# PREVALENCE OF OBESITY AMONG YOUNG ADULTS IN AFRICA – A META-ANALYSIS

**Rodo Mohamud Hassan[1], Regidor-111 Dioso[2*]**

[1]*Faculty of Human Health, East Africa University, Bosaso, Somalia*

[2]*Faculty of Nursing, Lincoln University College, Malaysia*

*\*Corresponding Author Email: duke@lincoln.edu.my*

## ABSTRACT

**Background:** In Africa high prevalence of overweight and obesity was found in regions of East Africa (0.3%), West Africa (0.7%), Central Africa (0.2%), South Africa (3.8%), and North Africa (12.5%).

**Aims:** This meta-analysis aimed to analyze the prevalence of obesity among young adults, aged 18-25 years from five African countries.

**Methods:** The Meta-analysis of Observational Studies in Epidemiology (MOOSE) guidelines were applied to search published studies. of the 100 studies published as found in scientific databases from 2010 to 2017, only five were selected. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist was used to eliminate other studies.

**Outcomes:** A total of 22,320 obese young adults were analyzed to be prevalent. The obesity among adults in South Africa was found to be correlated with less physical activities. In Uganda, the prevalence of obesity is 683 which relates with their sedentary lifestyle and socio-demography. Among 371 young adults in Nigeria, the prevalence of obesity was 5.1% among male and 10% among female related to diet and other consumptions. Among 646 adults in Ghana, the prevalence of general obesity was observed to be related to genetics.

**Conclusion:** Prevalence of the male gender was 9,509 having a $p$=0.284 (at 95% C.I.±4,440.87845-8,788.87845) with a mean score of 1,251, and a SD= 61,066. While the prevalence of obesity on females was 10,874 having a $p$= 0.00019, (at 95% C.I.±3,592.07-6,094.07) with a mean score of 2,174, and SD= 3,375.

*Keywords: Africa, meta-analysis, obesity, public health*

## INTRODUCTION

According to World Health Organization (WHO) (2015) obesity is defined as the abnormal or excessive fat accumulation that presents a risk to health. The most commonly used measurement for obesity is the body mass index (BMI) having the normal value ranging from 19 to 23 cubic millimeters (mm3) and obese individuals will usually have ≥24 mm3 (WHO, 2015).

Physical activities are associated with the prevalence of obesity (Mogre *et al.,* 2014; Peltzer *et al.,* 2014). Moreover, physical exercises have been used in risk reduction of obesity leading to cardiovascular diseases (Sutliffe and Carnot, 2011). In many evidences, healthy diet has been associated with, psychological influence and lifestyles especially physical activity behavior (Anderson *et al.,* 2010; Baalwa *et al.,* 2010). In previous evidence, it was focused that higher levels of self-efficacy and will power to reduce stress contributed to sedentary lifestyles that are associated with obesity (Olusanya & Omotayo, 2011; Tsang, Hui & Law, 2012). Same goes with the health belief model that is a useful framework for describing the healthy behaviors affecting sedentary lifestyle leading to obesity (Becker, 1974; Hanson & Benedict, 2002). Lastly, the genetic make-up of an individual is transferred from families of obese and more likely unavoidable (Mogre *et al.,* 2014).Kim, Joo & No, (2012) says that genes are the reasons for having obesity and it is only delayed if an individual aggressively resists it.

In 2014, more than 1.9 billion adults, 18 to 25 years old, were obese (WHO, 2014). Of over 600 million about 13% of the world's adult populations (11% of men and 15% of women) were obese, 39% of adults aged 18 years and over (38% of men and 40% of women) were overweight (WHO, 2015).

The rise in global obesity rates over the last three decades has been substantial and widespread, presenting a major public health epidemic in both the developed and the developing world (WHO, 2015; WHO, 2014).

In Africa high prevalence of overweight and obesity is found in East Africa (0.3%), West Africa (0.7%), Central Africa (0.2%), South Africa (3.8%), and North Africa (12.5%). Table 1 enumerates the African regions where the percentage of obesity is identified (WHO, 2015).

*Table 1: Prevalence of obesity in different regions of Africa (WHO, 2015)*

| Region | Prevalence(%) per 1,000 population |
|---|---|
| East Africa | 0.3 |
| West Africa | 0.7 |
| Central Africa | 0.2 |
| North Africa | 12.5 |
| South Africa | 3.8 |

On account of these issues, this meta-analysis aims to analyze prevalence of obesity among 18-25 years old, in Africa. Five African countries were selected – South Africa, Nigeria, Uganda, Ghana and Kenya.

## METHODOLOGY

The Meta-analysis of Observational Studies in Epidemiology (MOOSE) guideline was applied. The studies used were extracted from PubMed and MEDLINE. The following keywords were used on Medical Subject Heading (MeSH) guidelines. A total of 192 articles were found following database search with MeSH keywords, 'Adult', 'Africa' 'obesity'.

The PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analysis) guideline helped eliminate other studies (figure 1) of the 192 identified records, 100 studies were excluded due to (1) studies focusing on populations aged 17 years old and below (2) Africans living outside the African continents (3) Populations who were more than 25 years of age, while 35 studies were excluded based on the title and abstract that was not focusing on only the topic "obesity". Lastly, 52 studies were excluded due to (1) year of publication less than 2010 (2) using only one gender and (3) no specific country was mentioned.

*Figure 1: The PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analysis) guideline flow diagram*
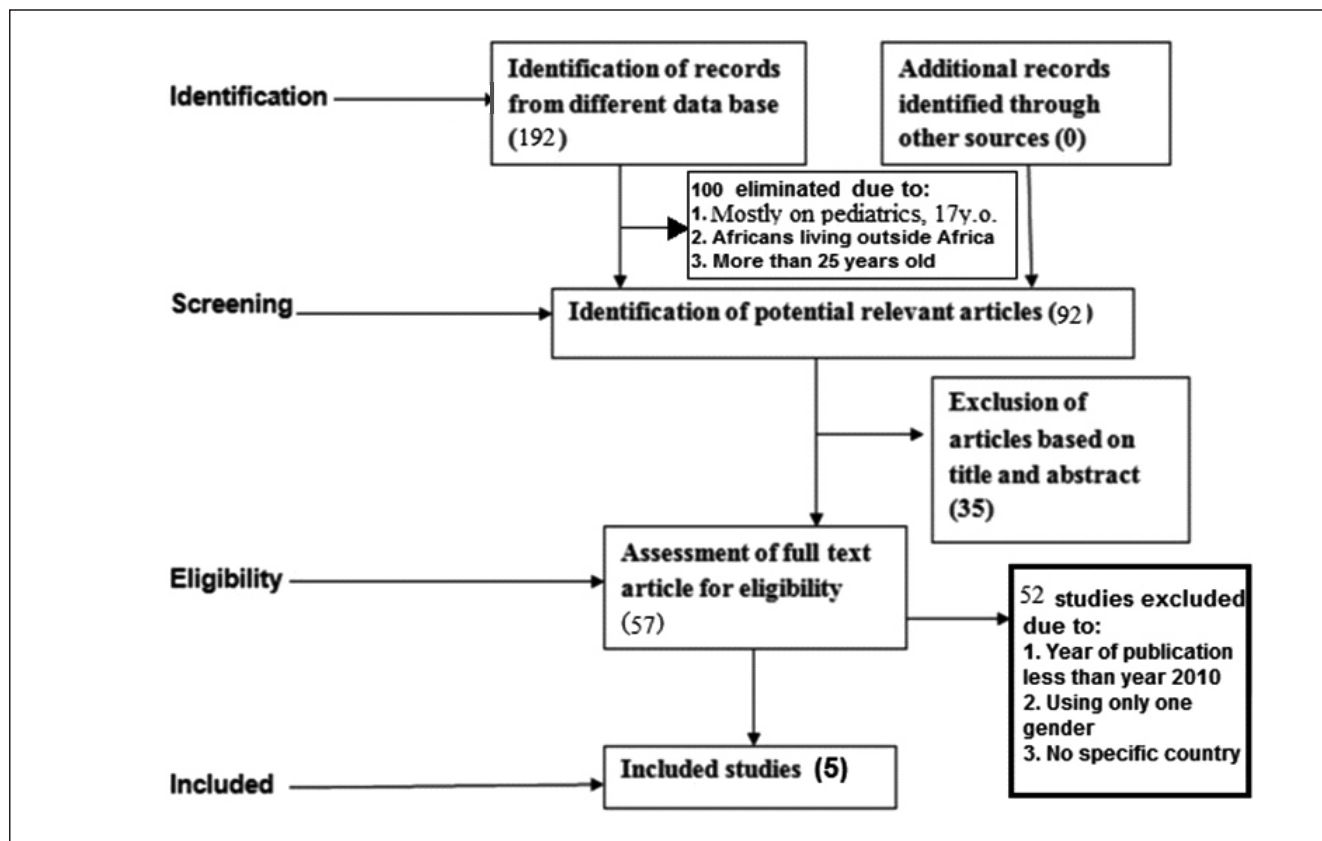
The biases on selecting the studies using random sequence selection and hiding of the allocation is a form of selection bias, but considering the implication of obesity on the health of people and how harmful it will be, is enough to ignore the harms of selection bias.

Percentile ranking was used to show the results. Descriptive statistical analysis is more appropriate since this study aims to analyze prevalence. Statistical package for social sciences (SPSS) version 21 was used to calculate the means, standard deviations and probability findings at 95% confidence interval (C.I.)

comparing male and female.

## RESULTS

The five selected studies showed a total of 22,320 prevalent young adult obese aged 18-25 years old from South Africa, Uganda, Nigeria, Ghana, and Kenya. The female gender is analyzed to be more obese ($p=$ 0.00019; n=10,874) as compared with the male gender ($p=$ 0.284; n=9,509) although the deviation between the two genders are narrow (m=61,066; f=3,375). The summary of the selected studies is found on table 2.

*Table 2: Summary of the five selected studies*

| Observational studies | Regions | Prevalence | Analysis |
|---|---|---|---|
| **Peltzer *et al.*, 2014** | South Africa | N= 15,686 | Male: 6773 (43.2%) |
| | | | Female: 8913 (56.8%) |
| **Baalwa *et al.*, 2010** | Uganda | N= 683 | Male: 339 (49.5%) |
| | | | Female: 345 (50.5%) |
| **Olusanya and Omotayo, 2011** | Nigeria | N= 371 | Male: 151 (5.1%) |
| | | | Female: 220 (10%) |
| **Mogre, *Nyaba* & Aleyira, 2014** | Ghana | N=646 | Males: 104 (1.9%) |
| | | | Female: 542 (4.2%) |
| **Ettarh *et al.*, 2013** | Kenya | N= 4,934 | Male: 2,142 (17.3%) |
| | | | Female: 854 (43.4%) |
| | | | Males: 95% C.I.= ±4,440.87845— 8,788.87845*, p=* 0.284, mean= 1,251, SD= 61,066 |
| | | | Females: 95% C.I.= ±3,592.07—6,094.07 *p*= 0.00019, mean= 2,174, SD= 3,375 |

The study of Peltzer *et al.*, (2014) assessed the prevalence of obesity from 22 universities in South Africa. A cross-sectional survey with the use of self-administered questionnaire and collected anthropometric measurements. The study population was 6773 (43.2%) males and 8913 (56.8%) females. The prevalence of non-obese males is 5.8% while among women is 5.2%. Peltzer *et al.*, (2014) did a survey focusing on university young adult student at around 17-25 years old. The survey lasted for 6 months

and the results were validated by checking the BMI and waist circumference of the respondents.

Baalwa *et al.*, (2010) on the other hand determined the prevalence of obesity among young adults in urban (Kampala city) and rural areas (Kamuli District) of Uganda. The study employed a cross sectional survey with a sample population of 683 adults was randomly selected. Of the 683 participants, 50.5% were female, 49.5% were male and 53.2% were from urban area

while 46.8 were from rural area. The overall prevalence of obesity discovered was 10.4%. The prevalence of obesity was 0.4% in urban area (Kampala) while in rural area (Kamuli) 10%. Looking at the socio-demographic and lifestyles as factors, female were more likely to be obese (2.9% vs. 1.8%). Residing in the city, alcohol consumption, smoking, and non-engagement in sports activities, commuting to school by taxi or private car and coming from a rich family were the main factors significantly associated with lifestyle and socio-demography of the respondents.

Olusanya and Omotayo (2011) studied the prevalence of obesity among young adult in Nigeria affected by their diet and other consumptions. The study was conducted among Tai Solarin University of Education in Ijebu-ode Ogun State, Nigeria. A-371 students were randomly sampled from 100 to 400 levels between 16 and 27 years old. Of the 40.7% male students, 1.3% was obese likewise of 59.3% female 4.6% were obese. Eating snacks apart from regular meal were common among female compare to male, more female student. The respondents were also uncontrollable with their food eating habits. In addition, oily foods are common among Nigerians.

Mogre, Nyaba & Aleyira, (2014) evaluated the prevalence of general and abdominal obesity among students of the university for development studies, school of medicine and health science tamale, Ghana. The study examined a population of 646 students with the use of anthropometric measurements and other risk factors were assessed using questionnaire. The prevalence of general and abdominal obesity was 1.9% and 4.2% respectively. Furthermore, it was discovered that age is the most influential predictor of obesity, while family background which is genetics have statistical significant relationship with obesity. The risk factors for abdominal obesity were among the male, being married, and female having general obesity after delivering a child. Abdominal obesity was more prevalent more general among the respondents in Ghana.

Ettarh et al., (2013) says that of the 4,934 in Nairobi from 2008-2009, 43.4% of women and 17.3% of men in the study population were overweight or obese. These results gave dissatisfaction with body image among younger adults and women. More than half (53%) of those who were overweight or obese underestimated their weight; 34.6% of women and 16.9% of men did so. In all BMI categories, more than one-third of women and men preferred body sizes classified as overweight or obese. Adults were randomly selected by Ettarh et al., (2013) from the Korogocho and Viwandani slums of Nairobi, where height and weight were measured during interviews; body mass index (BMI) was calculated and perceptions of current and ideal body image were determined by using 18 silhouette drawings of body sizes ranging from very thin to very obese. Regardless of BMI category, substantial proportions of women and men indicated a desire to have a body size that was larger than their actual size. The participants chose an ideal body image that was either overweight or obese because families, communities, and society strongly influenced perceptions of body image, and excess body weight had generally been associated with wealth and health and considered a desirable attribute. More than 54% of this subgroup was the only significant predictors of obesity. Ettarh et al., (2013) concluded that despite the high levels of poverty found in the slums, effective dietary and lifestyle interventions are needed to address this issue.

## DISCUSSION

Most of these studies found African females to be more vulnerable to obesity as compared to males. The genetic makeup of Africans tends to grow bigger in body surface area as compared with Asians, Europeans and Australians (Kim Joo & No, 2012; WHO, 2005).

However, body image perceptions and preferences differ by sex and age (Juma and Duda, 2007; Mbochi et al., 2012) and not just by genetic makeup (WHO, 2014). This has also been the factor why prevalence of obesity became high in Africa. In addition, cultural ideals influence how people looks at their body image and body weight (Ettarh et al., 2013). Examining culturally desired body sizes among the Africans, is also relevant to learn how they perceive their own body size and weight, because underestimation of the BMI may have problems in predicting overweight or obesity. To the Africans, they are not obese but culturally acceptable to be big; therefore, prevalence rises up its figure in this continent.

Secondly, it was also highlighted that the impact of exercise, social manipulation, and psychological imbalance are additional contributing factors to the

prevalence of obesity (Peltzer and Pengpid, 2011; WHO, 2015). Peltzer *et al.,* 2014 found that activities of daily living were a factor that led to obesity. It was observed that among men, of younger age, consciously avoiding fat and cholesterol, however, physically inactive, drinking alcoholic beverages, and current tobacco use were found to be significantly associated with obesity. Activities of the young adults, were specific risk factors discovered that can be evaluated to have an effect on their body weights.

Lastly, the five selected studies also suggest that the poor tend to perceive body size and its health implications differ from people with greater wealth and education. From the five studies selected, the poor people in Africa said that a larger body size is commonly assumed to reflect good health and higher social status and may thus be considered desirable. Although some of the factors that influence perception of body image have been studied in developed countries, but less likely in low income countries. In addition, this study also found people from rich background or living in urban setting to be more vulnerable to obesity as compared with people from poor background or living in the rural environments.

## CONCLUSION

There are 22,320 prevalent young adult obese aged 18-25 years old from South Africa, Uganda, Nigeria, Ghana, and Kenya. Prevalence of the male gender was 9,509 having a $p$=0.284 (at 95% C.I.±4,440.87845-8,788.87845) with a mean score of 1,251, and a SD= 61,066. While the prevalence of obesity on females was 10,874 having a $p$=0.00019, (at 95% 95% C.I±3,59.07-6,094.07) with a mean score of 2,174, and SD=3,375.

Public health awareness of obesity, worldwide, as a threat to health, adoption of healthy behavior, lifestyle modification, and timely medical checkup are the recommended activities to reduce the burden of obesity and its associated factors.

Since nationwide studies are already available, a continental wide study is recommended to massively identify the prevalence of obesity in Africa and categorize it further into race, income and age.

## ACKNOWLEDGMENT

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