

**ASSESSMENT OF OBESITY AND OVERWEIGHT AMONG WOMEN
TRADERS AGED 20-50 YEARS IN ELDORET MUNICIPAL MARKETS,
KENYA**

BY

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DECLARATION

Declaration by the Student

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DEDICATION

I dedicate this thesis to all organizations and persons that are committed to guiding people on health issues that are related to overweight and obesity.

ABSTRACT

Overweight (BMI 25-29) and obesity (BMI ≥ 30) is a global epidemic. Increase in non-communicable diseases is a major cause of death globally that is linked to nutritional imbalances like overweight and obesity. The main objective of this study was to assess overweight and obesity conditions among women traders aged 20-50 years at Eldoret Municipal markets, Kenya. The women's anatomy, physiology and metabolism, diet and sedentary lifestyle plays significant roles in predisposing them to overweight and obesity which increases in a cross sectional manner as people age. This was a cross sectional descriptive survey. The significance of this study is to bring into focus the magnitude of overweight and obesity and be a benchmark for implementation of strategies to mitigate the risks associated with the two conditions not only among women, but the society at large. To sample the 238 women traders, stratified random sampling was used followed by systematic sampling whereby the 3rd woman aged 20-50 years in each stratum was selected. Proportionate sampling was used to identify the number of participants per market because all the four markets differ in size. Data on demographic information, their physical activity patterns and feeding habits and dietary choices as well as anthropometric measurements was collected from 238 registered female traders aged 20-50 years from the Eldoret Municipal markets. Body Mass Index (BMI) was used to assess overweight and obesity. Data was analyzed using the Statistical Package for Social Sciences (SPSS) software (Version 26). Descriptive statistics was used to describe the data. The risk of overweight (24%) and obesity (37%) among the women traders was 61%, parity was high for 3-5 children (47%), and level of education was high for primary education at (48%). It was concluded that the overweight and obesity among women traders (61%) hence the need to address nutritional needs, promoting healthy dietary practices, encouraging physical activity and enhancement of knowledge and awareness of overweight and obesity.

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LIST OF ABBREVIATIONS

BMI	Body Mass Index
CDC	Center for Disease Control and Prevention
KDHS	Kenya Demographic and Health Survey
KNBS	Kenya National Bureau of Statistics
NACOSTI	National Commission for Science, Technology and Innovation
PA	Physical Activity
SES	Social Economic Status
WHO	World Health Organization
WtHR	Waist to Hip Ratio
FVS	Food Variety Score
DDS	Dietary Diversity Score
OWO	Overweight and Obesity

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CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Obesity and overweight (OWO) stems from the abnormal or excess fat accumulation in adipose tissue, to the extent that the health of an individual becomes impaired (Ahmed, Sultana, & Greene, 2021). The definition of OWO in adults, is defined by a BMI of greater than 30.0 Kg/ M² for obese and greater than 25.0 Kg/M² for overweight respectively (WHO, 2016). Increased levels of OWO are primary contributing factors not only to the global burden of chronic disease, but also to disability and low life expectancy of about 2.8 million people every year (Chu, Nguyet, Dinh, Lien & Ngoc, 2018; Roth, Mensah, Addolorato, Ammirati, Baddour & Benziger, 2020). A major factor contributing to the increase in non-communicable diseases (NCDs) is the escalating cases of OWO that in 2017 was close to malnutrition and infectious diseases which are major health threats for the developing world (Mawaw, Yav, Mukuku, Lukanka, Kaadi, Tambawe & Luboya, 2017).

Genetics play an important role in determining a person's susceptibility to obesity although it does not stem from a genetic mutation (Melzer, Pilling, & Ferrucci, 2020). A specific gene that has been implicated in the determination of OWO is leptin. The implication is that leptin plays a role in reducing food intake, and mobilizing fats until the body weight returns to normal (Xu, Wang, Tan, Zhang & Feng 2020); which is an indicator of a metabolic pathway that exists to curb OWO. Therefore, leptin-deficient individuals end up struggling with weight issues and consequently become obese (Melzer, Pilling & Ferrucci, 2020). Franzago, Santurbano, Vitacolonna, & Stuppia,

(2020) argue that factors like genetic predisposition and inherited conditions cannot be altered by the individual, but alterations are practical in lifestyle choices such as eating healthy or unhealthy foods, alcohol consumption, smoking and engaging in physical activity or a sedentary lifestyle.

Other obesity predisposing factors include: diet quality, physical inactivity, social determinants and age.

Diet quality- The human body processes different types of food differently. Whole foods like fresh vegetables and fruits, whole grains, nuts and white meats are higher in nutrients and have the ability to keep one more satisfied for longer hours (Rondanell, Faliva & Mazzola, 2021). On the other hand, processed foods tend to have more saturated fats and added sugars and often low in satiety. A study by Sifo (2022) shows that eating processed foods is linked to OWO because people tend to consume more calories than needed.

Physical inactivity- physical activity can result to the body using energy. When an individual is able to match the levels of physical activity and calorie consumption, then the risk of OWO is greatly reduced (Akinrinmade & Akindoyo, 2022). Spending most of the day sitting, whether it is due to work or leisure does not allow an individual to get the recommended amount of physical activity hence predisposing one to increased risks of being OWO.

Social determinants- these are the circumstances that an individual has very little control of, yet they have an impact on the community and life as a whole. Socioeconomic status is one of the social determinants that can cause OWO. When one has a low income, then more than often, they are not in a position to afford healthy foods, resulting to consumption of foods with the aim of satiety and not nutritional benefits (Daniel, 2020).

Age – As any individual grows older, the general body components and metabolism changes. There are hormonal changes which affect the general functioning of the body (Lee, Bartsch, Mui, Haidari, Spiker and Gittelsohn, 2018). The body muscles also decreases; the body metabolism tends to reduce which may result in more fat retention hence increasing the risks of OWO.

Overweight and obesity is a complex condition, with serious social and psychological dimensions. Its likelihood varies according to age, sex and region (Girdhar, Sharma, Chaudhary, Bansal, and Satija, 2016). The levels of OWO are increasing among women of reproductive age in urban Africa, with obesity among this age group having more than doubled in 12 of the 24 countries; with the urban settings being the most affected (Amugsi, Dimbuene, Mberu, Muthuri and Ezeh, 2017).

The status of OWO elevates health risks among women at a reproductive age by predisposing them to cardiovascular disease, diabetes, kidney disease and obesity related cancers (Glastras, Chen, Pollock and Saad, 2018). Obesity in pregnancy has implications such as gestational diabetes, pre- eclampsia, an increased miscarriage rate, stillbirth as well as congenital anomalies (Pfaller, Siu, D'Souza, Wichert, Kumar, Haberer and Silversides, 2021). Furthermore, there will be implications for the mother and children later in life including an increased risk of non-communicable diseases such as cancers, heart disease, hypertension and gestational diabetes in addition to increasing the risk of future obesity in the children (Pfaller et al., 2021). In addition, OWO are associated with decreased contraceptive efficacy and ovulatory disorders in women of reproductive age and other complications such as negatively impacting normal delivery (Amugsi,

Dimbuene, Mberu, Muthuri and Ezeh, 2017). There are other unique obesity-related conditions that mostly affect women who are obese than those who are not; these include: osteoarthritis which affects the bones, cardiovascular diseases like high blood pressure, endometrial cancer which starts by affecting the lining of the womb, polycystic ovary syndrome which if not treated makes it difficult for someone to have close to or normal weight range among other health complications (Giannini, Montt-Guevara, Shortrede, Palla, Chedraui, Genazzani, & Simoncini, 2019).

Despite the serious implications of OWO, most attention is concentrated on famine and under nutrition or malnutrition of children (Ekholuenetale, Tudeme, Onikan, & Ekholuenetale, 2020) yet women form a better part of the community, hence equally exposed to health risks associated with OWO. This study therefore assessed OWO among female traders aged 20-50 years in Eldoret municipal market

1.2 Statement of the problem

Overweight and obesity are potentially a global health threat with more than 1.6 billion adults being overweight (WHO, 2016) hence posing social, economic, physical and emotional burden to nations (Tremblay, LeBlanc, Kho, Saunders, Larouche, Colley, & Gorber, 2011). According to the Kenya Demographic Health Survey, OWO is on the rise from 13.8% in 2003 to 23.4% in 2008 among women (WHO, 2018). There is also empirical evidence that the existence of obesity among women is higher than men, with the incidences increasing with age (Chooi, Ding, & Magkos, 2019). Yaya, Ekholuenetale, and Bishwajit (2018) studied sub-Saharan countries including Kenya with the objective

of giving a description of the OWO trends and they established that there was a yearly 5% increase in obesity among urban women.

The women's anatomy, physiology and metabolism, diet and sedentary lifestyle plays significant roles in predisposing them to OWO (Bovolini, Garcia, Andrade, & Duarte, 2021). Age is a major determining factor for the development of OWO and women between the ages of 25 and 44 years showing the greatest amount of weight gain (Wang & Ren, 2018). Tauqeer, Gomez, & Stanford (2018) explained the phenomenon and described that one main contributing factor is childbearing, with a large number of women retaining gestational weight gain. Consequently, the women experience the implications of OWO which include vulnerability to NCDs, fertility issues and generally a reduction in the life expectancy (Roth, Mensah, Johnson, Addolorato, Ammirati, Baddour & Benziger, 2020).

One category of women are the market traders who form a better part of the community hence equally exposed to health risks associated with OWO. The environmental setup of these women traders is urban which statistics show there is an increase in OWO among urban women in the developing countries (Yaya, Ekholuenetale & Bishwaji, 2018). In as much as there has been research on the assessment of OWO among women in different socioeconomic classes, a study by Kim and Hyun (2018) reveals the size of a workplace can be a major contributor to the effective management of OWO. The space allocated to the traders is always minimal (3M*3M) and one can easily operate her sales without having to move. Emphasis has been placed on other issues such as food insecurity,

conflict and infectious diseases; yet obesity and non-communicable diseases are directly linked; hence addressing OWO is an important step in control of NCDs.

This study shows that OWO is an escalating concern among urban women traders. The challenges as identified by this study are centered on physical activity levels, dietary choices, and perception of OWO, hence, to solve these health concern effectively, quantifying the significance of nutritional status in relationship to predisposing aspects is paramount.

1.3 Broad objective of the Study

Assessment of overweight and obesity among women traders aged 20-50 years at Eldoret Municipal Market.

1.4 Specific objectives

1. To determine the dietary practices and food habits among women traders aged 20-50 years in Eldoret Municipal market,
2. To establish physical activity levels among the women traders aged 20-50 years in Eldoret Municipal market,
3. To establish the knowledge and perception of overweight and obesity among the women traders aged 20-50 years in Eldoret Municipal market, and
4. To determine the nutritional status of women traders aged 20-50 years in Eldoret Municipal markets.

1.6 Research questions

1. What are the dietary practices and food habits among women traders aged 20-50 years in Eldoret Municipal market,
2. What are physical activity levels among the women traders aged 20-50 years in Eldoret Municipal market,
3. What is the knowledge and perception of overweight and obesity among the women traders aged 20-50 years in Eldoret Municipal market, and
4. What is the nutritional status of women traders aged 20-50 years in Eldoret Municipal markets.

1.7 Justification of the Study

This study aims to bring into focus the magnitude of OWO, and provide data to health care providers in Kenya. This data will be a benchmark for implementation of strategies to mitigate OWO among women. The findings of this study will help policy makers and women traders in Eldoret Municipal markets and across other markets in the country to create interventions that can help them to be sensitive to the risks of being OWO in relation to life expectancy. In addition, the information will be beneficial to other researchers who have interests in this field of study and serves to add to existing knowledge relating to OWO and its impact on health.

1.8 Limitation

The study was carried out in the four Eldoret Municipal Markets, in Uasin Gishu County which is one of the 47 counties in Kenya. These findings can only be generalized for women traders in the country who come from counties that are similar to Uasin Gishu.

1.9 Assumptions of the study

In this study the following assumptions were made.

1. That the respondents gave true information in the questionnaires.
2. The dietary choices of the female traders at Eldoret Municipal markets are not influenced by cash flow because these female traders have established good relationships with food hawkers who can give them food on credit if need be.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Obesity and overweight are a multifactorial disorder that is characterized by abnormal or excessive body fat accumulation in adipose tissue, to the extent that health may be impaired. The worldwide levels of OWO is escalating epidemic, which has nearly tripled between 1975 and 2016 (WHO, 2018). According to WHO global estimates, more than 1.9 billion adults aged 18 and older are overweight, with 650 million of them being obese (WHO, 2016).

Over the years, OWO was believed to be a condition that affects developed countries (Gouda & Prusty, 2014). However, the problem is no longer restricted only to the developed world. Presently, the epidemic poses new challenges in developing countries and urges immediate attention and prevention. These countries face a double burden of nutritional problems as they are yet to solve the erstwhile problems of under nutrition and hunger (Prentice, 2018). This results in a situation where although the countries may typically be known for a high risk of under nutrition, a significant proportion of overweight and obese people coexist with those who are undernourished (Prentice, 2018)

Overweight and obesity become significant conditions of concern because they are a leading cause of various non-communicable diseases (NCDs), including life-threatening and nonfatal diseases like, type II diabetes, cardiovascular diseases, various cancers and other health problems, which can lead to further morbidity and mortality (Lemamsha, Randhawa & Papadopoulos.,2019). Obesity also leads to premature death and disability

in adulthood. Overweight and obesity are primary contributing factors to not only the global burden of chronic disease but also to disability and premature deaths of about 2.8 million people every year (Benziger et al., 2020). Furthermore, 35.8 million of global disability-adjusted life years (DALY) are caused by OWO (WHO, 2016).

2.2 Overweight and obesity

Overweight and obesity is an escalating epidemic (WHO, 2016). In Latin America and the Caribbean, more than 50 % of women are overweight or obese (WHO 2014). A study (Yaya et al.,2018) on 33 Sub-Saharan African countries reported that 27 of studied countries had a 10% evidence of overweight and 7 countries had more than 10% obesity. The results ranged from low OWO of 6.7% in Madagascar to 50.8 % in Swaziland. Those with OWO above 30% included Egypt with the highest cases of overweight at 44% and obesity at 39%. Ghana had overweight existence at 30% and obesity at 22%, while Niger OWO was at 32% and Rwanda at 31% (Amugsi, et al., 2017).

A study by Mkuu et al., (2018), recorded that 21% of women in Kenya are overweight, while 9% are obese; hence one in every three women in Kenya 31% are either overweight or obese. Overweight and obesity was considered a problem in the high-income countries but currently, it is on a rise among the low and middle-income countries, particularly in urban settings (WHO, 2018). The presence of OWO is twice as high in urban areas at 44% compared to the rural areas at 26% (Mkuu.,et al (2018) which increases with age, wealth and level of education and marital status (Tanwi et al., 2019). Abera et al., (2014) in a study on the regional, and national existence of OWO in children and adults during 1980–2013, it was evident that the burden of obesity is

increasing in developing countries yet there is no significant concentration on its burden in developed countries.

2.3 Measurement of obesity

2.3.1 Body Mass Index

The definition of OWO is pegged mainly on the Body Mass Index (BMI), which is determined by taking a person's weight (kilograms) divided by the square height (meters) Kg/m^2 , according to the World Health Organization (WHO, 2018).

Table 1: Classification of nutritional status according to BMI

BMI classification	
Underweight	<18.5
Normal weight	18.5-24.9
Overweight	≥ 25.0
Obese	≥ 30
Obese class I	30.0-34.9
Obese class II	35.0-29.9
Obese class III	≥ 40

The Body Mass Index has been used for several years as the traditional method of diagnosing OWO among different categories of individuals. The method has been used because of the advantages such as simplicity, affordability as well as its ability to remain a non-invasive surrogate measure of body fat (Lavie et al.,2018). The method solely relies on the height and weight of the individual, and with access to the proper equipment, individuals can have their BMI routinely measured and calculated with

reasonable accuracy. The tool has been globally utilized as a practical low-cost objective measure for tracking obesity due to its ability to predict and correlate body fat with future health risks (Ceniccola et al., 2019). The BMI tool has also had benefits at the population level and its utilization has resulted in the publication of population data that has been utilized by various public health stakeholders to make comparisons across time, regions, and population subgroups (Ceniccola et al., 2019). However, the method has several limitations as a measure of OWO. The main limitation is that the tool focuses on weight and height and consequently does not account for other factors such as muscle mass, bone density, overall body composition, and racial and sex differences (Lavie et al., 2018).

2.4 Dietary practices, food habits and overweight/ obesity

Obesity is caused by a complex interaction between the environment, genetic predisposition, and human behavior (Keller et al., 2019). The fundamental cause of OWO is an energy imbalance through food intake between calories consumed and calories expended (WHO, 2016). This has been increased by the global rise of the increase in the consumption of energy-dense foods that are high in fat, increase in physical inactivity and the adoption of a sedentary lifestyle by several people across different parts of the globe (Ng et al., 2014).

Dietary practices like high-fat foods, super-sized portions and fast food consumption play a major role in the occurrence of obesity. Among other factors causing OWO are the unhealthy eating habits defined as a high intake of total fats, saturated fats, refined

carbohydrates, added sugars, and a low intake of fiber, fruits, vegetables and water, (Franzago et al., 2020).

Food availability is a major pillar of food security, which is defined as “when all people at all times have access to sufficient, safe and nutritious food to maintain a healthy life” (Upton, Cissé and Barrett, 2016, p. 137). Food availability refers to the physical and economical access to healthy food resources to help provide essential food items for a community. It encompasses the consistent intake of essential nutrients and nutritious food in a population (Herforth, Venkat, Mahrt, Ebel and Masters 2020). There has been increased access to energy-dense foods as well as beverages and this has had a serious impact on people across the globe (Mason-D’Croz, Bogard, Sulser, Cenacchi, Dunston, Herrero and Wiebe, 2019). In the same line, the relative costs of fruits and vegetables have increased greatly compared with the prices of refined grains and sugar, making access to all sorts of processed foods progressively easier along with a range of income levels (Rauber, Costa Louzada, Steele, Millett, Monteiro and Levy, 2018) . In developed countries, access is further increased by the presence of points of sales including vending machines, drug stores, book stores, hardware stores, and big-box stores (Gordon- Larsen, Wang, & Popkin, 2014). The frequency and type of food vendors in a neighborhood determine the types of foods that residents can purchase and evidence has suggested that fast food restaurant density is associated with OWO cases (Lee, Bartsch, Mui, Haidari, Spiker and Gittelsohn., 2017).

Food deserts, which are the areas with limited access to affordable and nutritious food, are positively linked to the high rates of obesity, especially in developed countries. The

implication is that when individuals are unable to access high-quality or nutritious foods they end up surviving on the less nutritious and energy-dense foods which in turn increase their chances of becoming overweight or obese as indicated (Mbogori & Mucherah, 2019).

In addition to food availability and quality, the shift in food type, amount, and pricing are also relevant to the obesity epidemic. Portion sizes in the most popular fast-food, take-out, and family-style restaurants exceed current USDA and FDA standard-recommended portion amounts (Lee, Bartsch, Mui, Haidari, Spiker and Gittelsohn, 2017; Parada Fuente, Landskron, González, Quera, Dijkstra, Hermoso, 2019; Robinson and Kersbergen, 2018). The increase in portion sizes is likely to influence the energy intake of the children as well as the adults and consequently predispose the individual to OWO especially if the energy expenditure is minimal. Normally, fast foods, snack foods, and foods available through convenience stores are typically ultra-processed implying that they are most likely to be high in processed grains and added sugars; low in fiber and unsaturated fats (Lee et al., 2017).

2.5 Demographic, socio-economic status and overweight / obesity

The existence of obesity varies according to key individual characteristics such as age, sex, marital status and socio economic status.

2.5.1 Socio-economic status

Studies have repeatedly shown that high socio-economic status is negatively correlated with OWO in developed countries, particularly among women but positively correlated with OWO in populations of developing countries. Women with high socioeconomic

status make up the largest proportion of women who are overweight or obese since a high socioeconomic status is associated with greater consumption of high-calorie, high-fat diets as well as consumption of meals away from home (Kumanyika and Grier, 2006). Being OWO is rapidly increasing among low and middle-income countries (Ondicho, Omondi, & Onyango, 2016).

The association between socio economic status and OWO incidences differs with economic classification per region. A study by Gong, Chehrazi-Raffle, Reddi, and Salgia (2018) on the socio-economic differences in obesity and its risk factors among Asian Americans showed disparities among people in urban and rural areas. The study revealed that compared with their urban counterparts, rural populations have higher rates of preventable conditions such as obesity and its related conditions such as diabetes, cardiovascular diseases, and hypertension among other NCDs. The adverse health differences observed in rural populations might be due to higher rates of health risk behaviors e.g., smoking, physical inactivity, poor diet, and passive transportation means in rural areas. These findings differ from those of Adeboye, Bermano, and Rolland (2012) in their systematic review of OWO and its health impact in Africa. They established that the incidences of obesity were higher in urban than rural subjects with significant increases in obesity rates among women. These findings may be associated with the impact of urbanization and adoption of western foods. According to Adeboye et al., (2012) and Trivedi, Liu, Probst, Merchant, Jones, Martin (2015), people in rural areas are more likely to practice healthy lifestyle behaviors that prevent obesity. This is attributed to the characteristics such as the distance from the supermarkets and recreational opportunities and other attributes of the built environment which are strongly

correlated with obesity as they influence the resources, neighborhood quality as well as transportation methods (Papas, Alberg, Ewing, Helzlouer, Gary and Klassen, 2007).

2.5.2 Age

Age is a predisposing factor for OWO (Kessler, Koebnick, Smith, & Adams, 2013). The existence of obesity increases in a cross-sectional manner across the lifespan. Lee, Bartsch, Mui, Haidari, Spiker and Gittelsohn (2018) established that OWO is 13.9% among children between the ages of 2-5 while it is 18.4% among children between the ages of 6-11. The cases of OWO then increases to 20.6% among the adolescents who are between the ages of 12 and 19 and is 35.7% among young adults who are between the ages of 20-39. In adulthood, which is defined by the ages of 40-59, the chances of being obese are at 42.8% and is at 41% in older adults. A study by Mbochi, Kuria, Kimiywe, Ochola, and Steyn (2012) assessed the predictors of OWO among women in Nairobi and associated higher age with obesity. They established that age was the most significant predictor of all the dependent variables appearing first in all the models.

Another study by Mkuu, Epnere, and Chowdhury (2018) on the existence and predictors of OWO among Kenyan women agreed that age is a predictor for obesity, especially among women. The study by Hales et al., (2017) and Mkuu et al., (2021) revealed that women aged 40 to 44 had more than 4 times the odds of being OWO than women aged 15 to 24. This proves that the older people grow, the higher the chances of becoming OWO. This, therefore, becomes a major issue of concern because age is also associated with increased risk and vulnerability to other non-communicable diseases such as cardiovascular diseases.

2.5.3 Gender

Although both men and women are affected by obesity, the impact is more in women than it is in men (Censin, Peters, Bovijn, J., Ferreira, Pulit, Mägi, Lindgren, 2019). A study by Ondicho, Omondi & Onyango, (2016) on OWO and socio-demographic Factors Associated with OWO among Healthcare Workers in Kisumu East Sub-County, Kenya, revealed that females had a significantly higher risk of overweight or obesity compared to males. This phenomenon is attributed to several physiological processes that are associated with the storage of fats in the females as compared to the males. Among women, the extra energy after utilization by the body is typically stored as fat, while in the men, the extra energy is channeled into protein synthesis. This pattern in females contributes to further positive energy balance and fat deposition (Ahmed, Sultana, and Greene, 2021). Another explanation is that women generally have a higher percentage of body fat than men, and there are indications that the basal fat oxidation is lower in females as compared to men, thereby contributing to higher fat storage in women (Arroyo-Johnson & Mincey, 2016). This offers an explanation as to why women have fat, especially on their thighs and hips, which poses a challenge when they try to lose it.

The physiology of women further supports the need for fat since women rely on fat stores more than men for reproduction. Pregnancy and menopause are significant factors in the development of obesity in women, suggesting that fluctuations in reproductive hormone concentrations uniquely predispose women to excess weight gain. Serotonin, which contributes to the regulation of food intake, is regulated differently between the sexes. As BMI increases, the amount of serotonin synthesis decreases, presumably to indicate satiety at lower levels of food intake. In men, this decrease occurs when men reach a BMI

classifying them as “overweight” whereas women do not experience this drop in serotonin synthesis until they reach a BMI classifying them as “obese” (Adab et al., 2018). Furthermore, when losing weight, men are more likely to lose fat within the abdomen, whereas women are more likely to lose fat that resides just under the skin. Because of this difference, men experience greater declines in triglyceride levels and increases in HDL cholesterol levels compared to women losing the same amount of weight (Sumner, Zhou, Doumatey, Imoisili, Amoah, Acheampong and Rotimi, 2019).

2.5.4 Marital status, overweight and obesity

Marital status has been shown to be related to BMI whereby the married individuals are at a higher risk of being obese or overweight as compared to those who live alone, with higher cases among the divorced (Tanwi et al., 2019). Studies have correlated married individuals with obesity and this could be attributed to the fact that it is an emotional change in an individual. Marriage, like any other important event in the life, may affect one's emotional life of an individual and consequently cause changes in the food consumption patterns. Women are usually greatly affected by body weight change in marriage, although men may also be affected. Although the reasons are not clear, it has been suggested that there may be a reduction in the energy spent courting and also an increase in contentment and social eating (Mbochi et al., 2012). A study by Baioumi (2019) indicates that the cases of abdominal obesity is threefold higher among married women as compared to those who are not married.

2.5.5 Parity

Parity relates to the number of children that a woman has in their lifetime and it is linked to weight gain. However, a significant proportion of this weight is likely to be attributable to the weight gained during pregnancy. Also, motherhood influences the consumption habits of a woman and their ability to adopt healthy eating habits too (Mbochi et al., 2012). Ondicho, Omondi and Onyango (2016) also agreed that females tend to gain the greatest amount of weight during the childbearing years, and some of them develop overweight or obesity through the retention of gestational weight gain.

2.6 Physical activity and overweight /obesity

Physical activity is very significant in health for the well-being of the heart, body and mind. It remains to be a major contributing factor in prevention and management of non-communicable diseases, reduction of depression and anxiety, thinking, learning and judgment enhancement and improvement of the general well-being in healthy growth and development. Globally, one in every four adults fail to meet the global physical activity recommendations yet up to five million deaths a year could have been avoided if only the population was more physically active (Migueles, Cadenas-Sanchez, Ekelund, Nyström, Mora-Gonzalez, Löf and Ortega, 2017). Physical activity is the body movement during leisure time, transport from one place to another and as part of an individual's work (Ross et al., 2020). Physical activity is classified in four dimensions as indicated in the table below.

Table 2: Dimensions of physical activity

Dimension	Definition and context
Mode	Specific activity performed (e.g., walking, gardening, cycling).
Frequency	Number of sessions per day or per week (Session is ≥ 10 min in duration/length)
Duration	Time (minutes or hours) of the activity during a specified time frame (e.g., day, week, month or year)
Intensity	Rate energy expenditure which indicates metabolic demand

2.6.1 Mode of transport

The infrastructure that is prevalent in a given population influences the means of transport that is found in the neighborhood and this influences the chances of walking by the people in the region. High neighborhood walkability has been found to be associated with a decrease in OWO incidences (Creatore, Glazier, Moineddin, Fazli, Johns, Gozdyra and Manuel, 2016). The world has witnessed a reduction in transport-related physical activity and this is closely associated with the increase in car ownership as well as the presence of infrastructure that supports automotive transport (King & Jacobson, 2017). The choice of transportation can influence obesity and especially the decision by an individual regarding whether to travel by motorized travel (e.g., driving an automobile) or active travel (e.g., walking, cycling). While auto-mobiles provide a fast and convenient travel mode, replacing active travel with motorized travel also replaces the physical activity involved in walking or cycling with the sedentary activity of driving, thereby reducing personal energy expended (King & Jacobson, 2017). The sedentary nature has

been associated with the increase in urbanization, change in the means of transport that people use, to those that involve minimal energy expenditure, and the presence of employment or work forms that are sedentary in nature. However, other predisposing factors present the risk of OWO in people and they include genetic, psychological, biochemical, environmental, social and economic factors (Figuls, García, Martínez-Zapata, Pacheco, Mauricio and Cosp, 2018).

2.7 Knowledge and perception about overweight/obesity

Being overweight or underweight affects emotional health in several different ways, which can be as damaging as the physical effect. Also, mental health factors may contribute to the onset and maintenance of overweight and obese status in children, adolescents, and adults. The most prevalent issue is that overweight stigma and obesity discrimination can lead to some mental disorders. Scientific evidence lays emphasis on increasing the risk of low self-esteem, mood disorder, motivational disorders, eating problems, impaired body image, interpersonal communication problems and all these directly or indirectly affects the quality of life (Djalalinia, Qorbani, Peykari, & Kelishadi, 2015). In addition, it may result in situations where the affected individuals experience a vicious cycle that further leads to bulimia and other eating disorders (Goss & Gilbert, 2014). Depression, anxiety, and post-traumatic stress disorder are common among people with obesity and in some cases; people that have experienced trauma have an increased likelihood of becoming overweight or obese. This may be attributed to the aspect of turning to food to prevent pain or to find solace.

Obesity may also affect the social aspects of an individual, since it's common for obese individuals to most often be ridiculed by their teachers, physicians, and the public (Puhl & Brownell, 2001). At times they also suffer from discrimination, ridicule, social bias, rejection, and humiliation. Even specific obesity diagnostic or therapeutic procedures such as related anthropometric assessments could potentially affect their care givers' professional attitude and subsequent clinical evaluation and service provision for obese persons when they are seeking care (Djalalinia et al., 2015).

2.8 Consequences of overweight and obesity

2.8.1 Impacts on physical health

People who have obesity, compared to those with a normal or healthy weight, are at increased risk for many serious diseases and health conditions. What is not widely known is that the risk of health problems starts when someone is only very slightly overweight and that the likelihood of problems increases as someone becomes more and more overweight (Glastras et al., 2018). Many of these conditions cause long-term suffering for individuals and families. In addition, the costs for the health care system can be extremely high. It is related to increased health risks such as diabetes mellitus, hypertension, coronary heart disease, and osteoarthritis and is linked to various malignancies, particularly endometrium, breast, and colon cancers (Dağ & Dilbaz, 2015)

2.8.2 Cardiovascular disorders

According to the World Health Organization, Cardiovascular Disease (CVD), defined as disorders of the heart and blood vessels, is the number one cause of death globally (Roth, Mensah, Johnson, Addolorato, Ammirati, Baddour and Benziger, 2020). Multiple risk

factors contribute to CVD. Obesity is associated with an increased risk of developing cardiovascular disease (CVD), particularly heart failure (HF) and coronary heart disease (CHD) (Lavie, Ozemek, Carbone, Katzmarzyk, & Blair, 2019). According to Wendelboe and Raskob (2016), obesity has a major influence on CVD, contributing to symptoms such as heart failure, atrial fibrillation, coronary heart disease, stroke, and venous thromboembolism. It has also been listed among the leading causes of elevated cardiovascular disease (CVD) mortality and morbidity (Akil & Ahmad, 2011).

Obesity is an independent risk factor for CVD, negatively affecting the heart's function and structure, as well as the blood vessels' inner lining. An increase in body fat can directly contribute to heart disease through atrial enlargement, ventricular enlargement, and atherosclerosis. Several studies have shown a consistent increased risk for cardio metabolic disease and other chronic conditions as BMI increased (Roth, Mensah, Johnson, Addolorato, Ammirati, Baddour and Benziger, 2020). Furthermore, an increase in body fat indirectly contributes to heart disease through the promotion of other medical conditions such as sleep apnea and thromboembolic disease. It also results in the onset or leads to worsening of metabolic diseases dyslipidemia, type 2 diabetes, high blood pressure and metabolic syndrome, which are major cardiovascular disease risk factors (Roth et al., 2020). Also, individuals with obesity are vulnerable to systemic inflammation, which influences adipogenesis. Adipogenesis is the pathogenic enlargement of adipose cells and adipose tissue that results in anatomic and functional abnormalities, leading to metabolic disease and increased cardiovascular disease risk (Piché et al., 2018).

People who are obese have been found to often have chronic systemic inflammation along with the increased accumulation of epicardial adipose tissue, which may progress to serious conditions including premature death. Therefore, obesity presents an increased risk of both premature morbidity and mortality particularly cardio-metabolic morbidity (Lavie et al., 2019). Obesity is also associated with arteriosclerosis as part of the cardiovascular system. The pathogenesis of obesity and atherosclerosis has several common factors. In both cases, lipids, oxidized LDL particles, and free fatty acids activate the inflammatory process and trigger the disease (Csige et al., 2018). Inflammation is responsible for all the steps towards atherosclerosis, from early endothelial dysfunction to the atherosclerotic plaques causing complications, and is related to obesity, insulin resistance, and type 2 diabetes.

2.8.3 Type 2 Diabetes

Obesity is a major cause of type 2 diabetes and obese individuals have almost ten times the likelihood of getting type 2 diabetes. This is a condition that manifests through type 2 diabetes, the body either doesn't produce enough insulin, or it resists insulin. It is not clear why people who are overweight are more likely to develop this disease. It may be that being overweight causes cells to change, making them resistant to the hormone insulin (Ahmed, Sultana, and Greene, 2021). Insulin carries sugar from the blood to the cells, where it is used for energy. When a person is insulin resistant, blood sugar cannot be taken up by the cells, resulting in high blood sugar. In addition, the cells that produce insulin must work extra hard to try to keep blood sugar normal. This may cause these cells to gradually fail.

According to Ahmed et al., (2021) obesity is directly associated with insulin resistance. Overeating stresses the membranous network inside of cells called the endoplasmic reticulum (ER). When the ER has more nutrients to process than it can handle, it sends out an alarm signal telling the cell to dampen down the insulin receptors on the cell surface. This translates to insulin resistance and to persistently high concentrations of the sugar glucose in the blood one of the sure signs of diabetes (Ahmed et al., 2021)

2.9 Theoretical framework

According to Social Cognitive Theory by Gortmaker, Cheung, Peterson, Chomitz, Cradle, Dart, Colditz (1999), an individual's social and environmental factors influence the physiological and behavioral factors which are linked to obesity. Dietary patterns and eating habits are based on social cognitive theory which emphasize the interaction between social, environmental and personal interactions. In the case of this study the levels of influence include: personal i.e. lifestyle, genetics, psychological; Socio environmental i.e. family, friends and neighbors and physical environment i.e. restaurants, market community, home among others not forgetting the macro systems like mass media, and socio cultural practices (Boone-Heinonen, Gordon-Larsen, Kiefe, Shikany, Lewis and Popkin, 2011).

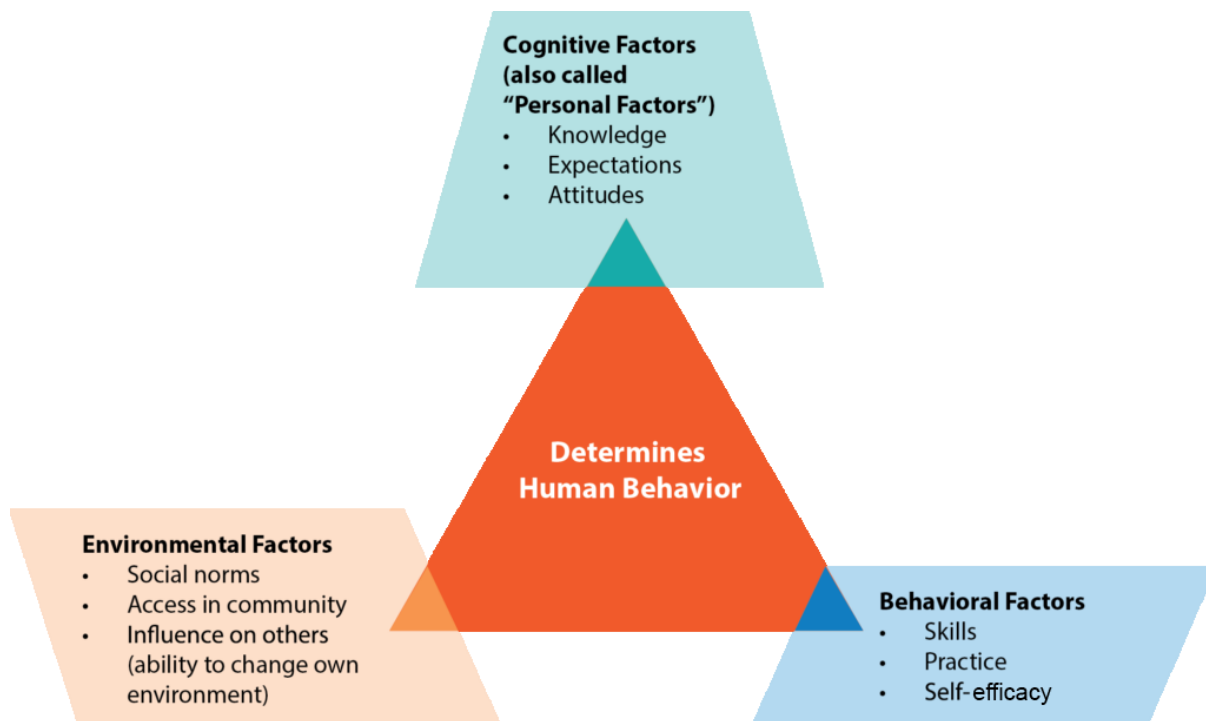


Figure 1: Social Cognitive Theory (Gortmarker et al., 1999).

2.10 Conceptual framework

This framework gives a clear indication that someone's weight is influenced by the interaction between cognitive, socio environmental and behavioral factors which influence both psychosocial and behavioral factors of OWO. An individual's food choices are influenced by knowledge and attitude hence leading to OWO.

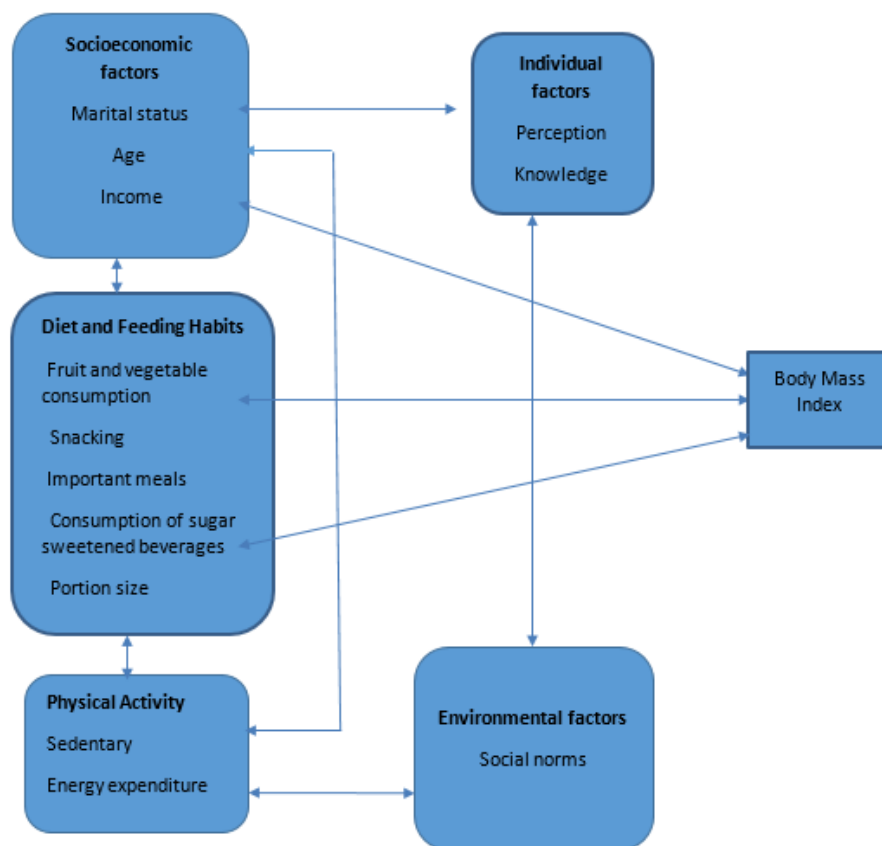


Figure 2: Conceptual framework adapted from the social cognitive theory (Gortmarker et al., 1999).

The dietary choices and practices are individual factors which are closely linked to the family values, traditions and even expectations, while environmental factors are governed by social norms such as peer influence and policies governing meals. In a market setup women have a direct influence on each other's food choice and preferences since food has a sensory response someone else is eating the next person's sensory glands respond by having an appetite for the same food. This makes one eat even when they are not hungry. With the fact that food is hawked in the market, maybe among three people who buy a specific meal at the same time only one may be hungry enough and in need of a

meal at that specific time. Environmental factors are linked to socioeconomic factors which determine physical activity levels. Socio economic status determines dietary choices by influencing the availability of healthy foods like fruits and vegetables hence opt to purchase affordable foods. The dense foods are a contributing factor to making someone overweight or obese.

2.11 Gaps in research

Obesity and overweight is increasing and has become an epidemic worldwide. Obesity is characterized by an abnormal or excessive body fat accumulation in adipose tissue, to the extent that health may be impaired. Excessive caloric intake is the fundamental cause of obesity. Globally we are seeing an increase in the consumption of energy-dense foods and a reduction in physical activity. The health consequences of this imbalance include cardiovascular disease, diabetes, musculoskeletal disorders, sleep apnea and an increased risk of certain malignancies, such as breast, endometrial and colon cancer (Gong Chehrazi-Raffle, Reddi, and Salgi, 2018). It also has an impact on the mental and social wellbeing of the affected people. The related comorbidities, as well as risks of obesity in various populations, have been established in the literature.

However, information on OWO among some populations like the women traders in Kenya and East Africa at large is lacking. These women form a better part of our community hence equally exposed to health risks associated with OWO. For prevention and education programs to be effective the levels of OWO among women traders should be established.

CHAPTER THREE

METHODOLOGY

3.1 Research design

Research design is the overall plan or strategy for data collection, measurement analysis and utilization of data so as to obtain desired valid information that is sufficiently precise and accurate (Sileyew, 2019). This study made use of descriptive cross sectional survey because it was a onetime study. Both quantitative and qualitative approaches were used with more emphasis put on qualitative research. Overall, the research was conducted in the day to day environment of the target population.

3.2 Study area

The study was conducted in the four Municipal markets in Eldoret town. Eldoret serves as the main administrative center of Uasin Gishu County and stands out as a principal town in the Rift Valley region of Kenya. According to the Kenya Population and Housing Census 2019, Eldoret is the second most important city in Western Kenya after Kisumu; and the fifth most populated urban area in Kenya. Eldoret Municipality has four Municipal markets. Two of these markets are in the town center. One is the main market and the other is a retail market. The other two are Kahoya market, which is out of town and the Eldoret West market, which is an assorted goods market. All the four markets were selected as research sites.

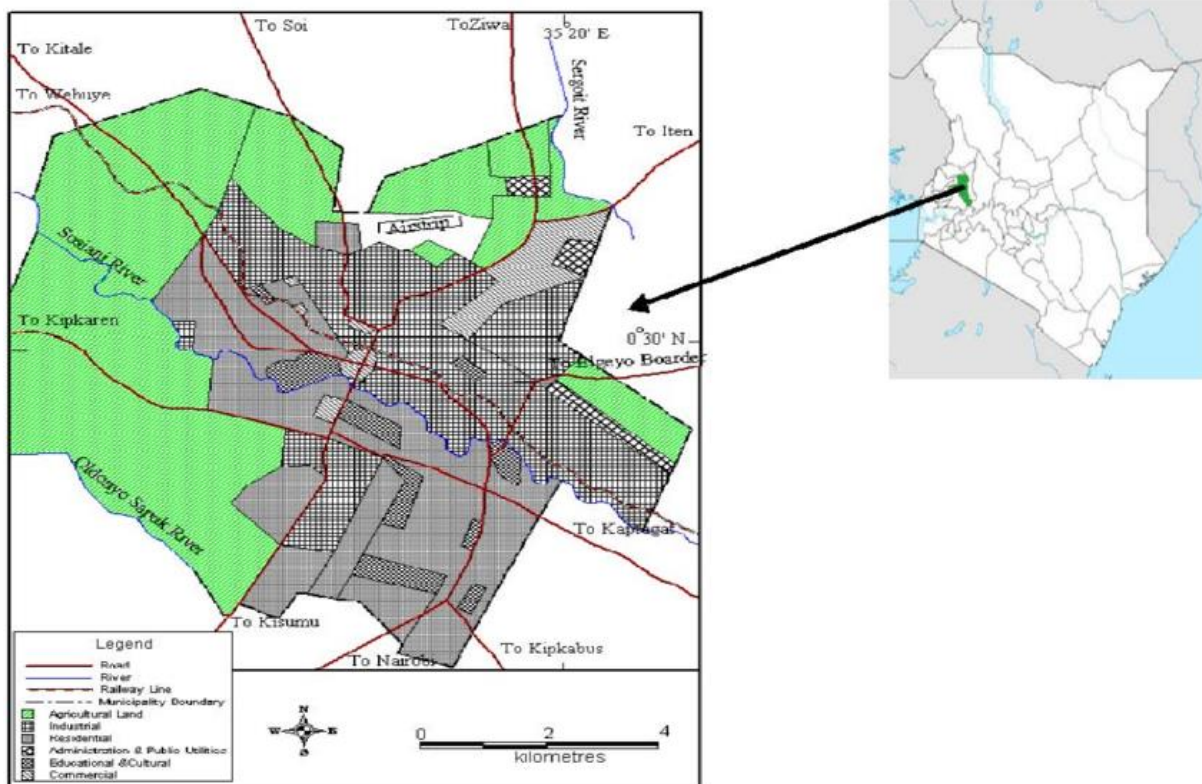


Figure 3: Eldoret municipality (Uasin Gishu, 2017)

3.3 Study population

The population of this study comprised of women traders aged between 20-50 years at the Eldoret Municipal market. The unit of analysis was OWO. The target respondents were randomly selected.

3.4 Sample size determination

The study sample size determination was based on the Cochran's formula.

$$n = \frac{Z^2 pq}{E^2} \quad (\text{Cochran 1977})$$

Where:

n = the desired sample size (if the targeted population is greater than 10,000).

Z = the standard normal deviate at the required confidence level.

P = the proportion in the target population estimated to have OWO.

$q = 1 - p$ = the level of statistical significance set in this study, $z = 1.96$

P used was 0.39 since this is the level of OWO among women in Kenya),

$E = 0.05$ Margin of error (desired precision level).

$$n = \frac{1.96^2 (0.4)(0.6)}{0.05^2}$$

$$n = 369$$

Population size less than 10,000

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

$$n = 238$$

Sample size is 238.

3.5 Sampling technique

Sampling technique refers to the manner in which a representative number of individuals is drawn from the population which is representative of a large group (Etikan & Bala, 2017). The study applied stratified random sampling procedure in the determination of the sample size. The strata were the four municipal markets, followed by systematic random sampling whereby every third woman trader aged 20-50 years was eligible for the study (Mahmud, Huang, Salloum, Emara, & Sadatdiyov, 2020). According to the Eldoret Municipal Market records, the total traders were 840 (inclusive of the male traders) in all the four markets, with female traders being 80% (672) of all the traders (Uasin Gishu County, 2017). Proportionate sampling was used to determine the number of subjects per market as they differ in population as indicated in Table 3, having a retail market with an estimated population of 700 registered traders, Main Market had 100

registered traders, West Market had 30 registered traders, and Kahoya Market had only 10 registered traders. Registration was determined by having a trader allocated a stall space within the four walls of the specific municipal market. The sample ratio was Retail Market (70): Main Market (10): West Market (3): Kahoya Market (1)

Table 3: Eldoret County Council Markets Population (Uasin Gishu County, 2017)

Stratum	Retail Market	Main Market	West Market	Kahoya Market
Total population	700	100	30	10
Fraction of female (4/5); Sample population	560	80	24	8
Sample ratio of the total population	70	10	3	1
Sample size	198	28	9	3

3.7 Data collection tools

The study adopted use of primary data collected from respondents using structured questionnaires. The questionnaires had both closed-ended and open-ended English questions. While structuring the questionnaire the study adopted questions from Global Physical Activity Questionnaire (GPAQ) (Sullivant, Metoyer, Hornikel, Holmes, Nickerson, Esco and Fedewa, 2021) for physical activity data and questions from Attitudes and Patterns of Eating (APE) questionnaire (Mahmud Huang, Salloum, Emara, & Sadatdiynov, 2020). The food variety score was used to assess the diversity of food

consumed by an individual within the past 24 hours thus providing insights into the range of food groups included in an individual's diet (Narita, Kitamura, Takemi, Yokoyam, Morita, & Shinkai, 2020). A higher food variety score indicates a more balanced and nutritionally diverse diet while a low food variety scores indicate potential dietary imbalances. 24- Hour recall and food frequency questionnaire for dietary practices and anthropometric measurement for BMI.

3.8 Data collection procedure

Data collection procedure refers to the collection, measurements and analysis of accurate insights for research studies through application of standard validated techniques data (Wagner, Kawulich, & Garner, 2019). It provides the foundation for reliability estimations. hence, good data collection procedures are crucial in ensuring that the reliability estimate is trustworthy (Tauqeer, Gomez, and Stanford 2018). The relevant market authorities were consulted and verbal approval to proceed with the research within the market was given. The market was visited a month before data collection to establish the market patterns and identify an appropriate or most convenient time for data collection.

The researcher and the assistants visited the market and carried out the study after a participant signed the consent form. The researcher and research assistants administered the questionnaire, and took the anthropometric measurements; to avoid inter-observer errors; one research assistant would take the anthropometric measurements twice while the other assistant took the records before moving to next participant. To ensure accuracy of the Arboreal digital weighing scale, flour was weighed to a kilo and packed and was

used to continuously calibrate the weighing scale. Upon completion, the two research assistants checked the questionnaire for completion, the accuracy of information and consistency before moving to the next participant.

Procedure for taking weight and height was as follows:

Taking weight measurements: - Ensured the individual is wearing lightweight clothing, without shoes or heavy accessories that could affect the accuracy of measurement. The weighing scale was placed on a level, flat and stable surface. The participant stood at the center of the scale with their feet evenly distributed and arms at the sides. The weight reading displayed on the scales digital screen was then recorded to the nearest 0.01 kilograms.

Taking height measurements: - A Hopkins stadiometer was used which was a vertical ruler attached to a portable stand. I ensured the participant is standing upright, barefoot and with the heels together removing any heavy headgear or accessories that would interfere with the measurement. The participant stood with their back against the stadiometer stand with the upper back being in contact with the stand and the head in a natural horizontal position. The stadiometer slider was gently lowered until it made contact with the top of individuals head making sure it is at a right angle with the stadiometer. The stadiometer readings were then recorded in meters.

3.9 Validity and reliability

Validity and reliability are two fundamental concepts in research that assess the quality and credibility of the research tools, research design and data collection methods ensuring the results obtained are accurate, consistent and trustworthy. Validity refers to the extent

to which a measurement or research design accurately measures the intended concept. A pilot study was carried out at Mabati stalls in Eldoret town on 10% of the actual sample size with similar characteristics to the actual sample to confirm the effectiveness of the questionnaire hence enhancing data collection reliability. Validity was ensured by having the anthropometric data collected using the WHO recommended weighing scale and height board which were well calibrated.

Reliability refers to the consistent and stability of measurement to yield consistent results when applied multiple times to the same individual under similar conditions. To cover reliability the research assistants were trained on how to take and record the anthropometric measurements accurately. The researchers took repeat measurements and closely monitored the data collection process. Each participant had a single observer to avoid inter observer bias. The participants were given a verbal explanation on the importance of giving correct information.

3.10 Data analysis

Data analysis refers to the systematic application of statistical and logical techniques in the description, illustration, condensation, recapping and evaluation of data (Wagner, Kawulich, & Garner, 2019). The completed questionnaires were compiled at the end of the day for accuracy and completeness. Data was then analyzed using SPSS version 26. Nutritional status was determined using WHO gender specific BMI-for-Height. Data from the food variety scores was calculated by quantifying the number of different food from major food groups like fruits, vegetables, grains, dairy and proteins consumed over the past 24 hours. Response on dietary patterns and practices were analyzed using percentages and frequencies

3.11 Research variables

The variables were the nutritional status, eating habits, physical activity levels and knowledge and perception of OWO. Nutritional status was assessed from the anthropometric data. The height and weight were objectively measured by the research assistants using standard techniques (DHS 2017). The weight was taken using an electronic digital weighing scale while height was taken using a height measuring board, then the BMI was derived (Eknoyan & Quetelet, 2008) by dividing weight in kilograms by the squared height in meters. With reference to BMI estimates from WHO guidelines (WHO 2006) the participants were classified as normal, overweight, or obese. The other variables like food and eating patterns which were measured using the APE, FFQ and 24 hour dietary recall. Data from the 24-hour recall had the sizes of foods converted to gram equivalents using South Africa and Kenya Food Photo Manuals then analyzed using a dietary software program (Nutri Survey- 2007) to obtain the number of nutrients consumed by the women in preceding 24 hours (Lee, Bartsch, Mui, Haidari, Spiker & Gittelsohn, 2017). Assessment of food variety was done by grouping food groups and getting the number of different food groups consumed in the previous day and measured by getting food variety score (FVS) which is a count of food items consumed over last 24 hours and used for analysis (Steyn, Nel, Parker, Ayah, & Mbithe, 2011). BMI was calculated as weight (kg) divided by square of height (meters). Physical activity was measured using the Global Physical Activity Questionnaire while demographic factors gave descriptive information on the demographic details of these female traders.

3.12 Inclusion and exclusion criteria

Female respondents of ages between 20-50 years old and registered in the municipal market records with evidence of a stall space were included in the study. Exclusion was for female traders who have a serious medical condition that may affect weight status, those who were pregnant or unwilling to participate in the study.

3.13 Ethical Consideration

Ethical considerations refer to the principles that guide research designs and practices such as informed consent, voluntary participation, potential for harm, confidentiality, anonymity and communication of results (Asenahabi., 2019). Before conducting the research, a research permit was also obtained from the National Commission for Science, Technology and Innovation (NACOSTI). The Eldoret County Council Office was also informed of research intentions. Participants were recruited upon their informed consent and they were assured that confidentiality and anonymity would be maintained throughout the study. Confidentiality was applied by providing the participants' identification numbers and no names and/ or other means of identification was used. All the references used to obtain the information in this study were duly acknowledged.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the research findings. The main objective was to assess OWO among female traders aged 20-50 years at the Eldoret Municipal market. The specific objectives were to:

- a) Determine the dietary practices and food habits among women traders aged 20-50 years in Eldoret Municipal market,
- b) Establish physical activity levels among the women traders aged 20-50 years in Eldoret Municipal market,
- c) Establish the knowledge and perception of overweight and obesity among the women traders aged 20-50 years in Eldoret Municipal market, and
- d) Determine the nutritional status of women traders aged 20-50 years in Eldoret Municipal markets.

4.2 Demographic and socioeconomic characteristics of the respondents

A total of 238 female traders participated in the study. The age groups 30-39 and 40-49 had the highest number of participants at 38% and 37% respectively. Age group 20-29 years had 16%, and 50-59 years had the least participants at 8%. The mean age in this study was 37 years.

Majority of the respondents were married (50%), the singles were 24%, separated 13%, and divorced 7%. The response shows that 47% of the respondents have between 3-5

children. The respondents with 0-2 children were 41% and 12% had a parity of 6 and above children as indicated in Table 4.

The respondents with no formal education were 9%. Those with primary education were 48%. The respondents with secondary education were 32% and 12% had tertiary education.

Table 4: Demographic characteristics of women traders age 20-50 at Eldoret municipal markets.

Factor	n=238	%
Age		
20 -29 Years	39	16.4
30-39 Years	91	38.2
40- 49 Years	88	37.0
50- 59 Years	20	8.4
Marital Status		
Single	58	24.4
Married	120	50.4
Divorced	30	12.6
Separated	14	5.9
Parity		
0-2 Children	97	40.8
3-5 Children	112	47.1
6 and above children	29	12.2
Education		
None	21	8.8
Primary	113	47.5
Secondary	17	31.5
Tertiary	29	12.2

The sample was categorized into six income group levels as shown in Figure 4. Those with income range <10,000 per month, 11,000-20,000; 21,000-30,000; 31,000-40,000; 41,000-50,000 and 50,000 plus.

Out of the 238 women, 48% earned less than Kshs. 10,000; 28% earned in the range of 11,000 – 20,000; 13% earned between 21,000 and 30,000; 6% earned in the range of 31,000 – 40,000; 2% earned in the range of 41,000 – 50,000 and 3% earned above 50,000.

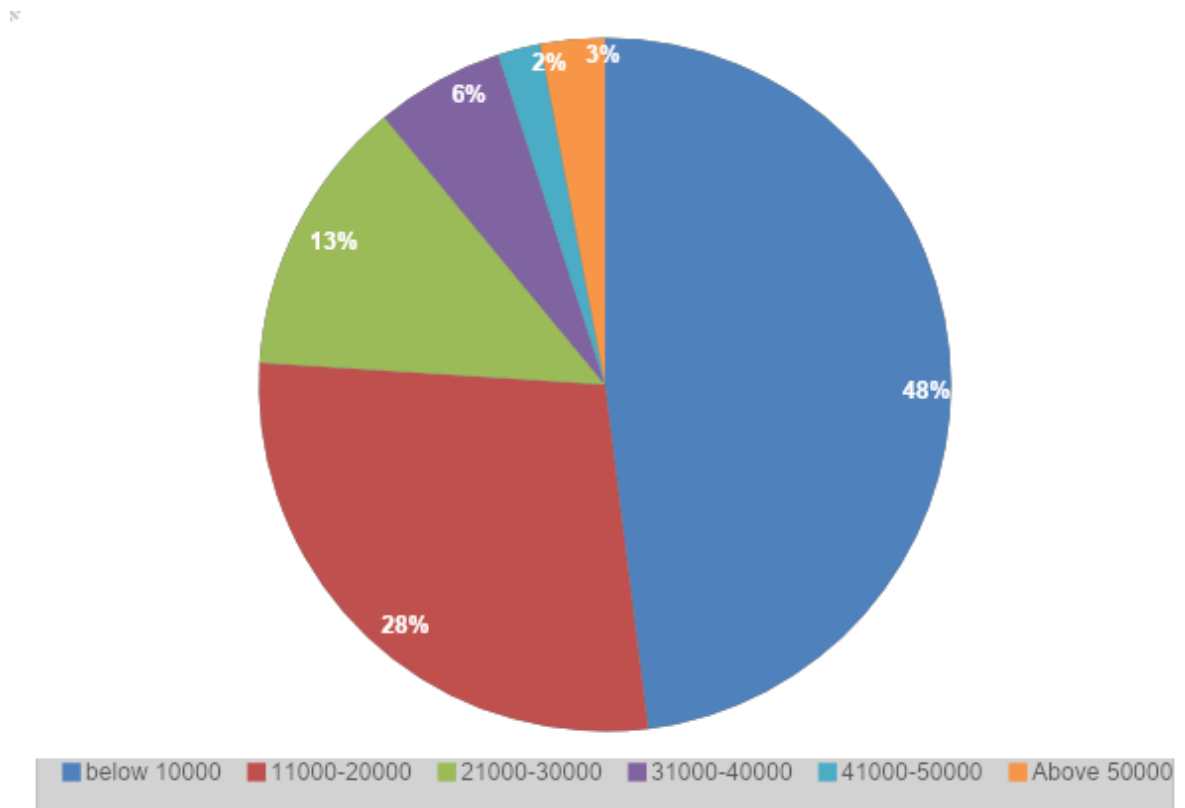


Figure 4: Monthly income of women traders

4.3. Dietary practices and eating habits

4.3.1 Eating habits of women traders.

a) Most important meal of the day

Forty-two percent of the respondents reported that they take lunch as the most important meal in a day as indicated in Table 5. They explained that during lunchtime, they are well settled in the market, and the traffic of clients at the market is low; hence they have ample time to have lunch.

Table 5: Most important meal of the day among women traders

Most important meal	n	%
Breakfast	44	18%
Lunch	99	42%
Dinner	55	23%
Midmorning snack	1	0%
Afternoon snack	2	1%
All of them	37	16%
Total	238	100

b) Meals eaten away from home

Most of the respondents carried tea from home in small thermos flasks and had it later with a snack as their breakfast. 75% said they ate lunch away from home, and found it easier to buy from the food kiosks because it is served direct to their working stations on order, and when still hot and fresh. Some respondents indicated they would wish to carry food from home, but because their work environment is usually hot, the food does not

often stay very fresh. Eating food from the nearby food kiosks was popular as indicated by the women traders.

c) Number of meals per day

According to Table 6, 53% indicated that they have three meals a day. Those who indicated that they have four meals in a day inclusive of snacks and tea, which they take in the late afternoon while still at the market were 30%. The 11% that take two meals a day often take a snack at the market and the other meal at home. Those who had one meal per day were 3% and those who had more than four meals per day were 3% respectively.

Table 6: Number of meals per day among women traders

Number of meals per day	n	%
One	7	3%
Two	27	11%
Three	126	53%
Four	71	30%
More than four	7	3%
Total	238	100%

d) Decision making on meals to be eaten at home

Sixty eight percent of the respondents reported that the decision on meals to be eaten at a home were made by mothers. However, 27% of the homes had decisions made by house helps, while 5% of the homes had fathers making decisions on meals to be eaten at home.

e) Considerations on meal choices

As tabulated in Table 7, 44% of the respondents reported that an important factor of consideration when planning meals is the price. The taste of the meal and the method of preparation was of concern to 16% and 15% respectively. Eighteen percent (18%) of the respondents also considered accessibility as a vital component for a meal to be served while healthy and balanced meal was of the least concern at 8%.

Table 7: Meal choices among women traders

Meal choices	n	%
Accessibility	43	18%
Price	104	44%
Taste	38	16%
Method of preparation	35	15%
Healthy and balanced meal	18	8%
Total	238	100%

f) Skipping of meals

Skipping meals was a dietary habit among the women traders. Forty percent (40%) of the respondents reported that they skip meals on an average of 3 times a week. When asked the reason why they skip meals, they indicated that having a busy schedule was the main reason for skipping a meal often during the weekends when there are too many clients.

When asked about snacking, 89% of the respondents indicated they do not snack while 10% reported taking snacks in between the main meals. Those who did not appreciate

snacking said that they preferred to wait until the next main meal is served, which forces them to have a heavy meal.

g) Satisfaction with current eating habits

This study also explored if the respondents are content with their eating habits. Fifty-three percent (53%) confirmed that they are satisfied with their eating habits. While on the other hand, 29% indicated that they are not sure if they are satisfied with their eating habits or not, because once in a while they try to change, but they find themselves falling back to their routine eating habits.

Table 8: Satisfaction with current eating habits

Satisfied with current eating habits	n	%
Yes	127	53%
No	43	18%
Not sure	68	29%
Total	238	100%

h) Food Portion Control

When asked if they control the amount of food they eat, majority (86%) of the respondents said they eat to satisfaction; however, 11% reported that they control the amount of food they ate. The reason for not controlling food portions was that the amount of food served by the food vendors or restaurants was a standard portion for a single meal, so there was no need for control. 3% of those who reported that they control the amount of food they take indicated that they do so for health reasons. They heed to

doctors' advice specifically on the foods to avoid; hence they would opt to eat it in small quantities than to completely avoid it. While at the market, the purchased food is often cleared to get value for their money. In a case where they could get an additional portion for free, then they do not hesitate to ask for it.

i) Source of food supply while at the market

With reference to Figure 5, 58% of the respondents have their meals at work supplied by food vendors who are punctual and customize the order to their needs. Among the participants, 26% of them carry their meals from home while 58% got food for the day from a food hawker or vendor. The remaining cumulative 16% opted to buy food from a supermarket or a restaurant or from a friend.

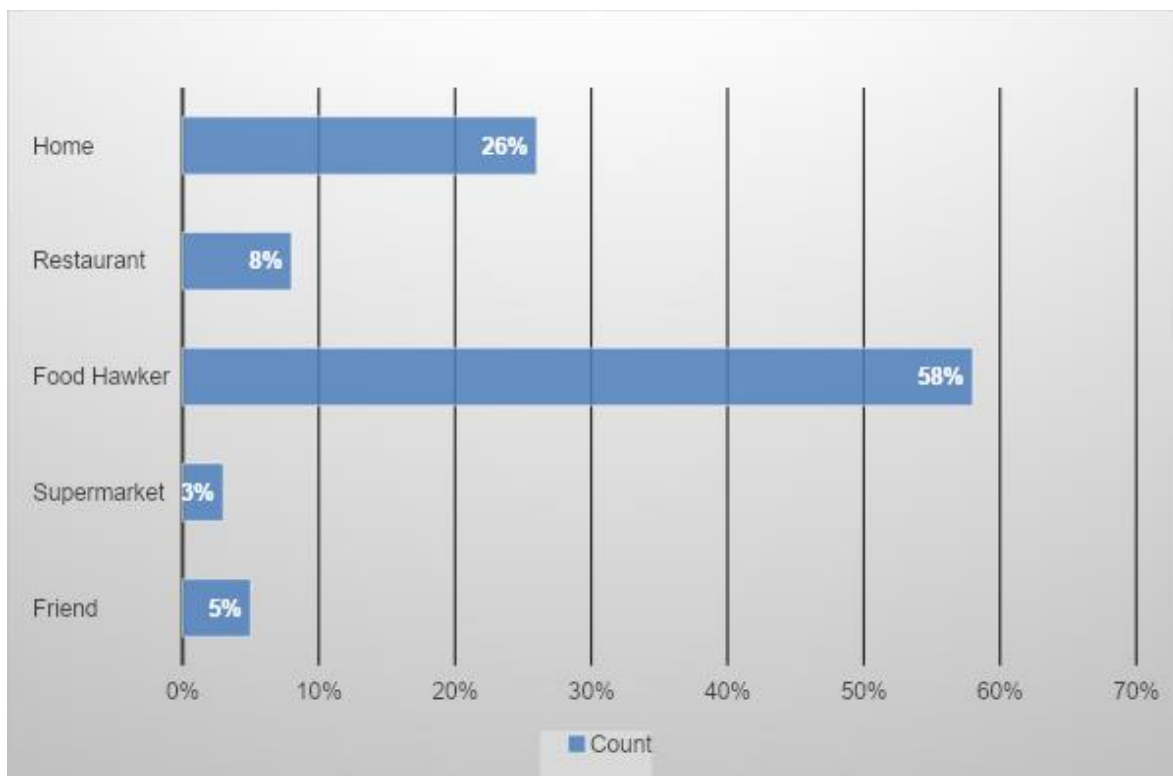


Figure 5: Source of food

The food vendors remain to be popular and the most preferred food supplier due to convenience while supermarkets were the least preferred while at the vending job.

4.3.2 Dietary diversity

Food Variety Score (FVS)

The considered food groups were starch (cereals), rich fruits and vegetables, legumes and nuts, meat, poultry and fish, oil and fat, eggs, milk and dairy products, other foods. Eating any quantity of any food group at least once per day, was taken into account, hence no consideration was put on minimum intake for the food group.

This was measured by counting the individual food items consumed by the women traders in the last 24 hours. The mean FVS of the women traders was 8.4 (± 2.4) which is lower as compared to the theoretical maximum of 15.

An imbalance in energy intake and energy use predisposes one to being overweight or obese. These respondents' consumption of high energy with low levels of physical activity explains why there is obese and overweight among the women traders.

4.4 Physical activity levels

a) Hours spent at the market per day

The 238 respondents reported to spend different hours at the market. 11% of the women traders spent between one to three hours at the market. Those who spent above seven hours at the market were the majority at 75 %. The remaining 14% spent between four hours to six hours on the vending job.

b) Mode of Travel

The mode of travel to and from the market was considered. The means of transport that was common among the respondents was the use of public transport (77%). The respondents who walked and those who used motorcycles were 11% and 10% respectively, 2% used bicycles as the mode of transport.

c) Physical activity

Another measure of physical activity at work was established by asking the women if their work involved activities that require hard physical effort (vigorous physical activity) like moving around while carrying a heavy load or moderate physical effort (moderate physical activity) like walking around the market. The results indicated that 66% of the women had a very light (sitting) level of physical activity: not active, while 13% had light weight (standing for less than two hours) level of physical activity: slightly active. Moderately active (walking) level of physical activity was reported among 20% of the women traders while only 1% (2) of the respondents had a vigorously active level (walk carrying a heavy load) of physical activity.

The total time spent on sedentary activities per day was established by asking the women to report on the total time spent sitting, standing, walking or reclining at work, and getting goods from one place to another place. The results indicated that 79% engaged in sedentary behavior of sitting for more than five hours in a day, with 15% of them being slightly active by spending two to five hours standing at their specific workstations without being mobile. The activity levels of these respondents during the day is sedentary whereby 5% engage in moderate active activities like walking for less than two hours as reflected in the Figure 6.

The results indicated that most of the respondents are sedentary at their work stations since most of their tasks were conducted while sitting. Movement was often within the cubicle work station which does not offer a lot of space for vigorous movement.

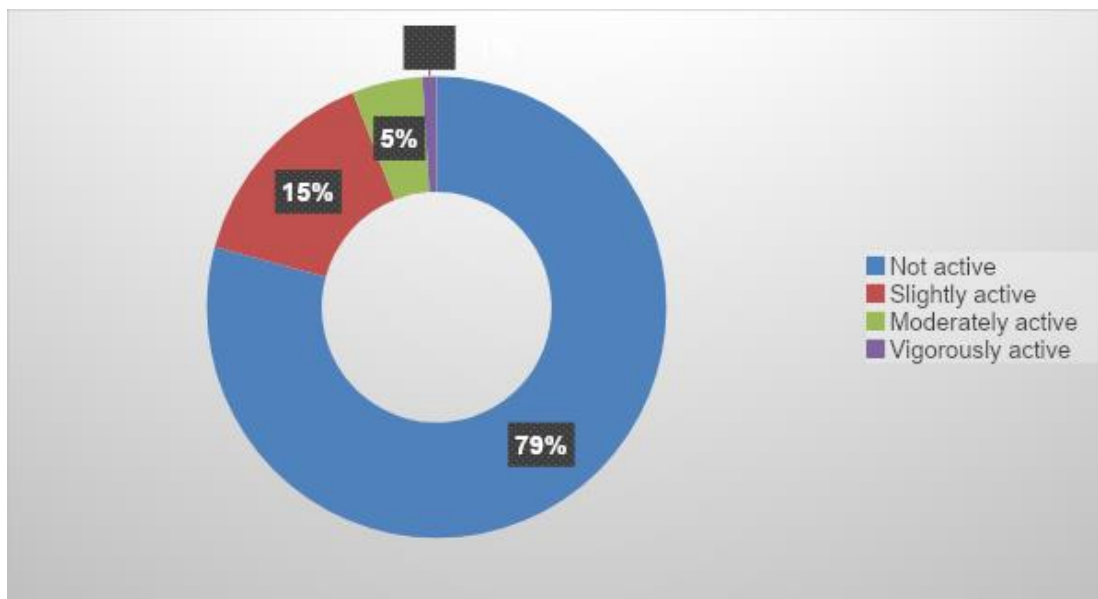


Figure 6: Physical activity levels of women traders

4.5 Knowledge and Perception on overweight and obesity among women traders

a) Perception on nutritional status

The individual respondents were asked their personal judgment of their nutritional status as per the Likert scale: underweight- BMI <18.5, Normal weight- BMI 18.5- 24.9, Overweight- BMI 25.0- 29.9 and obese – BMI >30. Twenty-four percent (24%) perceived themselves as being underweight; 57% perceived themselves as normal weight, and 19% perceived themselves as overweight. None of the respondents perceived themselves as being obese. However, 24% (58) of the respondents had the perception that their body sizes were small hence they would categorize themselves as being

underweight. When asked to explain why they had these perceptions, the respondents indicated that OWO is associated with general body size and that they might just be above the recommended weight but not too much to be categorized as obese.

b) Frequency of measuring weight per year

Majority (93%) of the respondents reported that they weighed themselves more than four times a year. The least was 1%, who reported taking their weight measurements once a year.

c) Weight control measures

The respondents who indicated that they are on weight control measures were 38%, while 62% indicated that they are not. When asked what weight control measure they were using, 23% indicated a change in eating habits, 2% indicated that they try to reduce fat consumption by preparing their meals with little or no fat, while 4% said they have been increasing their fruit and vegetable consumption.

d) Preference on losing or gaining weight

Among the respondents, 16% were focused on losing weight, while 61% were focused on maintaining their weight and 23% were focused on gaining weight.

e) Weight control motivating factors

From the results of this study, 48% of the respondents reported being motivated by having good health. 25% believed looking good is a worthy reason for maintaining a good weight, while 15% reported fear of developing NCDs and illnesses as a motivating factor to control their weight. Only 8% were motivated by being fit and 4% had no specific reason for motivation to weight control.

4.6 Nutrition status of women traders aged 20-50 years at Eldoret Municipal Markets

4.6.1 Overweight and Obesity among women traders

WHO (2016) classified BMI as follows, ≤ 18 is underweight, 18.5 – 24.9 is normal, 25 – 29.9 is overweight, 30-34.9 obese and ≥ 35 is obese class ii.

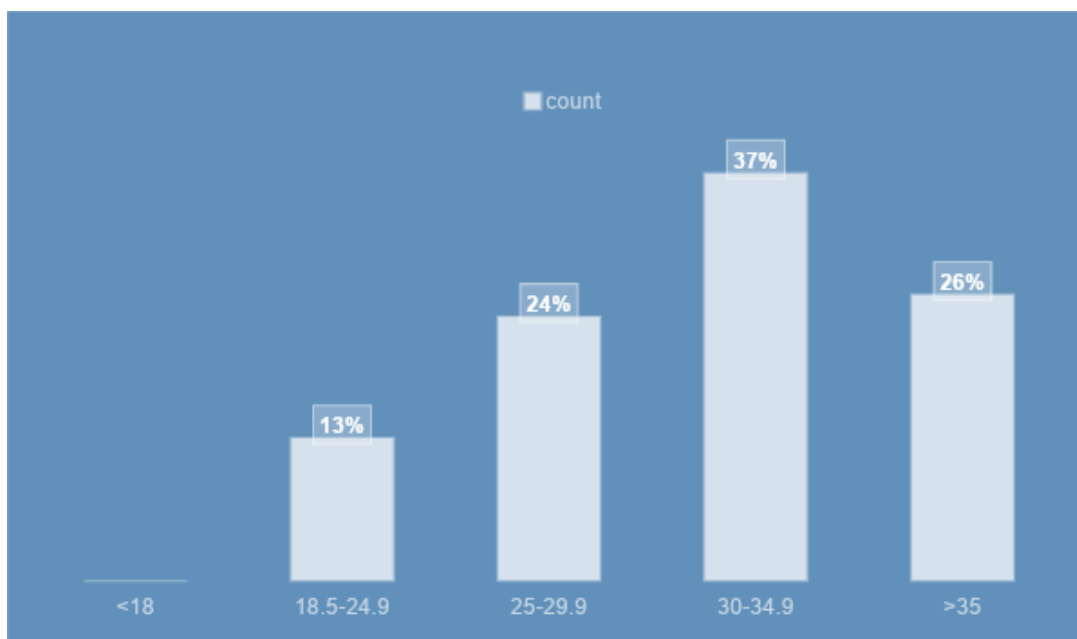


Figure 7: BMI Classification of women traders

Body Mass Index classification indicated that 13% were in the normal weight category. However, 24 % were overweight, 37% of the respondents were obese, and 26% were extremely obese as indicated in the Figure 7; giving a cumulative of 87% of the respondents being either overweight or obese.

4.6.2 BMI distribution across socio-demographic characteristics

With reference to the Body Mass Index, the nutritional status of the women traders was established. In relation to marital status, as indicated in Figure 8, a total of 24% were single, 26% of them were obese while 25% were of normal weight. For those who were married (50%), the obese were 43%, overweight were 58%, and 56% were of normal weight. On the other hand, within the divorced and separated category, 21% of them were obese, while 19% were of normal weight. The widowed respondents who were 7%, 9% of them were obese.

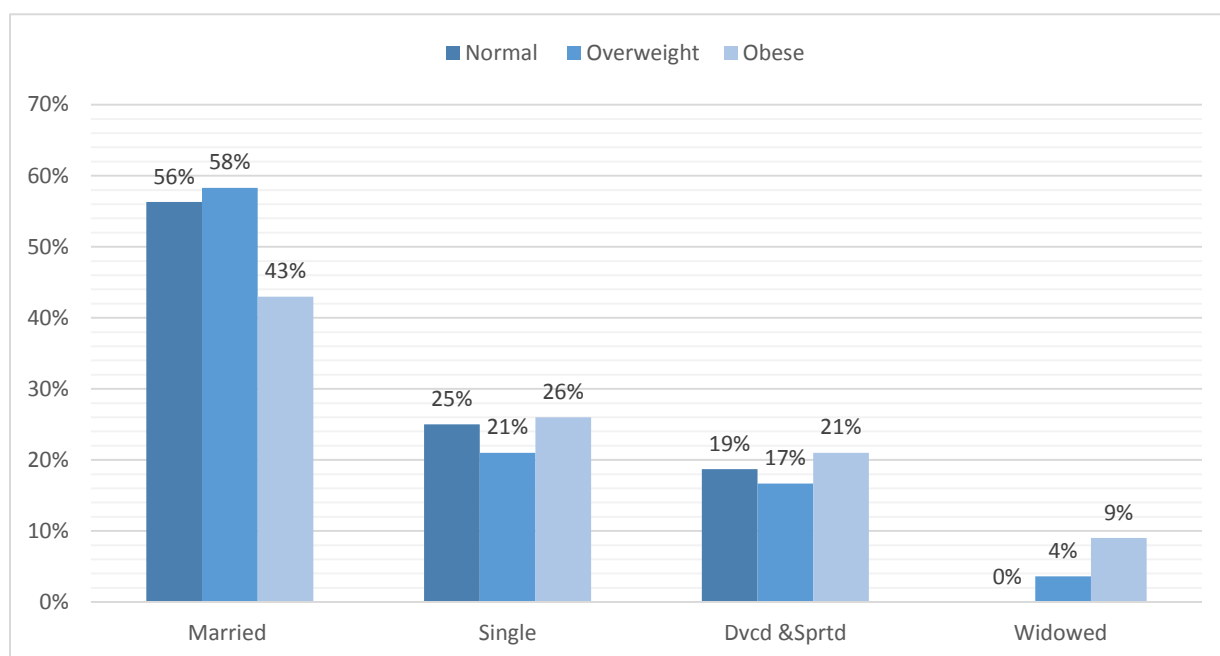


Figure 8: Marital status and BMI classification of women traders

Among the 9% respondents who had formal education, 57% were obese and only 5% were of normal weight. The 48% with primary education, 60% of them were obese and 32% were overweight. The 32% respondents with secondary education, 44% of them were obese, 41% were overweight and 15% were of normal weight. Among the 12% of

the respondents with tertiary education, 38% of them were obese and 24% were of normal weight.

Figure 9 indicates, women with 0-2 children had overweight levels at 51% and obesity 30%, with 53% being normal weight. On the contrary, women who had six and above children had none of the participants being normal weight, 12% of them were overweight and 16% were obese.

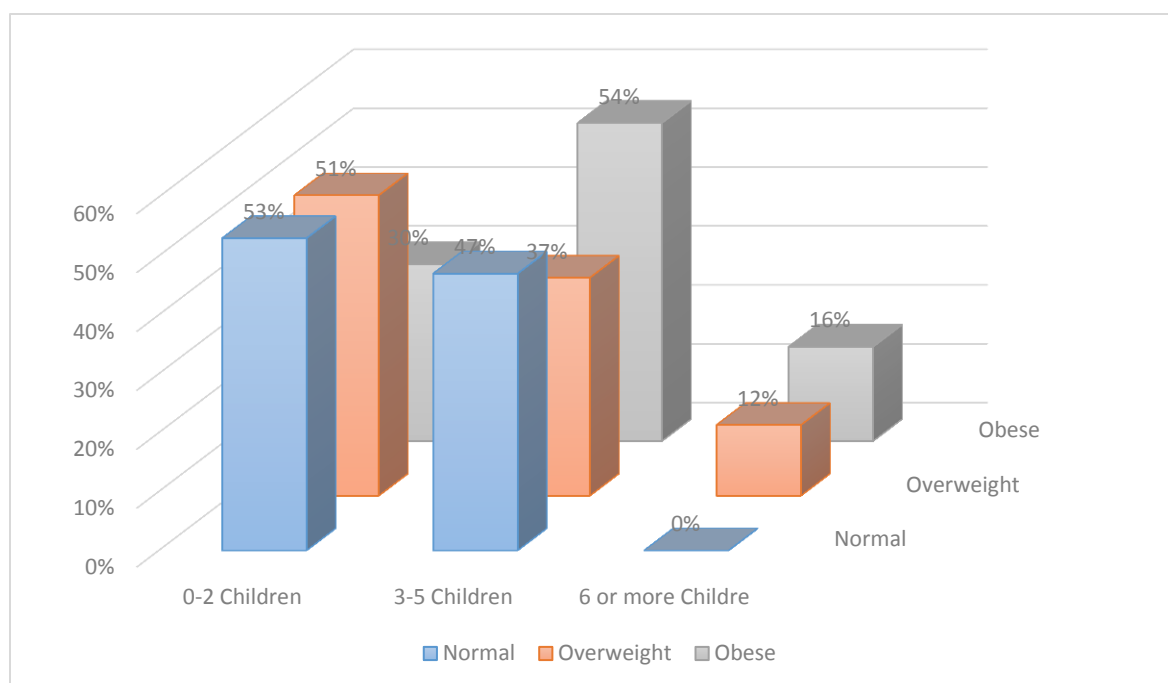


Figure 9: Parity and BMI Classification of women traders

Among the respondents who earned below 10,000 (48%), 52% were obese, 36% were overweight, and 12% were normal weight. Among the 28% who earn between 11,000 – 20,000 per month, 61% were obese and only 6% were normal weight. The 13% who earned between 21,000 and 30,000, 40% were obese and 38% were overweight.

4.6.3 Socio demographic and economic characteristics of the normal weight, overweight and obese women traders

Table 9: Sociodemographic and economic characteristics of the normal weight, overweight and obese women traders

Socio demographic characteristics		Normal weight n (%)	Overweight n (%)	Obese n (%)
Marital status	Married	18(56.3)	49 (58.3)	53(43.4)
	Single	8 (25.0)	18 (21.4)	32(26.3)
	Separated	4 (12.5)	12 (14.3)	14(11.5)
	Divorced	2 (6.3)	2 (2.4)	12 (9.8)
	Widowed	0 (0.0)	3 (3.6)	11 (9.0)
Level of Education	None	1 (3.1)	8 (9.5)	12 (9.8)
	Primary	12 (37.5)	34(40.5)	67(54.9)
	Secondary	11 (34.4)	32(26.2)	32(26.2)
	Tertiary	8 (25.0)	10(11.9)	11 (9.1)
Monthly income	Below 10,000	14(43.8)	42(50.0)	59(48.5)
	11,000-20,000	4(12.5)	22(26.2)	41(33.6)
	21,000-30,000	7(21.9)	13(15.5)	12 (9.8)
	31,000-40,000	5(15.6)	4(4.8)	5 (4.1)
	41,000-50,000	2(6.3)	0(0.0)	2 (1.5)
	Above 50,000	0(0.0)	3(3.6)	3 (2.5)
Age	21 - 25	11(34.4)	5(6.0)	7 (5.7)
	26 -30	5 (15.6)	18(21.4)	16(13.1)
	31 - 35	8 (25.0)	15(17.9)	19(15.6)
	36 -40	3 (9.4)	21(25.0)	30(24.6)
	41 -45	4 (12.5)	14(16.7)	25 (20.5)
	46 - 50	1 (3.1)	11(13.1)	25(20.5)
Parity	0 - 2 Children	17 (53.1)	43(51.2)	37(30.3)
	3 -5 Children	15 (46.9)	31(36.9)	66(54.1)
	< 6 Children	0 (0.0)	10(11.9)	19(15.6)

4.6.4 Nutritional status in relation to dietary practices and feeding habits of women traders

Among the 42% who indicated that lunch was the most important meal, 51% were obese and 40% were overweight and 9% were of normal weight. The respondents who indicated that they value dinner as an important meal of the day were 23%, with 62% of them being obese, 9% had normal weight and 29% were overweight.

Among the 53% who confirmed that they were satisfied with their eating habits, 43% were obese while 16% were of normal weight and 41% were overweight. On the other hand, 29% indicated that they were not sure if they were satisfied with their eating habits or not; among them 66% were obese whereas 28% were overweight. Being satisfied with eating habits did not have a major control to being overweight or obese since even those who were not satisfied with their eating habits were not able to adapt to a new routine.

4.6.5 Nutritional status to physical activity levels among women traders

Figure 11 shows that among the 11% who spent between one to three hours at the market, 52% of these respondents were overweight while 24% were obese; and 24% were normal in weight. Those who spent above seven hours at the market were the majority at 75 %; with 58% of them being obese, 34% overweight and 8% had normal weight. The rest (14%) reported that they spent between four hours to six hours on the vending job, 42% of them were obese, 18% were of normal weight and 40% were overweight. Therefore, the longer the hours spent at the market, the more the chances of being overweight or obese; because the level of physical activity while at the market was low.

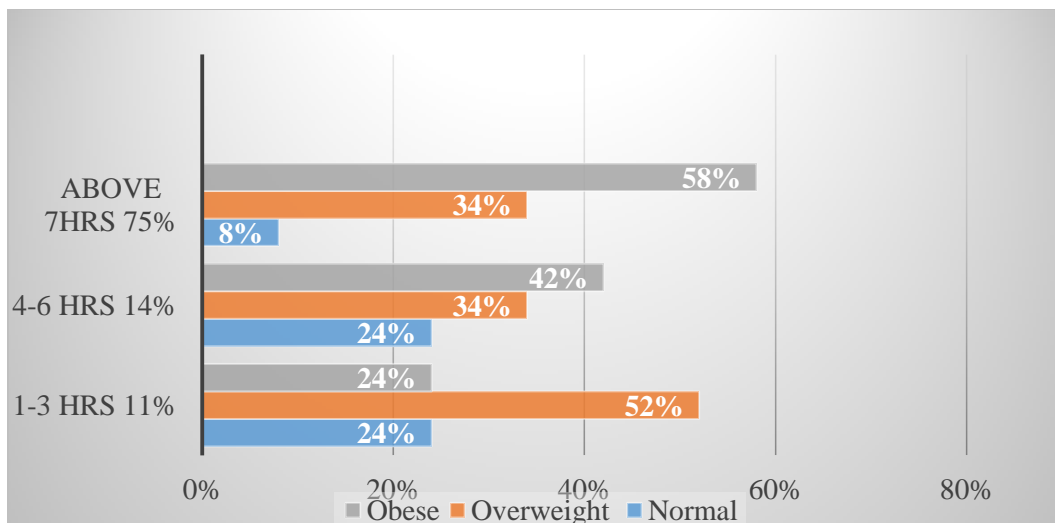


Figure 10: Hours spent at the vending job in the market and BMI classification of women traders

Among the women who reported to use matatu (77%), 50% were obese, 11% were normal weight, and 39% were overweight. Fifty-nine percent of those who walked were obese, 29% were normal weight and 12% were overweight. On the other hand, 56% of those who used motorcycles were obese, 41% were overweight, and 3% were of normal weight. The respondents using matatu made up 40% of those who were obese in relationship to the mode of transport used to travel to the market. Majority of the market women do not walk to their centers of business. This translates to a low level of physical activity, which does not balance with the levels of energy consumption and energy use hence predisposing them to being overweight or obese.

The physical activity levels were low having 79% engaging in sedentary behavior, hence 80% of those who were sedentary were obese and only 3% were of normal weight. Among the 15% who were slightly active, 69% of them were obese, 22% were overweight and only 9% were in the normal weight category. The results indicated that

most of the respondents had a sedentary lifestyle whereby tasks were conducted while sitting. Movement was often within the cubicle/ workstation which does not offer a lot of space for vigorous movement.

4.6.6 Nutritional status in relation to knowledge and attitude of overweight and obesity among women traders

Among the 238 respondents, thirty-seven percent (50) of those who had a perception of being normal weight were obese, 47% were overweight and 16% were of normal weight. Nineteen percent (45) had the perception that they are overweight, 89% of them were obese, 11% were overweight, and none was of normal weight. Among the 24% of the respondents who have the perception of being underweight, 59% of them were obese, 10% had normal weight, and 21% (18) were overweight.

Table 10: Knowledge and attitude to nutritional status by women traders

Knowledge and attitude		Normal weight n (%)	Overweight n (%)	Obese n (%)
On weight control measures	Yes	6 (18.8)	23 (27.4)	53(43.4)
	No	26 (81.3)	61 (72.6)	69 (56.6)
Frequency of weight check	Less than three times	0 (0.0)	1 (1.2)	2 (1.6)
	More than three times	32 (100.0)	81 (98.8)	122(98.4)
Weight control motivation	To look good and keep fit	6 (18.7)	23 (27.4)	50 (41.0)
	Good health and fear of NCDs	26 (81.3)	61 (72.6)	72 (59.0)

Table 10 shows the following indicators to be negatively associated with BMI; being on weight control measure were seen to increase obesity, weight control for health was high among people with normal BMI.

In conclusion there is clear evidence that there is a lack of adequate knowledge as concerns OWO management. The prevention and management of OWO is highly dependable on the education that the society has about OWO.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter discusses the results of the research findings. The main objective was to assess obesity and overweight conditions among female traders aged 20-50 years at the Eldoret Municipal market. The specific objectives were to determine the dietary practices and food habits of the female traders, to establish the physical activity levels, to establish the knowledge and perception gap of OWO among female traders and consequently to determine the nutritional status of the female traders age 20-50 years at the Eldoret Municipal market.

Two hundred and thirty-eight (238) women were sampled out of a total population of 840 at the four municipal markets in Eldoret town. The response rate was 98%. A descriptive survey was used and assessment of OWO was determined by assessing the nutritional status using the anthropometric data. The influence of dietary choices and patterns, physical activity levels and the knowledge and perception of overweight and obesity among the female traders in Eldoret Municipal market is discussed in this chapter.

5.2 Overweight and obesity among women with reference to demographic and socioeconomic status

The assessment of OWO was determined using BMI. The study population was aged 20-50 years; the mean age was 37.4, the median was 38, and a mean BMI of 30.3kg/M².

The level of overweight among women traders age 20-50 was 26%, whereas that for obese women was 37%. In essence, approximately one in every two respondents was

obese or overweight. The mean age of the respondents being 37.4 matches a study by Mkuu (2018) that confirms that the older women are at a higher risk of being OWO. WHO (2019) also indicates that the likelihood of being OWO is generally greater in older women; hence the risk of OWO increases across the lifespan.

The findings indicate the age bracket of 30 to 39 years as the highest population. However, 50% of women traders aged 21-30 years had normal weight, while 8% were obese. On the other hand, women traders aged 41-50 had 41% of them being obese and 16% being normal weight. Women aged 40 to 44 have four times the risk of being OWO than women aged 15 to 24 (Hales et al., 2017; Mkuu et al., 2018). According to Lee et al., (2017) the older people get, the higher their chances of becoming overweight and obese

Forty-eight percent of the respondents reported to receive an income below 10,000 per month, making them low income earners. According to Ondicho et al., (2016) OWO is rapidly increasing among the low and middle-income earners in Kisumu, Kenya. The low income earners have limited access or low affordability of fresh fruits and vegetables because fresh produce are priced higher, yet, the low and middle income families often have tight budgets making it harder to maintain a balanced diet.

Although the relationship between marital status and OWO is not clearly established. In this study, marital status indicates that among the married, 58% were overweight while 43% were obese. A study by Tzotzas et al., (2010) indicates that married individuals tend to be heavier than the unmarried.

On the other hand, the divorced and separated had higher percentages of those who are overweight and obese as compared to the never married or single which relates to a study by Bell et al., (2019). A study by Bell et al.,(2019) indicates that married individuals will more often have a confidant with whom they can eat together; therefore, this makes them eat more often. Another study by Ondicho et al., (2016) explains how the married are less conscious about their weight because they are not actively seeking a mate. On the other hand, studies by Bell and Thorpe Jr, 2019 and Ondicho et al., (2016) explain that psychological, and social disruption in marital status, mainly affects women. Psychological stress may trigger emotional eating as a coping mechanism when facing marital imbalances. Marriage can provide emotional support and motivation for healthy behaviors, Ondicho et al. (2016) hence when it is disrupted women may turn to comfort foods without putting an emphasis on the nutritional values contributing to weight gain.

In this study, a parity of six and more children has all the subjects being either obese or overweight. Women who have three or more children were 1.75 times at risk of being obese or overweight according to Taghdir et al., (2020). A parity of 3 and above had 87% of them being overweight or obese. Higher parity has previously been implicated as one of the predisposing risk factors of OWO among women (Taghdir et al., 2020) maintaining weight after child birth involves a combination of healthy eating, regular physical activity and individualized strategies that consider the unique circumstances and needs of a woman. During pregnancies there are changes in body metabolism, hormonal fluctuations, and lifestyle adjustments. Hales, 2018, when a woman has multiple pregnancies there is a risk of accumulating excess weight overtime if the body is not given sufficient time to recover between the births, and may make it challenging to

prioritize healthy eating and exercise. The greater the parity the higher the risk of being OWO which makes parity positively associated with the risk of OWO especially the abdominal obesity (Hales, 2018).

5.3 Dietary practices and food habits of women traders

Data collected on dietary practices indicate that 42 % of the respondents believed that lunch was the most important meal of the day, with 44% indicating breakfast as the most important meal in a day. Data shows that, 75% of the respondents ate lunch away from home because it is fresh, hot and served at their work station. The practice predisposed them to a high intake of energy giving foods. The diets included the intake of processed foods like white bread, chapatti, mandazi, cakes and biscuits among others which are made from refined wheat flours, added sugars and unhealthy fats making them high in refined carbohydrates which contribute to increased numbers of OWO (Goss & Gilbert, 2014; Rauber et al., 2018). Many processed wheat foods are stripped of the natural nutrients during manufacturing since the process removes essential vitamins, minerals, and fiber found in the grain, the processed foods often have food additives like flavor enhancers and preservatives which when consumed might have an effect on body metabolism (Rauber et al., 2018). Experiments conducted in 2018 and 2019 (Parada et al., 2019; Robinson & Kersbergen, 2018) showed that people tend to eat what they are served to completion especially if it is a purchased meal; which explains the high energy intake foods like ugali that might not necessarily balance out with the energy being used.

A factor that 44% of these women consider when deciding what to eat is the price of food, followed by accessibility at 18%, while only 8% consider the nutritional benefits of

the meal and 14% would put into consideration the method of food preparation. A study by McLaren (2007) explains that 58% of those who eat out do not consider nutrition as necessary when buying food.

The women traders do not achieve the daily recommended serving sizes of the different food groups showing a poor diet diversity. Cereal consumption was 100% making the consumption of the other food groups like animal products and fruits low. Starch (carbohydrate) (75%) was the main energy contributor to the diet, hence other nutrients and micronutrients are not effectively considered.

The high numbers of OWO in this study are due to the poor diets among the respondents imbalance in the consumption of energy-dense foods and physical activity and a high consumption of processed foods like chapatti and mandazi. A study by Lee et al., (2017), reports an increase in accessibility of energy-dense foods and beverages, and a relatively high price for fruits and vegetables, makes the accessibility of processed foods a lot easier. This confirms findings by Goss & Gilbert (2014) that explains how eating out is highly associated with poor diets and low consumption of fruits and vegetables. In the developing countries, lack of dietary diversity is a challenge because the diet is predominantly starchy staples (Creatore et al., 2016).

5.4 Physical activity levels of the respondents

Physical activity (PA) is known to be a major factor in reducing the likelihood of being obese or overweight and physical inability which is associated with aging (Mawaw et al., 2017). The findings of the study indicate that >65% of the women did work that did not involve vigorous physical activity. The differences between the BMI regarding vigorous

physical activity with the proportion of obese females who engaged in less physical activity, i.e. 0-10 minutes is high at 74% and this proportion reduced among females who spent 10-20 and 20-30-minutes on physical activity. This same trend was witnessed among women who did not work for more than 20 minutes a day. The proportion of obese women who spend 0-10 minutes on the continuous walk was 66%, and this percentage sharply dropped to 13% among women who spent 20-30 minutes walking. The levels of physical activity among the respondents were at minimum levels, which is one reason for having high levels of OWO (Sumner et al., 2019).

The results indicate that 80% of the women engaged in sedentary behavior of sitting with 15% of the women being lightly active by standing and only 5% being moderately active by moving around their stalls. Many of the traders do not have to carry heavy loads because they use mobile phones /technology to get goods delivered to their stalls. A sedentary practice increases the risks of being obese or overweight, as acknowledged by (Migueles et al., 2017). In this case, the problem of OWO among the group of women traders is not a paradox as most of these women engage in sedentary activities coupling with the long hours of physical inactivity and high energy intake diets which increases the chances of being OWO.

The average age of the respondents was 37 years and are at a high risk of being overweight or obese. A study by Mkuu et al., (2018) reveals that women aged 40 to 44 years have four times higher chances of being overweight and obese as compared to women aged between 15 to 24 years. Previous research, (Tremblay et al., 2011) indicates that the levels of physical activity as per the health regulations tends to decrease as

people age, which is risky for women approaching menopause because they are highly predisposed to non-communicable diseases like chronic heart disease.

This study shows the longer someone stayed at the vending job the higher the risk of being OWO. 75% of the women traders spent above 7 hours at the market, and 58% of them were obese; while among the women traders who spent 1-3 hours at the market only 24% of them were obese. These results relate to a study by (Amugisi et al., (2017) who says the longer the hours one stays away from home, the higher the chances of unhealthy eating habits hence increasing the likelihood of one being OWO. The activity level remains significant as the study indicates that most women while at their vending job have a sedentary work environment which predisposes them to the high risk of OWO.

5.5 Knowledge and attitude of overweight and obesity among female traders

Knowledge and attitude are considered as important indicators for OWO awareness which is directly related to self-weight management. A significant association is realized between BMI and the motivation for weight control. A study by Goss & Gilbert (2014) and Figuls et al., (2018) reveal that with BMI increase, serotonin synthesis equally decreases, which helps to indicate satiety at low levels of food intake, hence exposing those that are overweight and obese to eat more.

Among the women traders who reported to be on weight control measures, 43% were obese and 27% were overweight, and as the results indicate, the weight control measures; which were eating habits, physical activity/ exercise, dietary options, weight control medication, reduced fat consumption, increasing vegetable and fruit intake, consumption of a balanced diet, and skipping meals/ fasting did not reduce the levels of OWO among

the respondents. A study by Djalalinia, (2015) concluded that not every weight loss method works for everyone. Individuals who are trying to lose weight may fall on a vicious cycle which can lead to other eating disorders making it difficult to lose weight (Goss, 2014)

The description of obesity as "being very fat" generally decreases the attempts of losing weight (Djalalinia, 2015). Fifty-eight percent (161) of the respondents perceive that being OWO is a good sign of maturity that yields respect in the community; they take it as a sign of "living well" and being stress free.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Objectives of the study

The overall objective of the study was to assess overweight and obesity among women traders age 20-50 years at Eldoret Municipal Market.

The specific objectives of the study were to:

1. Determine the dietary practices and food habits among women traders aged 20-50 years in Eldoret Municipal market,
2. Establish physical activity levels among the women traders aged 20-50 years in Eldoret Municipal market,
3. Establish the knowledge and perception of overweight and obesity among the women traders aged 20-50 years in Eldoret Municipal market, and
4. Determine the nutritional status of women traders aged 20-50 years in Eldoret Municipal markets

6.2 Conclusion

The findings of this study provide valuable insights into the health and well-being of the specific population group; that is women traders aged 20-50 years in Eldoret Municipal markets in Kenya. The average age of the respondents was 37 years. This age category of women has high chances of being overweight or obese because of various predisposing factors. The conclusions of the study are given below according to the specific objectives of the study.

Objective 1: To determine the dietary practices and food habits among the women traders aged 20-50 years in Eldoret Municipal markets.

The conclusions are: -

- i. Majority (75%) of the respondents regularly purchased lunch from food vendors, supermarkets, friends or restaurants near the markets. They consumed largely a high calorie meal.
- ii. The respondents' meal choices were determined by affordability (44%) as opposed to nutrition (8%).
- iii. The respondents' daily diet lacked diversity in carbohydrates giving foods by having a common option of ugali, chapatti, or mandazi; which led to a high intake of starch in the diet rendering other nutrients and micronutrients not sufficiently consumed.
- iv. Although the socio economic status of this respondents is low the respondents can increase the variety of foods and include fruits, vegetables and whole grains while controlling the portion sizes in managing calorie intake.

Objective 2: To establish physical activity levels among the women traders aged 20-50 years in Eldoret Municipal markets.

The conclusions are: -

- i. Most of the respondents (79%) engaged in a sedentary behavior whereby tasks were conducted while sitting. Movement was often within the cubicle/ workstation (3M*3M) which does not offer a lot of space for vigorous movement.

- ii. 75% of the respondents spent more than 7 hours at the market; a sedentary work environment which predisposed them to high risks of OWO.
- iii. Only 5% of the respondents reported engaging in moderate active activities like walking for less than two hours in a day.
- iv. There is an imbalance between the number of calories consumed (calorie dense processed foods, added sugars, unhealthy fats) and the number of calories expended through physical activity and body metabolism.

Objective 3: To establish the knowledge and perception of overweight and obesity among the women traders aged 20-50 years in Eldoret Municipal market.

- It was concluded that majority of the respondents had a misconception that overweight and obesity was not a risk to health since 58% perceived being OWO as a good sign of maturity that yields respect in the community; and described it as a sign of "living well" and being stress free.

Objective 4: to determine the nutritional status of women traders aged 20-50 years in Eldoret Municipal markets.

The conclusions are:

- i. The level of overweight among women traders age 20-50 years in Eldoret Municipal markets was 26%, whereas that for obese women was 37%. Therefore, 53% of the respondents were in the OWO category; approximately one in every two respondents was obese or overweight.
- ii. Ugali was the frequent carbohydrate (75%) hence the main energy contributor to the respondents' diet, hence other nutrients and micronutrients were not adequately considered.

- iii. Poor dietary choices, with excess calorie intakes from high calorie and low nutrient foods, leads to inadequate nutrient intake and over consumption of calories combined with limited physical activity levels contribute to limited physical activity levels.

Lastly, this research underscores the importance of addressing the nutritional needs, promoting healthy dietary practices, encouraging physical activity, and enhancing knowledge and awareness of overweight and obesity among women traders aged 20-50 years in Eldoret Municipal markets. Implementing appropriate interventions based on these findings can contribute to improved health outcomes and overall well-being for this vulnerable population group.

6.3 Recommendations

The following recommendations were made:

Policy: The Ministry of Health in collaboration with the Trade Department should introduce interventions programs for management of obesity among women and the society at large. Multifaceted; Policy to involve different stakeholders

Further research: Research on various behavioral interventions such as cognitive behavioral therapy (CBT) and lifestyle modification programs that can promote healthier eating habits, physical activity and weight loss in OWO individuals.

Practice: The policy makers should consider enacting public health systems to sensitize the public on the need to engage in routine daily exercise with special emphasis on people whose work environment encourages sedentary lifestyle.

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APPENDICES

Appendix I: Research Consent form

I volunteer to take part in the research study.

Purpose of Study

I understand the purpose of this study in which I will participate is to assess overweight and obesity among women traders (aged 20 – 50 years) in Eldoret Municipal markets.

Confidentiality

I understand that my right to privacy will be protected, and that the information collected in this study will not be used to subject me to any public embarrassment. I understand that I will be assigned a code number, and that from that point on I will only be referred to by respective code number and that my identity will only be known to the researcher of this study.

Volunteer Rights

I understand that I am free to drop from this study at any time and for any reason. I also understand that I will be dropped from this study if I do not complete all assessment information required.

Informed Consent Signatures

Name.....

Signature.....

Date.....

Appendix II: Data Collection Questionnaire

ASSESSMENT OF OVERWEIGHT AND OBESITY AMONG FEMALE TRADERS (AGED 20-50) IN ELDORET MUNICIPAL MARKET (QUESTIONNAIRE)

Respondents ref No Residential estate

Section A: Socio demographic information

1. Age

2. Marital status

Single Married Divorced Separated Widowed

3. Number of children

0-2 3-5 6 and above

4. Respondents' level of education

None Primary Secondary Tertiary

5. Type of housing

Brick / concrete Traditional/ mud Plank / wood Iron/ Mabati other specify

[]

6. Income range per month (Ksh)

Below 10,000 11,000-20,000 21,000-30,000 31,000 -40,000 41,000-

50,000[50,000 and above

Section B: Physical activity

1. How many hours per day are you at the market?

1-3 [] 4-6 [] 7 and above

2. What form of transport do you use when going to work?

Walking [] Matatu [] Motorcycle [] Bicycle []

3. How much time do you spend walking continuously on a typical day?

0-10 in [] 10-20 min [] 20-30 min [] 30- 60 min []

4. Rate these daily activities from 1 to 4. What are your activity levels at the market on a scale of 1-4 (1- none, 2 moderate, 3 often, 4 always)

Sitting [] Standing [] Walking [] Moving while carrying something heavy []

Activity	None	Moderate	Often	Always
Sitting				
Walking				
Moving carrying a heavy load				

5. Do you do vigorous intensity activity that causes large increase in breathing or heart rate for at least 10 minutes continuously? (1-Yes, 2-No)

Running (1-Yes, 2-No) Lifting heavy loads (1-Yes, 2-No)

6. How much time do you spend doing vigorous- intensity activities at work on a typical day?

0-10 min [] 10-20 min [] 20-30 min [] 30- 60 min []

7. What are some of the reasons why you don't engage in any form of exercise?

.....

.....

Section C: Eating habits

1. Which is the most important meal for you in a day?

Breakfast [] Lunch [] Dinner [] Midmorning snack [] Afternoon snack [] All of them []

2. How many meals do you have in a day?

One [] Two [] Three [] four [] More than four []

3. How many meals do you eat away from home in a week?

Breakfasts [] Lunches [] Dinner [] Other []

4. Who makes decisions on meals to be eaten at home?

Father [] Mother [] children [] house help [] other specify

5. What do you consider when getting your meals?

Accessibility [] Price [] Taste [] Method of preparation [] Healthy and balanced []

6. Are you satisfied with your current eating habits?

Yes [] No [] Not sure []

7. Do you skip meals? Yes [] No []

If yes how frequent? Write the number of times in a week []

8. What are the reasons for skipping meals?

.....
.....
.....

9. Do you snack? Yes [] No []

10. Do you control the amount of food you eat? Yes [] No []

11. What are the reasons for controlling the amount of food that you eat?

.....
.....
.....

Section D: Dietary intake

1. 24-hour recall

Time	Food / Beverage	Method of preparation (boiled, fried, steamed, roasted, fresh)	Amount / Serving size	Source

Source of food:

1. Home 2. Restaurant/cafeteria/fast food 3. Good hawker 4. Supermarket 5. Friend 6. Other
2. Food Frequency Questionnaire

Class	Food	Frequency of consumption in the last one week					
		Once	2 times	3 times	4 times	Daily	Never
Cereals, starch carbohydrates	Ugali (specify is sifted or whole meal)						
	White bread						
	Whole meal bread						

	Brown rice						
	White rice						
	Porridge						
	chapatti						
	Sifted wheat flour						
	Githeri						
	Mandazi						
	Roasted maize						
	Chips						
	Arrow roots						
	Sweet potatoes						
	Bananas						
	Others (Specify)						
Dairy foods	Whole milk						
	Fermented milk (mala)						
	Yoghurt						
	Ice cream						
	Butter						
	Margarine						
	Others (Specify)						
Meats, meat products,	Eggs						
	Beef						
	Mutton						
	Chicken						
	Fish						
	Pork						
	Matumbo						
	Processed meat (sausages,						

	bacon, ham, smokies etc)						
	Others (Specify)						
Legumes / pulses and nuts	Ground Nuts						
	Dry peas						
	Dry beans						
	Lentils (kamande)						
	Green grams						
	Black eye peas (Njahi)						
	Others (Specify)						
Vegetables	Kales						
	Cabbage						
	Carrots						
	Spinach						
	Kunde (cow pea leaves)						
	French beans						
	Other African leafy vegetables						
Fruits	Apples						
	Bananas						
	Citrus/ Oranges						
	Melon						
	Passion						
	Pawpaw						
	Pineapple						
	Mangoes						
	Avocado						
	Others (Specify)						
Sugar Alternatives	Sweets						
	Sugar						

	Honey						
	Cakes						
	Biscuits						
	Others (Specify)						
Beverages	Soda						
	Commercial Juice						
	Fresh juice						
	Coffee						
	Tea						
	Water						
	Others (Specify)						

Section E: Anthropometry

Measurement	1 st reading	2 nd reading	Average
Weight (Kg) calibrate scale to zero, take reading to the nearest 100g after removal of shoes and excess clothing			
Height (Cm) to nearest 0.5 cm without shoes			
BMI Kg/M ² calculated as weight in Kg divided by height in meter squared			
Waist circumference (cm) measure narrowest point. Ensure tape is level around the body and parallel to the ground			
Hip circumference (cm) measure the circumference around hips.			

SECTION F: Knowledge attitude and practice towards weight gain and obesity

How do you describe yourself?

Underweight Normal weight Overweight Very overweight/Obesity

1. Are you on any weight control measures to change your weight?

Yes No

2. What have you changed?

Eating habits Physical activity/ exercise Dietary options Medication

Reduced fat consumption Increasing vegetable and fruit intake Consuming a balanced diet Skipping meals/ fasting Other (Specify)

3. What are you trying to do about your weight?

Lose weight Gain weight

4. How often do you measure your weight in a year?

Once Twice Thrice Four times More than four times

5. What are some of the motivations to control your weight?

Global Physical Activity Questionnaire (GPAQ)

Physical Activity		
<p>Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person.</p> <p>Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment. <i>[Insert other examples if needed]</i>. In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.</p>		
Activity at work		
Questions	Response	Code
1 Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like <i>[carrying or lifting heavy loads, digging or construction work]</i> for at least 10 minutes continuously? <i>[INSERT EXAMPLES] (USE SHOWCARD)</i>	Yes 1 No 2 <i>If No, go to P</i> 4	P1
2 In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	Number of days <input type="text"/>	P2
3 How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hours : <input type="text"/> : <input type="text"/> minutes hrs mins	P3 (a-b)
4 Does your work involve moderate-	Yes 1	

	intensity activity that causes small increases in breathing or heart rate such as brisk walking [or carrying light loads] for at least 10 minutes continuously? (Use Showcard)	No	2 7	If No, go to P	P4
5	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days	<input type="text"/>		P5
6	How much time do you spend doing moderate-intensity activities at work on a typical day?	Hours minutes	: <input type="text"/> <input type="text"/> hrs mins		P6 (a-b)
Travel to and from places					
The next questions exclude the physical activities at work that you have already mentioned.					
Now I would like to ask you about the usual way you travel to and from places. For example, to work, for shopping, to market, to place of worship. [insert other examples if needed]					
7	Do you walk or use a bicycle (<i>pedal cycle</i>) for at least 10 minutes continuously to get to and from places?	Yes No	1 2 10	If No, go to P	P7
8	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	Number of days	<input type="text"/>		P8
9	How much time do you spend walking or bicycling for travel on a typical day?	Hours minutes	: <input type="text"/> <input type="text"/> hrs mins		P9 (a-b)

Recreational activities			
The next questions exclude the work and transport activities that you have already mentioned.			
Now I would like to ask you about sports, fitness and recreational activities (leisure), [insert relevant terms].			
10	Do you do any vigorous-intensity sports, fitness or recreational (<i>leisure</i>) activities that cause large increases in breathing or heart rate like [<i>running or football,</i>] for at least 10 minutes continuously?	Yes 1 No 2 <i>If No, go to P13</i>	P10
11	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (<i>leisure</i>) activities?	Number of days <input type="text"/>	P11
12	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours : <input type="text"/> : <input type="text"/> minutes hrs mins	P12 (a-b)

Physical Activity (recreational activities) contd.			
Questions	Response		Code
13	Do you do any moderate-intensity sports, fitness or recreational (<i>leisure</i>) activities that causes a small increase in breathing or heart rate such as brisk walking, (<i>cycling, swimming, volleyball</i>) for at least 10 minutes continuously?	Yes 1 No 2 <i>If No, go to P16</i>	P13
14	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (<i>leisure</i>) activities?	Number of days <input type="text"/>	P14

15	How much time do you spend doing moderate-intensity sports, fitness or recreational (<i>leisure</i>) activities on a typical day?	Hours : <input type="text"/> : <input type="text"/> minutes hrs mins	P15 (a-b)
Sedentary behavior			
The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent [sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping. (USE SHOWCARD)			
16	How much time do you usually spend sitting or reclining on a typical day?	Hours : <input type="text"/> : <input type="text"/> minutes hrs min	P16 (a-b)

Attitude and Patterns of Eating Questionnaire

1. How many times a day do you eat? Please tick (✓)

One [] Two [] Three []

2. Please answer the following according to your particular eating habits?

	Yes	Sometimes	No
I eat a good breakfast			
I experience feelings of hunger during the day			
I eat meat			
I eat vegetables			
I eat meat fruit			
I eat sweets			

3. What meal would you consider to be your main meal of the day?

Breakfast [1]

Lunch [2]

Dinner [3]

4. What does your main meal consist of and how is it prepared?

Freshly home-cooked produce [1]

Restaurant meal [2]

Pre-cooked, microwave or TV dinners [3]

5. What does your main meal on the weekend consist of and how is it prepared?

Freshly home-cooked produce [1]

Restaurant meal [2]

Pre-cooked, microwave or TV dinners [2]

6. Have you been avoiding some foods for health reasons?

Yes

No

7. Do you have any particular food allergies?

Yes

No

8. What is your weekly food intake frequency of the following food categories?

	Several times a day	Once a day	Several times a week	Less often	Never
Sweet foods					
Salty foods					
Fresh fruit					
Fresh vegetables					
Cereal/ grains					

9. What percentage of your regular diet consists of meat and meat products?

90% or more

75%

50%

25%

Less than 25%

10. How much of your diet consists of vegetables and non-animal products?

90% or more

75%

50%

25%

Less than 25%

11. Do you or have you ever had cholesterol problems?

Yes

No

I don't know

12. Do you know your current BMI (Body Mass Index) index?

Less than 18.5 (Underweight)

18.5-25 (Ideal weight)

25-30 (Overweight)

30-35 (Moderate obesity)

35-40 (Obesity)

More than 40 (Morbidly obese)

Appendix III: Research Permit from NACOSTI

**THIS IS TO CERTIFY THAT:
 MISS. LYNNAH MMBAITSA MUGOTITSA
 of UNIVERSITY OF ELDORET, 1721-50200
 Bungoma, has been permitted to
 conduct research in Uasin-Gishu
 County**

**on the topic: PREVALENCE OF
 OVERWEIGHT AND OBESITY AMONG
 FEMALE TRADERS AGED 20-50 YEARS IN
 ELDORET MUNICIPAL MARKET, UASIN
 GISHU COUNTY.**

**for the period ending:
 30th September,2016**

[Signature]
**Applicant's
 Signature**

**Permit No : NACOSTI/P/15/1840/7771
 Date Of Issue : 30th September,2015
 Fee Recieved :Ksh 1,000**



[Signature]
**Director General
 National Commission for Science,
 Technology & Innovation**

CONDITIONS

- 1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit**
- 2. Government Officers will not be interviewed without prior appointment.**
- 3. No questionnaire will be used unless it has been approved.**
- 4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.**
- 5. You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.**
- 6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice.**



REPUBLIC OF KENYA



**National Commission for Science,
 Technology and Innovation**

**RESEARCH CLEARANCE
 PERMIT**

Serial No. A 6713

CONDITIONS: see back page

Appendix IV: Similarity Report

DrillBit
The Report is Generated by DrillBit Plagiarism Detection Software

Submission Information

Author Name	Mugotitsa L. M'mbaita AGR/PGF/14/10
Title	ASSESSMENT OF OBESITY AND OVERWEIGHT AMONG WOMEN...
Paper/Submission ID	967531
Submission Date	2023-09-13 08:56:06
Total Pages	106
Document type	Thesis

Result Information

Similarity **8 %**

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