INVESTIGATING THE PERVASIVENESS OF OBESITY AMONG ADOLESCENTS IN PRIVATE AND PUBLIC SECONDARY SCHOOLS IN CALABAR METROPOLIS, CROSS RIVER STATE – NIGERIA

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Abstract

This study was to investigate the pervasiveness of obesity among adolescents in private and public secondary schools in Calabar Metropolis of Cross River State, Nigeria. Survey research design was adopted for the study. Stratified random sampling technique was adopted to select 400 students (200 from private and 200 from public secondary schools) in Calabar Metropolis of Cross River State, Nigeria. Structured questionnaire titled "Pervasiveness of Obesity Among Adolescents (POAD)" was used to obtain data. The data obtained were analyzed using independent t-test statistic. All hypotheses were tested at 0.05 level of significance. The results indicated that significant differences existed between the students of private and public secondary schools as regards the pervasiveness of obesity in the study area. It was recommended among other things that Private school students most especially the adolescents should be involved in proper fitness programmes to help in improving their health thereby reducing the risk factors of having obesity related disorders.

Key words: Adolescents, Obesity, Pervasiveness, Private and Public.

Introduction

The pervasiveness or prevalence of overweight and obesity is confined not only to adults but also being reported among the children and adolescents of developed as well as developing countries (WHO, 2015). Since, adolescence is a period of transition from childhood to adulthood, it assumed critical position in the life cycle of human beings, characterized by an exceptionally rapid rate of growth (Jain, Bharadwaj & Joglekar, 2017). The pervasiveness or prevalence of overweight and obesity among children and adolescents has increased significantly in the developed countries during the past two decades and similar trends are being observed even in the developing world (Must, 2017).

The pervasiveness of overweight and obesity are risk factors for many health problems, regardless of a person's age. Children and adolescents who are overweight and obese, however, tend to face a greater risk of health problems including type 2 diabetes mellitus, high blood pressure, high blood lipids, asthma, sleep apnoea, orthopaedic and psychosocial problems than their normal weight peers (Goossens, Braet & Decaluwe, 2017). There is an urgent need to investigate the magnitude of this pervasiveness in developing countries such as Nigeria and most especially the study area, which is Calabar Metropolis, and to implement prevention strategies as early as childhood by involving families, schools and the whole community (Ugbong, 2015).

A study by Eme (2015) on prevalence of overweight and obesity among adolescents in secondary schools in Abia state, Nigeria, revealed that more females (51.7%) than males (48.3%) participated in the study. A greater percentage of them were within the ages of 10-14 years and more than half of the respondents (57.5%) were from private schools. The reason for more females than males in the population might be because of more enrolment of the females in education in recent times than males. Most males tend to go into business and apprenticeship than the female folks. The background characteristics in this study were comparable to those used in previous studies (Akinpelu, Oyewole & Oritogun, 2018). The mean age of the respondents in this study (14.56±1.84 years) was similar to the findings of (Adesina, Peterside, Anochie & Akani, 2019) where the mean age of their respondents was 14.25±1.25 years. The prevalence of overweight and obesity in this study was 9.7% and 3.5% respectively. This was lower when compared with the prevalence of overweight (15%) and obesity (5%) in Iranian adolescents (Dorosty, Siassi & Reilly, 2016) and Indian adolescents (11.1% for overweight and 14.2% obese). The possible reasons of higher pervasiveness or prevalence of overweight and obesity may be linked to their food habit, westernization and government policies in these countries which may be counterproductive to a healthy lifestyle.

However, in Eme (2015) study, there was a significant ($P<0.05$) higher prevalence of overweight (6.7% and 3.0%) and obesity (2.5% and 1.0%) in females than in males respectively. It can be explained by the fact that the male adolescents might be involved in more exercise than their female counterpart. This was however lower than the findings of a similar study done at Sagamu by Akinpelu, Oyewole and Oritogun (2018), where it was revealed that, the prevalence of overweight and obesity in males were (8.1% and 1.9% respectively) and females (8.1% and 2.7% respectively) but it was higher than the findings of similar studies by (Alabi, 2018) and Izuora, (2017). This however, might be explained due to the time these studies were carried out because both studies were carried in different study areas. The Waist-Hip Ratio (WHR) of the females (12.8%) had more significantly ($P<0.001$) high health risk than males (3.0%). The implication of this result is that the females might be more predisposed to non-communicable diseases such as diabetes, hypertension and other health related diseases later in life. According to Manyanga, (2018), the fitness experts, waist-hip ratio (WHR) helps us track our weight loss progress and also serve as a warning about our estimated health risk for problems related to being overweight such as diabetes, stroke and heart disease which are life threatening.

Obesity is a common disease with an increasing pervasiveness or prevalence and usually with late onset consequences. If acquired during childhood, it tracks into adult life to some extent, since the relationship between obesity and hypertension is well established in adults, obese children appear to be at particularly high risk of becoming hypertensive adult, (Faloia Giacchetti & Mantero, 2020). Alpert (2020) in his study opined that, obese girls seemed to have significantly higher casual and ambulatory blood pressure than non-obese boys, except for night time diastolic pressure. The health effects of obesity may depend on the anatomic distribution of body fat, which in turn may be a better indicator of endocrinologic imbalance, environmental stress, or genetic factors than in fatter peers. Obesity develops when energy intake increases more than the amount of energy expended, this in turns promotes an increase in energy stores and

weight gain (Flatt, 2015). When energy consumed is more than energy spent, and then the extra energy is preserved in the adipose tissue, the fatty cells increase rapidly in large amount during late childhood and adolescence period even after one stop growing, fat cell still continues to multiply in numbers anytime there is positive energy balance (Whitney, Pinna & Rolfes, 2016). Obesity develops in boys and girls as a result of positive energy balance and this leads to weight gain. Conversely a negative energy balance may show that, intake of energy is less than expenditure of energy and this promotes a decrease in energy stores and decrease in energy weight (Flatt, 2015). Flatt, (2015) concluded that an energy store is influence by intake of energy and is influenced by the consumption of macro nutrient.

The researchers observed that, boys and girls who are obese have more and larger fat cells than normal weight individuals. When the energy intake is more than the energy expenditure, it causes the fat cells to accumulate triglycerides and enlarge. As the cell enlarges, it stimulates rapid increase in the number of cells so that their numbers increase again thereby leading to obesity. Obesity occurs when an individual's fat cell increases in size or number or both and whenever expenditure of energy is more than intake, the fat cell shrinks in size but it does not affect the numbers. The researchers again observed that, boys and girls with more fat cells tend to regain their weight lost faster, as they regain back their weight; their many fat cells get filled up, but people with small number of enlarged fat cells, successfully mountain weight loss when their cells shrink. Excess fat stored in fat cells may not really cause much harm to the body, but accumulation of fat in organs like the heart and liver can lead to the occurrence of diseases like heart failure, hypertension and other dangerous terminal diseases.

However, in normal circumstances, the energy balance fluctuates depending on the meal and the day-to-day activities without any lasting change in energy stores or weight (Labib, 2014). Different macro nutrient has different properties in calories density of energy, capacity for storage and capacity to subdue hunger. Obesity occurs when there is a positive energy balance for a considerable period of time. Physiological processes therefore have the capacity to regulate body weight and maintain it all at relatively short range. It is therefore assumed that the body has a more powerful effect on nutrition and loss of weight compared with over consumption and increase in weight (Blundell & Cooling, 2020). Energy intake has also been referred to as all the energy consumed into the body as food and drink that can be metabolized in the body (Cumming & Schwartz, 2020).

Energy expenditure has three components that contribute to the expenditure: they include basal metabolic rates (BMR), density thermos genesis and physical activity (Labib, 2014). The proportion that each component contributes to the entire energy expenditure defers base on the frequency and intensity of physical activity. It has been shown that in adults that have sedentary lifestyle, basal metabolic rates accounts for almost 60 percent of their total energy output, the dietary thermos genesis accounts for both 10 percent and physical activity for the remaining 30 percent. In those engaged in heavy manual work, the total energy expenditure increases and the proportion of energy expenditure accounted for by physical activity may rise to about 50 percent. Dietary thermos genesis appears to remain constant at 10 percent leaving

basal metabolic rate at 40 percent of the energy expended, although the BMR may vary intrinsically between individuals of similar ages by + or – 25, within each individual, it is tightly controlled (WHO, 2013)

The pervasiveness or prevalence of obesity is on the rise in developing countries, especially in urban areas such as Calabar Metropolis of Cross River State. The pervasiveness of obesity has continued to rise at an alarming rate world-wide to such an extent that it has been described as a global epidemic. Calabar metropolis has experienced rapid and unplanned urbanization in recent years and there have been changes from local diet to western style of diet as well as change in eating habits which is driven by the explosion of fast-food canteens and restaurants or eateries. Consequently, over consumption of refined fast foods such as meat pie, fried/jollof rice, snacks, ice cream, indomie, energy drinks etc., is becoming noticeable among individuals, children/adolescents, groups and families in Calabar Metropolis. Based on this, one can then ask, what is the pervasiveness of obesity in adolescents in private and public secondary schools in Calabar Metropolis of Cross River State?

Method and Materials

In this study, the researchers adopted the survey method of research design to conduct the study. This method was best adopted because surveys are mostly conducted to establish the nature and position of prevailing issues. It is important in this study because it deals with group of different individuals for analysis. It also made it possible for the researchers to reach out to a larger population (private and public secondary school students) and at the same time takes care of those areas under consideration in the study.

The sample for the study was made up of four hundred (400) students randomly selected from both the private and public secondary schools in the study area. Twenty (20) schools were selected from the two Local Government Areas of Calabar Metropolis made up of, ten (10) public and ten (10) private schools. And a total number of 100 males and 100 females in public secondary schools and same number in the private secondary schools. This amounts to a sample size of four hundred (400) students selected from the population.

The sampling procedure used in this study was stratified random sampling technique. Isangedighi (2015), opined that, stratified sampling identifies and addresses heterogeneity in the population and which in turn reduces sampling error. The author further stated that, the technique is used when the population contains definite subsets, each of which is distinctly different, though within each stratum and the units are homogeneous. In the first stage the secondary schools in Calabar metropolis in the study area were stratified by school type base on their ownership (private and public schools).

Stage two, forty schools were randomly picked from the two Local Government Areas with twenty schools from each Local Government Area (ten private and ten public schools) out of the 64 schools in the Metropolis. In the third stage, each school was stratified base on their classes from each level of SS2 and SS3 classes because of their age bracket and two arms were selected from each of the class of SS2 and SS3 using simple random sampling. In the fourth stage, five students were randomly selected from each arm making ten

students from each of the forty schools to make a total of four hundred [400] students which form the sample size used for the study.

The instruments used to collect data were:

Questionnaire, which was titled Pervasiveness of Obesity Among Adolescents Questionnaire (POADQ). Information was gotten from the students using structured questionnaire. Section "A" of the questionnaire covered demographic data and anthropometric data while in Section "B" information about their diet, eating habit, and lifestyle etc. were obtained. The researchers and four trained assistants visited the selected schools to administer the questionnaire which contains close and open-ended questions.

Weight measuring scale(kg) a bathroom scale calibrated from Zero to 120 kg was used to measure the weight of the students. The scale was checked and corrected for zero error before every measurement and each subject was allowed to wear only the school uniform during measurement, their shoes and other extra wears like sweaters were also removed in other to reduce error margin while the weight was read to the nearest 0.5 kg.

Height measurement (m) a mobile height measurement instrument called stadiometer was used to take the students measurement. The students were asked to remove their shoes and stand upright by the instrument and reading was taken to the nearest 0.5m. The body Mass Index was calculated by using the height and the weight measurement to assess for normal weight, overweight and obesity and was calculated by dividing the weight in kg by the square of the height in meters. Body Mass Index=Weight (kg)/Height (m^2).

Reliability estimate was conducted to determine the consistency of the instrument. The instrument was trial tested on 50 students selected in the area that were not part of the ones sampled for the study. The data collected were analyzed using Cronbach alpha reliability method which gave coefficients that ranged from .73 to .79

The procedure for data analysis depended on stated hypothesis. The hypothesis of the study was analyzed using appropriate statistical technique. The researchers compared two groups of students, that is public and private secondary school students and the statistical analysis technique for testing all hypotheses was independent t-test. The hypothesis was tested at .05 level of significance.

Results and Discussion

This study investigated the pervasiveness of obesity in adolescents in private and public secondary schools in Calabar Metropolis of Cross River State, Nigeria. The variable involved in this study is school type, as a result of obesity. The results of the descriptive data analyses are presented in Table 1.

Generaly as presented in Table 1 below, the mean score obtained by the 400 subjects as regards to pervasiveness of obesity was 15.72 with a standard deviation of 3.38 while the 177 males had a mean score of 14.18 with a standard deviation of 3.37 and the 223 females had a mean score of 16.95 with a standard deviation of 2.84.

Table 1 Mean scores and standard deviations of subjects in the study variables

SN	Sub variables	Groups		Mean	SD
1.	Prevalence of obesity	Male	177	14.18	3.37
		Female	223	16.95	2.84
		Total	400	15.72	3.38

(N=400)

In this section the null hypothesis of the study was re-stated, the independent and dependent variables identified as well as describing the statistical analysis technique used to test the hypothesis.

Hypothesis

The hypothesis stated that there is no significance difference between pervasiveness of obesity among adolescents in private and public secondary schools. The independent variable is school type which was categorized into private and public while the dependent variable is pervasiveness of obesity among adolescents.

The data was analyzed using independent t-test analysis tested at .05 levels of significance. The result of the analysis is presented in Table 2.

Table 2 Independent t-test analysis of school type and pervasiveness of obesity

School type	N	X	SD	t-value	p-level
Private school	200	17.34	2.98		
				10.924*	.000
Public school	200	14.10	2.95		

*Significant at .05 level; p<.05; df=398.

The result in Table 2 revealed that the mean score obtained by the 200 subjects from private school as regards to pervasiveness or prevalence of obesity was 17.34 with a standard deviation of 2.98 which is greater than the mean score of 14.10 with a standard deviation of 2.95 obtained by the 200 subjects from public school. The mean difference was statistically significant since the obtained t-value of 10.924 with a p-value of .000 at 398 degrees of freedom met the criteria for significant at .05 level. Implying that adolescents in private schools in Calabar Metropolis differ significantly from their counterparts in public schools as regards to pervasiveness of obesity with those from private school having more prevalence of obesity.

Discussion

The study investigated the pervasiveness of obesity among adolescents in private and public secondary schools. At the end of the study, the result of the hypothesis revealed that there was a statistically significant difference between

adolescents in private schools in Calabar Metropolis and their counterparts in public schools as regards to pervasiveness of obesity with those in private schools having more pervasiveness of obesity than those in public secondary schools. The result further consolidates the findings of Eme (2015) on prevalence of overweight and obesity among adolescents in secondary schools in Abia state, Nigeria.

The study revealed that more females than males participated in the study, and a greater percentage of them were within the ages of 10-14 years and more than half of the respondents were from private schools. The reason for more females than males in the population might be because of more enrolment of the females in education in recent times than males. Most males tend to go into business and apprenticeship than the female folks. The outcome of this study was in agreement with the study of Manyanga, (2018), in his study, a cross-sectional study was conducted in two divisions in Nairobi province to determine the prevalence of and some risk factors associated with overweight and obesity among school children in Nairobi, Kenya. It involved 344 school children aged 9-14 years drawn from four randomly selected public and private primary schools. Weight and height were measured and body mass index was calculated. Nutrition status was determined using the World Health Organization age and gender specific BMI-for-age Z-scores. The chi-square test was used to determine the relationship between overweight/obesity and selected socio-demographic characteristics. Complete anthropometric measurements were available for 321 children. Prevalence of combined overweight and obesity was 19.0%, with prevalence being higher among girls (21.0%) than boys (16.9%). The prevalence among adolescents in private schools was significantly higher than among those in public schools.

Also, the result was in agreement with the study conducted by Akinpelu, Oyewole and Oritogun (2018) among public and private school participants in which about 60.8% of them were between (15-19) years. This clearly illustrated that participants in this study might have established certain food habits in their food consumption and physical activity practice that may influence their weight status. Furthermore, about 61.7% of participants walked to school, this is in line with findings of Jain, Bharadwaj & Joglekar, (2017), where majority of participants walked to school. Walking to school may influence physical activity level of participants and since this study was conducted in rural and semi-urban areas. It indicates that the environment encouraged free movement of participants unlike in many private schools where neighborhood environment does not encourage human movement.

Conclusion

Based on the result of the findings, it was concluded that:

There were significant differences between adolescents in private secondary schools and public secondary schools in Calabar Metropolis, Cross River State-Nigeria regarding pervasiveness of obesity.

Recommendations

Based on the conclusion of the stud, the researchers recommend among others as follows:

Private school students most especially the adolescents should be involved in proper fitness exercise and programmes to help in improving their health thereby reducing the risk factors of having obesity related disorders.

The school should organize physical fitness activities and programmes for students in private schools on a regular basis at both senior and junior classes so as to develop good respiratory endurance, body composition and flexibility among others.

Parents should encourage their children to make good use of their leisure hours by reducing time-taking in sedentary activities like computer games, watching cartoons and movies but encourage participation in domestic work. This will help in minimizing sedentary life style of the children.

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