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Assessing The Prevalence Level Of Obesity Among Adolescents In Second-Cycle Institutions Within Kumasi Metropolis

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ABSTRACT

Obesity has become a key global public health issue largely because obese individuals are found to be at higher risk of developing non communicable diseases such as, diabetes, heart disease, mental health and reproductive failures. This study assessed the prevalence level of obesity among Ghanaian adolescent within the Kumasi Metropolis. The study population came from second-cycle schools within the Greater Kumasi Metropolis. Accordingly, seven (7) out of the twenty-seven (27) second cycle schools within the metropolis were targeted. The study used a cross-sectional research design. The study used questionnaire as its main data collection instrument. The study used the statistical package for Social Scientist to analyse the data on the basis of descriptive and inferential statistics (independent sample t-test and multiple regression analysis. Results from the study showed that most of the respondents had a lower risk perception on obesity particularly with regards to its ability to affect their physical prowess and mental cognition abilities. Also, it was revealed that 11.5% of the respondents were found to be overweight. Meaning they had their BMI within the range of 25.0-29.9 kg/m^2. Again, results from the study revealed that a student consumption patterns that is the kind of food one consumes increase one predisposition to obesity. It is recommended that school authorities and parents ought to take keen interest in the type of foods their children eat since the food a person consumes has a direct effect on their body size.

Keywords: Obesity, adolescent, prevalence, risk perception, food consumption patterns, senior high schools

INTRODUCTION

Obesity has become a key global public health issue largely because obese individuals are found to be at higher risk of developing non-communicable diseases (NCD) [1]. Obesity has also been identified to be associated with poor mental health and quality of life both for adults and adolescents [2] [3]. For instance, children who are obese are found to be at greater risk of developing asthma and cognitive impairment in their early life and their later life suffer from NCDs such as diabetes, heart disease, mental health, and reproductive failures [4]. Obesity has also been found to have severe economic ramifications both on the individual and the entire society as a whole [5]. For example, the direct and indirect costs of obesity in the United Kingdom have been estimated to cost the economy about 2 billion pounds sterling each year in areas such as health and education, lost productivity, absenteeism, treatment of ailments, procurement of drugs [6]. Similarly, in the US, absenteeism arising from obesity alone has been estimated to cost the country as high as $4.3 billion annually [7]. This suggests that witnessing an increasing rate of obesity in Ghana could come with a huge social and economic cost to the individual and the society in the general.

Moreover, in sub-Saharan Africa, the evidence available suggests that there has been a rising rate of overweight and obesity among most adolescents and urban dwellers. For instance, in West Africa, it is estimated that the prevalence of obesity among both male and female adults has doubled and consistently increased from the period 1992 to 2007 [8] [9]. Again, it has been established that in Africa, countries with the highest prevalence of overweight and obesity among its adolescent cohorts are Seychelles with their prevalence rate at 73.8%, Lesotho with a prevalence rate of 70.8%, South Africa with a prevalence rate of 68.5%, Mauritania with a prevalence rate at 56.8% and lastly Mauritius with a prevalence rate at 53.5% [10]. Even though the prevalence of childhood and adolescent obesity appears to be decreasing in some advanced countries nonetheless, in absolute terms there seem to be more obese adolescents living in low- and middle-income countries than in high-income countries [11]. For instance, in Africa, the number of obese children has nearly doubled from merely 5.4 million in 1990 to 10.3 million in the last decade [4] [12]. Similarly, in Ghana statistics provided at the national level tend to suggest that there is a high rate of obesity among adolescents particularly those within the age group of 15-19 years [13] [14]. Adolescent obesity has been identified to be caused by biological, behavioral, and contextual factors. The biological factors usually take the form of maternal malnutrition which usually becomes evident during pregnancy and infant feeding [4]. With behavioural factors, it takes the form of someone participating in physical activities hence; the higher one participates in physical activities the less likely that individual will be obese [15]. Contextual and wider societal factors, constitutes socio-economic considerations, nutritional knowledge within families, availability, and affordability of healthy foods, inappropriate marketing of foods and beverages to children and families, lack of education [4]. Hence, these factors have been identified as the main factors that increase adolescent susceptibility to obesity. Even though

many targeted initiatives have been instituted both at the local and the global level to reduce the incidence of obesity among adolescent yet still the results of such initiatives have often been very disappointing as evidence still tend to suggest its increasing rate, particularly among those within the age group of 15-19 [12]. Hence, there have been many calls for scholars and academics to change their perspective with regards to understanding the triggers of obesity among adolescents [16] [17]. Accordingly, many studies have begun to look at how social factors such as family and parenting style contribute to adolescent obesity. Generally, the family becomes an individual immediate social environment and is one of the key sources of social support that influences health behavioral outcomes [18]. For instance, adolescents often see their parents eating habits or consumption of certain foods as their support or approval for them to consume the same food or adopt the same eating behaviour [19]. Again, adolescents see their parent's less participation in physical activity as their parent's disapproval for their participation in physical exercises [19]. According to Ikoh et al., [20], parental approval of certain food consumption patterns and participation in physical activities tend to have a significant effect on adolescents' proneness to obesity. This significant connection between parenting style and adolescent obesity tends to emanate from the social learning theory which asserts that people acquire or learn certain behaviour through their interaction with their immediate environment that is family [21]. The aim of the study was to assess the prevalence level of obesity among adolescents in second-cycle institutions within Kumasi metropolis, Ghana.

RESEARCH DESIGN

The study adopted a cross-sectional research design. According to Kumar [22], the cross-sectional design is most appropriate to studies aimed at identifying the dominance of a phenomenon, situation, problem, attitude, or issue, by taking a cross-section of the population. Notwithstanding this research design's ability to enable this study to achieve its stated objectives in a more valid and economical manner, it is still not void of deficiencies. Rightly, the present study seeks not to measure change outcomes as purported but seeks to ascertain how a given parenting style contributes to obesity among adolescents as such; the cross-sectional design provides the study the best means to achieve its study purpose. Again, as this study collected the same kind of data from a large sample size within the shortest possible time, cross-sectional gave the best medium to realise this outcome judging from the limited time this study was completed.

Study Population

According to Bryman [23], a study population is the group of individuals that have the required information or the precise characteristics from which a researcher seeks to carry his investigation. However, the key important thing a researcher ought to take into account

when defining his population parameters is the precise specification of who should and who should not be included in the sample [24]. Therefore, as this study seeks to examine the obesogenic behaviour among adolescents as well as parenting style influence on adolescent obesity, the study population was conducted in the second-cycle schools within the Greater Kumasi Metropolis. The Greater Kumasi Metropolis has a total of 27 second-cycle schools. Out of 27 schools, four are boys' schools (i.e. Prempeh College, Opoku Ware Senior High, St. Hubert Senior High, and Kumasi High Senior High) and the remaining 24 are mixed schools. However, out of these schools, seven schools within the Greater Kumasi Metropolis were targeted. Moreover, hundred (100) students each from the seven (7) selected schools formed the study population. Accordingly, 700 students were targeted as the study population.

Sampling and Sampling Strategy

According to Quinlan [25], a sample is a small subset of a population and is also said to be representative of the total population. Hence, sampling becomes a vital procedure when analysing data as it is an accurate way of gathering data without using the whole population, in particular when both time and budget constraints exist for the researcher. The method of selection was based on a probability or a non-probability sampling approach. However, the decision to select a particular sampling technique ought to be informed by what the study seeks to achieve. However, since this study wanted to ensure that each student from the selected schools had an equal chance of being selected as well as ensures that its sample truly reflected the population under study; a simple random sampling technique was used. This sampling technique gave each respondent an equal opportunity to be selected in the study. Moreover, to determine the sample size for the study, the study employed [26] sampling table. Per the table, a population size of 100 for each given school required sample size of 80 students. This suggests that 80 students each were selected from the seven (7) identified second-cycle schools within the Greater Kumasi Metropolis.

Response Rate from the Selected Schools

The respective data retrieved from the respective schools have been presented in Table 1.

Table 1: Representation of Sample from the Selected Schools

Schools	Frequency	Percent
Asanteman Senior High School	84	16.9
Kumasi Anglican Senior High School	96	19.4
Adventist Day Senior High School	78	15.7
Opoku Ware Senior High School	94	19.0
St. Hubert Seminary Senior High School	32	6.5
Serwaa Nyarko Girls' Senior High School	40	8.1

Kumasi Wesley Girl's Senior High School	72	14.5
Total	**496**	**100.0**

Source: Author's field work, 2020

Data Collection Instrument

According to Bryman [23], data collection tools are the set of tools a study uses to gather information from its study sample. Often these instruments could take the form of a questionnaire tool, an interview guide, focus group discussion, and in some cases investigation by observation. However, as this study was guided on the principles of the quantitative research approach, questionnaire instruments were used. Using questionnaire instruments provided the study with more benefits than the other data collection instruments. Specifically, a questionnaire was quicker to complete [26]. Also, with this instrument there was no investigator present when a questionnaire was being completed hence, the tendency for the investigator during the time of investigation was reduced [23]. With this tool, a researcher will have to constantly live with the fear that no useful data patterns and theory will emerge afterward. Moreover, since this study has a specified time frame and limited resources to complete its study, a self-administering questionnaire provided the researchers the optimal means to achieve its study objectives without any imminent challenges. Nevertheless, questionnaires are deemed as the appropriate instrument that will enable the researchers to achieve the study objectives largely due to their ability to collect data from a large sample size. Concerning the specifics of the measuring items in the questionnaire, the study adapted what previous works used to assess respondents' obesogenic behaviour. Hence, the measurement scale of the questionnaires was adapted from works such as [27] [28], and [17]. Likewise, the scale used to measure the parenting style of the students was adapted from the works of [19] and that of [18].

Data Collection Procedure

Before the commencement of the data collection, the researchers visited the selected schools to familiarise themselves with the school heads and the school teachers as well as the students. Discussions were made with the respective schools' heads as to the date and time the researchers could come to the school and administer the questionnaire. Again, an introductory letter was obtained from the graduate school to confirm our identities as students of the university and equally indicate the purpose of the study. Afterward, the distribution of the questionnaire was done by the agreed dates within each given school. The administration of the questionnaire took three weeks.

Instrumentation Validity and Reliability

Accordingly, to guarantee instrument reliability in this context, a pilot test was conducted at a comparable setting that is Yaa Asantewaa Girls Senior High and Islamic Senior High School.

This exercise helped the study to ascertain whether the respondents understand the items as presented. After the pre-test, any indications of ambiguities realised were modified to make them straightforward and more meaningful. The validity concerns whether the findings generated from a study are really about what they appear to be about. Hence, it is more concerned about the integrity of the conclusions that are made from a piece of research [23]. Specifically, in quantitative studies, validity is concerned with three areas namely; measurement validity, internal validity, and external validity. With measurement validity, it seeks to ensure whether a measure that is devised out of a concept does reflect the concept that it is supposed to be denoting or measuring. Hence, to achieve this, the expert and the study supervisor were consulted to vet the questions on the face value to ascertain whether the questions depict what it seeks to measure. However, with the internal consistency of the study items, Cronbach's alpha was used to ascertain the measuring item's level of reliability. A Cronbach's Alpha value of 0.70 or more was used as an indicator to ascertain the reliability of each measuring scale. Nunnally and Bemstein's [29] added that the reliability scores for all the constructs that ranged between 0.70 and 0.90 prove that the instrument is highly reliable. Kline [30] affirms Nunnally and Bemstein's view when the author argues that coefficient alpha values within the ranges of 0.7 and 0.8 are usually the acceptable indicator that a scale is reliable. The variability of the assessed constructs, values less than 0.7 but greater than 0.6 are acceptable when dealing with psychological constructs [30].

Ethical Considerations

For the study to ensure that all these ethical dimensions were addressed, first, possible forms of traces that could make respondents fall victims as a result of the information provided were eliminated. For instance, respondents were not asked to provide information about their names and contact details in this study. Again, to ensure that the respondents were aware of what this study sought to achieve, the respondents were thoroughly briefed and equally allowed to rescue themselves anytime they felt uncomfortable to continue answering their questionnaire items. Finally, every questionnaire that was sent out had a cover letter included in it which espoused the purpose of the survey to the respondents.

Data Analysis

Kumar [22] underscored that data obtained from research is pointless until it is changed for decision-making. Data analysis usually involves reducing the raw data into a manageable size, developing summaries, and applying statistical inferences. The data collected were keyed into the Statistical Package for Social Sciences (SPSS) version 20.0 and the result of the study was analysed based on descriptive and inferential statistics. Since the purpose of descriptive statistics is to give a detailed account of how an event or phenomenon occurred, the data were analyzed using descriptive statistics (i.e. frequencies, percentages). Moreover,

to identify the prevalence level of obesity among Ghanaian adolescents, the body mass index (i.e. a measure of a person's weight to his or her height) was used to ascertain the adolescent degree of obesity. Again, to compare the prevalence of obesity across gender and schools, cross-tabulation was used.

RESULTS AND ANALYSIS

Demographic Profile of the Respondents

Results on the demographic profile of the respondents have been presented in this section. Results in Figure 1 show that out of the total respondents of 496, 239 representing 48.2% were males with 257 representing 51.8% being females. Results from this study suggest that the respondents were made up of more females than males.

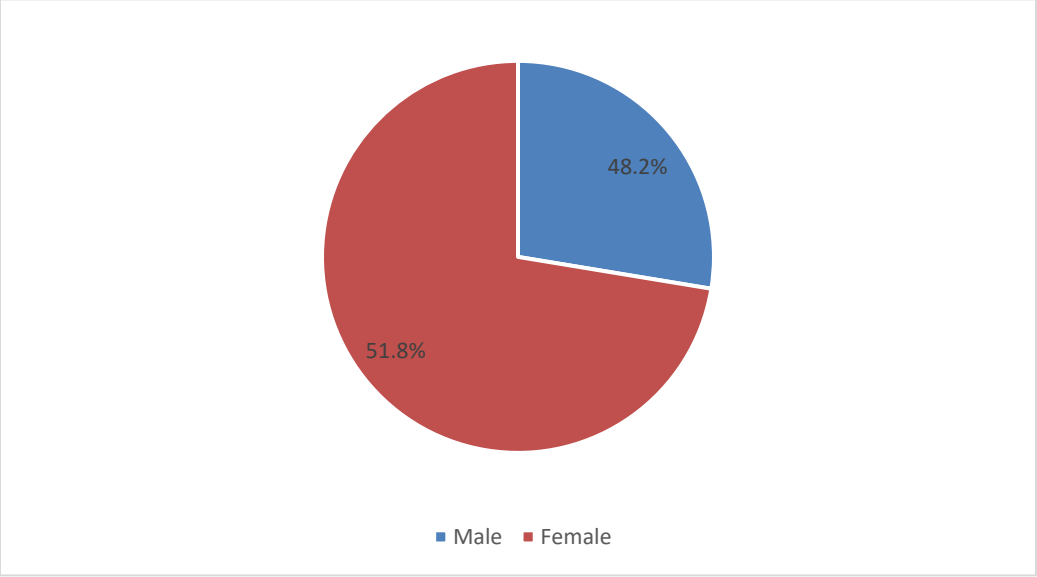

Fig. 1: Gender Distribution of Respondents
Source: Authors field work, 2020

Age of respondents

It can be observed in Table 2 that 25.4% of the respondents' ages fall within the age bracket of 11-15 years. However, more than half of the respondents that is 64.6% had their age within the age category of 16-20 years. Again, 10.0% of the respondents had their age within the age distribution of 21-25. This is quite surprising since the supposed ages of students within senior high school ought not to be beyond 20 years. Per the Ghana Education Service age structure, the mean age distribution of final year senior high students ought to be within the age bracket of 17-19 years. Per this assumption, it is expected that students within the

senior high school should have their ages within the age distribution of 15-19 years. Interestingly, in this study, it was observed that 10% of the respondents had their ages within the age distribution of 21-25 years suggesting that their ages were way above the expected age distribution of senior high school students.

Table 2: Age Distribution of Respondents

Age	Frequency	Percent
11-15	125	25.4
16-20	318	64.6
21-25	49	10.0
Total	**492**	**100.0**

Source: Authors field work, 2020

Class Year of Respondents

Results from Figure 2 show that a little over half of the respondents that is, 51% were in year three. Also, 38.5% of the respondents were in year two whereas the rest that is, 10.5% were in year one within the understudied schools. This suggests that most of the respondents were in their final year. The high representation of year three students could be attributed to the Covid-19 condition that has restricted students' access particularly year one and two students in schools. Currently, it is only year three students and gold year two students who have been allowed back in school.

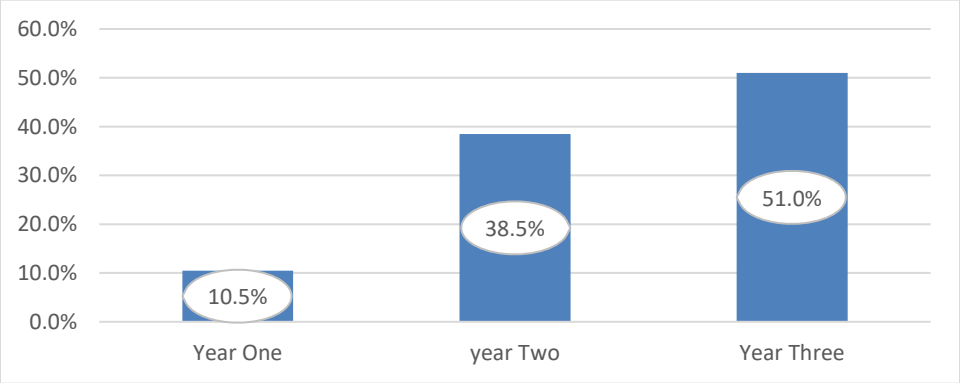

Fig. 2: Class Year of Respondents
Source: Authors field work, 2020

The Prevalence of Obesity among Ghanaian Adolescent

This objective sought to examine the prevalence level of obesity among the study respondents. The proxy used to measure the respondents' obesity level was the BMI

computation where the respective weight and height of each respondent was taken. Accordingly, the results of the respondents' BMI have been shown in Table 3.

After the computation of the respondents' body mass index, it can be observed in Table 4.6 that a little over 4% of the respondents' BMI falls within the category of 16.0-16.9 kg/m2. Per the operationalized weight classification having a BMI within this range classified these groups of persons within the weight description of severely underweight. This suggests that 4.8% of the respondents were found to be severely underweight. This ought to be a great sign of worry since being severely underweight tends to increase one's vulnerability to diseases and equally can restrict a child's brain development. Also, it can be seen in Table 4.6 that 11.3% of the respondents obtained BMI within the range of 17.0-18.4 kg/m2. This BMI range corresponds with the weight description of underweight. Accordingly, this suggests that 11.3% of the respondents fall within the weight description of underweight.

Again, 31.7% of the respondents obtained a BMI within the range of 18.5-24.9 kg/m2. Per the BMI table distribution, this BMI range depicts the weight description of normal weight. This revelation tends to be quite positive since having a normal weight limits a person's chances of becoming obese. However, 11.5% of the respondents obtained a BMI within the range of 25.0-29.9 kg/m2. This BMI range suggests that these clusters of respondents fall under the weight description of overweight. Generally, being overweight means that the individual is either five percentage points or one percentage point away from becoming obese. What this suggests is that these persons can become obese in the next few months or years if these persons' diets are not properly checked and controlled. Furthermore, nearly 40% of the respondents' BMI falls within the range of 30.0-34.9 kg/m2. What this BMI range connotes is that these respondents can be categorized under the weight description of obese. This means that 39.7% of the respondents were found to be obese. Again, another worrying trend in the study result is that 1.0% of the respondents' BMI was beyond ≥40.0 kg/m2 meaning their weight description falls within the category of type III obesity.

Results from the study suggest that the prevalent level of obesity among the study respondents stood at 40.7%. This suggests that 40.7% of the participants were found to be obese. Again, it was observed that 16.1% of the respondents were found to be underweight. As indicated earlier being underweight also has some health ramifications as it tends to increase one's susceptibility to chronic ailments and may even affect a child's brain development and growth. Also, it was revealed that 11.5% of the respondents were found to be overweight. Meaning they obtained a BMI within the range of 25.0-29.9 kg/m2. What this suggests is that 11.5% of the respondents were either five percentage points or one percentage point away from becoming obese. Moreover, the study identified three categories of students whose weight condition demands immediate intervention that is,

those found to be underweighted, overweight as well as those identified to be obese. Finally, aside from these vulnerable groups, there was also another category of respondents whose weight description fall within the normal weight distribution and had to be encouraged. Specifically, 31.7% of the respondents had a normal weight that is, have their BMI within the range of 18.5-24.9 kg/m2. This suggests that these categories of students were far from becoming overweight in the next few months or years to come.

Table 3: Prevalence of Obesity among the Respondents

BMI	Frequency	Percent
16.0-16.9	24	4.8
17.0-18.4	56	11.3
18.5-24.9	157	31.7
25.0-29.9	57	11.5
30.0-34.9	197	39.7
≥40.0	5	1.0
Total	**496**	**100.0**

Source: Author's field work, 2020

The Prevalence Rate of Obesity across Gender

This item seeks to compare the prevalence level of obesity across genders (i.e. male and female adolescents) within the understudied senior high schools within the Kumasi Metropolis. Accordingly, the results of the prevalence level of obesity across the respondents' gender have been presented in Table 4.

Results from Table 4 suggest that more males were found to be severely underweight than their female counterparts. For instance, whereas 23.4% of the male respondents' BMI fell within the severely underweight classification that is, 16.0-16.9 kg/m2 only 2.8% of the female respondents' weight description falls within this BMI classification. However, when it comes to the next BMI weight description that is, 17.0-18.4 kg/m2 it can be observed that more females were found to be underweight than their male counterparts. For instance, whereas 12% of the female respondents had this BMI description only 9.5% of the male respondents had this BMI description. Again, when it comes to the normal weight description that is, a BMI within the range of 18.5-24.9 kg/m2, results from Table 4 show that comparatively more females (i.e. 32.3%) had a normal than their male counterparts (i.e.

29.9%). Also, it can be observed in Table 4 that more males were found to be overweight (i.e. 8.0%) than their female counterparts (i.e. 7.8%). Also, when it comes to the BMI classification of 30.0-34.9 kg/m it can be observed in Table 4 that whereas 1.5% of the male respondents' weight descriptions fall within this BMI classification only 0.8% of the female respondents' weight description fall within this BMI classification. This suggests that on both genders only a few of the male and female respondents had their weight description under the classification of obese type I. Lastly, it can be established from Table 4 that more females were found to be under obese type III classification than their male counterparts. For instance, whereas 44.3% of the females had their weight within this BMI classification only 27.7% of the males had their weight within Obese III. Results from the study suggest that whereas there is a high rate of underweight for a significant number of the male respondents, there were also a significant number of female respondents whose weight description falls under obese III.

Table 4: The Prevalence Rate of Obesity across Gender

BMI	Gender		Total
	Male, Freq (%)	Female, Freq (%)	
16.0-16.9	56 (23.4%)	7 (2.8%)	63
17.0-18.4	23 (9.5%)	31 (12.0%)	54
18.5-24.9	71 (29.9%)	83 (32.3%)	154
25.0-29.9	19 (8.0%)	20 (7.8%)	39
30.0-34.9	4 (1.5%)	2 (0.8%)	6
≥40.0	66 (27.7%)	114 (44.3%)	180
Total	**239 (100%)**	**257 (100%)**	**496**

Source: Author's field work, 2020

The prevalence rate of obesity across schools

This item seeks to compare the prevalence level of obesity across schools (i.e. single-sex schools against mixed-sex schools). Accordingly, the results of the prevalence level of obesity across the different categories of schools have been presented in Table 5.

Results from Table 5 suggest that there is not much difference among single-sex and mixed-sex schools when it comes to the BMI description of 16.0-16.9 kg/m2. For instance, whereas 8.8% of the respondents in single-sex schools had their BMI within this weight range comparatively 8.1% of the respondents in mixed-sex schools had their weight description within this weight description as well. However, when it comes to the weight description of underweight (i.e. with a BMI of 17.0-18.4 kg/m2), it can be observed in Table 5 that more of the participants in single-sex school (i.e. 15.1%) were found to be underweight than the respondents from mixed-sex school (i.e. 7.8%). Again, it can be observed from Table 5 that

comparatively there is a 2 percentage point's difference between single-sex and mixed-sex schools when it comes to the respondents with normal weight. Specifically, 32.8% of the respondents from single-sex had their BMI within the range of 18.5-24.9 kg/m2 qualifying them with the weight description of normal weight. On the contrary, 30.6% of the respondents from mixed-sex schools have their BMI within the range of 18.5-24.9 kg/m2. Again, it can be established from Table 5 that whereas 8.4% of the respondents from single-sex schools had their BMI within the range of 25.0-29.9 kg/m2, 7.4% of the respondents from mixed-sex schools had such BMI range. This suggests that there is a 1 percentage point difference between single-sex and mixed-sex schools along with the weight description of overweight. Last but not the least, results from Table 5 suggest that most of the respondents from mixed-sex schools were found to have the weight description of obese I than the respondents from single-sex schools. For instance, whereas 0.4% of the respondents from single-sex schools had a BMI of 30.0-34.9 kg/m2 comparatively 1.6% of the respondents from mixed-sex schools had their weight within this BMI range. Lastly, it can be observed that comparatively more students from mixed-sex schools had their BMI within obese III than their counterparts from single-sex schools. For instance, whereas 44.6% of the respondents from mixed-sex schools had their BMI within the range of ≥40.0 kg/m2 only 34.5% of the respondents from single-sex schools had their BMI within the ≥40.0 kg/m2. Results from the study suggest that the prevalence of obesity within the studied senior high schools was quite higher within mixed-sex schools than in single-sex schools.

Table 5: Prevalence Rate of Obesity across Schools

BMI	Category of school		Total
	Single sex school, Freq (%)	Mixed school, Freq (%)	
16.0-16.9	21 (8.8%)	21 (8.1%)	42
17.0-18.4	36 (15.1)	20 (7.8%)	56
18.5-24.9	78 (32.8%)	79 (30.6%)	157
25.0-29.9	20 (8.4%)	19 (7.4%)	39
30.0-34.9	1 (0.4%)	4 (1.6%)	5
≥40.0	82 (34.5%)	115 (44.6%)	197
Total	**238 (100%)**	**258**	**496**

Source: Authors field work, 2020

Discussion

This objective sought to identify the prevalence of obesity among the study respondents. Results from this objective revealed that the prevalence level of obesity among the study respondents stood at 40.7%. This suggests that 40.7% of the participants were found to be obese. Again, it was observed that 16.1% of the respondents were found to be underweight. Generally, being underweight comes with some health complications as it tends to increase

one's susceptibility to chronic ailments and even has the possibility of affecting a child's brain development and body growth rate. Also, it was revealed that 11.5% of the respondents were found to be overweight. Meaning they obtained a BMI within the range of 25.0-29.9 kg/m2. This suggests that 11.5% of the respondents were either five percentage points or one percentage point away from becoming obese. These results again suggest that 11.5% of the respondents could become obese in the next few months when aggressive dieting measures are not instituted to control these persons' food intake. Moreover, the study identified three categories of students whose weight condition demands immediate attention that is, those found to be underweighted, overweight as well as those identified to be obese. Aside from these vulnerable groups, there was also another category of respondents whose weight description falls within the normal weight distribution. Specifically, 31.7% of the respondents had a normal weight that is, have their BMI within the range of 18.5-24.9 kg/m2. Also, when it comes to the prevalence level of obesity across genders (i.e. male and female adolescents), results from the study suggest that more females were found to be under the obese III classification than their male counterparts. For instance, whereas 44.3% of the females had their weight within this BMI classification only 27.7% of the males had their weight within Obese III. Results from the study suggest that whereas there is a high rate of underweight for a significant number of the male respondents there were a significant number of female respondents whose weight description falls under obese III.

Again, when it comes to the prevalence level of obesity across schools (i.e. single-sex school against that of mixed-sex school) results from the study revealed that comparatively more students from mixed-sex schools had their BMI within obese III than their counterparts from single-sex schools. For instance, whereas 44.6% of the respondents from mixed-sex schools had their BMI within the range of ≥40.0 kg/m2 only 34.5% of the respondents from single-sex schools had their BMI within the ≥40.0 kg/m2. Results from the study suggest the prevalence of obesity within the studied senior high schools was quite higher within mixed-sex schools than in single-sex schools. Having a little over 40% of the respondents being obese has to be a great course of worrying to the participating schools as well as the respondents themselves due to the serious health consequences obesity brings to the lives of the individuals, particularly that of children. For instance, as observed in the study of [30] motor development was 1.80 times more likely to delay in overweight children than that of non-overweight children (95% CI: 1.09–2.97) and 2.32 times as likely in infants with high hypodermal fat than infants with lower subcutaneous fat (95% CI: 1.26–4.29). Even aside from its effect on a child's motor skill development, it can equally affect the menstrual cycle and reproduction system of adolescents. For instance, [31] posits that obesity may itself be a common unnoticed cause of adolescent ovulatory dysfunction since excessive

accumulation of body fats can interrupt the ovulatory cycle by suppressing gonadotropins and by growing insulin resistance.

Additionally, results from this study affirm the earlier studies undertaken by the [13] and that of [14] as in their respective works it was observed that there is a higher prevalence of obesity among adolescents particularly those within the age group of 15-19 years. Again, the results in this study are similar to the trends observed in the study of [15] as their work identified the prevalence level of obesity among Ghanaian youth particularly those in the parts of Kumasi and Accra to be around 41%. Similarly, in this study, the prevalence of adolescent obesity among the respondents stood at 40.7%.

Nevertheless, the results found in this study tend to be quite different from the ones reported in the study of [32] [33], and that of [34]. Particularly, in the study of [32] obesity prevalence rate among Junior High School students stood 26.5%. Also, in the case of [33] their study after assessing 470 basic school students, found an overall prevalence of obesity to be around 10.9% among adolescents. Likewise, in the study of [34] after their analysis of junior high school students both in the Kumasi Metropolis and Northern Region of Ghana, the prevalence level of obesity across these cities stood at 12.20%, 0.80%, and 17.4% respectively. What this study result suggests is that the prevalence level of obesity among adolescents seem to be increasing as per the study computation of the BMI of about 496 adolescents close to 40.7% have their BMI within the obese range of 30.0-34.9 kg/m2

CONCLUSION

The following conclusions were drawn based on the major findings of the study. Findings from the study suggest that the prevalence of obesity among the study respondents stood at 40.7%. Again, findings from the study suggest that within genders more females were found to be obese than their male counterparts. Particularly, whereas 44.3% of the females had their weight within obese III classification (i.e. ≥40.0 kg/m2) only 27.7% of the males had their weight within Obese III. Additionally, when it comes to the prevalence level of obesity across schools (i.e. single-sex school against that of mixed-sex school) results from the study revealed that comparatively more students from mixed-sex schools were found to be obese than their counterparts from single-sex schools. For instance, whereas 44.6% of the respondents from mixed-sex schools had their BMI within the range of ≥40.0 kg/m2 only 34.5% of the respondents from single-sex schools had their BMI within the ≥40.0 kg/m2.

RECOMMENDATIONS

Based on the study results the following recommendations were made:

1. It is recommended to the various schools continuously measure the BMI of their students to categorise their students along with the class of underweight, normal weight, overweight, and obesity and subsequently use this insight to plan the meals of their students as well as the physical activities of their students since this can help improve the weight status of their students.

2. Again, findings from the study suggest that within genders females were more likely to be obsessed than their male counterparts. Accordingly, it is recommended to the participating schools particularly the girl's schools to take a keen interest in their student's meals as well as their physical activities since such initiative by the schools could help minimize female students' predisposition to obesity.

3. It was revealed that student consumption patterns that is, the kind of food one consumes has a significant influence on a person's susceptibility to obesity. Accordingly, it is recommended to the schools and parents to take a keen interest in the foods their children eat since the food a person eats has a direct effect on their body size. Again, the schools and the student's parents are to ensure that the meals they serve to their students and children are well balanced with vegetables, fruits and also have fewer amounts of carbohydrate and cholesterol since this in a way help minimize adolescent risk to obesity.

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