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Prevalence of Overweight and Obesity and its Associated Factors among Medical Students: A Case of Copperbelt University School of Medicine, Ndola, Zambia

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Article History

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Abstract

Purpose: Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. They are a complex chronic global disease affecting people worldwide across all ages, sexes, ethnicities and nationalities. In 2016, more than 1.9 billion adults aged 18 years and older were overweight. Of these over 650 million adults were obese, 39% of adults aged 18 years and over (39% of men and 40% of women) were obese. Once considered a high – income country problem, overweight and obesity are now on the rise in low- and middle – income countries, particularly in urban settings. In Africa, obesity and overweight has been attributed to demographic and nutritional changes that have resulted from urbanization and the adoption of a western lifestyle which include lack of exercises and changes in dietary intake

The objective of the study is to determine the prevalence of overweight and obesity and its associated factors among medical students from Michael Chilufya Sata Copperbelt University School of medicine, Ndola, Zambia.

Methodology: A descriptive, quantitative cross – sectional study, which will use a standardized, structured self – administered questionnaire to survey the prevalence of overweight and obesity among medical students from Michael Chilufya Sata Copperbelt University School of medicine, Ndola, Zambia. 384 medical students will be allowed to participate in the study and data collected will be analyzed using the statistical package for social sciences (SPSS for windows).

Findings: found a low prevalence of overweight and obesity among medical students at Ndola's copper-belt university. Male participants had a significantly higher prevalence than female participants, and most significant risk factor where associated with male student this might have been due to the disproportion in numbers between the male and female participants.

Unique Contribution to Theory Practice and Policy: The study indicates a need for behaviour modification related to enhance lifestyle through increased physical activity and better nutritional practices among medical students.

Keywords: *Overweight, Obesity, Factors, Medical Students*

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INTRODUCTION

One of the most significant public health concerns of the twenty-first century is the prevention of chronic, non-transmissible diseases. The World Health Organization (WHO) estimates that chronic non-transmissible diseases accounts for 71% of fatalities globally, particularly among individuals between the ages of 30 and 69. Cardiovascular disorders account for the majority of chronic diseases and cause over 85% of these deaths, which are concentrated in low- to middle-income nations. Cardiovascular illnesses are predicted to cause three times as many fatalities and impairments as infectious diseases in the upcoming years (Forouzanfar et al., 2016). In Latin America, cardiovascular and cerebrovascular diseases are reckoned to be responsible for 35–55% of all deaths (Sapag et al., 2010).

Overweight and obesity is a highly complex chronic condition that develops in the face of potentially hundreds of factors (Rabanales-Sotos et al., 2020). A suboptimal diet that is dominated by high caloric consumption, primarily from excess lipids and carbohydrates, and is coupled with low levels of physical activity results can result in obesity and overweight.

All age groups are impacted by non-transmissible diseases, which develop gradually. University students and other members of the adolescent and young adult population are also exposed. Population risk factors like overweight, obesity, smoking, binge drinking, and sedentary are becoming more prevalent as people get older (Rabanales-Sotos et al., 2020).It has been suggested that the period between youth and adulthood is crucial for the emergence of obesity and unhealthy lifestyles. The majority of university students have identified the main obstacles to participating in healthy activities as being a lack of time, self-discipline, social support, and parental control (Deliens et al., 2015). The following is a list of difficulties that the students of the university of being under the influence of alcohol. 37.1% of university students in Spain (Caamao-Isorna et al., 2015), and 11.9-33% of international medical students(Gerstenkorn & Suwała, 2003; Kurpas et al., 2012; Thakore et al., 2009). Previous research have also shown that university students, particularly those majoring in health sciences, adopt sedentary practices, spending a mean of more than 8 hours per day studying while seated (Deliens et al., 2015). Only around 50% of college students engage in physical activity overall.

The information at hand indicates that Zambia, like many other low-income nations, may be experiencing an increase in non-communicable diseases. According to Goma (Goma et al., 2011), residents of Lusaka had a prevalence of hypertension of 34% (38.0% of men and 33.3% of women). According to Nsakashalo-senkwe, 4% of people have diabetes or impaired glucose levels caused by overweight and obesity (Nsakashalo-senkwe et al, 2011).

The study's purpose is to determine the prevalence of overweight and obesity among medical students at the Copper-belt University School of Medicine in Ndola, Zambia, and to determine how these conditions relate to sociodemographic factors, level of physical activity, and the presence of unhealthy habits.

Problem Statement

Obesity and overweight pose health risks with potential consequences for an individual's and a community's social and economic well-being(Kafyulilo, 2008). Poor health as a result of being

overweight or obese may act as a barrier to the development of a good mind, paving the way for poor learning behavior and outcomes. Despite the fact that overweight and obesity are recognized as serious health and social problems with economic and academic consequences all over the world, research on their prevalence among Zambian medical students is limited. As a result, establishing statistics on the causes, social problems, and health implications of overweight and obesity in medical students' learning behavior and outcomes in their profession after university has been difficult.

Therefore, the purpose of this study was to determine the prevalence of obesity and overweight among medical students at the Michael Chilufya Sata Copperbelt University School of Medicine in Ndola, Zambia, as well as the associated factors.

LITERATURE REVIEW

Global Perspective

Obesity was not recognized as a global epidemic by the WHO until the twentieth century. In 2016, over 1.9 billion adults aged 18 and up were overweight. Over 650 million of these people were obese. In 2016, 39% of adults aged 18 and up were overweight, and 13% were obese. In 2016, over 340 million children and adolescents aged 5 to 19 were overweight or obese. The majority of the world's population lives in countries where being overweight or obese kills more people than being underweight (WHO, 2018a). In 2016, 39% of men and 39% of women over the age of 18 were overweight (BMI 25 kg/m2), while 11% of men and 15% of women were obese (BMI 30 kg/m2). As a result, nearly 2 billion adults worldwide were overweight, with the majority of these being women.

Racette *et al.*, (2008) conducted a prospective, longitudinal, observational study on changes in body weight and BMI among 204 students from the beginning of their freshman year to the end of their senior year at a private university in St. Louis, Missouri. Several questionnaires were given to the students, including a demographic questionnaire, an exercise questionnaire to determine whether they did aerobic, strengthening, and stretching exercises on a regular basis, and a dietary questionnaire. The results were obtained through the use of two-sample t-tests with a statistical significance of p 0.05. According to the findings, 5% of freshmen were classified as underweight, 80% as normal weight, and 15% as overweight or obese. By the end of their senior year, however, the percentage of obese/overweight students had risen to 23%. Weight, height, and BMI increased for both males and females from freshman to senior year, though these changes were highly variable among students.

Similarly, Sira and Pawlak, (2010) investigated the rates of overweight/obesity and eating attitudes among college students using a cross-sectional survey. Their specific goals were to determine weight status by BMI category, the rate of overweight and obesity, dieting attitudes, and any differences in dieting by gender and ethnicity. A total of 582 undergraduate students filled out a questionnaire with demographic information as well as self-reported weight and height. Data was analyzed using descriptive statistics such as mean, range, frequencies, and percentages, as well as one-way ANOVA and chi-square. The statistical significance level was set at p 0.05. According to the findings, 15.1% of the students were underweight, 21.4% were overweight, and 10.8% were

obese. Males had a significantly higher mean BMI than females (p 0.001), and African American students' BMI was significantly higher than White students' (p 0.001).

Hu *et al.,* (2003) conducted a prospective cohort study to investigate the relationship between sedentary behavior such as watching TV and the risk of obesity and type 2 diabetes in women. The researchers recruited Nurses' Health Study participants and collected data from 50,277 women for analysis. Women with diagnosed cardiovascular disease (CVD), cancer, or diabetes, as well as those who were obese, were excluded from the study. Participants reported their weekly average time spent sitting at home while watching TV, sitting at work or away from home or while driving, and other sitting at home activities, as well as time spent standing or walking around at home or at work. They were also asked to report the average amount of time spent per week on a variety of physical activities. Body weight was self-reported, and diabetes was diagnosed using a supplementary questionnaire, diagnostic tests, and hypoglycemic therapy. SAS was used to analyze all of the data, and the statistical significance level was set at p 0.05. According to the findings, women who spent more time watching television were more likely to smoke, drink alcohol, and exercise less. Furthermore, these women consumed more total energy, total and saturated fats, red meat, processed meat, refined grains, snacks, and sweets, and consumed less fish, fruits, vegetables, and whole grains, and were more obese or overweigh.

African Perspective

According to the WHO analysis, the prevalence of obesity among adults in high-burden countries will range from 13.6% to 31%, while it will range from 5% to 16.5% in children and adolescents. Africa is also dealing with an increasing problem of childhood obesity (WHO, 2022). In 2019, the continent housed 24% of the world's overweight children under the age of five. Cultural perceptions and ideals, particularly in Africa, contribute to the rise in overweight and obesity. For instance, it is widely held that skinny people are not healthy because it represents poverty and illness(Manafe et al., 2022).

South Africa has one of the highest obesity rates in Africa, with a projected increase in obesity of 47.7% in females and 23.3% in males by 2025(Simfukwe et al., 2017). A systematic review conducted by (Kramer et al., 2013) revealed that people who are obese are at an increased risk of long-term, negative health outcomes, even if they do not have metabolic comorbidities like high blood pressure. Obesity is caused by a combination of environmental and individual factors. Consumption of high-energy foods has been linked to an increase in the prevalence of overweight and obesity (Dagne et al., 2019).

In a study done by Luke, (2009), showed that about 6% to 8% of the people in Nigeria is thought to be obese. It is believed that the rising prevalence of the epidemic is caused by an increase in the intake of processed, high-fat fast foods, frequent snacking while watching movies, and a lack of regular exercise. The virus is spreading more quickly in urban areas in Africa due to a lack of space for sports fields and infrastructure. The practice of spending extended amounts of time watching TV, watching videos, and having kids play electronic games is also likely to be a factor in the rising prevalence of obesity and overweight among affluent and middle-class city inhabitants. Obesity prevalence rates were 13, 14, and 15% in a few African countries like Sudan, Egypt, and

Libya respectively (North Africa), 15, 10 and 9% in Ghana, Senegal, and Niger (West Africa), and 13, 12 and 14% in Kenya, Uganda, and Tanzania (East Africa), respectively (US Census Bureau)

Zambian Perspective

The Zambian government is currently concerned about obesity rates among young people (Mwambazi, times of Zambia 2015). According to the Times of Zambia 2015, many citizens, particularly the young, have been exposed to fast food restaurants via media advertisements, luring them into consuming unhealthy meals on a larger scale. The debate over the rise of obesity among Zambian youth centered on an individual's inability to incorporate a healthy aspect into their diet(Goma et al., 2019).

According to Goma et al. (2011)'s study in Lusaka, the overall prevalence of obesity in the general population was 14.2%, with females (18.6%) being more obese than males (5.1%). Obesity was found to be influenced by gender, age, education, cigarette smoking, and blood pressure. The prevalence and determinants of obesity and overweight vary by community, and it is critical that these determinants be identified so that targeted interventions tailored to that community can be implemented to prevent overweight and obesity.(Goma et al., 2011).

Similarly, Zyaambo *et al.*, (2012) conducted a study in the copper belt province of Zambia on the Prevalence and Determinants of Overweight and Obesity among Residents of a Mining Township in Kitwe, Zambia, in 2011, with a population of 1627 respondents, 42.3% of whom were males. About half of the participants (56.0%) were between the ages of 25 and 34, and 41.7% had completed secondary school. Overweight and obesity were prevalent in 24.7% (21.0% among males and 27.3% among females, p=0.005) and 16.9% (8.0% among males and 23.5% among females, p=0.005) of the population, respectively. Age, gender, education level, sedentary lifestyle, smoking, and blood pressure were all significantly associated with overweight and obesity in multivariate analysis.

Objectives

General Objectives

To determine the prevalence of overweight and obesity and its associated factors among medical students from Michael Chilufya Sata Copperbelt University School of medicine, Ndola, Zambia.

Specific Objectives

i. To estimate the prevalence of overweight and obesity among medical students at the Copperbelt university school of Medicine.
ii. Determine influencing factors to obesity and overweight among medical students the Copperbelt university school of Medicine.

Measurements

Operation Definitions of Concepts

Overweight: is a possession of extra weight that is unproportioned to the height and age. It is the body weight falling above the range associated with minimum mortality (Sharkey, 1997).

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Obesity: refers to much higher body fat percentages than that considered normal for age and sex. It can also be termed as the condition of having excess of non – essential Body Mass Index above 30 (Sharkey, 1997).

Body mass index: refers to a measure of measure of relative body weight that takes height into account and is correlated with direct measures of body fat (Sharkey, 1997).

Essential fat: is fat in the body necessary for the normal body functioning (Sharkey, 1997).

Variables

Table 1: Variables with Indicators

Variables	Indicators	Scale of measurement
Waist Circumference (continuous variable)	A measure which gives an indication as to the distribution of excess body fat. However, in isolation it provides insufficient information regarding overall adiposity. In men risk is increased at 94 cm but at 102 cm the risk greatly increased. In females, the risk is increased at 80 cm and at 88 cm the risk is greatly increased	Interval Scale.
BMI (Continuous variable)	BMI uses weight and height to determine whether an adult is within the healthy weight range (18.5 – 24.9), underweight(less than 18.5), overweight (25 -29.9, obese class 1 (30 – 34.9), obese class 2 (35 -39.9) and obese class 3 (above 40).	Ordinal scale
Waist-to-hip ratio (WHtR)	(WHtR) as with the waist-to-hip ratio (WHR), WHtR is a measure of fat distribution, and primarily identifies those with abdominal obesity. A person is typically considered obese if their WC is over half their height (threshold of 0.5 across multiple countries and ethnicities).	Ratio scale
Gender (Categorical)	Male/ Female	Nominal scale
Marital status (categorical/ discrete)	Married, Single, Divorced	Nominal scale
Age (categorical/ discrete)	Older people are more exposed to information regarding health issues.	Ordinal scale

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Conceptual Framework

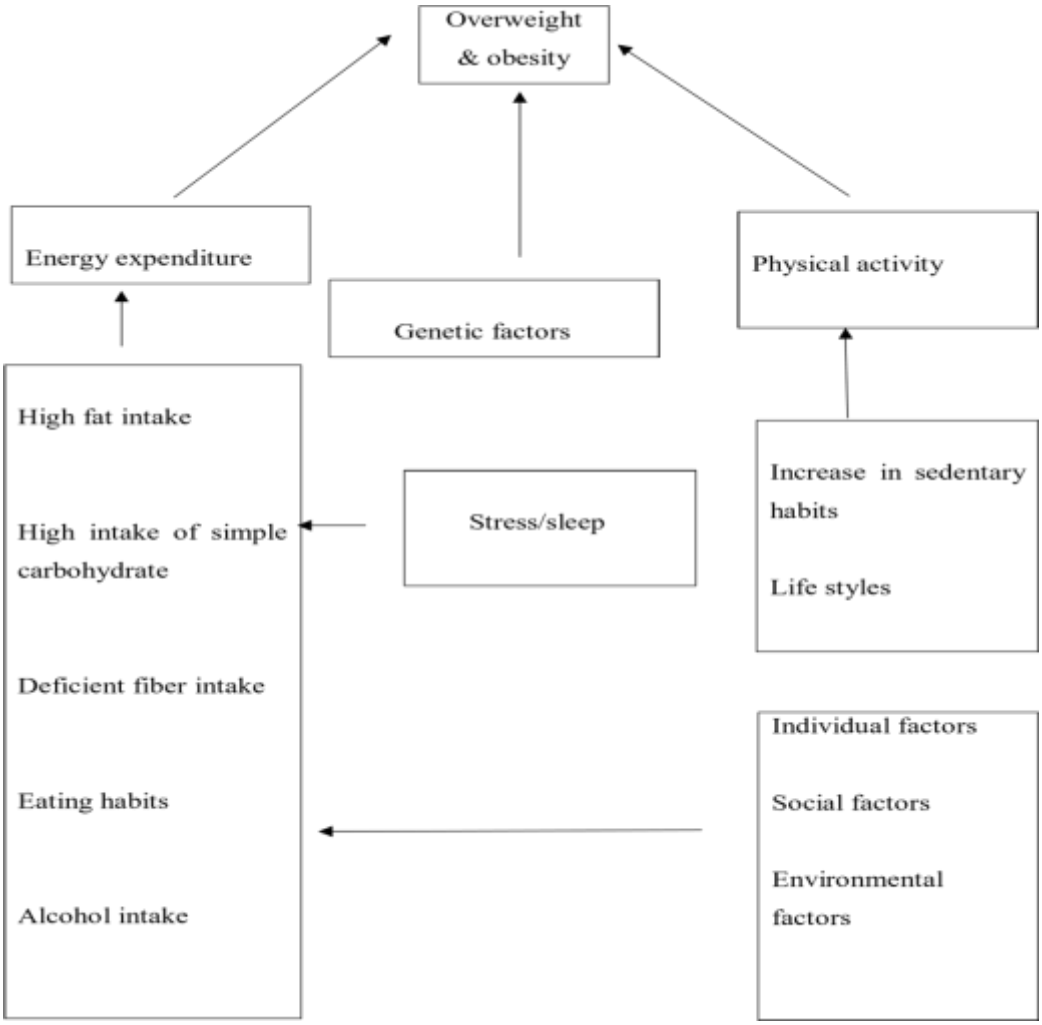

Figure 1: Conceptual Framework for Overweight and Obesity

Source: Adapted From (Sartorius Et Al., 2015)

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METHODOLOGY

Study Site

The proposed study site is at Michael Chilufya Sata Copperbelt University School of Medicine, Ndola campus, Ndola, Zambia. Michael Chilufya Sata School of Medicine is the second largest public Medical University in Zambia from Ridgeway. Currently, it has four undergraduate programs namely Bachelor of Medicine and Surgery, Bachelor of Dental Surgery, Bachelor of Clinical Medicine and Bachelor of Biomedical Science. It also offers post graduate studies.

Target Population

The target population for the study are Medical Students from the Copper-belt University School of Medicine Ndola Campus.

Study Design

A cross-sectional study of male and female registered medical students at Copper-belt University School of Medicine, was done where prevalence of overweight and obesity and their associated risk factors were assessed. The study was carried out with Anthropometric Measurements and questionnaire.

Sample Size

The number of people included in a research study to reflect a population is referred to as sample size in research. The overall number of respondents included in a study is referred to as the sample size, and this number is generally split down into sub-groups based on demographics such as age, gender, and geography to ensure that the total sample accurately represents the entire population. One of the most crucial aspects of statistical analysis is determining the optimum sample size. For this study the Taro Yamane, formula was used to determine the sample size in respect to the population under study which is 1450 registered medical students at copper belt university school of medicine, allowing inferences and conclusions drawn from the survey to be applied to the complete population from which the sample was drawn.

Equation 1: Yamane's Formula

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n is the required sample size from the population under study

N is the whole population that is under study

e is the precision or sampling error 0.05

n = 1450/1+1450(0.05)2

n= 313

The calculated sample size 95% confidence interval was 313, hence 313 questionnaires were distributed among medical students but 210 responses where obtained.

Sampling Procedure

A random sampling method was used to select medical students from each intake. All the students were chosen in such a way that each had an equal and independent chance of being selected.

Inclusion and Exclusion of the Study Criteria

Inclusion Criteria

- All medical students from the Copper-belt University school of medicine studying Bachelor degree in undergraduate studies.
- Both Male and Female undergraduate students.
- Registered student for the current academic year

Exclusion Criteria

- Non undergraduate medical students from the Copper-belt University School of medicine.
- Students that have not registered yet for the current academic, while the study is been conducted.
- Registered students but currently studying in Kitwe.

Research Instruments

Research instruments used in the survey were as follows.

- **Weighing machine**: Weighing machine manufactured by, with the capacity of 180kg and having the least count of 0.1Kg (1piece) was used.
- **Stadiometer**: Stadiometer was used to measure height with the capacity of 197 cm and
- having the least count of 0.1cm.
- **Measuring tape**: A non-stretchable flexible measuring tape was used to measure waist and hip circumference.
- **Questionnaire**: A well designed, and structured questionnaire was used to collect information on socio-demographic and economic data, physical activity, dietary intake and behavioral characteristics.

Data Collection

In order to determine prevalence of overweight and obesity, data will be collected by measuring student's weights and heights to determine Body Mass Index and will also measure Waist Circumference and Waist-to-height ratio. The associated factors to obesity and overweight will be studied using a questionnaire. Overall, the study will employ four data collection methods: BMI, Waist Circumference, Waist-to-height ratio and student questionnaire. Each research theme will be studied by using more than one method so as to be certain with results.

The socio-demographic and economic variables part involved asking the respondents about their age, marital status and gender. Information on other variables and data on anthropometric measurements were obtained by following methods.

Physical activity

Physical activity part was used to collect data on type, frequency, duration and intensity of physical activity during school, and leisure time in a typical week. Data on physical activity were collected using the short form of "International Physical Activity Questionnaire (IPAQ)". The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health-related physical activity.

Anthropometric Measurements

Anthropometric measurements were conducted by measuring height with the help of stadiometer, weight with the help of weighing balance and waist and hip with the help of non-stretchable measuring tape.

Waist Circumference

It was measured at the mid-point between the lower border of the rib cage and the iliac crest. Waist circumference was measured using a non-stretchable tape halfway between the lower border of ribs and the iliac crest on a horizontal plane, while ensuring that the tape was level around the body and parallel to the floor. The tape was tightened around the body without depressing the skin. Two measurements to the nearest 0.1cm were taken and the mean recorded.

Hip Circumference

Hip circumference was measured using a non-stretchable tape. Two measurements to the nearest 0.1cm were taken and the mean was recorded.

Weight

Weight was measured to the nearest 100 grams (0.1kg) using a weighing scale, after calibrating it to zero, and after removal of shoes and excess clothing. Both weight and height were taken twice. In order to ensure quality data, the weighing scale was calibrated before measuring of weight every day and after every five measurements during the data collection time.

Height

Height was measured using stadiometer to the nearest 0. 1cm.The participant was told to stand (without shoes) on a horizontal platform with his heels together and with the Frankfurter plain horizontal. The subject draws himself to full height without raising the shoulders with arms and hands relaxed and with the feet flat on the ground.

Data Analysis

Data that will be collected through questionnaires will be analyzed quantitatively using a statistical package for social science (SPSS) program, version 26.0 to test Chi – square results. Chi – square test will be chosen for testing significance in this study because it tests the relationship between two independent variables. Also it takes into account for variables that are both categorical

(underweight, normal weight, overweight and obesity) and numerical (percentage and frequencies). In addition, it tests for association between the row variables and column variables (Ame, 2004).

Weight and height measurements will be subject to calculations of BMI so as to determine their implications to student's weight status. Results will be used to clarify weight status as 'underweight, normal weight, overweight, and obesity. The risk of obesity will be supported by using the waist circumference and waist to height ratio. All results will be presented in graphs, charts and tables.

Study Limitation

People might not respond well due to the fact that they may be having a tight schedule with their studies. Most people expect a direct benefit and because there is no personal benefit to respondents, it may make others hesitate to participate in the study. Above all, most people wouldn't want to be seen as though they do not know, hence failing to come out with what they only know.

RESULTS

A cross sectional study to assess the prevalence of overweight and obesity (as indicated by BMI, WC and WHR) and their associated risk factors was conducted among Medical students at Copperbelt University school of Medicine. The collected data were analysed using MS Excel 2019 and SPSS version 26.0. Results obtained are explained in several following headings:

Demographics

Gender Wise Distribution of the Respondents

As shown in table 4.1, out of total 210 respondents, this result shows that, majority of the respondents were male i.e. 60.5 % (127) followed by female with figure 39.5 % (83) of total sample.

Table 2: Distribution of Surveyed Population By Gender (N=210)

Variable	Frequency(n)	Percent (%)
Gender		
Female	83	39.5
Male	127	60.5

Age Wise Distribution of the Respondents

As shown in table 4.2, out of total 210 assessed male and females, this result shows that, the maximum number of participants 75.7%(159) were from 20-29-year age group. This was followed by age group of 30-39 years with figure 17.61 % (37) then the least were of age group of above 40 and 18-19 years with figure 7%(3.33) each of total sample.

Table 3: Distribution of Surveyed Population by Age Group (N=210)

Variables	Frequency(n)			Percent (%)
	Male (60.5%)	Female (39.1%)	All	
Age				
18-19	3(42.9%)	4(57.14%)	7	3.33
20-29	98(61.6%)	61(38.36%)	159	75.7
30-39	21(56.76%)	16(43.24%)	37	22.8
40-49	5(71.42%)	2(28.57%)	7	3.33

Marital Status

The majority 75.2% (158) of the respondents were unmarried, and 24.8% (52) were married as shown in Table 4.4.

Table 4: Distribution of Marital Status (N=210)

Variable	Frequency(n)			Percent (%)
	Male (60.5%)	Female (39.5%)	All	
Marital status				
Married	20(38.5%)	32 (61.5%)	52	24.8
Unmarried	107(67.7%)	51(32.3%)	158	75.2

Behavioural Characteristics

The data regarding the behavioural characteristics of respondents is shown in table 4.5. Out of 210 respondents, 21% (46) respondents never skipped their breakfast whereas 35% (59) skipped their breakfast daily, 36.7% (77) respondents skipped their breakfast atleast 2-3 times a week and 13.3% (28) respondent skipped their breakfast once a week.

This study showed that majority of the respondents did not watch TV or Movies on PC while eating 61.4% (129). However, 12.9% (27) of population eat while watching TV on daily basis. Similarly, 11.5% (25) eat twice a week while watching TV, where 13.8% (29) watch TV at least 3 to 4 times a week.

The reviled that that majority of the respondents 35.2% (74) rarely ate food outside the home, while 32.4% (68) of population used to eat outside once a day or 2-3times a day outside as shown in Table 4.5

Furthermore, this study showed that 95.7% (201) respondents slept for <7 hours a day in night, while only 4.3% (9) of respondents slept for 7-9 hours and 0% was recorded for students who slept for >9. Out of 210 respondents, most of them 57.1%(120) do not get out of the bed and eat while minority of the population of about 27.1% (57) gets out of the bed and eats only sometimes and the rest 15.7% (33) eats 2 or 3 times in a week during sleeping hours as shown in the table below.

Table 5: Distribution of Behavioural Factors (N=210)

Variables	Frequency(n)			Percent (%)
	Male (60.9%)	Female (39.1%)	All	
Skipping breakfast				
Never	29(63.1%)	17(36.9%)	46	21.9
Daily	24(40.7%)	35(59.3%)	59	28.1
Once	20(71.4%)	8(28.6%)	28	13.3
2 or 3 times	54(70.1%)	23(29.9%)	77	36.7
Eating in front of TV or PC Never	68(43.9%)	61(56.1%)	129	61.4
Daily	12(44.4%)	15(55.6%)	2 7	12.9
Twice a week	21(80%)	4(20%)	25	11.5
3 or 4 times	26(62.5%)	3(37.5%)	29	13.8
Eat away				
Once	46(70.8%)	22(32.4%)	68	32.4
2 or 3 times	38(55.9%)	30(44.1%)	68	32.4
Rarely	43(64.9%)	31(52.7%)	74	35.2
Sleeping hour				
<7 hours	(26%)	54(74%)	201	95.7
7-9 hours	6(66.7%)	4 (44.3%)	9	4.3
>9 hours	0	0	0	0
Get out of bed and eat				
Never	81(67.5%)	39(32.5%)	120	57.1
2 or 3 times	13(39.4%)	20(60.6)	33	15.7
Sometimes	33(57.9%)	24(24.10%)	57	27.1

Physical Activity Pattern

This study revealed that 44.8% (94) respondents were involved in moderate physical activity and low physical activity each. While very few respondents 10.5% (22) were involved in heavy physical activity. Similarly, the study findings showed that majority 50.5% (106) had adequate

physical activity (≥1500 mins/week) while 49.5% (104) performed inadequate physical activity (<1500 mins/week) according to WHO recommendations.

Table 6: Distribution of Physical Activity (N=210)

Variable	Frequency(n)			Percent (%)
	Male	Female	All	
	60.9	39.1		
Physical activity				
Low	51(54.3%)	43(45.7%)	94	44.8
Moderate	56(59.6%)	38(40.4%)	94	44.8
Heavy	20(90.9%)	2(9.1%)	22	10.5
Physical activity				
Adequate	69(62.2%)	37(37.8%)	106	50.5
Inadequate	58(44.6%)	46(55.4%)	104	49.5

Dietary Intake

Daily intake of salt should be restricted to less than 5 grams per day (FAO, 2003). This study revealed that majority of the students 70% (147%) had high salt intake while 30% had less than 5gram. It might be due to lack of knowledge regarding the appropriate amount of salt consumption. 33.8% (71) of respondents drink alcoholic beverages where majority 66.2% (139) do not take alcohol, furthermore the student found that few students were vegetarian 88%(185) been non-vegan, while 6.7%(14) were lacto vegan, followed by vegan 4.8%(10), and lastly ovo-lacto vegan 3.8% (8) didn't consume alcohol.

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Table 7: Dietary Factors Distribution (N=210)

Variables	Frequency(n)			Percent (%)
	Male (60.9%)	Female (39.1%)	all	
Salt intake				
Less than 5 gram	33(52.4%)	30(47.6%)	63	30
Greater than or equal to 5 gram	94(63.9%)	53(36.1%)	147	70
Drinking alcohol				
Yes	49(69 %)	22(31%)	71	33.8
No	78(34.8%)	61(65.2%)	139	66.2
Vegetarianism				
Vegan	2(20%)	8(80%)	10	4.8
Lacto vegan	4(28.6%)	3(71.4%)	14	6.7
Ovo-lacto vegan	3(37.5%)	5(62.5%)	8	3.8
Non-vegan	118(63.8%)	67(36.2)	185	88.1

Note: salt intake not included from processed foods

Prevalence of Overweight and Obesity

BMI Classification

The prevalence of overweight (BMI = 25.0–29.9 kg/m2) was 29.0%, and that of obesity (BMI ≥ 30.0 kg/m2) was 6.7%. Overall, 54.8% of students presented with a BMI > 25 kg/m2. While only 9.5% (20) where underweight.

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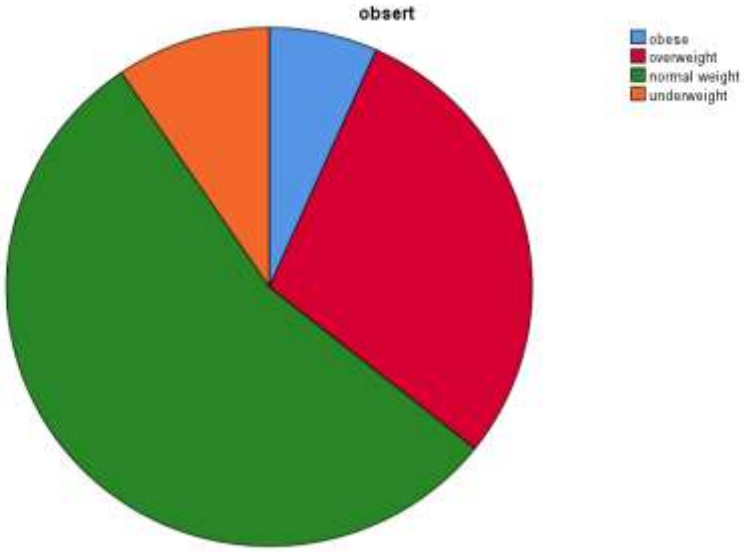

Figure 2: Prevalence of Overweight and Obesity among Medical Student at the Copper-Belt University

Table 8: Distribution of Prevalence of Overweight and Obesity among Medical Student

Variables	**Frequency(n)**			**Percent (%)**
	Male (60.5%)	**Female (39.1%)**	**All**	
Obese	9(64.3%)	5(35.7%)	14	6.7
Overweight	28(45.9%)	33(54.1%)	61	29
Normal	78(67.8%)	37(32.2%)	115	54.8
underweight	12(60%)	8(40%)	20	9.52

In terms of socio-demographic characteristics like Age, gender and marital status, while the proportion of students with an under- or overweight or obese status was not significantly different between female and male student, the results showed that they were no statistically significant relationship found on the chi square test between the social demographic variables and obesity (p = 0.00).

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Waist to Hip Ratio Measurement

The prevalence of total abdominal obesity was found to be 56.7% (119). The prevalence of normal was 56.75%(91) of the total respondents of 210. The mean waist to hip ratio was found to be 1.566 both in male and female respondents which is higher than NCD risk factors survey 2013 result i.e. 0.90 for both sexes (MOHP, 2013). The results showed that majority of the male students had a normal abdominal weight of 59.3% while female students 50.5%. In the case of abdominal obesity 61.3% was found in male while 38.7% in female students.

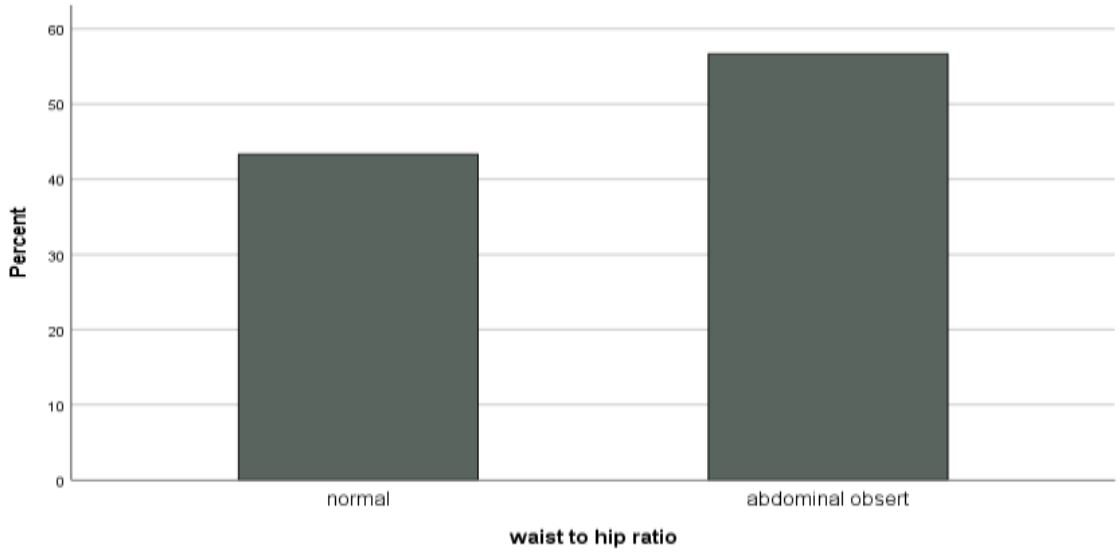

Figure 3: Prevalence of Abdominal Obesity among Male and Female Medical Students (n=210)

Waist Circumference Measurements

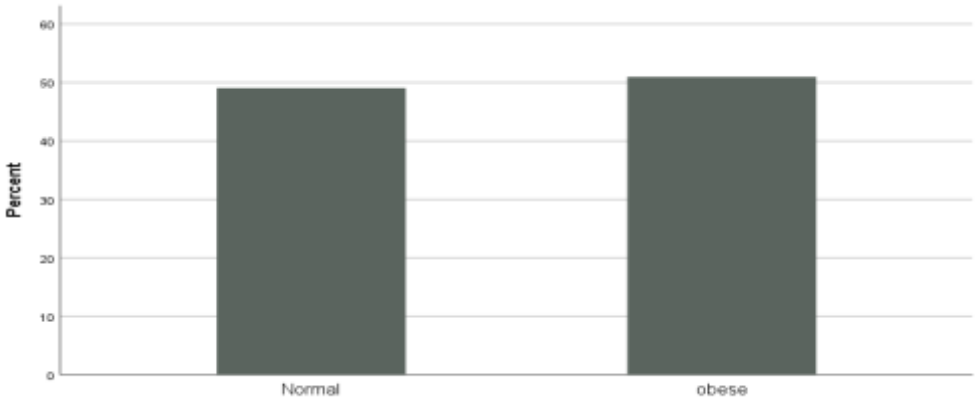

Figure 4: Prevalence of Total Abdominal Obesity in Male and Female Medical Students (=210)

The waist circumference measurement showed 49%(103) normal, while 51%(107) obese. The results further showed that majority of the male respondents where 55.1% (70) had normal waist circumference measurement while 44.9%(57) were found to be obese.

The mean waist circumference was found to be 1.395 in both male and female respondents.

Associating Factors and Obesity

Level of physical activity, healthy dietary criteria, and socio-demographic characteristics of the students that presented a BMI within normal limits vs. a high BMI.

Table 9: Socio-demographic characteristics and BMI

Variables	BMI < 25 kg/m^2 No. (%)	BMI ≥ 25 kg/m^2 No. (%)	*p*
Gender			0.00
Men	18 (14.5)	12 (18.5)	
Women	106 (85.5)	53 (81.5)	
Age			0.00
18-19	5 (82.3)	2 (67.7)	
20-29	130(81.8%)	29(18.2%)	
30-39	17(46%)	20(54%)	
40-49	1 (14.3%)	6 (85.7%)	
Marital status			0.00
Married	16 (30.8%)	36 (69.2)	
Unmarried	90 (57%)	68 (43%)	

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Table 10: Distribution of Behavioural Factors

Variables	**BMI < 25 kg/m2 No. (%).**	**BMI ≥ 25 kg/m^2 No. (%)**	Total	***p***
Skipping breakfast				
Never	14 (30%)	32 (70%)	46	0.03
Daily	25 (42.4%)	34 (57.6%)	59	
Once	19(67.9%)	9(32.1%)	28	
2 or 3 times	52(67.55%)	25 (32.5%)	77	
Eating in front of TV or PC				
Never	74 (27.3)	55 (21.7)	129	0.518
Daily	(72.7)	127 (76.5)	27	
Once			25	
3 or 4 times	0 (0.0)	3 (1.8)	29	
Eat away				
Once	9 (27.3)	50 (30.1)	68	0.682
2 or 3 times	24 (72.7)	112 (67.5)	68	
Rarely	0 (0.0)	4 (2.4)	74	
Sleeping hour				
<7 hours	110 (54.7%)	91(45.3%)	201	0.840
7-9 hours	3 (33.3)	6 (66.7)	9	
>9 hours	0	0	0	
Get out of bed and eat				
Never	61 (50.8%)	59 (49.2%)	120	0.744
2 or 3 times	21 (63.6%)	12 (36.3%)	33	
Sometimes	22 (39%)	35 (61%)	57	

Table 9: Physical Activity

Variables	BMI < 25 kg/m^2 No. (%)	BMI ≥ 25 kg/m^2 No. (%)	*p*
Level of physical activity			0.551
Inactive	58 (46.8)	26 (40.0)	
Moderate	26 (21.0)	13 (20.0)	
Heavy	40 (32.3)	26 (40.0)	
Physical activity			0.889
Adequate	52 (52.5)	29 (53.7)	
Inadequate	47 (47.5)	25 (46.3)	

Regarding obesity/overweight (>25kg/m2) and the associated factors, the behavioral factors and physical factors were statistically significantly associated with Obesity and overweight as compared to social Demographic factors.

DISCUSSION

This chapter presents the interpretation and discussion of the main findings of the study. It comprises of a sections that provide prevalence as well as causes of overweight and obesity among primary school children. Also it presents the health, social and academic implications of overweight and obesity.

Medical students were the study's primary focus group because they are future physicians. If they are overweight or obese, they will offer the wrong impression to the broader population. The purpose of this study was to describe the prevalence of overweight and obesity among Copper-belt Medical students and to explore whether certain sociodemographic factors are associated with either condition. The medical field has a reputation for being demanding and stressful. Stress plays a significant role in diet variation, physical inactivity, and addiction, making it a risk factor for obesity (Abdulghani et al., 2011). Due to their poor lifestyle, which includes less physical exercise and disordered eating habits, medical students are more likely to develop obesity (Thakore et al., 2009).

Prevalence of overweight and obesity was obtained by use of BMI, Waist to hip ratio measurement and Waist circumference measurements, calculations recommended by WHO. In this study, prevalence of overweight (BMI = 25.0–29.9 kg/m2) was 29.0%, and that of obesity (BMI ≥ 30.0 kg/m2) was 6.7%. Overall, 54.8% of students presented with a BMI > 25 kg/m2. While only 9.5% (20) where underweight. The prevalence of total abdominal obesity was found to be 56.7% (119). The prevalence of normal was 56.75%(91) of the total respondents of 210. The mean waist to hip ratio was found to be 1.566 both in male and female respondents which is higher than NCD risk factors survey 2013 result i.e. 0.90 for both sexes (MOHP, 2013).

However, participants above the age of 25 are still at risk for obesity, according to the study's findings, which showed that social-demographic factors including age, gender, and marital status were not linked to obesity (Rabanales-Sotos et al., 2020). This results are consistent with those of several research done on both young and older persons, showing that the amount of belly fat increases with age (Chirwa et al., 2019; Health, 2018; Rabanales-Sotos et al., 2020). According to the most recent findings, male students had a greater prevalence of obesity.

The information on the respondents' behavioral traits revealed that the vast majority of them never skipped breakfast, while those who did so every day came in second. Regular breakfast consumption is directly linked to healthy dietary habits and inversely linked to excess weight.(Kafyulilo, 2008). Compared to never eating breakfast, daily breakfast consumption is also linked to healthier dietary selections and higher levels of physical activity (Arora et al., 2012). Breakfast has always been regarded as the most significant meal of the day. Breakfast enhances daily nutrient intake, food group selection, nutritional sufficiency, and diet quality, according to studies conducted on adults (O'Neil et al., 2015). This study reported very low significant association between taking breakfast and obesity occurrence. However, the incidence rate was higher among student who was taking the breakfast daily 57.6%.

According to this study, the majority of respondents did not watch TV or movies on their computers while they were eating. A small percentage of responders do, however, often eat while watching TV. According to several research, eating while watching TV or a computer movie can increase intake (Mathur & Stevenson, 2015). The bulk of the population, 47.1% (99), was found to rarely eat food outside the home, although 28.6% (63) and 22.9% (48) of the population, respectively, used to do so once or twice daily. However, the current findings indicated a statistically significant correlation between having dinner in front of the TV and consuming fast food on the go and students' likelihood of being obese.

The findings of this study, showed that majority of respondents slept for less than 7 hours per night, with a small proportion of respondents sleeping for between 7 and 9 hours. Teenage obesity is associated with excessive food consumption, a poor diet, and short sleep duration. Poor sleep quality and late bedtimes are also related to these issues. Diet, physical exercise, sedentary behavior, and sleep all interact and have an impact on one another to affect health. (Chaput & Dutil, 2016).

Also, the present results reported that there is no association between sleeping disturbance and obesity. These results mismatched with a previous study that showed that obese subjects have excessive fatigue independently of sleep-disordered breathing and sleep apnea(Jehan et al., 2017). The most modern progress of lifestyle modification programs combines dietary and exercise interventions with behavioral strategies to enhance adherence to long-term weight control**.**

Physical activity improves body composition, lowers the risk of developing metabolic illnesses, and has positive psychological and physical effects(Warburton et al., 2006). Despite the advantages of physical activity, our findings confirm that a significant portion of students were inactive or sedentary. According to this survey, only a small percentage of respondents engaged in vigorous exercise, while the majority either engaged in moderate or light exercise. According

to WHO recommendations, the majority of participants in the study conducted inadequate physical activity (1500 mins/week) and had appropriate physical activity (1500 mins/week).

Salt consumption should be limited to less than 5 grams per day (FAO, 2003). As shown in Chapter 3, the majority of students consumed a lot of salt, while only a few consumed less than 5 grams. It could be due to a lack of knowledge about the proper amount of salt to consume. According to the findings, 33.8% of respondents consume alcoholic beverages. Similarly, to our findings, previous studies have revealed that alcohol and other drug consumption is a major problem among university students, with the following proportions of hazardous drinkers reported: 37.1% of university students in Spain (Caamaño-Isorna et al., 2008), 11.9–33% among medical students from Canada (Thakore et al., 2009), and 17.9–27.2% among nursing students in countries such as Spain and Costa Rica (Rabanales Sotos, López Gonzalez, Párraga Martínez, Campos Rosa, María J. Simarro Herraez, *et al.*, 2015;).

CONCLUSIONS AND RECOMMENDATION

Conclusions

The current study found a low prevalence of overweight and obesity among medical students at Ndola's copper-belt university. Male participants had a significantly higher prevalence than female participants, and most significant risk factor where associated with male student this might have been due to the disproportion in numbers between the male and female participants.

Risk behaviours, such as alcohol consumption, lack of physical activity, and poor diet, as well as their consequences, such as overweight and obesity, are major public health issues. New studies should be conducted in the future to determine which risk factors may be modifiable when it comes to preventing cardiovascular diseases and other health problems among Zambian medical students.

Recommendations

- Based on the results of this study following recommendations could be made in order to lower the risk of overweight and obesity among medical students.
- The study indicates a need for behaviour modification related to enhance lifestyle through increased physical activity and better nutritional practices among medical students.
- By supporting public health initiatives like the obesity screening program in the university every academic year.
- Increasing the student’s awareness of obesity prevention strategies which can be accomplished by increasing medical students' knowledge of the risk of obesity and its major physical and psychological effects.
- In order to determine whether the issue of overweight and obesity is widespread in Zambia, the study could be duplicated in other universities and compared with the recent research. This would be useful in identifying the factors and their effects on academic performance of future physicians.

REFERENCES

Caamaño-Isorna, F., Corral, M., Parada, M., & Cadaveira, F. (2008). Factors associated with risky consumption and heavy episodic drinking among Spanish university students. *Journal of Studies on Alcohol and Drugs*, *69*(2), 308–312. https://doi.org/10.15288/JSAD.2008.69.308

Dagne, S., Gelaw, Y. A., Abebe, Z., & Wassie, M. M. (2019). Factors associated with overweight and obesity among adults in northeast Ethiopia: a cross-sectional study. *Diabetes, Metabolic Syndrome and Obesity : Targets and Therapy*, *12*, 391–399. https://doi.org/10.2147/DMSO.S179699

Deliens, T., Deforche, B., De Bourdeaudhuij, I., & Clarys, P. (2015). Determinants of physical activity and sedentary behaviour in university students: A qualitative study using focus group discussions. *BMC Public Health*, *15*(1), 1–9. https://doi.org/10.1186/S12889-015-1553-4/FIGURES/2

Forouzanfar, M. H., Afshin, A., Alexander, L. T., Biryukov, S., Brauer, M., Cercy, K., Charlson, F. J., Cohen, A. J., Dandona, L., Estep, K., Ferrari, A. J., Frostad, J. J., Fullman, N., Godwin, W. W., Griswold, M., Hay, S. I., Kyu, H. H., Larson, H. J., Lim, S. S., … Zhu, J. (2016). Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet*, *388*(10053), 1659–1724. https://doi.org/10.1016/S0140-6736(16)31679-8

Gerstenkorn, A., & Suwała, M. (2003). [Alcohol use by future physicians--medical and social problem]. *Wiadomosci Lekarskie (Warsaw, Poland : 1960)*, *56*(9–10), 402–406. https://europepmc.org/article/med/15049202

Goma, F. M., Mwewa, B., Tembo, G. K., Kachamba, M., Syatalimi, C., Simweemba, C., Chilufya, L., Mutale, W., Beaney, T., Xia, X., & Poulter, N. R. (2019). May Measurement Month 2017: Blood pressure screening results from Zambia—Sub-Saharan Africa. *European Heart Journal Supplements*, *21*(Supplement_D), D130–D132. https://doi.org/10.1093/EURHEARTJ/SUZ077

Goma, F. M., Nzala, S. H., Babaniyi, O., Songolo, P., Zyaambo, C., Rudatsikira, E., Siziya, S., & Muula, A. S. (2011). Prevalence of hypertension and its correlates in Lusaka urban district of Zambia: A population based survey. *International Archives of Medicine*, *4*(1). https://doi.org/10.1186/1755-7682-4-34

Hu, F. B., Li, T. Y., Colditz, G. A., Willett, W. C., & Manson, J. A. E. (2003). Television Watching and Other Sedentary Behaviors in Relation to Risk of Obesity and Type 2 Diabetes Mellitus in Women. *JAMA*, *289*(14), 1785–1791. https://doi.org/10.1001/JAMA.289.14.1785

Jehan, S., Zizi, F., Pandi-Perumal, S. R., Wall, S., Auguste, E., Myers, A. K., Jean-Louis, G., & McFarlane, S. I. (2017). Obstructive Sleep Apnea and Obesity: Implications for Public Health. *Sleep Medicine and Disorders : International Journal*, *1*(4). https://doi.org/10.15406/smdij.2017.01.00019

Kafyulilo, A. C. (2008). *PREVALENCE AND IMPLICATIONS OF OVERWEIGHT AND OBESITY IN CHILDREN ' S HEALTH AND LEARNING BEHAVIOUR The Case of Kinondoni and Njombe Districts in Tanzania PREVALENCE AND IMPLICATIONS OF OVERWEIGHT AND OBESITY IN CHILDREN ' S HEALTH AND LEARNING BEHAVIOUR . September*.

Kramer, C. K., Zinman, B., & Retnakaran, R. (2013). Are metabolically healthy overweight and obesity benign conditions?: A systematic review and meta-analysis. *Annals of Internal Medicine*, *159*(11), 758–769. https://doi.org/10.7326/0003-4819-159-11-201312030-00008

Kurpas, D., Mroczek, B., Bielska, D., Wojtal, M., Seń, M., & Steciwko, A. (2012). [Alcohol intake and tobacco smoking among students of medical schools]. *Przegląd Lekarski*, *69*(10), 893–895.

Manafe, M., Chelule, P. K., & Madiba, S. (2022). The Perception of Overweight and Obesity among South African Adults: Implications for Intervention Strategies. *International Journal of Environmental Research and Public Health*, *19*(19). https://doi.org/10.3390/ijerph191912335

Memon, A. A., Ezz-E-Rukhshan Adil, S., Siddiqui, E. U., Naeem, S. S., Ali, S. A., & Mehmood, K. (2012). Eating disorders in medical students of Karachi, Pakistan-a cross-sectional study. *BMC Research Notes*, *5*. https://doi.org/10.1186/1756-0500-5-84

Rabanales-Sotos, J., Villanueva-Benites, M. E., Jacinto-Magallanes-castilla, J., Leitón-Espinoza, Z. E., López-González, Á., & López-Torres-hidalgo, J. (2020). Prevalence of overweight and obesity among health sciences students in the amazonia region of Peru. *Healthcare (Switzerland)*, *8*(4), 1–11. https://doi.org/10.3390/healthcare8040538

Rabanales Sotos, J., López Gonzalez, Á., Párraga Martínez, I., Campos Rosa, M., Simarro Herraez, M. J., & López-Torres Hidalgo, J. (2015a). Self-assessment of alcohol consumption as a health-education strategy in nursing students. *Nurse Education Today*, *35*(1), 132–137. https://doi.org/10.1016/J.NEDT.2014.08.004

Rabanales Sotos, J., López Gonzalez, Á., Párraga Martínez, I., Campos Rosa, M., Simarro Herraez, M. J., & López-Torres Hidalgo, J. (2015b). Prevalence of hazardous drinking among nursing students. *Journal of Advanced Nursing*, *71*(3), 581–590. https://doi.org/10.1111/JAN.12548

Racette, S. B., Deusinger, S. S., Strube, M. J., Highstein, G. R., & Deusinger, R. H. (2008). Changes in Weight and Health Behaviors from Freshman through Senior Year of College. *Journal of Nutrition Education and Behavior*, *40*(1), 39–42. https://doi.org/10.1016/J.JNEB.2007.01.001

Sapag, J. C., Lange, I., Campos, S., & Piette, J. D. (2010). Estrategias innovadoras para el cuidado y el autocuidado de personas con enfermedades crónicas en América Latina. *Revista Panamericana de Salud Publica/Pan American Journal of Public Health*, *27*(1), 1–9. https://doi.org/10.1590/s1020-49892010000100001

Simfukwe, P., Van Wyk, B., & Swart, C. (2017). Perceptions, attitudes and challenges about obesity and adopting a healthy lifestyle among health workers in Pietermaritzburg, KwaZulu-Natal province. *African Journal of Primary Health Care and Family Medicine*, *9*(1), 1–9. https://doi.org/10.4102/phcfm.v9i1.1276

Sira, N., & Pawlak, R. (2010). Prevalence of overweight and obesity, and dieting attitudes among Caucasian and African American college students in Eastern North carolina: A cross-sectional survey. *Nutrition Research and Practice*, *4*(1), 36–42. https://doi.org/10.4162/NRP.2010.4.1.36

Thakore, S., Ismail, Z., Jarvis, S., Payne, E., Keetbaas, S., Payne, R., & Rothenburg, L. (2009). The perceptions and habits of alcohol consumption and smoking among Canadian medical students. *Academic Psychiatry*, *33*(3), 193–197. https://doi.org/10.1176/appi.ap.33.3.193

Warburton, D. E. R., Nicol, C. W., & Bredin, S. S. D. (2006). Health benefits of physical activity: the evidence. *CMAJ : Canadian Medical Association Journal*, *174*(6), 801. https://doi.org/10.1503/CMAJ.051351

Zyaambo, C., Babaniyi, O., Songolo, P., Muula, A. S., Rudatsikira, E., Mukonka, V. M., & Siziya, S. (2012). *Prevalence and Determinants for Overweight and Obesity among Residents of a Mining Township in Kitwe , Zambia , in 2011 : A Survey*. *4*(1), 1–7. https://doi.org/10.3823/102