, (cycling, swimming and volleyball) for at least 10 minutes continuously? a) Yes b) No

*** The following question is about sitting or resting at work, at home, getting to and from places, or with friends including time spent (sitting at a desk, sitting with friends, playing cards or watching television) but do not include time spent sleeping.**

14. How much time do you usually spend sitting or reclining on a typical day? ……………...Hours …………………. Minute

15. Is there any family member who have of overweight obesity?

a) Yes b) No

PART 3: DIETARY INTAKE

FOOD FREQUENCY QUESTIONNAIRE

16. How many times did you consume the following foods in the last 7 days?

Frequency of consumption in the last one week (tick where appropriate)

Type of food	**Once**	**2 Times**	**3 Times**	**4 Times**	**5 times**	**Daily**	**Never**
White rice							
Pasta							
Brown bread							
White Bread							
Roshi							
Whole milk							
Low fat milk							
Yogurt							
Ice-cream							
Cheese							
Butter							
Margarine							
Beef							
Cone sausage							
Chicken							
Fish							
Eggs							
Coconut							
Cabbage							
Carrot							
Tomatoes							
Cucumber							
Beans							
Leafy vegetables							
Apples							

Banana							
Passion fruit							
Mango							
Sugar							
Cakes							
Biscuits							
Soda (Fizzy drinks)							
Juice							
Jam							

17. What type of oil / fat is mostly used to cook in your home? (Indicate the brand name where applicable)

a) Vegetable oil……………………….

b) Vegetable fat……………………….

c) Animal fat………………………….

d) Ghee………………………………..

18. What type of milk is mostly used in your home? (Indicate brand name where applicable, and fat percentage)

a) Packed milk…………………………

b) Powdered milk……………………….

c) Any other (specify)…………………..

19. In the last 3 months, how would you rate your meal consumption pattern? (Tick appropriately in the table below)

Meal	**Regularly**	**Sometimes**	**Rarely/Never**
Break fast			
Mild-morning			
Lunch			
Evening tea			
Dinner			
Late night snacks			

20. How many times (on average) do you eat away from home in a day?

a) Once b) Two times c) Three times d) >Four times e) Never

ANTHROPOMETRY

Take the exact measurements (each measurement must be done twice

Measurements	**Readings**
Weight (kg)	
Height (cm)	
BMI	
Body fat percentage (%)	
Waist circumference (cm)	

Appendix 3: consent form (Dhivehi version)

ދިރާސާގެ ބައިވެރިންނަށް ދެވޭ އިރުޝާދުތައް

އަޅުގަނޑު ޖަމީލާ މުޙައްމަދަކީ ދިވެހިރާއްޖޭގެ ޤައުމީ ޔުނިވަރސިޓީގެ ފެކަލްޓީ އޮފް ހެލްތު ސައިންސަސްގައި "ބެޗްލަރ އޮފް ފާރމަސީ ހޮނަރސް" ކޯސް ފުރިހަމަ ކުރަމުންދާ ދަރިވަރަކުމެވެ. މިކޯހުގެ މައްދާއެއްގެ ގޮތުގައި ހިމެނޭ ރިސާޗް ޕްރޮޖެކްޓް ފުރިހަމަ ކުރުމަށްޓަކައި، ހަދާ ދިރާސާއަކީ ކަމުގައިވާ "ދ.ކުޑަހުވަދޫގެ 25-55 އަހަރާ ދެމެދުގެ ބޭފުޅުން ތެރޭގައި ބަރުދަން ހުންނަންވާ މިންގަނޑުން މައްޗަށް ގޮސްފައިވާ މިންވަރާއި އަދި އެކަމާއި ގުޅޭ [illegible] ކަންކަން" ބެލުމަށްޓަކައި ތިޔަބޭފުޅުންގެ އެއްބާރުލުން ބޭނުންވެއެވެ.

މި ދިރާސާގައި ބައިވެރިވުމާއި ނުވުމުގެ ފުރިހަމަ އިޚްތިޔާރު ތިބޭފުޅާއަށް ލިބިގެންވެއެވެ. އަދި ދިރާސާގައި ބައިވެރިވާ އެއްވެސް ފަރާތަކަށް ގެއްލުންވާފަދަ އެއްވެސްކަމެއް މި ދިރާސާގައި ހިމެނިފައި ނުވާނެއެވެ. ދިރާސާގައި ބައިވެރިވުމަށްފަހު އެއްވެސް ހިސާބަކުން ދިރާސާއިން ވަކިވުން ބޭނުންވާނަމަ އެފަރާތަކުން ދިރާސާއިން ވަކިވުމުގެ އިޚްތިޔާރު ލިބިގެންވާނެއެވެ. ދިރާސާގައި ބައިވެރިވާ ފަރާތްތަކުން މި ދިރާސާއަށް ފޯރުކޮށްދޭ މައުލޫމާތުތަކަކީ ސިއްރު ހިފެހެއްޓޭނެ މައުލޫމާތު ތަކެކެވެ. އަދި އެ މައުލޫމާތުތައް ބޭނުންކުރާނީ ތައުލީމީ ކަންކަމުގައި އެކަނިއެވެ. ނަމަވެސް މި ދިރާސާގައި ހުށަހަޅާ މައުލޫމާތުތަކީ ތިބޭފުޅާގެ އަމިއްލަ މައުލޫމާތުކަން އެނގޭނެ ގޮތަކަށް އެއްވެސް މައުލޫމާތެއް ނުހިމަނާނަމެވެ. އަދި މި ދިރާސާއަށް ނަގާ މައުލޫމާތު އެއްވެސް [illegible] އެހެން އެއްވެސް ފަރާތަކާ ހިއްސާކުރެވޭނެ މައުލޫމާތުތަކެއްނޫނެވެ. މި [illegible] އިންޓަވިއުގައި [illegible] [illegible] [illegible] އަޅުގަނޑުގެ މި ދިރާސާ ފުރިހަމަކުރުމަށް ވަގުތުން ވަރަށްވެސް ބޮޑު ޝުކުރިއްޔާއެވެ.

ބައިވެރިންގެ ނިންމުން

އަޅުގަނޑު، މަތީގައިވާ ހުރިހާ އިރުޝާދުތައް ރަނގަޅަށް ކިޔައި، މި ދިރާސާގެ މަޤްސަދު ވަރަށް ރަނގަޅަށް އެނގިހުރެ މި ދިރާސާގައި ބައިވެރިވުމަށް އެއްބަސްވަމެވެ. މި ދިރާސާގައި ބައިވެރިވުމާއި ނުވުން އޮތީ އަޅުގަނޑުގެ އަމިއްލަ އިޚްތިޔާރުގައި ކަމާއި، މި ދިރާސާއިން ވަކިވާން ބޭނުންވެއްޖެ ހާލަތެއްގައި މި ދިރާސާއިން ވަކިވެވޭނެކަން އަޅުގަނޑަށް އެނގޭތީއެވެ. އަދި މި ދިރާސާއަށް އަޅުގަނޑު ފޯރުކޮށްދޭ މައުލޫމާތު ސިއްރު ހިފެހެއްޓޭނެ މައުލޫމާތުކަން ކަށަވަރު ކުރައްވާފައިވާތީ. އެއްބަސްވުމާއެކު މި ފޯމުގައި ސޮއިކުރަމެވެ.

ބައިވެރިވާ ފަރާތުގެ ކާޑު ނަންބަރު .... ސޮއި .... ތާރީޚް ....

Appendix 4: questionnaire (Dhivehi version)

ދ.ކުޑަހުވަދޫގެ ބޮޑެތިމީހުންގެ ތެރޭގައި ބަރުދަން ހުންނަންވާ މިންގަނޑުން މައްޗަށް ގޮސްފައިވާ މިންވަރާއި އަދި އެކަމާއިގުޅޭ އެހެނިހެން ކަންކަން ބެލުމަށް ކުރާ ސުވާލު ފޯމު

އުމުރު: ބައިވެރިޔާގެ ކޯޑު:

ޖިންސު: އިންޓަވިއު ކުރި ތާރީޚް:

ފުރަތަމަ ބައި: ބައިވެރިންގެ އިޖްތިމާޢީ އަދި އާންމު މައުލޫމާތު

1. ކައިވެނީގެ ހާލަތު

☐އަދި ނުއިނދެ ☐އިނދެގެން ☐ވަރިވެފައި ☐ހުވަފަތްވެފައި

2. އެންމެ މަތީ ތައުލީމީ ފެންވަރު

☐އަސާސީ ތައުލީމު ☐ފުރާ މަދަރުސީ ☐ސާނަވީ ☐މަތީ ސާނަވީ

☐ސެޓުފިކެޓް ލެވެލް

☐ޑިޕްލޮމާ ލެވެލް ☐ޑިގްރީ ލެވެލް ☐ މާސްޓަރސް ނުވަތަ އެއަށްވުރެ މަތީ ސަނަދެއް

3. އާމްދަނީ ހޯދުމަށް ވަޒީފާ އަދާކުރަންވަންތޯ؟ (ވަޒީފާ އަދާކުރާނަމަ އެވްރެޖްކޮށް ލިބޭވަރު)

☐އާއެކޭ، ....ރ. ☐ނޫނެކޭ

4. އަންނަނިވި ކަންކަމަށް މަހެއްގެ އާންމުކޮށް ދިރިއުޅުމަށް ހަރަދުވަނީ ކިހާވަރެއް؟

- ކާން ބޯން .... ރ.
- ތައުލީމު .... ރ.
- ކަރަންޓު ބިލް .... ރ
- ކުއްޔާއި [illegible] .... ރ
- އަންނައުނާއި އެހެނިހެން ހަރަދު .... ރ.

5. އަންނަނިވި ތަކެތި ގެންގުޅެނީތޯ؟

☐ބީޑި ☐ފުރިޖް ☐މޯބައިލް ފޯނު ☐އަވަން ☐ސައިކަލް ☐ކޮންޕިޔުޓަރ

ދެވަނަ ބައި: ޖިސްމާނީގޮތުން ހެލިފެލިވެ އުޅޭ މިންވަރު

ދެން މަޢުލޫމާތު ހޯދުން ބޭނުންވަނީ ހަފްތާއެއްގެ ތެރޭގައި ތިޔަބޭފުޅާ ކުރާ މަސައްކަތްތަކާއި ރޫވިޔައި ހުންނަގޮތާއި ވަގުތުތަކެވެ. ތިބާ އަދި ޖިސްމާނީގޮތުން އެހާ ހެލިފެލިވެ އުޅޭ ބޭފުޅެއްކަމުގައި ނުވިޔަސް އަންނަނިވި ސުވާލުތަކަށް ޖަވާބުދެއްވުން އެދެމެވެ.

އަންނަނިވި ސުވާލުތަކަށް ޖަވާބުދެއްވުމުގައި: "ގަދަބާރުން ކުރާ މަސައްކަތްތައް" ބޭނުންކުރަނީ ޖިސްމާނީގޮތުން އުނދަގޫ މަސައްކަތްތަކުގެ ސަބަބުން ނޭވާލުމާއި ހިތުގެ ވިންދު ޖެހުން އަވަސްކުރުވާ ކަންކަމެވެ. "މެދުމިނުގައި ކުރާ މަސައްކަތްތައް" ބޭނުންކުރަނީ ޖިސްމާނީގޮތުން އުނދަގޫ ނޫން މަސައްކަތްތަކުގެ ސަބަބުން ނޭވާލުމާއި ހިތުގެ ވިންދު ޖެހުން މެދުމިނުގައި ހުންނަ ކަންކަމެވެ.

6. ކުރާ މަސައްކަތްތަކުގައި މަދުވެގެން 10 މިނެޓް ހުއްޓުމެއްނެތި "ގަދަބާރުން ކުރާ މަސައްކަތްތައް" ހިމެނޭތޯ؟
(ބަރު އެއްޗެހި އުފުލުން، ކޮށުން، އިމާރާތް ކުރުން، ދުވުން، ފުއްމުން، ގޯތިތެރޭގައި ކުރާ ބުރަ
މަސައްކަތް، ބަރު އެއްޗެހި އުފުލައިގެން ހިނގުން/ހުރުން) ؟ ☐އާއެކޭ ☐ނޫނެކޭ

7. ކުރާ މަސައްކަތްތަކުގައި މަދުވެގެން 10 މިނެޓް ހުއްޓުމެއްނެތި "މެދުމިނުގައި ކުރާ މަސައްކަތްތައް"
ހިމެނޭތޯ؟ (ލުއި އެއްޗެހި އުފުލުން، އެރޯބިކް ޑާންސް، ގޯތިތެރޭގެ ލުއި މަސައްކަތް، ފޮޅުން، އާންމުކޮށް
އަތާއި ފައި ބޭނުންކޮށް ކުޅޭ ކަހާލުން) ؟ ☐އާއެކޭ ☐ނޫނެކޭ

8. އާދައިގެ ހަފްތާއެއްގައި، "ގަދަބާރުން ކުރާ މަސައްކަތްތައް" ކުރަނީ ކިތައް ދުވަހުތޯ؟ .... ދުވަހު

9. އާދައިގެ ހަފްތާއެއްގައި، "މެދުމިނުގައި ކުރާ މަސައްކަތްތައް" ކުރަނީ ކިތައް ދުވަހުތޯ؟ ....ދުވަހު

10. އާދައިގެ ދުވަހެއްގައި، ދަތުރުފަތުރު ކުރުމުގެގޮތުން ހިނގުމުގައި ނުވަތަ ބައިސްކަލު ދުއްވުމުގައި
ހޭދަވޭތޯ؟ އެހެންނަމަ ކިހާވަރެއް ހޭދަކުރަނީތޯ؟ ☐އާއެކޭ، .... ގަޑިއިރު ☐ނޫނެކޭ

11. ތިޔަބޭފުޅާ އެއްވެސް ވަރަކަށް ކުޅިވަރު ކުޅެނީތޯ؟ ☐އާއެކޭ ☐ނޫނެކޭ

12. މަދުވެގެން 10 މިނެޓު ހުއްޓުމެއްނެތި "ގަދަބާރުން ކުރާ ކުޅިވަރުތަކެއް" ގެ ތެރޭގައި ކުޅިވަރާއި، ސިއްހީ ދުޅަހެޔޮ ކަސްރަތުކުރުން ހިމެނޭތޯ؟ (ދުވުމާއި އަދި އެރޯބިކްސް) ☐އާއެކޭ ☐ނޫނެކޭ

13. މަދުވެގެން 10 މިނެޓު ހުއްޓުމެއްނެތި "މެދުމިނުއްގައި ކުރާ ކުޅިވަރުތަކެއް" ގެ ތެރޭގައި ކުޅުމާއި، ސިއްހީ ދުޅަހެޔޮ ކަސްރަތުކުރުން ހިމެނޭތޯ؟ (ޔޮގާއި ބައިސްކަލް ދުއްވުމާއި އަދި އެހެނިހެން ކުޅިވަރުތަކުގަ)
☐އާއެކޭ ☐ނޫނެކޭ

***އަންނަނިވި ސުވާލު ބިނާވެގެންވަނީ، ގޭގައި އަދި މަސައްކަތުގައި އިށީނދުން/އަރާމުކުރުން، އެއްތަނުން އަނެއްތަނަށް ދިއުން/އައުން، ރަހުމަތްތެރިންނާއި އެކު ވަގުތު ހޭދަކުރުން، ޓީ.ވީ ބެލުން ފަދަ ކަންކަމަށް ހޭދަކުރާ ވަގުތުތަކަށެވެ. ނިދުމުގައި ހޭދަކުރާ ވަގުތުތަކަށް ނޫނެވެ.**

14. އިށީނދުމުގައި އާއި އަރާމުކުރުމުގައި، އާންމު ގޮތެއްގައި ދުވާލެއްގެ މައްޗަށް ކިހާވަގުތެއް ހޭދަކުރައްވަތޯ؟
.... ގަޑިއިރު

15. އާއިލާގައި އެއްވެސް ވަރަކަށް ފަރު މީހުން ތިބޭތޯ؟ ☐އާއެކޭ ☐ނޫނެކޭ

ތިންވަނަ ބައި: ކާއިންބުއިމުގެ ކަންކަން

16. ފާއިތުވިދިޔަ ހަފްތާގެ ތެރޭގައި އަންނަނިވި ކާނާ ފަރިއްކޮޅު ކިތައްފަހަރުތޯ؟ (އެކަށީގެންވާ ގޮޅީގައި ރަނގަޅު ފާހަގަ ޖައްސަވާ)

ބާވަތް	އެއް ފަހަރު	ދެ ފަހަރު	ތިން ފަހަރު	ހަތަރު ފަހަރު	ފަސް ފަހަރު	ކޮންމެ ދުވަހަކު	ނުކަން
ހުދު ބަތް							
ޕާސްޓާ							
ބްރައުން ޕާން							

އާދައިގެ ޕާން							
ރޮށި							
ކިރު							
ކިރު (ފެޓް މަދު)							
ޔޮގަޓް							
އައިސް ކްރީމް							
ޗީޒް							
މާޖިރީން							
އެއްގަމު މަސް							
ސޮސެޖް							
ކުކުޅު							
ކަނޑު މަސް							
ބިސް							
ކާށި							
ކެބެޖް							
ކެރެޓް							
ޓޮމާޓޯ							
ކިއުކަންބާ							
ބީންސް							
ބަރުކާރީ ފަޅޯ							
އާފަލު							
ދޮންކެޔޮ							
ޖުމްހޫރީ ދޭވާ							
އަނބު							
ހަކުރު							
ކޭކު							
ބިސްކޯދު							

ސޯޑާ ބުއިންތައް							
ޖޫސް							
ޖޭމު							

17. ގޭގައި ކެއްކުމުގައި ބޭނުންކުރަނީ ކޮންބާވަތެއްގެ ތެލެއް؟ (ބްރޭންޑް ނަމާ އެކު)

☐ވެޖިޓަބަލް އޮއިލް...................................   ☐އެނިމަލް ފެޓް ....

☐ވެޖިޓަބަލް ފެޓް...................................   ☐ގީ ....

18. ގޭގައި ބޭނުންކުރަނީ ކޮންބާވަތެއްގެ ކިރެއް؟ (ބްރޭންޑް ނަމާއި އަދި ފެޓްގެ މިންވަރާ އެކު)

☐ޕެކެޓް ކިރު......................   ހިކި ކިރު......................   ☐ އެހެނިހެން..........................

19. ފާއިތުވިދިޔަ ތިން މަސްދުވަހުގެ ތެރޭގައި ތިބާގެ ކުއްޖުގެ ނާސްތާ ކުރިއަށް ދިޔައީ ކިހިނެއްތޯ؟

(އެކަށީގެންވާ ގޮޅިގައި ރަނގަޅު ފާހަގަ ޖައްސަވާ)

ނާސްތާ	އާންމުކޮށް	ބަޔެއް ފަހަރު	މަދުމަދުން
ހެނދުނު			
ނުވަގަޑި			
މެންދުރު			
ހަވީރު			
ރޭގަނޑު			
ދަންވަރު			

20. ބޭރުން [illegible] އާންމުގޮތެއްގައި ދުވާލަކު ކިތައްފަހަރު؟

☐އެކެއް   ☐ދޭއް   ☐ތިނެއް   ☐ހަތަރަކަށްވުރެ ގިނަ   ☐ނުކަން

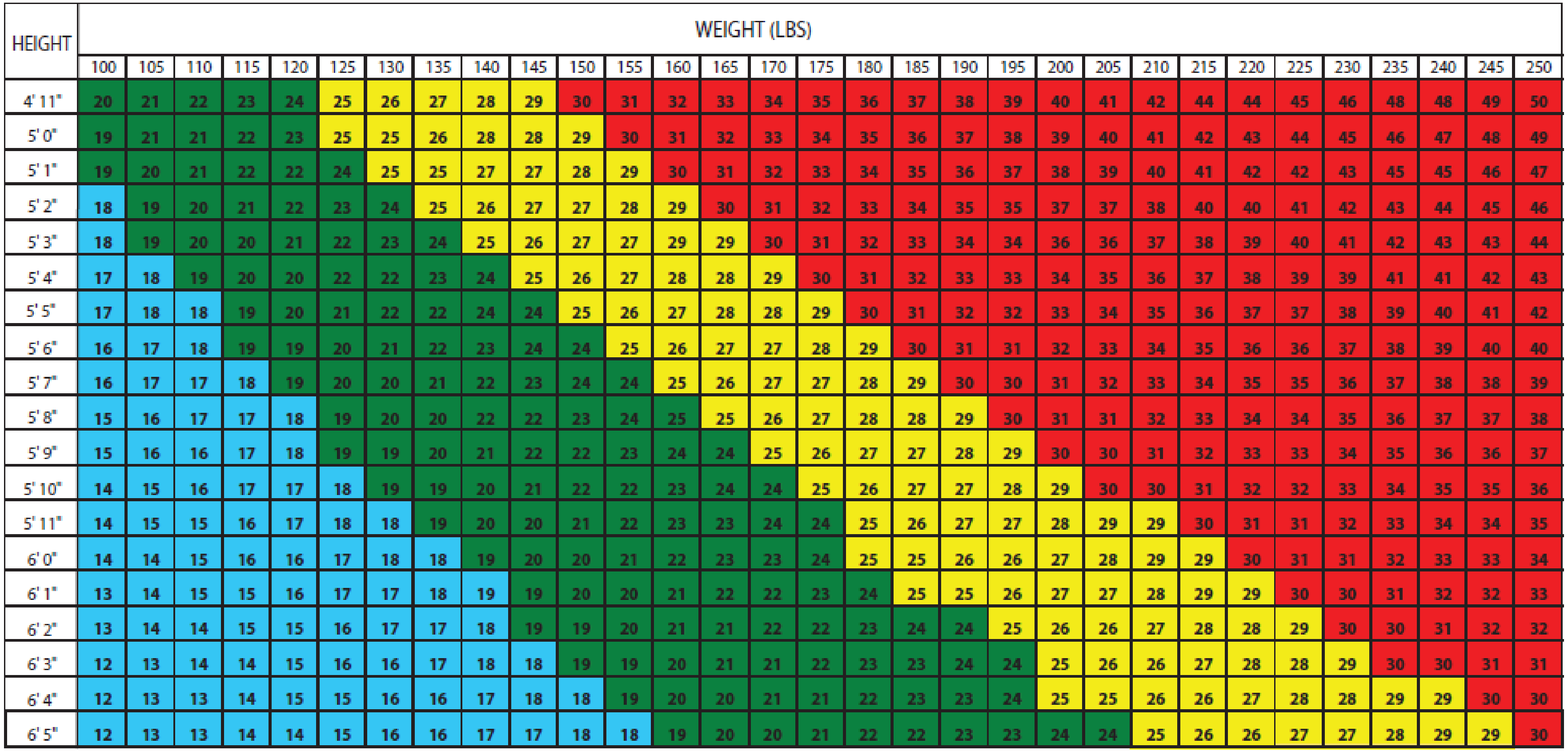
އެންތުރޮޕޮމެޓްރީ (ހަމައެކަނި ސާވޭކުރާ ފަރާތުން ފުރުމަށް)

ސައްޙަ މިންގަނޑު

މިން	ނަތީޖާ
ބަރުދަން (ކިލޯ ގްރާމް)	
އިސްކޮޅު (ސެންޓިމީޓަރ)	
ބީ.އެމް.އައި	
ހަށިގަނޑުގެ ފެޓް މިންވަރު (%)	
އުނަގަނޑުގެ ވަށައިން (ސެންޓިމީޓަރ)	

ތިޔަ ދެއްވި އެއްބާރުލުމަށްޓަކައި ޝުކުރިއްޔާ

Appendix 5: Body Mass Index (BMI)

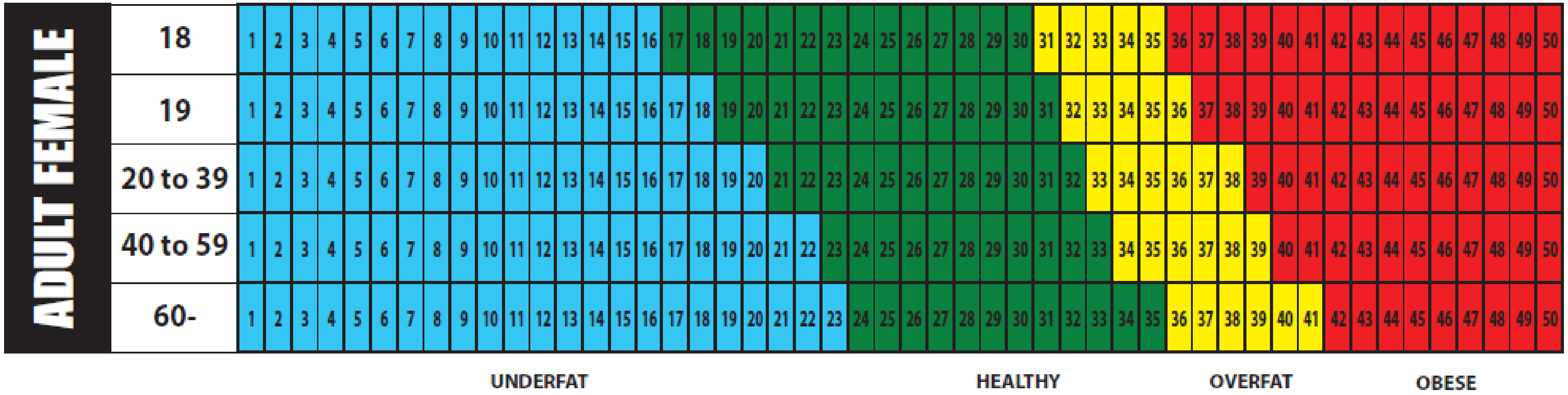


HEIGHT	WEIGHT (LBS)																														
	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250
4' 11"	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	44	44	45	46	48	48	49	50
5' 0"	19	21	21	22	23	25	25	26	28	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
5' 1"	19	20	21	22	22	24	25	25	27	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	42	43	45	45	46	47
5' 2"	18	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	33	34	35	35	37	37	38	40	40	41	42	43	44	45	46
5' 3"	18	19	20	20	21	22	23	24	25	26	27	27	29	29	30	31	32	33	34	34	36	36	37	38	39	40	41	42	43	43	44
5' 4"	17	18	19	20	20	22	22	23	24	25	26	27	28	28	29	30	31	32	33	33	34	35	36	37	38	39	39	41	41	42	43
5' 5"	17	18	18	19	20	21	22	22	24	24	25	26	27	28	28	29	30	31	32	32	33	34	35	36	37	37	38	39	40	41	42
5' 6"	16	17	18	19	19	20	21	22	23	24	24	25	26	27	27	28	29	30	31	31	32	33	34	35	36	36	37	38	39	40	40
5' 7"	16	17	17	18	19	20	20	21	22	23	24	24	25	26	27	27	28	29	30	30	31	32	33	34	35	35	36	37	38	38	39
5' 8"	15	16	17	17	18	19	20	20	22	22	23	24	25	25	26	27	28	28	29	30	31	31	32	33	34	34	35	36	37	37	38
5' 9"	15	16	16	17	18	19	19	20	21	22	22	23	24	24	25	26	27	27	28	29	30	30	31	32	33	33	34	35	36	36	37
5' 10"	14	15	16	17	17	18	19	19	20	21	22	22	23	24	24	25	26	27	27	28	29	30	30	31	32	32	33	34	35	35	36
5' 11"	14	15	15	16	17	18	18	19	20	20	21	22	23	23	24	24	25	26	27	27	28	29	29	30	31	31	32	33	34	34	35
6' 0"	14	14	15	16	16	17	18	18	19	20	20	21	22	23	23	24	25	25	26	26	27	28	29	29	30	31	31	32	33	33	34
6' 1"	13	14	15	15	16	17	17	18	19	19	20	20	21	22	22	23	24	25	25	26	27	27	28	29	29	30	30	31	32	32	33
6' 2"	13	14	14	15	15	16	17	17	18	19	19	20	21	21	22	22	23	24	24	25	26	26	27	28	28	29	30	30	31	32	32
6' 3"	12	13	14	14	15	16	16	17	18	18	19	19	20	21	21	22	23	23	24	24	25	26	26	27	28	28	29	30	30	31	31
6' 4"	12	13	13	14	15	15	16	16	17	18	18	19	20	20	21	21	22	23	23	24	25	25	26	26	27	28	28	29	29	30	30
6' 5"	12	13	13	14	14	15	16	16	17	17	18	18	19	20	20	21	22	22	23	23	24	24	25	26	26	27	27	28	29	29	30

UNDERWEIGHT **NORMAL** **OVERWEIGHT** **OBESE**

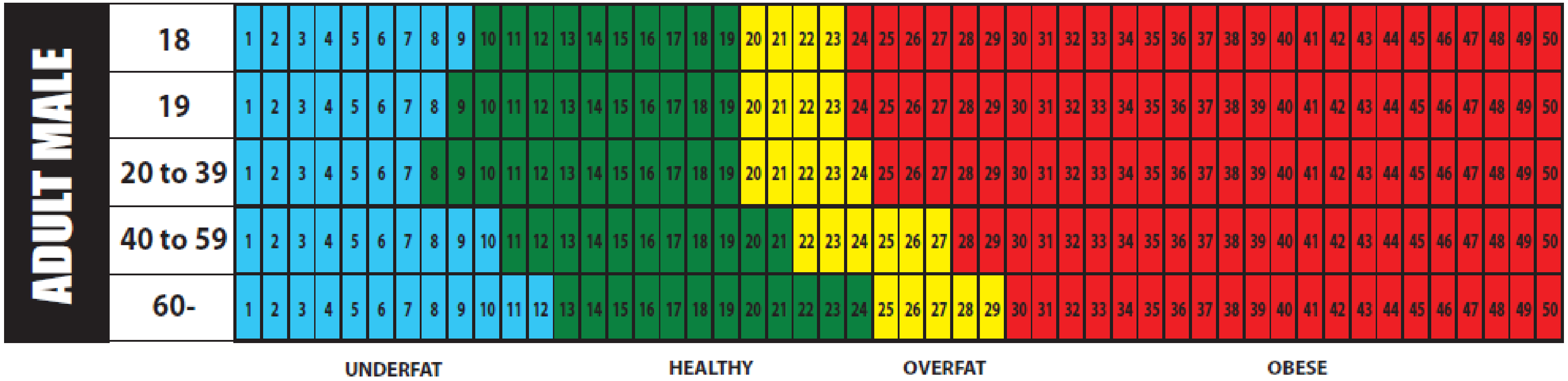
Report of a WHO consultation on Obesity Geneva, 3-5 June 1997 Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004

Appendix 6: Body fat ranges for standard adults



ADULT FEMALE																																																		
18	🟦 1	🟦 2	🟦 3	🟦 4	🟦 5	🟦 6	🟦 7	🟦 8	🟦 9	🟦 10	🟦 11	🟦 12	🟦 13	🟦 14	🟦 15	🟦 16	🟩 17	🟩 18	🟩 19	🟩 20	🟩 21	🟩 22	🟩 23	🟩 24	🟩 25	🟩 26	🟩 27	🟩 28	🟩 29	🟩 30	🟨 31	🟨 32	🟨 33	🟨 34	🟨 35	🟥 36	🟥 37	🟥 38	🟥 39	🟥 40	🟥 41	🟥 42	🟥 43	🟥 44	🟥 45	🟥 46	🟥 47	🟥 48	🟥 49	🟥 50
19	🟦 1	🟦 2	🟦 3	🟦 4	🟦 5	🟦 6	🟦 7	🟦 8	🟦 9	🟦 10	🟦 11	🟦 12	🟦 13	🟦 14	🟦 15	🟦 16	🟦 17	🟦 18	🟩 19	🟩 20	🟩 21	🟩 22	🟩 23	🟩 24	🟩 25	🟩 26	🟩 27	🟩 28	🟩 29	🟩 30	🟩 31	🟨 32	🟨 33	🟨 34	🟨 35	🟨 36	🟥 37	🟥 38	🟥 39	🟥 40	🟥 41	🟥 42	🟥 43	🟥 44	🟥 45	🟥 46	🟥 47	🟥 48	🟥 49	🟥 50
20 to 39	🟦 1	🟦 2	🟦 3	🟦 4	🟦 5	🟦 6	🟦 7	🟦 8	🟦 9	🟦 10	🟦 11	🟦 12	🟦 13	🟦 14	🟦 15	🟦 16	🟦 17	🟦 18	🟦 19	🟦 20	🟩 21	🟩 22	🟩 23	🟩 24	🟩 25	🟩 26	🟩 27	🟩 28	🟩 29	🟩 30	🟩 31	🟩 32	🟨 33	🟨 34	🟨 35	🟨 36	🟨 37	🟨 38	🟥 39	🟥 40	🟥 41	🟥 42	🟥 43	🟥 44	🟥 45	🟥 46	🟥 47	🟥 48	🟥 49	🟥 50
40 to 59	🟦 1	🟦 2	🟦 3	🟦 4	🟦 5	🟦 6	🟦 7	🟦 8	🟦 9	🟦 10	🟦 11	🟦 12	🟦 13	🟦 14	🟦 15	🟦 16	🟦 17	🟦 18	🟦 19	🟦 20	🟦 21	🟦 22	🟩 23	🟩 24	🟩 25	🟩 26	🟩 27	🟩 28	🟩 29	🟩 30	🟩 31	🟩 32	🟩 33	🟨 34	🟨 35	🟨 36	🟨 37	🟨 38	🟨 39	🟥 40	🟥 41	🟥 42	🟥 43	🟥 44	🟥 45	🟥 46	🟥 47	🟥 48	🟥 49	🟥 50
60-	🟦 1	🟦 2	🟦 3	🟦 4	🟦 5	🟦 6	🟦 7	🟦 8	🟦 9	🟦 10	🟦 11	🟦 12	🟦 13	🟦 14	🟦 15	🟦 16	🟦 17	🟦 18	🟦 19	🟦 20	🟦 21	🟦 22	🟦 23	🟩 24	🟩 25	🟩 26	🟩 27	🟩 28	🟩 29	🟩 30	🟩 31	🟩 32	🟩 33	🟩 34	🟩 35	🟨 36	🟨 37	🟨 38	🟨 39	🟨 40	🟨 41	🟥 42	🟥 43	🟥 44	🟥 45	🟥 46	🟥 47	🟥 48	🟥 49	🟥 50

UNDERFAT 🟦 HEALTHY 🟩 OVERFAT 🟨 OBESE 🟥



ADULT MALE																																																		
18	🟦 1	🟦 2	🟦 3	🟦 4	🟦 5	🟦 6	🟦 7	🟦 8	🟦 9	🟩 10	🟩 11	🟩 12	🟩 13	🟩 14	🟩 15	🟩 16	🟩 17	🟩 18	🟩 19	🟨 20	🟨 21	🟨 22	🟨 23	🟥 24	🟥 25	🟥 26	🟥 27	🟥 28	🟥 29	🟥 30	🟥 31	🟥 32	🟥 33	🟥 34	🟥 35	🟥 36	🟥 37	🟥 38	🟥 39	🟥 40	🟥 41	🟥 42	🟥 43	🟥 44	🟥 45	🟥 46	🟥 47	🟥 48	🟥 49	🟥 50
19	🟦 1	🟦 2	🟦 3	🟦 4	🟦 5	🟦 6	🟦 7	🟦 8	🟩 9	🟩 10	🟩 11	🟩 12	🟩 13	🟩 14	🟩 15	🟩 16	🟩 17	🟩 18	🟩 19	🟨 20	🟨 21	🟨 22	🟨 23	🟥 24	🟥 25	🟥 26	🟥 27	🟥 28	🟥 29	🟥 30	🟥 31	🟥 32	🟥 33	🟥 34	🟥 35	🟥 36	🟥 37	🟥 38	🟥 39	🟥 40	🟥 41	🟥 42	🟥 43	🟥 44	🟥 45	🟥 46	🟥 47	🟥 48	🟥 49	🟥 50
20 to 39	🟦 1	🟦 2	🟦 3	🟦 4	🟦 5	🟦 6	🟦 7	🟩 8	🟩 9	🟩 10	🟩 11	🟩 12	🟩 13	🟩 14	🟩 15	🟩 16	🟩 17	🟩 18	🟩 19	🟨 20	🟨 21	🟨 22	🟨 23	🟨 24	🟥 25	🟥 26	🟥 27	🟥 28	🟥 29	🟥 30	🟥 31	🟥 32	🟥 33	🟥 34	🟥 35	🟥 36	🟥 37	🟥 38	🟥 39	🟥 40	🟥 41	🟥 42	🟥 43	🟥 44	🟥 45	🟥 46	🟥 47	🟥 48	🟥 49	🟥 50
40 to 59	🟦 1	🟦 2	🟦 3	🟦 4	🟦 5	🟦 6	🟦 7	🟦 8	🟦 9	🟦 10	🟩 11	🟩 12	🟩 13	🟩 14	🟩 15	🟩 16	🟩 17	🟩 18	🟩 19	🟩 20	🟩 21	🟨 22	🟨 23	🟨 24	🟨 25	🟨 26	🟨 27	🟥 28	🟥 29	🟥 30	🟥 31	🟥 32	🟥 33	🟥 34	🟥 35	🟥 36	🟥 37	🟥 38	🟥 39	🟥 40	🟥 41	🟥 42	🟥 43	🟥 44	🟥 45	🟥 46	🟥 47	🟥 48	🟥 49	🟥 50
60-	🟦 1	🟦 2	🟦 3	🟦 4	🟦 5	🟦 6	🟦 7	🟦 8	🟦 9	🟦 10	🟦 11	🟦 12	🟩 13	🟩 14	🟩 15	🟩 16	🟩 17	🟩 18	🟩 19	🟩 20	🟩 21	🟩 22	🟩 23	🟩 24	🟨 25	🟨 26	🟨 27	🟨 28	🟨 29	🟥 30	🟥 31	🟥 32	🟥 33	🟥 34	🟥 35	🟥 36	🟥 37	🟥 38	🟥 39	🟥 40	🟥 41	🟥 42	🟥 43	🟥 44	🟥 45	🟥 46	🟥 47	🟥 48	🟥 49	🟥 50

UNDERFAT 🟦 HEALTHY 🟩 OVERFAT 🟨 OBESE 🟥

Source: American Council on Exercise