# DETERMINANTS OF OBESITY AMONG RURAL MEN AGED 18 YEARS AND ABOVE:

# A CASE OF BAGAMOYO DISTRICT HOSPITAL

# DETERMINANTS OF OBESITY AMONG RURAL MEN AGED 18 YEARS AND ABOVE:

# A CASE OF BAGAMOYO DISTRICT HOSPITAL

**By**

**Pendo Eva Lugendo**

**A Dissertation to be submitted in the partial fulfillment of the requirements for an award of Master of Health System Management (MHSM) at Mzumbe University**

**2015**

## CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a Dissertation entitled **Determinants of Obesity among rural men aged 18 years and above: A case of Bagamoyo District Hospital**, in Partial fulfillment of the requirement for award of the degree of Master of Health Systems Management of Mzumbe University

Signature

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Internal Examiner

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## DECLARATION

I, Pendo Eva Lugendo, declare that this is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

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## DEDICATION

This work dedicated to my loved parents Mr. and Mrs. Laureanus Lugendo. To my relatives' Edgar Ndayishimie Lugendo and Crispine Niyonkuru. Lugendo, my sister Vaileth Niyofashe Lugendo. I really appreciate them for their footprint in my entire life as they worked hard to build my personality and ability to be as I am; May the almighty God bless them!

## LIST OF ABREVIATIONS

| | |
|---|---|
| BMI | Body Mass Index |
| CHD | Coronary Heart Disease |
| CVD | Cardiovascular Disease |
| CTC | Care and Treatment Centre |
| HIV/AIDS | Human Immunodeficiency Virus Acquired Immune Deficiency syndrome |
| IEC | Information, Education and Communication |
| FBO | Fixed Base Operator |
| MHSM | Master of Health System Management |
| *MS Excel* | *Microsoft Excel* |
| NIDDM | Non Insulin Dependent Diabetes Mellitus |
| OECD | Organization for Economic Cooperation and Development |
| UN | United Nations |
| UNICEF | United Nations International Children's Emergency Fund |
| WFP | World Food Programme |
| WHO | World Health Organization |

## ABSTRACT

***Introduction****: In Tanzania, obesity is regarded as a town problem; but currently the problem is facing the rural community as well. However, the magnitude and determinants of this problem in rural areas are not well known. This study aimed to explore determinants of obesity among rural men aged 18 years and above in Bagamoyo district.*

***Methodology:*** *A cross sectional study design was employed; data were collected from selected health facilities in Bagamoyo district. A Hundred and twenty men patients aged 18 years and above who visited health facilities during the study period were recruited. A semi-structured questionnaire was used to collect primary data. Secondary data were obtained from reviewing patient's registers and files from CTC and Diabetes clinics in Bagamoyo district hospital. Data were entered and analyzed using Microsoft Excel applications.*

***Results****: The findings showed that 41.5% and 31.7% of the obese men were of the age group 40 or above and between 29-39 years respectively. Majority of the obese men were married and cohabiting by 37% and 27% respectively. Over 70% of the obese men earned a monthly incomes ranging from TZS 201,000/= to TZS 300,000/=. Furthermore, 56% of the obese men reported to eat 3 times a day and 24% more than 3 times a day eat starch food like ugali and beans, rice and beans in as lunch and dinner while during morning they eat fried doughnuts or cassava. Beer and soda were highly preferred by obese men by 43.9% and 35% respectively while 34% had drinking habit after working hours. More than 70% of the obese men did not participate in physical activities, 56% reported that they did not have recreational places and 65.9% did not engage in any recreation clubs. In addition, the findings from CTC and Diabetes clinics revealed that overweight and obesity is an indicative of being at risk of co-morbidities.*

***Recommendations****: This study strongly recommends that education should be given on how to prevent and control obesity, for example education on eating balanced diet as well education on physical activities.*

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# CHAPTER ONE

# INTRODUCTION AND BACKGROUND

## 1.1 Introduction

This chapter presents the historical background of the problem, statement of the problem, study objectives and research questions, significance of the study, limitations of the study and lastly definition of key terms relevant to this study.

As the world has undergone development also human being have adopted changes in their life as the way of living in socialization, economic, politically, culturally as for their daily life, which might lead them to obese. Obesity is a term used to describe body weight that is much greater than what considered healthy. There are many ways to determine if a person is obese, but experts believe that a person's body mass index (BMI) is the most accurate measurement of body fat for children and adults. Therefore, Obesity is the accumulation of body total fat. It clinically defined as having a body mass index, which calculated by dividing weight (kilograms) by height (in meters) squared, is commonly used to categorize people in terms of appropriateness of weight (WHO, 2000).

Obesity has become a greater challenge in the global public health. Previously the problem was more prevalent in developed countries but nowadays the problem rapidly distributed all over the world including developing countries like Tanzania. Obesity also regarded as the town problem; but currently the problem is facing the rural community as well. Obesity is significantly been acknowledged as a contributing factor in the development of various chronic diseases such as cardiovascular disease, hypertension, type 2 diabetes mellitus, stroke, osteoarthritis and certain cancers (Asfaw, 2006). As a risk factor for non-communicable diseases, obesity has become a global public health concern with more than one billion adults estimated to be overweight and over 400 million of them obese. Often coexisting in developing countries with under-nutrition, obesity is a complex condition, with serious social and psychological dimensions, affecting virtually all ages and socioeconomic groups (WHO, 2005).

There is an increase of number of people having obesity in rural areas. Although it used to be regarded as a disease of industrialized countries, obesity commonly defined as a body mass index (BMI); if greater or equal to 30 kg/m2 is assumed as an epidemic dimension globally. Then from being potentially modifiable cardiovascular disease (CVD) risk factors on its own, there are only very small amounts of disease that can cause a person to gain the amount of weight they have but for the most part, it caused by bad diet, lack of exercise, and overall poor choice of lifestyle. Symptoms that are commonly associated with obesity are diabetes mellitus II, hypertension, several cancer, high total cholesterol (Dyslipdemia) ischemia, digestive problem, stroke, edema, heart attack, and sleep apnea, respiratory problem, and metabolic syndrome among others (WHO, 2000).Tanzania, being a sub-Saharan African country, shares a similar problem.

Globalization phenomenon has resulted in considerable changes of social economic, human behaviour and environmental aspects that accelerates the change of life style and eating habit of people. In general; obesity has emerged as a world-wide phenomenon affecting wealthy and middle income groups, as well as residents of countries previously considered to be poor (Barry, 1998). A combination of biological, environmental, dietary and lifestyle, household and demographic factors seem to determine excess weight status across all stages of life (Gupta and Kapoor, 2012). Men in rural areas live within a different cultural setting than men living in major cities. For rural men, talking about health not considered a normal, pastime, visiting health professionals may be seen as a last resort. Moreover, being overweight or a big bloke is seen as a sign of strength, rather than a sign of poor health (Minnesota Department of Health, 2005). In addition, education strategies for health professionals working with men in rural areas need to recognize the impact of such attitudes and beliefs on help seeking behaviors, particularly for more sensitive issues.

This study therefore, assessed the determinants of obesity among rural men aged 18 years and above a case of Bagamoyo district.

This dissertation has six chapters; the introduction part, statement of the problem, conceptual framework, research questions and objectives of the study is presented in chapter one. Literature review of the study is presented is chapter two followed by methodology of the study in chapter three.

Key research findings are summarized in chapter four followed by discussion of the major findings in chapter five. Conclusion and lastly recommendations basing on the major findings of this study presented in chapter six.

## 1.2 Statement of the Problem

Despite such attempts to address the problem of obesity; in Tanzania, efforts are mainly directed to urban areas. Obesity is a global epidemic that affects every socio-economic class in both rural and urban areas. Tanzania, men aged 18 years and above are facing the problem of obesity. However, little is available in the literature on the status of the problem in these areas. Globalization phenomenon has resulted in considerable changes of social economic, human behavior and environmental aspects, which accelerates the change of life style and eating habit of people. In general; obesity has emerged as a world-wide phenomenon affecting wealthy and middle income groups, as well as residents of countries previously considered to be poor (Barry, 1998).

In 2005, the World Health Organization estimated the number of overweight adults (age 15+) to be approximately 1.6 billion, with projections for 2015 increasing this figure to 2.3 billion (WHO, 2005). Obesity is increasing at an alarming rate both in developed and developing countries, and the problem appears to be increasing at a remarkable rate in children as well as in adults. Obesity may be relatively uncommon in African and Asian countries but is prevalent in urban than rural populations and is steadily rising in developing countries. There is critical need for awareness creation of obesity as a public health problem in both urban and rural areas in Tanzania; however, the magnitude of this problem in rural areas is not well known. Thus, this study provides a great opportunity to explore the determinants of obesity in order to highlight the causes, effects and potential mitigation measures of the syndrome with particular interest on the status of the condition among rural men in Bagamoyo District.

## 1.3 Objectives of the Study

### 1.3.1 General Objective

The general objective of the study was to explore the determinants of obesity among rural men aged 18 years and above in Bagamoyo district.

### 1.3.2 Specific Objectives

Specifically the study aimed to:

1. To evaluate demographic factors that lead to obesity.
2. To examine physical activities as determinant of obesity
3. To asses eating behavior as a determinant of obesity

## 1.4 Research Questions

This study had the following research questions

1. What are the demographic factors, which determine obesity among rural men?
2. What are the eating behaviors that determine obesity among rural men?
3. What are the physical activities, which determine obesity?

## 1.5 Significance of the Study

The study was conducted with the aim of finding out the key determinants of obesity among rural men aged 18 years and above in Bagamoyo district. The findings of this study would to enable to provide valuable recommendations and appropriate framework for obesity prevention and control in Bagamoyo district in particularly Tanzania in general. In additional; the findings generated with this study will assist to:

Generate the information considered necessary to provide the basis for Policy Makers, Scholars and other stakeholders dealing with interventions concerning obesity prevention and control.

Inform Management Team on appropriate and effective design Information, Education and Communication (IEC) intervention for awareness creation about obesity prevention and control.

## 1.6 Definition and Operations of Key Terms

**Obesity:** In clinical practice, body fat is commonly, simply estimated by using a formula that combines weight and height. The underlying assumption is that most variation in

weight for persons of the same height is due to fat mass, and the formula most frequently used in epidemiological studies is body-mass index (BMI) (WHO, 1997).

**BMI:** (Body Mass Index) is a statistical measurement derived from your height and weight. Although it considered a useful way to estimate healthy body weight, it does not measure the percentage of body fat. The BMI measurement can sometimes be misleading a muscleman may have a high BMI but have much less fat than an unfit person whose BMI is lower. However, in general, the BMI measurement can be a useful indicator for the average person (WHO, 1997).

**Rural:** based on geographic units those sometimes combined with population or provider characteristics. Rural definitions can result in different outcomes from those intended when target areas and populations have not have been carefully specified, data used to conceptualize the rural definition are unavailable, or consequences of applying the chosen rural definition are not fully considered (Miller et al.,2004).

**Food:** means substance whether in liquid, concentrated, solid , frozen or dried dehydrated form that are sold for ingestion or chewing by humans and are consumed for their test or nutritional test (WHO/WFP/UN/UNICEF, 2007).

**Nutrition:** is the intake of food, considered in relation to the body's dietary needs. Good nutrition an adequate, well balanced diet combined with regular physical activity is a cornerstone of good health. Poor nutrition can lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development, and reduced productivity (WHO/WFP/UN/UNICEF, 2007).

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

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter provides a literature review of obesity. It starts by giving the overview of the rural men obesity in general and further provides the views and discussions of different scholars on the concept of obesity by theoretical literature review, globally, Africa and Tanzania in particular. In addition, it provides in details the different aspects on the determinants of obesity and its consequences on health of the people. It also entails documentary review from Bagamoyo hospital.

## 2.2 Theoretical literature review

### 2.2.1 Behavioral Susceptibility Theory

Recent behavioral and psychometric studies demonstrate that appetitive characteristics such as responsiveness to internal satiety signals and external food cues not only differentiate obese and normal weight groups, but also are quantitatively associated with weight. The results indicate that sensitivity to internal and external appetitive signals are heritable phenotypes that increase the risk of overeating in obesogenic environment. A behavioral susceptibility model helps to explain how weight is both highly heritable and highly responsive to environmental characteristics (Carnell and Wardle, 2009). According to Webber et al., (2009), he argues that there was no systematic association with weight for emotional under eating. The results support the idea that approach related and avoidance related appetitive traits systematically related to adiposity and not exclusively associated with obesity. Early assessment of traits used as indicators of susceptibility to weight gain. Supporting the statement above as some people are obese as they have inherited from their parents and obese can be also due to eating behavior.

### 2.2.2 Schachter's Externality Theory of Obesity

In the late 1960s, the social psychologist Stanely Schachter proposed that obese people eat not because of hunger, stress or boredom but in response to external food cues that drive eating in the obese until those cues removed or consumed (Grossberg and Grant, 1976).

When external cues are absent, these obese are not motivated to eat, even if they are substantially food-deprived. This theory achieved widespread attention because it challenged long-standing ideas about the causes of obesity by means of several innovative and dramatic experiments. Schachter's research was correlation, showing that obesity is associated with externality.

He assumed that externality causes obesity. According to this theory, the eating behavior of normal weight individuals is primarily controlled by internal hunger cues; while that of the obese is more influenced by external stimuli such as the sight, smell and taste of food, talk about food. The obese should be less reactive than normal at low levels of stimulation and more reactive at high levels. This statement can be argues as hunger cannot be controlled as is involuntary also is not caused by seeing food is when you feel to eat.

### 2.2.3 Fat Cell Theory

Fat Cell Theory has been popular in medical fields for more than 30 years. The idea behind the theory is that each body programmed to have a basic set number of cells. Fat cell theory shows that during growth, fat cells increase in number. When energy intake exceeds expenditure, fat cells increase in size. When fat cells have reached their maximum size and energy intake continues to exceed energy expenditure, fat cells increase in number again. When fat decrease, the size of the fat cells shrinks; but not the number. The theory states that the creation of new fat cells is far easier than losing old ones, a fact that plays an important role in adult weight loss (Morrison and Benette, 2009).

Fat accretion in the body as it relates to obesity occurs in fat cells known as adipocytes. These cells originate either directly or indirectly from the embryonic mesenchyme tissue, but cannot identify as adipocytes until they begin to accumulate lipid. As an individual grows and develops, the size of the adipose tissue will affected by factors that modify cell division and the enlargement of the cells Bottom. Adults whether normal or obese, have a fixed number of adipocytes in the body. Obesity developing in adult life is associated only with the enlargement of fat cells (hypertrophic obesity).

Obesity developing in infancy or childhood is associated with an increase in cell number (hyper plastic obesity). Current infant feeding practices, particularly those involve high-energy intakes, stimulate fat cell hyperplasia.

Hyper plastic obesity is more resistant to weight reduction therapy than hypertrophic obesity, and the two types may have a different morbidity and mortality. The possible etiologies of obesity are numerous. The primary cause may be in adipose tissue or in other tissues that influence energy expenditure. While number and size of fat cells influence the quantity of adipose tissue, new information indicates that changes during maturity in these cellular parameters are also important to the success of weight reduction program (Bulfer and Allen, 1979). I can conclude with the theory that men advised not to take much fat food when they are eating, as fat cannot be digested easily, remain in the body, and hence cause obesity.

### 2.2.4 Ecological Theory

The ecological theory states that driving force for the increasing prevalence of obesity in populations is the increasingly obesogenic environment rather than any pathology in metabolic defects or genetic problems within individuals. Current strategies are not containing the obesity pandemic. A shift needed away from the traditional view of obesity as a personal disorder that requires treatment. An ecological approach regards obesity as a normal response to an abnormal environment rather than vice versa. Understanding, measuring and altering the obesogenic environment is important to reduce obesity. A paradigm shift to understanding obesity as normal physiology within a pathological environment signpost the directions for a wider public health approach to the obesity pandemic (Egger and Swinburn, 1997). Environmental policy and social changes are important contributors to the rapid rise in obesity over the past few decades and there has been substantial progress toward identifying environmental and policy factors related to eating and physical activity that can point toward solutions (Sallis and Glanz, 2009). There is relationship between childhood obesity and many obesogenic environment variables such as deprivation, urbanization, access to local amenities as well as dietary and physical activity behaviour (Procter et al., 2008). Men have to know obesity is depending on each other cannot stand alone, so they have to be aware with the urbanization, environment they live as well kind of food they eat from supermarkets.

## 2.3 Overview of Obesity

Rural communities are experiencing higher rates of obesity and overweight than urban areas (Claire and Devon, 2013). Rural residents tend to eat diets higher in fat and calories, exercise less, and watch more television, all of which can contribute to unhealthy weight gain (Australian Institute of Health and Welfare, 2008). Adding to the challenge, rural communities face barriers to addressing obesity, such as higher poverty levels, less access to services that facilitate physical activity and healthy eating, and limited school resources to provide nutrition education and physical education.

Further, rates of overweight and obesity have greatly increased since the 1990s, not only throughout high-income countries, but also in urban and even rural areas of many if not most middle- and many low-income countries; and not only in adults, but also in children and young people. Obesity in both childhood and adult life can now see more as a disease of poverty than of affluence (WHO, 2005). In Tanzania, prevalence of obesity among men and women in urban areas estimated to be 30% and 28.6%, respectively (Mosha et al., 2003). In rural communities, prevalence of obesity among men and women is significantly lower than this.

## 2.4 Empirical literature review

### 2.4.1 Globally

The prevalence of overweight and obesity has increased rapidly over the past two decades and (WHO, 2000) have described it as a global epidemic. Before obesity was associated with developed counties, but this day developing countries are experiencing an obesity epidemic. In addition, women are more often obese than men are, but male obesity rates have been growing faster than female rates in most OECD countries (WHO, 2013).

World health organization (WHO) has declare a global epidemic of obesity as the rate of obesity has nearly doubled since 1980, with just over 200 million adult men and just under 300 million adult women obese (WHO, 2008)**.** Obesity rates have been steadily rising in children, too. In 2010, 43 million preschool children were overweight or obese, a 60 percent increase since 1990 (Mercedes et al., 2010).

A 2014 study by Mercedes et al., (2010) of overweight and obesity in children and adults from 1980-2013 found that worldwide, the proportion of overweight or obese adults increased, and prevalence also increased substantially in children and adolescents in both developed and developing countries. A study conducted across Canada shows obesity to be as prevalent in rural men (37%) and women (30%) as in urban participants (34% and 28% respectively). However, a difference observed in Western Canada where 41% of rural and 34% of urban men were obese as were 35% of rural and 25% of urban women (The Report to the Secretary, 2005).

### 2.4.2 Situation in Africa

For quite some time, overweight and obesity considered primarily problems of developed countries. However, with increasing incomes, urbanization, and changing lifestyles, it is obvious that developing countries are facing the same issues (Popkin, 2004).

A major difference is that in developing countries relatively little attention paid to the problem of excessive weight gain by policymakers; it is still perceived rather positively and associated with higher social status.

In general, most of the people in developing world countries are living with the double burden of over nutrition and under nutrition (Rosen and Shapouri, 2008). This situation has resulted in overweight or obesity and stunting or wasting, respectively. Study by Ziraba *et al*., (2009) showed that seven sub-Saharan African countries namely Tanzania, Ghana, Kenya, Malawi, Burkina Faso, Niger and Senegal have 5% increase in overweight and obesity per year between 1992 and 2005. Amole et al., (2011) that; abdominal obesity was almost six times higher among female than male adults in Nigeria were, further reported this situation.

Occurrence of overweight and obesity are increasing in the more developed parts of Africa with a resultant coexistence of under-nutrition and over-nutrition in many African countries. The rise in the prevalence of obesity detected over the past decades taken by many as an indication of the predominance of environmental factors i.e. the so-called obesogenic environment over genetic factors in explaining why obesity has reached epidemic proportions (Rudkowska & Perusse, 2012).

Furthermore; Oyeyemi et al., (2012) explained that; the trend in the increasing prevalence of obesity and related morbidity and mortality in developing countries been attributed to rapid urbanization, nutritional transition and reduced physical activity. In Africa there is increase of obesity of rural men as in West Africa, the rate of obesity is about 10% (WHO Report 2005). It is three times higher among women than men are. Also in parts of West Africa, the rates have more than doubled in the last 15 years (WHO, 2005). In South Africa one in three men and in two women are either overweight or obese (Goededcke et al., 2010).

### 2.4.3 Obesity in Tanzania

During the 1980s obesity was already common, particularly in diabetic patients McLarty et.al.,1990).Observed that diabetic patients aged 30 years or older in Dar es Salaam were more obese than non-diabetics of the same age. High executives, mainly represented by members of parliament, were five times more obese than other urban Africans, but 30 times more when compared with rural Africans (Lukmanji et.al.,2007) this is due to many people are unaware of their body weight. In addition to that, Tanzania is also at a great risk of overweight and obesity for both adults and children (WHO, 2006). Besides, technological advancement and consumption of modern food sought to mitigate this trend from increasing arithmetically to increasing geometrically (WHO, 2005). As in Tanzania the prevalence of obesity has found to be significantly in urban and rural less investigation been made.

### 2.4.4 Social Demographic Characteristics and Obesity

According to WHO (2005) prevalence of overweight males 36.7% while females 28.3% and obesity male 23.3%, female 34.1%, compared to underweight males 4.3%, females 5.9% and normal range of BMI males 35.8%, females 31.8%. Moreover, no significant association found between the level of education, household, income and the trend toward overweight and obesity (WHO, 2005). Due to immigration of people from rural to urban areas and changing of lifestyle in developing countries, obesity and central obesity tend to increase for example increase because of age, education, income, gender due to change of lifestyle (WHO, 2000).

In Tanzania findings in the study done by Grace, and Ferdinand, (2011) showed that, those with no formal education had the highest prevalence of obesity. One would expect low socioeconomic status in those with no formal education and thus low prevalence of obesity among those with no formal education. In the Kinondoni district, about 60% of residents are unemployed and are engaged in self-employment, petty businesses, fishing.

Those who are self-employed may have a better income than the employed ones who are far better educated due to the existing low salaries among civil servants in Tanzanian government.

**Obesity in Bagamoyo District**

Table 1 below summarizes the findings from the Care and Treatment Centre (CTC) and diabetes clinics from Bagamoyo district hospital as from April 2014 to April 2015. A total of 150 male patient's files from each clinic reviewed and relevant information for this study collected. The information collected included the weight and height measurements of the patients that enabled the investigator to calculate the BMI.

The findings showed that; majority of patients 38% attended CTC clinic had normal weight (BMI 18-24.9), while 28.7% and 20% of the patients were overweight (BMI 25-29.9) and obese (BMI 30+) respectively; only 13.3% were underweight (BMI <18). The findings from diabetes clinic indicated that; most of the patients 34.7% and 32.6% were overweight (BMI 25-29.9) and obese (BMI 30+) respectively. About 24.7% of patients had normal weight (BMI 18-24.9) and only 8% were underweight (BMI <18). Furthermore, the findings from both clinics revealed that; overweight and obese patients were at severe risk of co-morbidities whereas underweight patients were at risk of other clinic problems as compared to those who had normal weight.

**Table 2.1: Distribution of Patients BMI and Co-morbidities Risk**

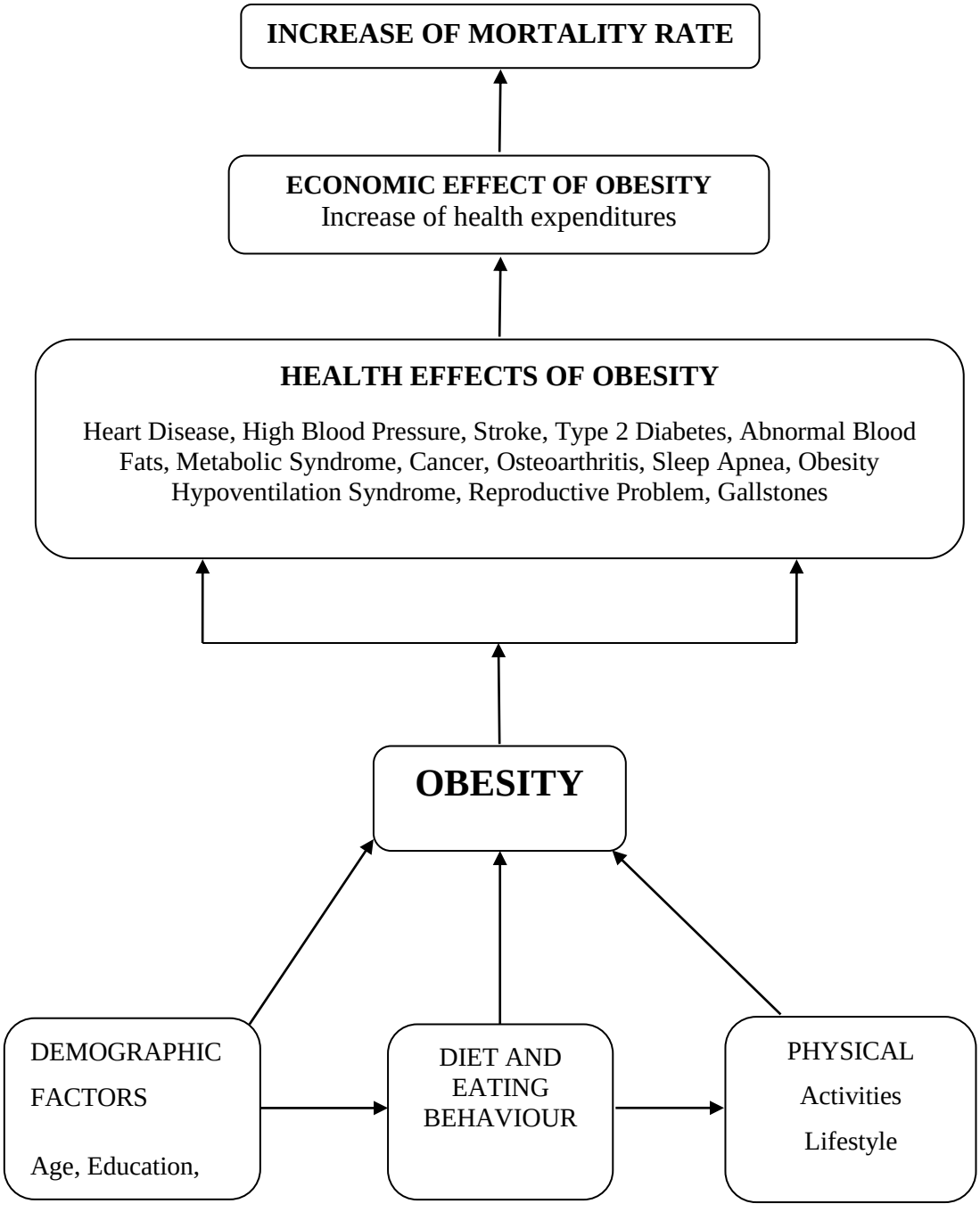
| Clinic | BMI | No of Patients | Percentage | Risk co morbidities |
|---|---|---|---|---|
| **CTC** | Underweight Less than 18 | 20 | 13.3 | Low (but increase risk of other clinic problem) |
| | Normal (BMI 18 - 24.9) | 57 | 38.0 | Moderate |
| | Overweight (BMI 25- 29.9) | 43 | 28.7 | Severe |
| | Obesity (BMI 30+) | 30 | 20.0 | Very severe |
| **Total** | | **150** | **100** | |
| **DIABETES** | Underweight Less than 18 | 12 | 8.0 | Low (but increase risk of other clinic problem) |
| | Normal (BMI18-24.9) | 37 | 24.7 | Moderate |
| | Overweight (BMI 25-29.9) | 52 | 34.7 | Severe |
| | Obesity (BMI 30+) | 49 | 32.6 | Very severe |
| **Total** | | **150** | **100** | |

**Source**: Bagamoyo District Hospital CTC and Diabetes Clinic April 2014- April 2015

### 2.4.5 Conceptual Framework

Theoretical framework below shows how determinants link each other and hence cause obesity and its impact to society. Cultural, environment, social, diet and eating behavior and physical aspects can determine obesity. Obesity acknowledged being the major cause of chronic diseases hence increasing health expenditures. Most of chronic diseases require long treatment and control interventions of which most of the people in developing countries cannot afford; thus the ultimately end is the increase of mortality rate.

**Figure 2.1: Conceptual Framework**




***Source**: Lugendo Pendo Eva MHSM 2013/2015*

## 2.5 Determinants of Obesity

### 2.5.1 Cultural Determinants

Cultural perceptions concerning obesity and overweight played a role in the high prevalence of overweight and obesity. According to Muhihi et al., (2012), most of people in Tanzania think that having obesity is the indicator of a person to be free from HIV/AIDS. In addition to that, in Tanzania obesity culturally embraced, seen as a sign of wealth in most of our communities (Muhihi et al., 2012). With regard to gender, this review shown that women have a tendency to have more of the biological risk factors of being obese (Njelekela et al., 2002).High prevalence of hypertension, hypercholesterolemia was highly observed to women as compared to men. Men were higher prevalence of alcohol drinking and were more likely to smoke (French et al., 2009).

As well, they cause value of body mass index, blood pressure and cholesterol Mayige et al., (2012). Gudrun et al., (2013) argue that in Tanzania, as well, it has been suggested that overweight and obese women are perceived as beautiful; they are admired and respected, while skinniness is associated with illnesses, especially HIV/AIDS, and, therefore, is not desirable also support it. Also, not only rural women have been admired but also rural men tend to be admired by women as it seems obese men have enough money and living wealth life; so there has been a tendency of admiring them and forget that they may be affected and having other health problem. Cultural factors have been shown to influence rural men to shift to urban searching for good life and when they reach town they adopt a different culture as in urban areas the culture fifers from that of rural areas. Therefore, they start using food from supermarket and eating chips and hence they cause obesity (Mokhtar et al., 2001).

### 2.5.2 Social Determinants

According to Ezekiel et al., (2009) Tanzania not spared by the consequences of globalization, and profound societal changes taken place especially in urban settings. Leisure time activities are increasingly sedentary. Entertainments such as television, video and computer games are also widely and easily accessible.

Hours spent on viewing television and computer usage is associated with increasing BMI among children (Muhihi et al., 2012). Walking to and from school and morning joggings provided a potentially important opportunity for establishing daily physical activity among primary school children. This can be argued as not only children have entertainment also men use entertainment like watching television, going to pub and bars as well clubs and praying draft and cards. In addition, due to low level of education of rural men, they have no idea of obesity, how they can prevent from getting obesity in their social activities.

Americans exposed to huge food portion on restaurants, fast food place, gas stations, movie theaters, supermarkets and even at home (Feinleib, 1985). This is also related to African culture such Tanzania, in rural areas if you eat a little portion of food you may be regarded to be sick and they may ask you " do you want to be a miss?", and if he is a man not eating he will be told you are a men you have to eat. Therefore, our environments, which are living also, encourage people to eat regardless of what she or he is eating leading to obesity.

### 2.5.3 Diet and Eating Behavior

Dietary intake of people has been changed day to day where by associated with prevalence and high risk of obesity (Popkin, 2005).Dietary behavior includes a high dietary fat and sugar in take low fiber fruit and vegetable combinations. Due to that, it causes unhealthy diet, as the major risk for chronic disease. Therefore, unhealthy diet is one of the reasons in the rural obesity problem. Rural residents in some areas eat a higher fat and calorie diet, which at the end they got obesity (Foster, 2002). People in rural areas, are often faced with limited selection and higher cost for fresh fruit and vegetables than consumers in urban areas cost.

Diet with high in calories, lacking in fruits and vegetables, full of fast food, missing breakfast, and laden with high calorie beverages and oversized portions contributes to weight gain. Due to distance and limited transportation options, shopping for healthy food can prove difficult for those living in areas not served by a major grocery chain (Foster and McGuckin, 2002). People in rural areas may also lack nutrition information that would help them to choose a healthier diet.

Nutritionists tend to be less available in rural areas, and fewer school and nutrition education opportunities exist, compared with what may be available in larger communities (Mosha, 2003).

Thereafter, in developing countries, rapid changes in dietary intake are indicative of an increase in per capita availability of food. While the changes in energy intake have been small, there have been large changes in consumption of animal products, sugars and fats (Nyaruhucha et al., 2003). Thus, it appears that in most developing countries, the change in energy intake been dominated by large changes in consumption of livestock and animal products, sugars and fats (World Agriculture Report 2015/2030). In addition to that, a lot of food advertising by companies makes people like to taste whatever has been advertised in the newspaper, televisions and radios without thinking of the impact of tasting everything. The aim of advertising those foods is to make people buy these high calories foods and often they do so such as Mac Donald (Feinleib, 1985) and in Tanzania, Azam products.

### 2.5.4 Physical Activities

Excess body weight is a result of an imbalance between energy intake and energy expenditure. Physical activity is the most variable component of energy expenditure and therefore has been the target of behavioral interventions to modify body weight. It appears that physical activity is an important component on long-term weight control, and therefore adequate levels of activity should be prescribed to combat the obesity epidemic (Jakicic and Otto, 2005). Thus, lack of enough physical exercise might be predictive and contributing factor of obesity.

The popular image of active rural lifestyle is no longer accurate. Rural residents tend to be less physically active than urban residents (Wadden, 1997) are. Some possible causes include less access to exercise facilities and fewer school physical education classes. Rural areas may also face challenges in terms of appropriate environment, which consists of buildings, sidewalks, parks and other physical aspects of a community (Metcal et al., 2012). Physical activities with less positive images of sport, negative perceptions of their own ability, frail motivations and personal choice to engage in activities, and no supporting influence of their friends and family as well as the detrimental impact of life

transitions such as moving from college to full time employment decreasing participation rate in physical activities (Mbalilakiet al., 2007).

In addition to that, an increasing physical activity is an effective way to maintain body composition and potentially prevent obesity (Bourchard et al., 2002). Physical activity been shown to induce health related benefits in males and females of all age groups. This can be supported by showing that prevalence of obesity increases with age (Muhihi et al., 2012).The association of obesity and age cannot be separated as when aged physical activity decrease with age in both men and women (Shayo and Mugusi 2011). On the other hand, a decrease in metabolism with age, particularly in women after menopause is another reported explanation. Indeed, globally, women have higher rates of obesity than men (Shayo and Mugusi, 2011) do.

Adult men have the weakest relationship between social economic status and recreational physical activity and obesity (Sobal and Stunkard 1989). It has been shown that higher social economic status men and women had higher levels of perceived overweight, monitored their weight more closely and were more likely to be trying to lose weight. Higher social economic status groups also reported more restrictive and dietary practices**,** more vigorous physical activity (Kafyulilo and Mafumiko, 2008).

Muhihi, (2012), and preschool Hinkley et al. (2008) argued that; adolescent boys do significantly more vigorous physical activity than girls in all social economic activities do. This is cars; motorcycles have replaced bicycles and walking. Work on the farm or in the factory been replaced by work in front of a computer; fewer activities may be contributing obesity even more than higher food consumption. As physical activity identified as playing a key role in influencing health outcomes, even in communities undergoing epidemiological transition, trends in physical activity behavior have implications for public health and the emerging burden of obesity in rural areas.

## 2.6 Environment Determinants

Environment is anything surrounding and everything that affect an organism during its lifetime Centre for Science and Environment (1991). Environment plays an important role to increase obesity that is affecting the entire mankind on a large scale (James, 1995).

There is growing interest in how social and physical environments influence obesity risk, and efforts to identify mutable, environmental causes of obesity are underway (Black and Macinko, 2008). The environmental factors include availability and proximity of obesity-promoting foods at fast food establishments, restaurants, large supermarkets, recreational points in a given area and at home (Currie et al., 2010).

The rising prevalence of childhood obesity in developing countries attributed to the growing urbanization, transition towards high caloric western diet of refined and fast foods and sedentary lifestyle (Muhihi et al., 2012).

Habits developed in childhood and childhood environments such as physical activity behaviors, have been shown to be important contributors to the development of adult obesity (Telama et al., 2005). In developing countries, the level of obesity is greater in the higher socioeconomic status segments of society (Tanzania Demographic and Health Survey 2010). Tanzania spared by the consequences of globalization, and profound societal changes have taken place especially in urban settings.

Environmental and social factors may either favor or minimize the attainment of unhealthy weight by affecting the dietary behaviors and activity pattern of individuals.

For instance, the way supermarkets may influence weight gain is by providing a wide variety of obesity-enhancing foods at reasonable prices which then affect purchasing behavior and subsequently the availability of these foods at home (Wall et al., 2012). The tendency of people to eat in fast food restaurants more increasingly so they have less control over how much fat, sugar and salt they have eaten. Fast food restaurants encourage super rising of meal, adding unnecessary calories such as onga mchuzi mix, vinegar, royicol, beef masala etc of which at the end have health effect (National Heart Lung and Blood Institute,1998).

Leisure time activities are increasingly sedentary. Entertainments such as television, video and computer games are also widely and easily accessible. Hours spent on viewing television and computer usage is associated with increasing BMI among children (Muhihi et al., 2012). Walking to and from school and morning joggings provided a potentially important opportunity for establishing daily physical activity among primary school children.

For example, in Tanzania rural nowadays there are many motor cycles and cars called Noah that are used as the major means of transport. This situation has reduced the use of bicycles as well as walking habit of which was part of health physical activity.

Feinleib (1985) argued that people have no place for recreations as people tend to be busy with the activities no time of talking with each other as well doing sports as a key way for physical activities. In the rural area, as well there is a limited playgrounds and cultural tendency of societal physical activities. Nowadays people have become lazy; they mainly do in active activities or not doing at all. People in the rural areas they go to what television at home place, video games, pool table, draft, and these days' movies are preferable activities (National Heart Lung and Blood Institute, 1998). This situation is also observed in Tanzania environment; whereby rural men especially youths they have no work do rather going to the market place watching cinema, praying computer games, and pool table.

## 2.7 Health Effects of Obesity

Obesity is a chronic condition that threaten heath, but there is a lack of consensus on whether obesity should be considered a disease or a merely a risk factor of disease (Asfaw, 2006). WHO, (2000) reported that; obesity is strongly connected to increased health risks, morbidity and mortality. Obesity is associated with a range of chronic non-communicable diseases such as cardiovascular disease, hypertension, type 2 diabetes mellitus, stroke, osteoarthritis, certain cancers, gallstones, pregnancy related problems, infertility, sleep apnea, degenerative disease of joints and respiratory diseases (Asfaw, 2006). It must be renowned that numerous of the above mentioned complications of obesity are the result of the metabolic complications that linked with excessive fat deposition.

It was reported by WHO, 2007 that in 2005, an estimated 17.5 million people died of cardiovascular diseases representing 30% of all global deaths; out of these, 80% were from low- and middle-income countries. Some studies revealed that mortality from cardiovascular diseases in developing countries is expected to increase by 120% for women and 137% for men by 2020 (Yach et al., 2004).

Furthermore, study conducted by Oghagbon *et al.* (2008); the findings indicated that an increased occurrence of hypertension is associated with increasing BMI.

Since Westernization, consumption of industrial beer, wines and hard liquor has risen considerably. Unfortunately, modern alcoholic drinks contain high quantities of mainly alcohol. Excessive alcohol drinking been directly related to obesity and diabetes among government executives (Nyaruhucha, 2003). Although cigarettes and drugs are not food, their use closely related to eating practices and the money spent displaces food. The prevalence of smoking among females is 1.5% in Dar es Salaam, 19.7% in Kilimanjaro and 15.8% in Morogoro; the prevalence among males is higher: 21.7% in Dar es Salaam, 55.8% in Kilimanjaro and 60.3% in Morogoro.

Many urban youths in Tanzania have been lured into drugs, which affects their health and has even worse effects on food availability for the family's involved (A Tanzanian perspective on the nutrition transition and its implications for health (Nyaruhucha, 2003).

The health consequences of rural men obesity are many and varied, ranging from an increase in risk of premature death to several non-fatal but debilitating complaints that can have a marked effect on the quality of life. It is a major factor for metabolic disturbance, Non-insulin Dependent Diabetes Mellitus (NIDDM), Coronary Heart Disease (CHD), Debilitating health problem**;** such as osteoarthritis pulmonary disease**,** Gall bladder disease, Endocrine disturbances, some forms of cancer and various psychological problems (Simopoulos, 1999).

## 2.8 Economic Effect of Obesity

According to National Bureau of Statistics Tanzania (2004-2005), treatment and medical care are costly with high economic status had statistically significant increased risk for obesity than people with low economic status which results to high economic status influence weight gain. Economic development is certainly associated to a country's ability to sustain and stimulate economic growth, decrease external debt and foster productivity. Nutrition and poverty intimately linked by the relationship between nutrition and work capacity, such that poor nutrition is not only a result of, but perhaps a cause of poverty as well (Ray, 1998).

Poverty influenced by poor nutrition in that a poor person has a reduced ability to purchase nutritious foods and in turn has a lower work capacity that perpetuates a low income.

Studies from Europe and the United States demonstrate quite unequivocally that obesity is negatively associated with a person's productivity and work performance. An increased fat mass been reported to inhibit spontaneous movement result in poor health that, reduces overall activity and inhibit various movements (Seidell, 1998). Several studies have reported a strong relationship between body mass index, decreased physical functioning and a reduction in overall productivity (Rissanen, 1996). Moreover, obesity exerts its effects on productivity not only by an increase in mortality, but also through an increase in morbidity. Increased morbidity removes individuals from the workforce but leaves them in society where they are still able to place demands in terms of food and health care needs.

An obese person reportedly experiences a 50 percent increase in loss of productivity and visits a doctor 88 percent more than a healthy person during a six-year period in the United States (Wolf and Colditz, 1994). This creates a situation in which the chronically ill person not only contributes less to the economy, but also essentially requires more, creating a drain on economic resources. The more sick a person is the greater his or her degree of absence from the workplace; chronic diseases related to adiposity and obesity increase absenteeism. Narbro *et al.* (1996) reported that obese people were up to two times more likely to have a large amount of sick leave in one year compared to lean people either through absence from illness or for a doctor's appointment. In both cases, obesity contributes to absenteeism and directly reduces the productivity of a population.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter provides research methodology of the study. Research methodology is a science of studying how research is done scientifically (Kothari, 2004).

## 3.2 Study Area

This study conducted in Bagamoyo district in Tanzania. Bagamoyo district is one of the six districts of the Coast Region of Tanzania. It is bordered to the North by the Tanga Region, to the West by the Morogoro Region, to the East by the Indian Ocean and to the South by the Kibaha District. The district capital is at Bagamoyo and according to the 2012 Tanzania National Census; the population of the Bagamoyo District was 311,740. It is located at an elevation of 152 meters above sea level. The Bagamoyo District have health facility from government which are fifty eight (58) health facility, FBO are five, parastatal are six and private health facility are fourteen.

## 3.3 Study Design and Study Population

This study adopted cross sectional study design. It aimed to explore determinants of obesity among rural males aged 18 years and above. Data were collected from male patients aged 18 years and above who visited health facilities in Bagamoyo district; including the district hospital, two health centres and two dispensaries because they met the criteria of being accredited by obesity and providing service for diabetes clinic and hypertension as they result to obesity.

## 3.4 Sample and Sampling Methods

Purposive sampling was selected used to health facilities because not all health facilities in Bagamoyo District have clinic for diabetics' problem as effect of obesity. A purposive sampling technique employed to select health facilities to be included in the study in order to get significant number of the respondents for the study.

Bagamoyo district has only one hospital that is the referral centre, thus about 33.3% of the study respondents recruited from the Bagamoyo district hospital. A purposive sampling technique used to obtain the respondents of the study because of the previous data of one year about the enrollment of 7 obesity men from every health facilities. One hundred and twenty men selected purposively so in order to assess their weight levels as shown in table two.

**Table 3.1: Percentage Distribution of Respondents by Health Facility**

| No | Name of the health facility | No of Respondents | Percentages |
|---|---|---|---|
| 1 | Bagamoyo District Hospital | 40 | 33.3 |
| 2 | Kerege Dispensary | 14 | 11.7 |
| 3 | Mapinga Dispensary | 15 | 12.5 |
| 4 | Chalinze Health Centre | 27 | 22.5 |
| 5 | Lugoba Health Centre | 24 | 20 |
| | **Total** | **120** | **100** |

## 3.5 Data Collection Instruments

Both secondary and primary data were used in order to answer the research questions. Secondary data obtained from the Care and Treatment Centre (CTC) and diabetes clinics from Bagamoyo District Hospital as from April 2014 to April 2015. A total of 150 male patient's files from each clinic were reviewed and relevant information for this study was collected retrospectively. The information collected included the weight and height measurements of the patients that enabled the investigator to calculate the BMI.

A semi-structured questionnaire developed in English in order to capture primary data from the respondents (see appendix 1). The tool was pre-tested in order to ensure the validity of the contents before administering to the target population. The questionnaire comprised of two sections.

The first section elicited socio-demographic characteristics, and section two comprised questions, which aimed to explore the determinants of obesity with a focus on different aspects including diet and eating behavior, physical activity, environmental and social issues.

### 3.6 Recruitment and Training of Research Assistants

Two Research Assistants assisted principal Investigator of this study. Prior to the actual fieldwork, Research Assistants were trained in order to familiar them with the data collection tool; and how to administer the tool to the respondents. Additionally, they were briefed on research ethics, administrative and other logistics issues.

### 3.7 Data Collection Procedure

Data collected on daily basis. In the first week, research team administered the questionnaire at the Bagamoyo district Hospital. In the second week, the team divided into three and each investigator went to own health facility. Prior to this, data collection schedule was developed and introduction letters sent to District Executive Director copied to District Medical Officer and respective health facility in charges. The letters pointed out the objectives of the study, participants, date and time for data collection. Prior administering the questionnaire to respondents, researchers asked for an informed consent from respondents and there after respondents signed the consent form.

### 3.8 Data processing and analysis

All questionnaires were thoroughly reviewed and numbered. Also, all responses of the open-ended questions coded from the list of possible responses. MS excel application was used for data analysis as well as calculation of BMI. Descriptive statistics in terms of frequency, ratios, and graph computed.

## 3.9 Study Variables

Both dependent and independent variables examined in this study

**Dependent variable**

The dependent variable in this study was obesity

**In dependent Variables**

Independent variables in this study were predicted determinants of obesity, which included:

1. Demographic characteristics
2. Diet and eating behaviors
3. Physical activities

## 3.9 Ethical Considerations

Ethical clearance was sought from Mzumbe University. Research permit was requested from the District Executive Director who officially informed the District Medical Office and the health facility in charges accordingly. Lastly, prior administering the questionnaires; participants were clearly verbally explained on the aim of the study, and who agreed to participate signed a written consent form (see Appendix 2). For the purpose of confidentiality, participants were assured of anonymity and the information provided whether orally or in writing strictly was used for research purposes only. No names of the respondents were recorded anywhere throughout the study.

## 3.10 Study Limitations

Due to financial constraints; the geographical coverage and sample, size of the study was very limited. The information collected might not be of good representation of the study population.

# CHAPTER FOUR

# ANALYSIS AND PRESENTATION OF RESULTS

## 4.1 Introduction

This chapter presents the findings from undertaken to assess the determinants of obesity, its characteristics, contributing factors, and associations with other health effects. The following are the sections presented: (1) Socio-demographic and other characteristics of the study respondents, (2) the determinants of obesity (3) relationship between obesity and other variables

## 4.2 Background information of the Respondents

The study was facility based and 120 respondents participated. Rural men aged 18 years and above who attended health facilities during data collection were asked if they can answer questioners and fill concert form, which the research had. After that, they were measured height and weight so that they can be calcurated for BMI in order to know their position and research come up with respondents of 120 during her data collection. Table 3 below summarizes distribution of study sample by facility. Five facilities, which used to have diabetes clinic and CTC clinic, were included in the study; one hospital, two health centres and two dispensaries. Majority of respondents 40 (33.3%) were recruited from Bagamoyo District Hospital followed by respondents from Chalinze and Lugoba Health centres 27(22.5%) and 24(20%) respectively. The findings indicated that few respondents were recruited from dispensaries 15(12.5%) from Mapinga and 14(11.7) from Kerege.

**Table 4.1: Percentage distribution of the Study Sample by health facilities**

| No | Name of the health facility | No of Respondents | Percentages |
|---|---|---|---|
| 1 | Bagamoyo District Hospital | 40 | 33.3 |
| 2 | Kerege Dispensary | 14 | 11.7 |
| 3 | Mapinga Dispensary | 15 | 12.5 |
| 4 | Chalinze Health Centre | 27 | 22.5 |
| 5 | Lugoba Health Centre | 24 | 20 |
| | **Total** | **120** | **100** |

**Source**: Field Data 2015

### 4.3 Demographic or Social Factors for Obesity

#### 4.3.1 Distribution of Respondents' by Demographic Characteristics

Distribution of the study respondents based on demographic characteristics presented in Table 4.2 below. Men within the age range of 18 – 40+ years participated in the study. Majority of them (40%) were of the age group of 40 years and above. About 33.3% were between the age of 29 – 39 years and 26.7% were of the age between 18 – 28 years. Majority (46.7%) of the study respondents were married and the rest were either single (26.7%), cohabiting (20%) or separated (5.8%). Also majority of the study respondents attended school at some stage. About 28.3% completed ordinary level secondary education, 27.5% completed primary education. About 2.5% and 15% of the participants did not complete primary and secondary level education respectively. Also 10% of the study participants completed advanced level secondary education and 6.7% completed collage training. However, 10% of the study participants did not attended neither school nor collage.

The findings also indicated that; about 37.5% of the respondents were farmers, 30.3% employed in formal sectors, 20% were self-employed and 11.7% were shopkeepers. Level of income per month was also determined from the study participants. The findings revealed that most (26.7%) of the respondents earned the income range between 101,000 – 150,000 Tanzanian Shillings (TZS) per month followed by 21.6% who earn between 151,000 – 200,000 TZS. Of the participants, only 15% and 11% earned the income ranging between 201,000 – 250,000 and 251,000 – 300,000 TZS respectively. Few of the respondents 7.5% reported that they earned the income below 50,000 TZS and 7.5% earned above 300,000 TZS. The findings indicated that; about 35.8% families had the history of obesity while 64.2% of the respondents got obesity due to different factors.

**Table 4.2: Percentage distribution of Respondents' by Demographic Characteristics**

| Variables | No | % |
|---|---|---|
| **Age of Group** | | |
| 18 – 28 | 32 | 26.7 |
| 29 – 39 | 40 | 33.3 |
| 40+ | 48 | 40.0 |
| **Total** | **120** | **100** |
| **Marital status** | | |
| Single | 33 | 27.5 |
| Married | 56 | 46.7 |
| Cohabiting | 24 | 20 |
| Separated | 7 | 5.8 |
| **Total** | **120** | **100** |
| **Educational Level** | | |
| No formal education | 12 | 10 |
| Primary education (incomplete) | 3 | 2.5 |
| Primary education (complete) | 33 | 27.5 |
| Secondary education (ordinary level, incomplete) | 18 | 15 |
| Secondary education (ordinary level, complete) | 34 | 28.3 |
| Secondary education (advanced level) | 12 | 10 |
| College/University | 8 | 6.7 |
| **Total** | **120** | **100** |
| **Occupation** | | |
| Employed | 37 | 30.8 |
| Self employed | 24 | 20 |
| Farmer | 45 | 37.5 |
| Shopkeeper | 14 | 11.7 |
| **Total** | **120** | **100** |
| **Level of Income** | | |
| Below 50,000 | 9 | 7.5 |
| 50,000 – 100,000 | 18 | 15 |
| 101,000 – 150,000 | 32 | 26.7 |
| 151,000 – 200,000 | 26 | 21.6 |
| 201,000 – 250,000 | 15 | 12.5 |
| 251,000 – 300,000 | 11 | 9.2 |
| Above 300,000 | 9 | 7.5 |
| **Total** | 120 | 100 |
| **Family history of overweight** | | |
| Yes | 43 | 35.8 |
| No | 77 | 64.2 |
| **Total** | **120** | **100** |

**Source**: Field Data 2015

## 4.4 Respondents' Anthropometric Characteristics by Age Group

Table 4.3 below presents the BMI of the study respondents by their age groups. Participants with heavy clothes like jackets, sweaters asked to remove them during the process of taking measurements. They also asked to remove shoes, sandals, belts and empty their pockets as well in order to ensure the accuracy of the measurements. In this study, BMI categorized into three groups whereas normal weight was that of BMI ranged from 18 - 24.9, overweight with BMI ranged from 25 - 29.9 and obesity with BMI of 30+.

The findings revealed that over 32.5% of the study, participants had normal weight, 33.3% were overweight and 34.2% were obese. The findings also indicated that 40.6% of the participants within the age group ranged from 18-28 years were obese as compared to 28.9% and 34% of those within the age group ranged from 29-39 and 40+ years respectively. Furthermore, the findings showed that 39.5% of the participants within the age group ranged from 29-39 years were overweight as compared to 28.1% and 34% of those within the age group ranged from 18-28 and 40+ years respectively. In addition, the findings indicated that; 34% of the participants with 40+ years had normal weight as compared to 31% in each of the participants within the age group of 18-28 and 29-39 years respectively.

**Table 4.3: Percentage distributions of Respondents' Anthropometric Characteristics by Age Group**

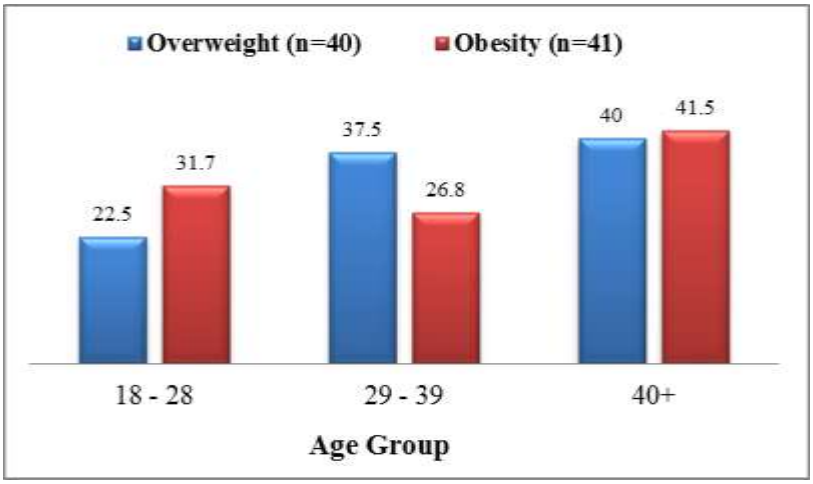
| Variable | Total | | Age Group (Year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 18 – 28 | | 29 – 39 | | 40+ | |
| **BMI Category** | **No** | **%** | **No** | **%** | **No** | **%** | **No** | **%** |
| Normal (BMI 18 - 24.9) | 39 | 32.5 | 10 | 31.3 | 12 | 31.6 | 17 | 34 |
| Overweight (BMI 25 – 29.9) | 40 | 33.3 | 9 | 28.1 | 15 | 39.5 | 16 | 32 |
| Obesity (BMI 30+) | 41 | 34.2 | 13 | 40.6 | 11 | 28.9 | 17 | 34 |
| **Total** | **120** | **100** | **32** | **100** | **38** | **100** | **50** | **100** |

**Source**: Field data 2015

### 4.4.1 Relationship between Age and Obesity

Figure 4.1 below presented relationship between obesity and age. The findings showed that among of the respondents who were obese; 41.5% had 40 years and above followed by 31.7% and 26.8% of the respondents with the age ranged from 18-28 and 29-39 years respectively.

**Figure 4.1: Percentage distribution of respondents by Relationship between Age and Obesity**

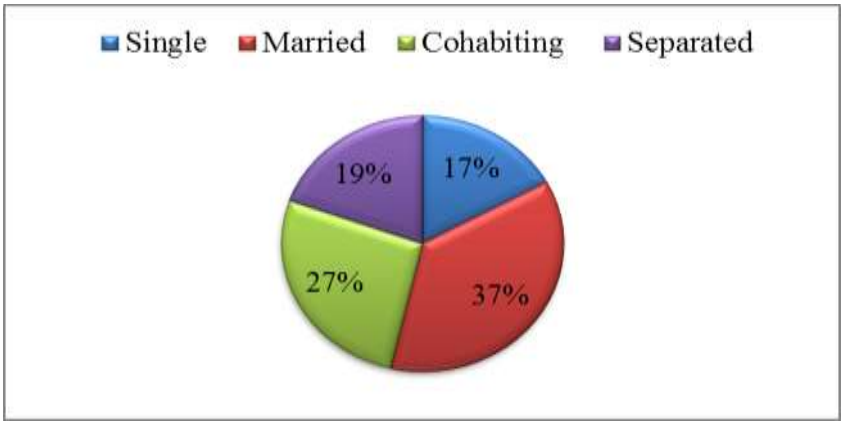



**Source**: Field data (2015)

### 4.4.2 Relationship between Marital Status and Obesity

Figure 4.2 below present the relationship between obesity and marital status. The findings indicated that there is a relationship between marital status and obesity. Of the obese respondents, 37% were married, 27% were cohabiting and 19% and 17% were single and separated respectively.

**Figure 4.2: Percentage Distribution of Respondents by Relationship between Marital Status and Obesity**




**Sourc**e: Field data (2015)

### 4.4.3 Relationship between Level of Education and Obesity

As presented in figure 4.3 below; the findings showed relationship between education level and obesity. Of the respondents were observed to be obese; 19.5% and 17% completed advanced and ordinary level secondary education respectively whereas 19.5% attended ordinary level secondary education but didn't completed. Also 14.6% reached high education level (college or university). Only 4.9% of the obese respondents did not attend formal education and about 12% completed primary level education whereas 12% did not.

**Figure 4.3: Percentage distribution of Respondents by Relationship between Level of Education and Obesity**

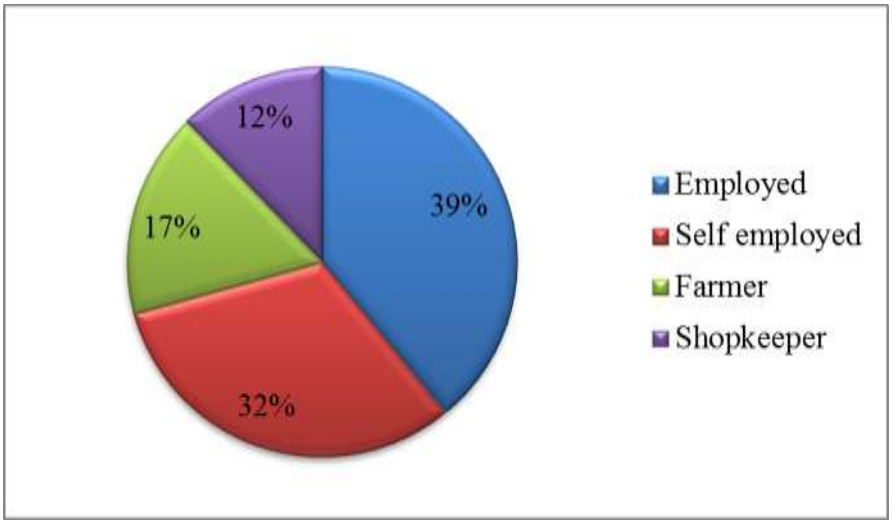



**Source**: Field data 2015

### 4.4.4 Relationship between Occupation and Obesity

The findings indicated that there is relationship between occupation and obesity. Among of the obese respondents; majorities (39%) were employed followed by 32% who were self-employed. About 17% and 12% were famers and shopkeepers respectively (see Figure 4.4 below).

**Figure 4.4: Percentage distribution of Respondents by Relationship between Occupation and Obesity**

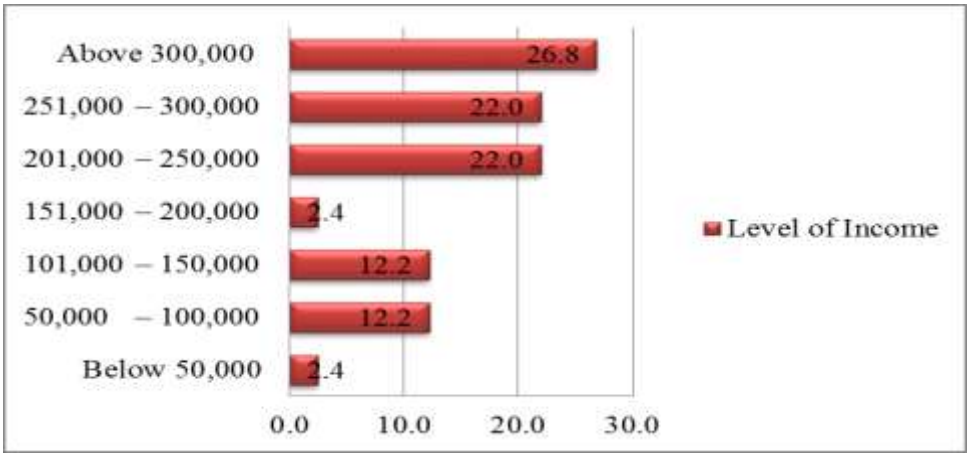



**Source**: Field data (2015)

### 4.4.5 Relationship between Level of Income and Obesity

Figure 4.5 below summarized the relationship between level of income and obesity. The findings showed that most of the obese respondents earned more than 200,000 Tanzanian Shillings (TZS) per month. Among of them; 26.8% earned above 300,000TZS, whereas 22% earned a monthly income ranged from 251,000 - 300,000TZS and 22% earned 201,000 – 250,000TZS. Furthermore, the findings indicated that, only 2.4% of the obese respondents earned below 50,000TZS.

**Figure 4.5: Percentage distribution of Respondents by Relationship between Level of Income and Obesity**



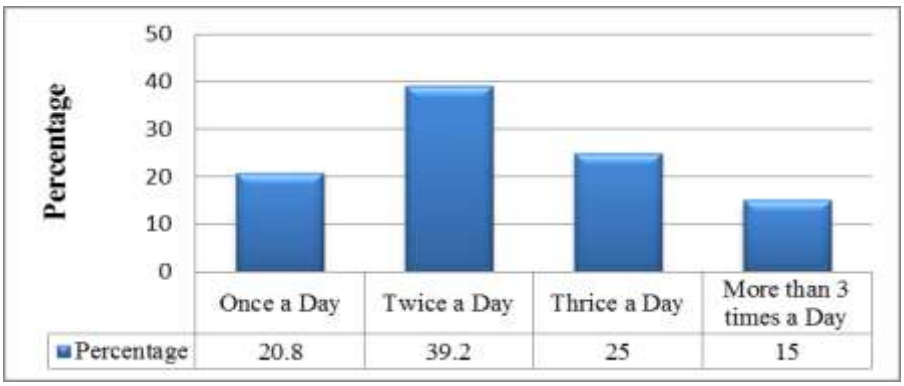

**Source**: Field data (2015)

## 4.5 Eating Behavior as a Determinant of Obesity

### 4.5.1 Eating Frequency

Normally it is a culture for the Tanzanian to eat at least three times a day; breakfast, lunch and dinner. However, what is taken in each meal is questionable and varies across communities. Figure 4.6 below presented the distribution of respondent's frequencies concerning eating behavior. Out of 120 participants, over 20.8% reported to eat once a day, majority 39.2% eaten twice a day and 25% eaten thrice a day. Also, 15% of the respondents reported to eat more than three times a day.

**Figure 4.6: Percentage distribution of Respondents by their Eating Behavior**

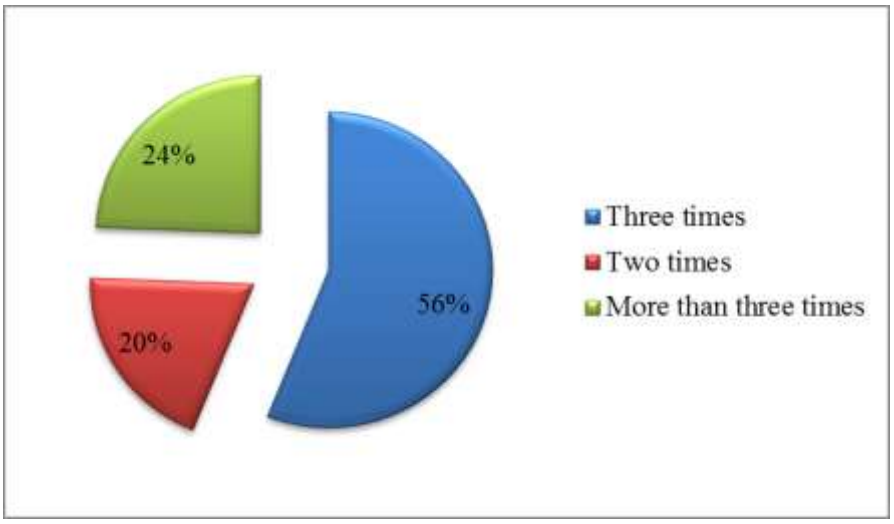



**Source**: Field data 2015

### 4.5.2 Relationship between Frequency of Eating and Obesity

The findings of the study indicated that obesity is associated with the incidence of eating. Of the obese respondents, 56% were eating three times and 24% more than three times a day (see Figure 4.7 below).

**Figure 4.7: Distribution of Respondents by Relationship between Frequency of Eating and Obesity**

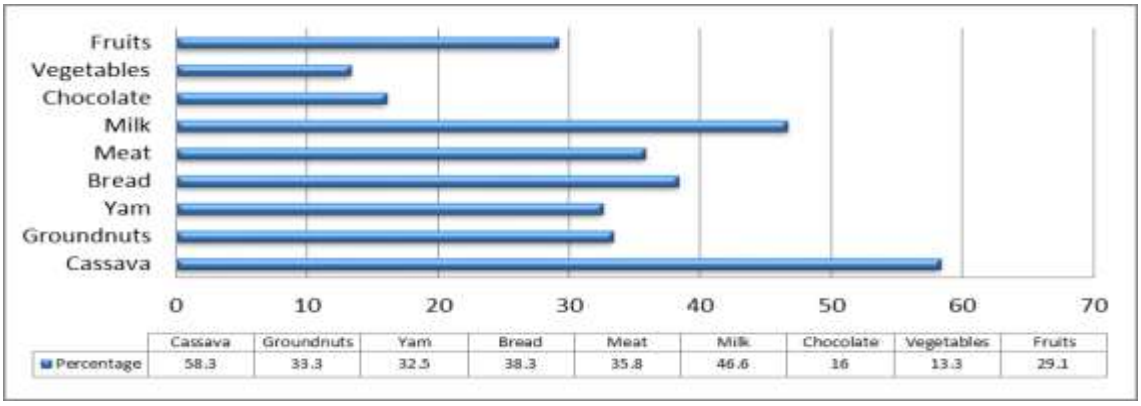



**Source**: Field data (2015)

### 4.5.3 Percentage distribution of Respondents by Food taken during Breakfast

The findings showed that majority 58.3% of respondents reported to eat cassava during breakfast. More than 46.6% of respondents reported to take milk, 38.3% and 35.8% of respondents reported to take bread and meat respectively. In addition, over 32% of respondents reported to take yam and groundnuts (see Figure 4.8 below).

**Figure 4.8: Percentage distribution of Respondents by Types of Food taken during Breakfast**



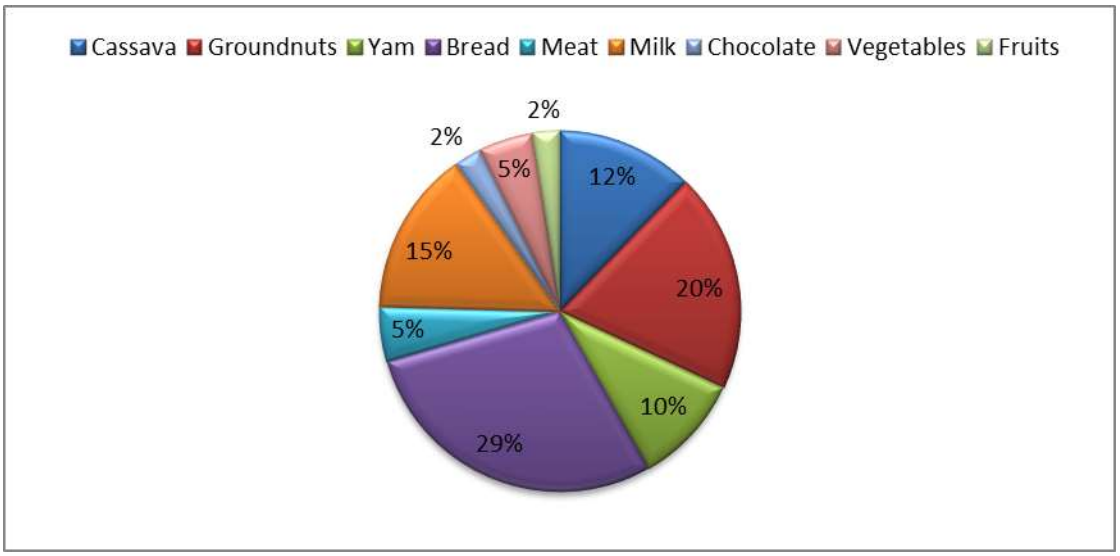

*Note: There were multiple responses

**Source**: Field data 2015

### 4.5.4 Relation of Food taken during Breakfast and Obesity

It observed from the findings as summarized in Figure 4.9 below that; 29% preferred to take bread, 20% and 15% preferred groundnuts and milk respectively.

**Figure 4.9: Percentage distribution of respondents in Relation to Food taken during Breakfast and Obesity**

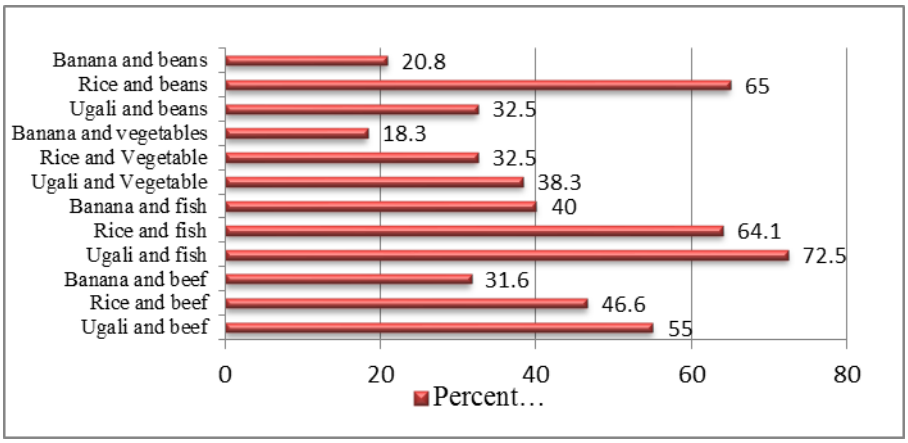



**Source**: Field data (2015)

### 4.5.5 Distribution of Respondents' by Food taken as Lunch

Most of the respondents 72.5%; reported to eat ugali and fish as lunch followed by those who ate rice and beans by 65%, whereas 64% ate rice and fish and 55% ate ugali and beef. Few respondents 18.3% and 20.8% ate banana and vegetable or ugali and beans respectively (see Figure 4.10 below).

**Figure 4.10:Percentage of Respondents by Types of Food taken as Lunch**



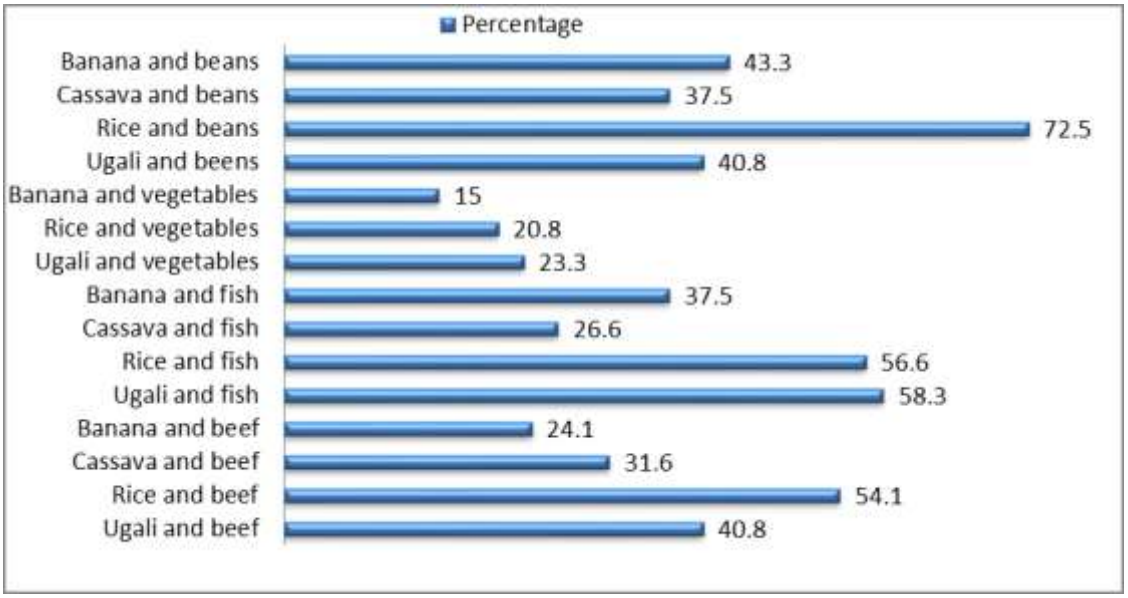

*Note: There were multiple responses

**Source**: Field data 2015

### 4.5.6 Distribution of Respondents by Food taken as Dinner

The findings with respect to food taken as dinner showed that; majority of the respondents 72.5% ate rice and beans, over 58% ate ugali and fish, where as 56.6% and 54% ate rice and fish, and rice and beef respectively. In addition, the findings revealed that men did not prefer to eat a combination of any starch food with vegetable. Fifteen percent of respondents ate banana and vegetable whereas 20.8% and 23.3% of the respondents ate rice and vegetable, ugali, and vegetable respectively (see Figure 4.11below).

**Figure 4.11: Percentage distribution of respondents by Food taken as Dinner**



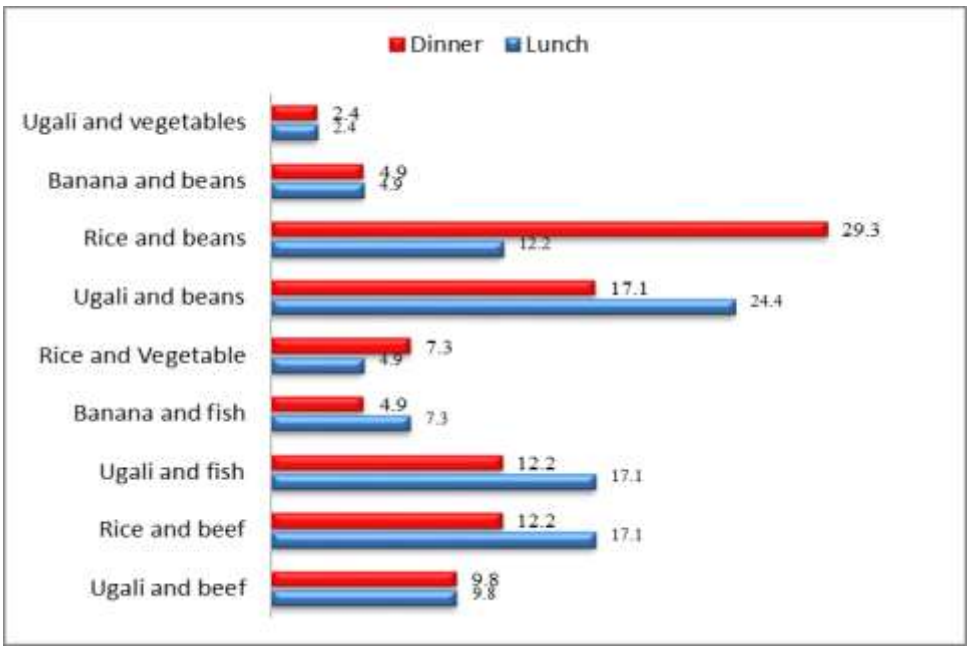

*Note: There were multiple responses

**Source**: Field data 2015

### 4.5.7 Relationship between Food taken as Lunch/Dinner and Obesity

The findings in Figure 4.12 below show the relationship between food eaten during lunch and dinner and obesity. Of the obese respondents 29.3% preferred rice and beans during lunch and 24.4% preferred ugali and beans. However, ugali and fish or rice and beef were mostly preferred during lunch by 17% each.

**Figure 4.12: Percentage distribution by Relationship between Food taken as Lunch/Dinner and Obesity**

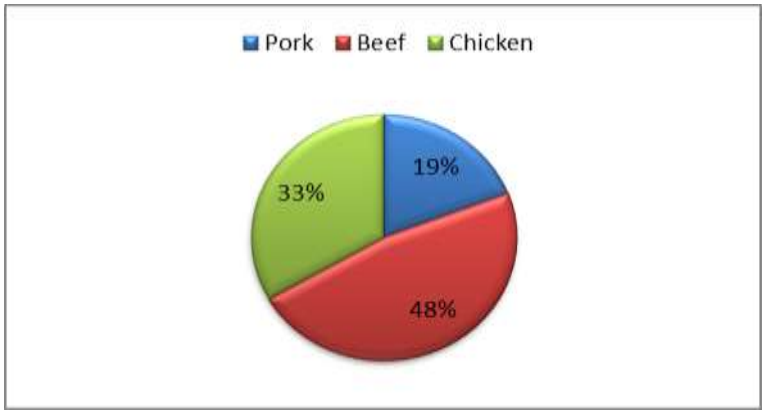



**Source**: Field data (2015)

### 4.5.8 Preferred Type of Meat

Figure 4.13 below shows the eating habits of meat among rural men in Bagamoyo district. Out of 120 respondents, 55% preferred to eat meat every day as the main food as compared to 45% who did not. Beef was highly preferred by most of the respondents by 48% followed by chicken 33% and 19% preferred pork.

**Figure 4.13: Percentage distribution of Respondents by Most preferred Type of Meat**

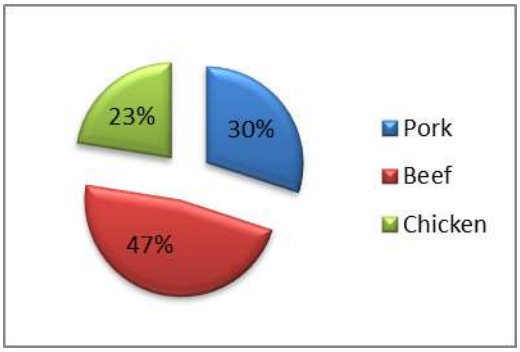



**Source**: Field data 2015

### 4.5.9 Relationship between Preferred Type of Meat and Obesity

Figure 4.14 below shows the preferred type of meat by obese respondents. The findings indicated that 47% preferred beef, 30% pork and 23% chicken.

**Figure 4.14: Percentage distribution of Respondents by Relationship between Preferred Type of Meat and Obesity**




**Source**: Field data (2015)

### 4.5.10 Preferred Types of Beverage

There were different beverages preferred by rural males. Table 4.4 below presented frequency of preferred types of drinks by respondents. Mainstream of the respondents 80% preferred to drink water, followed by 62.5% who preferred coffee, 57.5% preferred tea whereas 55.8% and 50% preferred beer and milk respectively. In additional about 46.6% of the respondents preferred to drink soda and 37.5% local brew.

**Table 4.4: Percentage distribution of respondents by Preferred Types of Beverage**

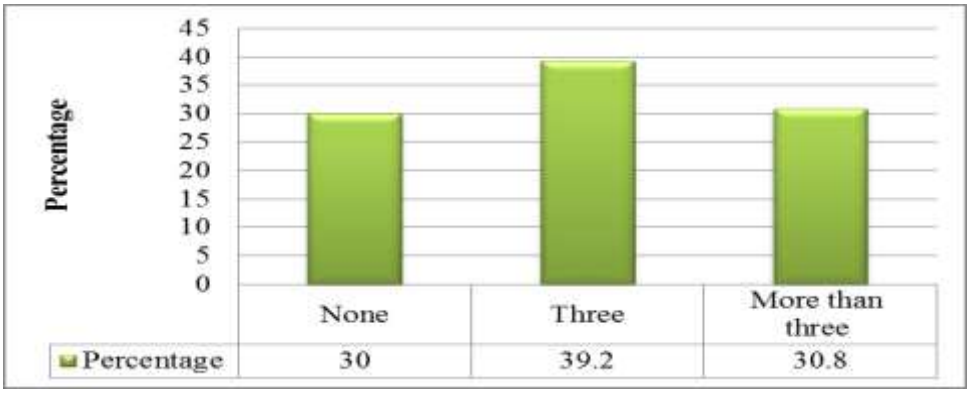
| Type of Drink | Frequency | Percentage |
|---|---|---|
| Soda | 56 | 46.6 |
| Water | 96 | 80.0 |
| Beer | 67 | 55.8 |
| Tea | 69 | 57.5 |
| Milk | 60 | 50.0 |
| Coffee | 75 | 62.5 |
| Local brew | 45 | 37.5 |
| None of the above | 0 | 0 |

*Note: There were multiple-choice responses **Source**: Field data 2015

### 4.5.11 Frequency of Drinking Soda or Sweetened Beverage

The findings indicated that more than 39% of the respondents taken three sodas or other sweetened drinks a day while 30.8% taken more than 3 and 30% did not drink any (see Figure 15 below).

**Figure 4.15: Percentage distribution of respondents by Frequency of Drinking Soda or Sweetened Beverage**

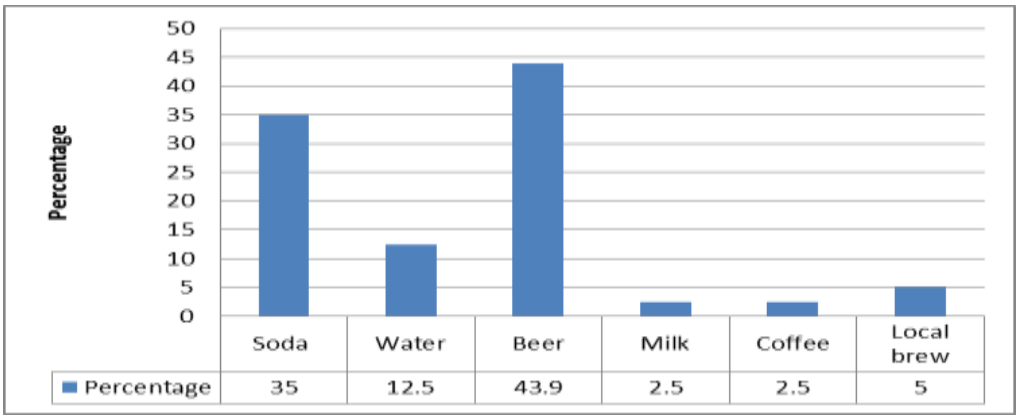



**Source**: Field data 2015

### 4.5.12 Relationship between Types Beverage and Obesity

Figure 4.16 below presented the relationship between types of beverage and obesity. Majority of obese respondents 43.9% preferred beer and 35% soda; only 12.5% preferred water.

**Figure 4.16: Percentage distribution of respondents by Relationship between Types Beverage and Obesity**




**Source**: Field data (2015)

## 4.6 Physical Activities as the Determinant of obesity

### 4.6.1 Participation in Physical Activities

Physical activities make people to feel well with their body. The respondents asked if they participated in any physical activity. It revealed from the findings that; majority of them 70.8% did not participate in any physical activities; only 29.2% participated. Most of the respondents 30.8% participated in football, 30% evening walk, 21.7% jogging and 17.5% basketball. In addition, respondents were asked about the reasons for their involvement in physical activities. Some said that physical activities keeps their body fit, ability to self-defense in case of any physical attack, others said they want to be healthy to enhance body metabolism to take place in order to reduce or burn unnecessary fats and remove bad cholesterol and reduce weight to avoid diseases (see Table 4.5 below).

**Table 4.5: Percentage distribution of Respondents by Participation in Physical Activities**

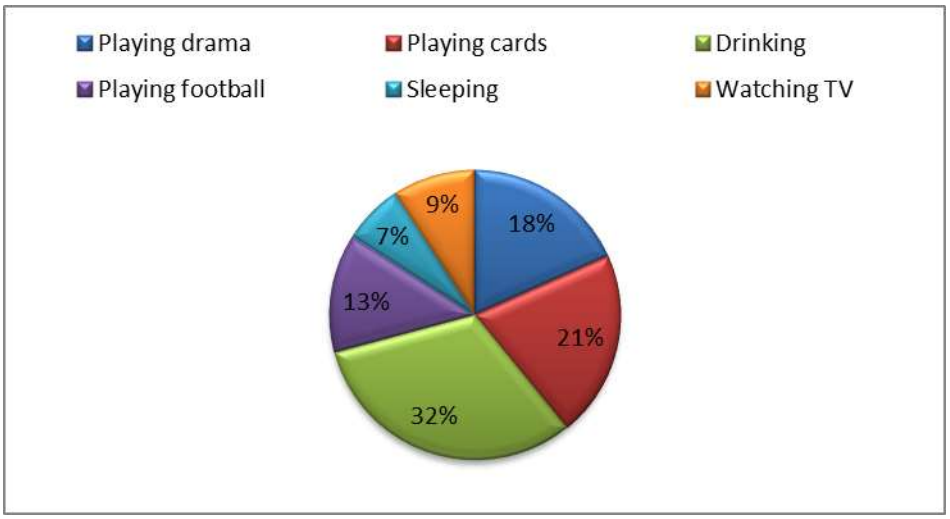
| Variables | No of Respondent | Percentage |
|---|---|---|
| Do you participate in any physical activity? | | |
| Yes | 35 | 29.2 |
| No | 85 | 70.8 |
| **Total** | **120** | **100** |
| | | |
| Which type of physical activity do you participate? | | |
| Jogging | 26 | 21.7 |
| Football | 37 | 30.8 |
| Basket ball | 21 | 17.5 |
| Evening walk | 36 | 30 |
| **Total** | **120** | **100** |

**Source**: Field data (2015)

### 4.6.2 Activities after Working Hours

Participants asked what always they do after working hours. The findings indicated that most 32% of the respondents preferred drinking after working hours, 21% playing cards, 18% playing drama and 13% playing football. Few respondents 7% and 9% preferred to sleep and watching TV respectively (see figure 18 below).

**Figure 4.16: Percentage distribution of respondents by Preferred Activities after Working Hours**




**Source**: Field data (2015)

### 4.6.3 Availability of Recreation Place and Clubs Engagement

Only 30.8% of the respondents admitted to have recreation places in their locality whereas 69.2% revealed not to have such places. In addition, to that, the findings showed that only 35.8% had engaged in recreation clubs available in their places whereas 64.2% did not (see Table 4.6 below).

**Table 4.6: Availability of Recreation Place and Clubs Engagement**

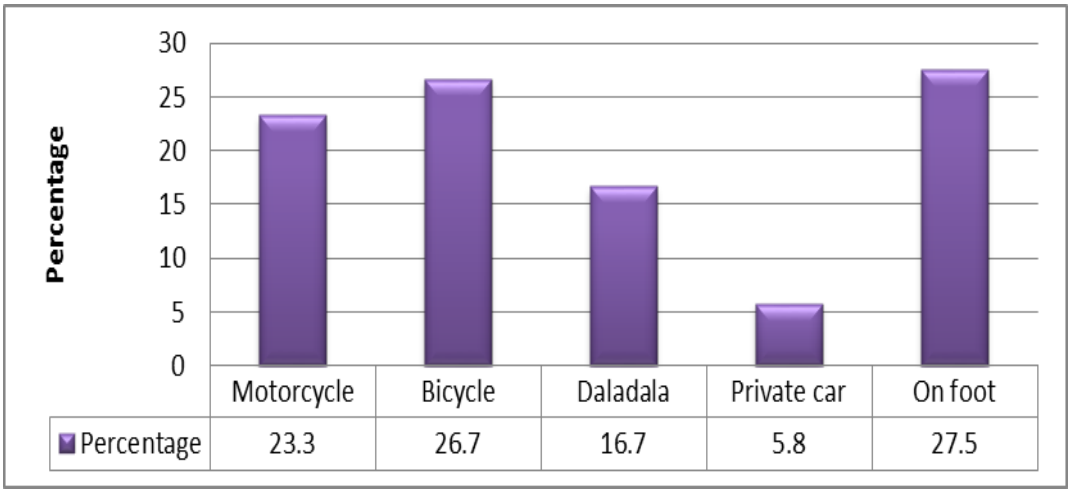
| Variables | No of respondents | percentage |
|---|---|---|
| Are there any recreation places in your area of resident? | | |
| Yes | 37 | 30.8 |
| No | 83 | 69.2 |
| **Total** | **120** | **100** |
| Do you engage in any recreation clubs | | |
| Yes | 43 | 35.8 |
| No | 77 | 64.2 |
| **Total** | **120** | **100** |

**Source**: Field data (2015)

## 4.7 Means of Transport

Availability and means of transport reported by respondents presented in figure 4.17 below. Majority of the respondents 27.5% revealed that they always walk from one point to another whereas 26.7% reported to use bicycles as means of transport and more than 23% use motorcycle. Only 16.7% and 5.8% of the respondents reported to use daladala and private car respectively.

**Figure 4.17: Percentage distribution of Respondents by Means of Transport used**




**Source**: Field data (2015)

## 4.8 Relationship between Physical Activity and Obesity

Table 4.7 below summarized relationship between physical activities and obesity. About 70.7% of the obese respondents did not participate in physical activities as compared to only 29.3% who participated. Also, the findings indicated that over 34% of the obese respondents had drinking habit after working hours, 20% and 19.5% were playing cards and watching TV respectively. In addition, the findings showed that over 56% of the obese respondents reported that they do not have recreation places as compared to 43.9%. However, 65.9% reported that they did not engage in any recreation clubs available.

**Table 4.7: Percentage distribution of respondents by Relationship between Physical Activity and Obesity**

| Variables | No | % |
|---|---|---|
| Do you participate in any physical activity? | | |
| Yes | 12 | 29.3 |
| No | 29 | 70.7 |
| **Total** | **41** | **100** |
| What are you doing after working hours? | | |
| Playing drama | 4 | 9.8 |
| Playing cards | 9 | 22.0 |
| Drinking | 14 | 34.1 |
| Playing football | 3 | 7.3 |
| Sleeping | 3 | 7.3 |
| Watching TV | 8 | 19.5 |
| **Total** | **41** | **100** |
| Are there any recreation places in your residents? | | |
| Yes | 18 | 43.9 |
| No | 23 | 56.1 |
| **Total** | **41** | **100** |
| Do you engage in any recreation clubs available | | |
| Yes | 14 | 34.1 |
| No | 27 | 65.9 |
| **Total** | **41** | **100** |

**Source:** Field data 2015

# CHAPTER FIVE

# DISCUSSION OF FINDINGS

## 5.1 Introduction

Weight gain has always regarded as to man to be a sign of good health and prosperity. Excessive energy stored as adipose tissue in the body depots has proved to be an efficient and practical way of making energy available for utilization by the body whenever it needed. These days' profound changes have occurred in our lives in association with improved living standards that have led to clearly reduced need for utilization of stored energy and even for moderate levels of activity. Consequently, the prevalence of weight gain and obesity are also rising and becoming a major public health problem in many countries of the world.

## 5.2 Obesity and Demographic Characteristics

Most of the study participants 40% were of the age above 40 years. Based on the BMI measurements; the distribution of both overweight and obesity among the age groups of the study participants showed that overweight and obesity increased with the age. Of the participants who were obese 41.5% were of the age of 40 year and above. The study by Muhihi et al., (2012) also revealed that prevalence of obesity increases with age. It argued that association of age and obesity could not be separated because as when you become aged physical activities decrease.

It was also observed that marital status has association with obesity; the risk of becoming obese increased when rural men are living with partners. This is supported by the findings of this study; 37% and 27% of the obese men were married and cohabiting respectively. Not only marital status; obesity is also determined by the status of occupation whether in formal or self-employment. The findings show that among the obese men 39% were employed and 32% self-employed. This can be argued that when men are employed they are assured of earning reasonable income and this facilitate to reduce practice behavior leading obesity.

Of the obese men, 26.8% earned above 300,000TZS per month, whereas 22% earned from 251,000 - 300,000TZS and 22% earned from 201,000 – 250,000TZS as compared

to only 2.4% who earned below 50,000TZS. Moreover, it was also noticed that obesity increased with the level of education as people attend school they become more exposed to the environment to for them to change their life style. The findings of this study are contrary to the study done by Grace, and Ferdinand (2011) that showed that those with no formal education had the highest prevalence of obesity. Their study further pointed out that those who are self-employed may have a better income than the employed ones who are far better educated due to the existing low salaries among civil servants in Tanzanian government.

### 5.3 Obesity and Eating behavior among Rural Men

Diet intake has been cited as a one of the causes in development of overweight and obesity. Findings showed that rural men have improper way of eating (over eating). Majority of the obese men (56%) in this study reported to eat 3 meals and 24% more than three meals a day. Ugali and rice together with beef, beans and fish noticed to be preferred during lunch and dinner. The findings also indicated that 47% of the obese men in this study preferred beef and 30% pork. It was observed from the findings that rural men preferred to eat starch in the afternoon as well as during evening. It revealed that intake of vegetables and fruits are low. As observed that, men preferred to eat foods, which have high fat content and calories ultimately leading to the increased rate of obesity problem among rural men. The study by Foster (2002) argued that rural residents in some areas eat a higher fat and calorie diet resulting in obesity. Only 15% of the respondents ate fruits and vegetable daily whereas the rest sometimes they did or rarely; over 18% they never ate vegetables or fruits. It was argued by one of respondents that eating vegetable is a sign of being poor; while in Bagamoyo there are a lot of fish and small fish (dagaa), why eat vegetables as a meal?

In general, majority of the study participants 80% preferred to drink water followed by 62.5% who preferred coffee, 57.5% preferred tea. In addition, 39% of the respondents were taking 3 sodas or other sweetened drinks a day while 30.8% took more than 3.

However; further analysis revealed that majority of obese respondents 43.9% preferred beer and 35% soda; only 12.5% preferred water. These findings signify that drinking habit of the men in the study contributes to the problem of obesity. Most of the obese

men have a drinking habit after working hours, thus the combination of foods intake and drinking habit of sodas and beer and no physical activities determine the rate of obesity. Study by Popkin (2006) also showed that sweetened things like soda as other sweetened drinks have replaced water and milk. Nyaruhucha (2003) also argued that excessive alcohol drinking has been directly related to obesity and diabetes among government executives.

### 5.4 Physical Activity

The findings of the results show most of rural men did not engage in physical activities as after working hours they are playing cards, playing drama, drinking, going to beach as it has become the culture of rural men in Bagamoyo. The findings of this study indicated that 70.7% of the obese respondents did not participate in physical activities as compared to only 29.3% who participated. The study by Wadden (1997) revealed that image of active rural lifestyle is no longer accurate; rural residents tend to be less physically active than urban residents are. This also is supported by the finding of this study as 34% of the obese respondents had drinking habit after working hours, 20% and 19.5% were playing cards and watching TV respectively. Increasing physical activity is an effective way to maintain body composition and potentially prevent obesity (Bourchard et al., 2002). It appears that physical activity is an important component on long-term weight control, and therefore adequate levels of activity should prescribe to combat the obesity epidemic (Jakicic, and Otto, 2005).

Few of men said that there is a practice of rural men of acting as *mwinyi* and not helping their wives in some of physical activities like digging, fetching water, as well not doing physical activities with their families. Doing so is not their culture and if a man *mweuse* will be seen helping the wife in such activities people will call him *mzungu*. Others said that they are not engaging in physical activities because they have no time. The study by Mbalilaki et al (2007) had the same findings that life transitions such as moving from college to full time employment decrease participation rate in physical activities.

Findings showed that over 34% of the obese men in this study had drinking habit after working hours. Obesity also has association with types of job; for example, those who are

shopkeepers most of the time they have to be in their shops so they have no time to participate in physical activities.

### 5.5 Environment

The environment exposes people to abundance of high calories, high fat foods that are readily available, relatively in expensive, heavily advertised and reasonably tasty. The findings show that the environment, which is changing from day to day, has influenced people's life as participants said their wives also want to go with the change of the world. They cook food with a lot of oil; putting different spices so that their husband can eat and stop eat from restaurants and other places. Therefore, they said they use to eat sometimes pilau with beef or chicken, chapati, biliani and pasta such as spaghetti. In addition to that, their barriers to healthy eating may contribute to high rate of obesity within rural men environment with low income who cannot afford to buy fruits, vegetables and whole grains as they are expensive and their income is low.

### 5.6 Cultural Determinants

Findings show that being fat is regarded as a social status and people see you as wealthy and you have good health rather than a thin person. Being fat for a men means, he is well off. This statement can be supported by Muhihi et al., 2012) who said that most people in Tanzania think having obesity is the indicator of a person to be free from HIV/AIDS as well is the sign of being wealth and this cause most people to be affected by HIV/AIDS as they look physical appearance only. In addition, cultural determinants believe that men have to eat more food than women do; also, men who are married, their wife have to prepare good food for them. As well, the food for married men is prepared well. During findings, married men been indicated that they have more obesity than other men do and this is due to the way their foods are prepared for.

### 5.7 Social Determinants

Due to the development of social networks like facebook, twitter, whatsapp, instagram viber, made people do their social issues through online where they get different friends and they do not go to playing grounds where they can meet other friends. As well, opportunities may be limited when there is no place for creation as some respondents said

they did not have a place for recreation where they can jog or walk and hence at the end, they become obese.

### 5.8 Health Effects Associated with Obesity

Obesity is the public health problem in the world and has become the problem in developing countries such as Tanzania. Obesity has psychological, behavioral and medical consequences, the nature and severity of which have been influenced by the degree of obesity. The health consequences of massive obesity are evident, with as much as a 12-fold increase in the rate of death from cardiovascular diseases in men aged 25-34 with this condition (Kissebah, 1982). The findings from document review showed that 28.7% and 20% of patients at CTC clinic were overweight and obese respectively whereas in diabetes clinic the findings were worse; most of the patients 34.7% and 32.6% were overweight and obese respectively. These findings imply that overweight and obese patients from both clinics were at severe risk of co-morbidities including heart disease, high blood pressure, stroke Type 2 diabetes, abnormal blood fats, metabolic syndrome, cancer, osteoarthritis, sleep apnea, obesity hypoventilation syndrome, and gallstones. In addition to that, findings show that, after those men get the impact of obesity they die and left their wives as widows, their children become orphans. Then there tends to be an increase of dependants in the family and due to low income of some rural men in Bagamoyo children stop to study because a lot of money spent in taking their parents to hospital and sometimes they have to take care of their parents when they are sick. Then, obesity can lead to economic effect, as treatment and medical care are costly.

### 5.9 Challenges Facing Rural Men

The researcher found different challenges facing rural men in Bagamoyo in obesity prevention, as most of rural men have no education about food and nutrition, they do not see the importance of physical activities, new technology of socialization, which keeps most men charting like facebook, viber, whatsapp, instagram and twitter. Since they tend to feel that they have done socialization when their charting with their friends and they do not see if recreational physical activities are of any importance.

Another challenge is how to take care of children after parents have died of the impact of obesity. Therefore, the findings show that most of rural men are poor economically and

fail to buy fruits and vegetables as to eat balanced diet. Another challenge is the ways of cooking food as Bagamoyo like to use coconuts in their food, as it has been said coconut contain cholesterol, which also contributes to obesity. Furthermore, they have a challenge on education on how to prevent and control obesity, education on eating balanced diet and education on physical activities (exercises).

# CHAPTER SIX

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 6.1 Introduction

This chapter shows the summary of the study by revealing general objective particularly that was addressed in the fourth chapter, as this helps in giving out conclusion and some of the recommendations of the study. It presents some of the recommendations as obtained partly from the respondents during the study and other views of the researcher from the study done on the analysis and observation from Bagamoyo District Hospital.

## 6.2 Summary

The study was conducted at Bagamoyo District Hospital, where by the purpose of the study was to determine of obesity among rural men aged 18 and above in Tanzania. The researcher specifically aimed to know the determinants of obesity among rural men in Bagamoyo. Obesity is a public health problem, which is Globally, Africa, Tanzania as well in Bagamoyo District. Obesity has different theories as Behavioral Susceptibility Theory, Schachter's Externality Theory of Obesity, Fat cell theory, Ecological Theory all these theories explained determinants of obesity and how to prevent being obesity. As well, theoretical framework indicates the determinants of obesity, effect of obesity and hence shows the outcome of obesity, which is mortality rate. In addition, the methods used to collect data were questionnaire and documentary review. Data collected were both primary and secondary in nature. Then data processing and analysis were done by using Micro Soft Excel. The findings of results indicated three major determinants of obesity, which were demographic and social determinants, eating behavior determinants, and Physical activities determinants.

## 6.3 Conclusion

Obesity results from over nutrition, low physical activities, cultural attitudes, absence of social activities, and genes from parents, some of environmental factors, and change of dietary habits. To treat obesity, restricting food intake and engaging in physical fitness are necessary.

Although exercise can help a patient reach a target weight, dietary restriction and control may be more effective for treatment of obesity. It seems that society needs to instill in young people healthy and orderly eating habits based on sound nutritional science and to provide sports fields and opportunities, education, encouragement and motivation to use them on regular basis. Exercise and sensible eating are the best ways of regulate body fat percentage. Nevertheless, the key to keeping a healthy body weight is largely dependent on one's lifestyle. Despite lower rates of obesity than many regions of the world, obesity is increasing in Africa, Tanzania and Bagamoyo District. Tanzania should therefore place measures in place to forestall its effects on health burden on the health care system.

## 6.4 Recommendations

### 6.4.1 Recommendations for Practice

The high rates of obesity in the study point to a need for behavior change related to improved lifestyle through increased physical activity and improved dietary practices. This would help to prevent the increase of obesity among rural men. This could be though increasing their physical activity, both planned and unplanned, for instance by walking or enrolling in facilities that offer planned activity. For the rural men who are in the lower socio economic groups and cannot afford these facilities by walking or jogging would be practical for them.

There is need of awareness on the problem of obesity especially among rural men. The awareness could focus on areas like making healthy food choices. This is necessitated by observation that in lower socio economic group, there were many food restaurants along the pathways who sell fatty foods, which were mostly prepared using deep frying method such as doughnuts, fish and chips.

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 in upper socio economic groups and those who are better off in terms of socio economic status. This is justified by the rising levels of obesity up the social economic group, and the low levels of physical activity relative to the other socio economic groups.

### 6.4.2 Policy Recommendations

The high prevalence of obesity using all three indicators calls for public health interventions to reduce the prevalence of obesity among rural men in Tanzania. Awareness programme about the consequences of overall and abdominal obesity including prevention activities should be made available in the workplace and in the community to act as reference point for the rural men, even as the government of Tanzania, non-governmental organizations and other stakeholders fight with the problem of food insecurity. Then efforts should be directed towards obesity because of the associated health risks. This problem needs to be emphasized as the prevalence of obesity keeps increasing and may continue to be worse unless appropriate preventive measures ae taken. The study found that obesity is not a problem only limited to the high socio economic groups in Tanzania. Even in the lower socio economic groups, the problem exists; hence, affordable interventions targeting all social economic groups should be put in place. For instance, social facilities like community centres with fitness facilities could be considered and improvement of infrastructure would create a more conducive environment for physical activities. These could be alongside where people can walk or jog.

Policies on health and human welfare should focus on development of the generation that is free from cardiovascular diseases and other chronic diseases, which are results of overweight and obesity. Since rural men obesity suffers a lot, policies should focus on elimination of the problem at childhood age. Treatment of diseases resulting from overweight and obesity reported to be expensive. Thus, efforts should be made to control the problem among rural men.

Policies on health should focus on education on how to prevent and control obesity, education on eating balanced diet and education on physical activities as from primary education to higher education so that people can be aware of preventing unnecessary obese.

### 6.4.3 Recommendations for Further Research

A more advanced method to study the determinants of obesity among rural men aged 18years and above in Tanzania is recommended. Such method may include conducting a longitudinal study that will help to get a systematic progress of overweight and obesity among rural men.

A study to identify the type of physical activities that can effectively work out on obesity among rural men within a limited range of time is also needed. For this case, an experimental study with effective diet management between the experimental groups is suggested.

In additional further, research should look on into the problem among rural women in Tanzania.

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## APPENDICES

### Appendix 1: Survey Questionnaire

### INTRODUCTION

**Objectives**

Hello, my name is Pendo Eva Lugendo from Mzumbe University pursuing Master of Health Systems Management. I am conducting a research to **explore the determents of obesity among rural men aged 18 years and above in Bagamoyo District**. I would like to take this opportunity to request your sincere cooperation in answering the questions as the part of primary data for the study. You requested to respond to the questions to the best of your knowledge, as it will provide important and valuable information, which would enable to understand the status of the condition.

**Informed consent and confidentiality**

Your participation in this study is voluntary and therefore you can withdraw from the study without encounter any consequences. In addition, your responses will be confidential and anonymous. With this note therefore, your name will not appear on any page of this questionnaire. The information collected used only for the purpose of this study only.

Thank you in advance for your willingness to participate in this study

**SECTION A: SOCIO DEMOGRAPHIC INFORMATION**

1. Name of the village: _____
2. Name of the ward: _____
3. Name of the Health Facility: _____
4. Height:|____|____|
5. Weight: |____|____|
6. Age of the respondent (years): |____|____|

7. Marital status
    a. Single
    b. Married
    c. Cohabiting |_____|
    d. Separated
8. Education level
    a. No formal education
    b. Primary education (incomplete)
    c. Primary education (complete)
    d. Secondary education (ordinary level, incomplete) |_____|
    e. Secondary education (ordinary level, complete)
    f. Secondary education (advanced level)
    g. College/University
9. Occupational
    a. Employed
    b. Self employed
    c. Farmer |_____|
    d. Shopkeeper
10. Monthly income
    a. Below 50,000
    b. 50,000 – 100,000
    c. 101,000 – 150,000
    d. 151,000 – 200,000
    e. 201,000 – 250,000 |_____|
    f. 251,000 – 300,000
    g. Above 300,000
11. Family history of overweight
    a. YES
    b. NO |_____|

**SECTION B: DETERMINANTS OF OBESITY** *Please cycle appropriate response*

**SECTION B1: DIET AND EATING BEHAVIOR**

12. How many times are you eating in a day?
    a. One
    b. Two
    c. Three
    d. More than three
13. What are you eating as breakfast?
    a. Cassava
    b. Doughnuts
    c. Yams
    d. Bread
    e. Meat
    f. Milk
    g. Chocolate
    h. Vegetables
    i. Fruits
14. What are you eating as lunch?
    a. Ugali and beef
    b. Rice and beef
    c. Banana and beef
    d. Ugali and fish
    e. Rice and fish
    f. Banana and fish
    g. Ugali and vegetables
    h. Rice and Vegetables
    i. Banana and Vegetables
    j. Ugali and beans
    k. Rice and beans
    l. Banana and beans
    m. Others Specify _____

15. What are you eating as dinner?

a. Ugali and beef
b. Rice and beef
c. Cassava and beef
d. Banana and beef
e. Ugali and fish
f. Rice and fish
g. Cassava and fish
h. Banana and fish
i. Ugali and vegetables
j. Rice and vegetables
k. Banana and vegetables
l. Ugali and beans
m. Rice and beans
n. Cassava and beans
o. Banana and beans
p. Others Specify _____

16. What type of drinks do you prefer to drink always?

a. Soda
b. Water
c. Beer
d. Tea
e. Milk
f. Coffee
g. Local brew
h. None of the above
i. Others Specify _____

17. Do you eat meat every day? (If No skip to question 19)

a. Yes
b. No

18. Which types of meat do you eat?
    1. Pork
    2. Beef
    3. Chicken
    4. Often (specific)_____

19. Do you eat fruits every day? (If No skip to question 21)
    a. Yes
    b. No

20. Which fruits do you eat?
    a. Papaws
    b. Mangoes
    c. Oranges
    d. Avocado
    e. Water melon
    f. Bananas
    g. Other specific _____

21. How often are fruits and vegetables included as part of your meals?
    a. Daily
    b. Sometimes
    c. Rarely
    d. Never

22. How many sodas or sweetened beverages do you drink each day?
    a. None
    b. 1- 3
    c. More than three

**SECTION B2: PHIYSICAL ACTIVITY**

23. Are you participating in any physical activity?
    a. Yes
    b. No
24. If the response to question No.17 is No. Why? (If No skip to question 27)

    _____

    _____
25. What physical activity do you engaged?
    a. Jogging
    b. Football
    c. Basket ball
    d. Evening walk
    e. Others specify _____
26. Why do you engage in that physical activity?

    _____

    _____
27. Do you think your daily activities are enough to keep your body healthy?
    a. Yes
    b. No

**SECTION B3: ENVIRONMENT**

28. What are you doing after the working hours always?
    a. Praying drama
    b. Praying cards
    c. Drinking
    d. Praying board
    e. Praying football
    f. Sleeping
    g. Watching TV
    h. Others specify _____

29. Are there any recreation places in your area of resident?
    a. Yes
    b. No
30. Do you engage in any recreation clubs available in your area of resident?
    a. Yes
    b. No
31. Which mean of transport are you using always to facilitate you daily activities?
    a. Motorcycle
    b. Bicycle
    c. Daladala
    d. Private car
    e. On foot

**SECTION B4: SOCIAL DETERMINANTS**

32. How often does your family do something active together? (If Never skip to question 34)
    a. Daily
    b. Sometimes
    c. Rarely
    d. Never
33. What of physical activities, is the family doing together?
    a. _____
    b. _____
    c. _____

**Appendix 2: Informed Consent Form**

INFORMED CONSENT FORM

This informed consent form for research is concerning on the topic of Determinants of Obesity among rural men aged 18 years and above in Bagamoyo district

I, the undersigned, confirm that (please tick box as appropriate):

| | | |
|---|---|---|
| 1. | I have read and understood the information about the research, as provided in the Information Sheet dated _____. | ☐ |
| 2. | I have given the opportunity to ask questions about the research and my participation. | ☐ |
| 3. | I voluntarily agree to participate in the research | ☐ |
| 4. | I understand I can withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor will questioned on why I have withdrawn. | ☐ |
| 5. | The procedures regarding confidentiality have been clearly explained (e.g. use of names, pseudonyms, anonymisation of data, etc.) to me. | ☐ |
| 6. | If applicable, separate terms of consent for interviews, audio, video or other forms of data collection explained and provided to me. | ☐ |
| 7. | The use of the data in research, publications, sharing and archiving been explained to me. | ☐ |
| 8. | I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms, I have specified in this form. | ☐ |
| 9. | Select only **one** of the following:<br>1. I would like my name used and understand what I have said or written as part of this study used in reports, publications and other research outputs so that anything I have contributed to this project recognized.<br>2. I do not want my name used in this project. | ☐<br>☐ |
| 10. | I, along with the Researcher, agree to sign and date this informed consent form. | ☐ |

**Participant:**

_____ _____

Name of Participant Signature Date

**Researcher:**

_____ _____ _____

Name of Researcher Signature Date