# Determinants of obesity among adolescents in selected secondary schools in Calabar Municipality, Cross River State, Nigeria

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## Abstract

The increasing prevalence of obesity among adolescents has become a significant public health concern globally, with developing countries like Nigeria experiencing alarming rates. This study investigates the determinants of obesity among secondary school students in Calabar Municipal Council, Cross River State, Nigeria, focusing on the roles of overeating and lack of physical activities. A sample of 220 students aged 11-19 was selected using simple random sampling. The study utilized a descriptive design and a self-structured questionnaire, alongside height, weight, and waist circumference measurements. Simple linear regression analysis was employed to test two hypotheses. Results revealed a significant correlation between overeating and obesity ($r = .352$, $p < 0.05$), accounting for 62% of the variance in obesity. Conversely, the relationship between lack of physical activities and obesity was not significant ($r = .087$, $p > 0.05$), explaining only 7% of the variance. These findings suggest that overeating significantly contributes to obesity among adolescents, while lack of physical activity does not. Addressing adolescent obesity in this context requires targeted interventions focusing on dietary habits. This study contributes to the understanding of obesity determinants in developing regions and highlights the need for tailored public health strategies.

**Keywords:** Adolescent obesity, overeating, physical activity, secondary school students, Calabar Municipal Council

## Introduction

The global shift in lifestyles among youths has raised significant concerns among sociologists and health practitioners due to its profound health and social implications. The World Health Organization (2015) has identified obesity as one of the major public health concerns of the 21st century. While historically associated with adults, recent trends show that obesity is increasingly prevalent among children and adolescents. The Body Mass Index (BMI) remains the widely accepted parameter for measuring obesity in adolescents (Deurenberg, Westrate & Seidell, 1991). Although obesity and overweight are often used interchangeably, they are distinct conditions (CDC, 2015; Adesina, Peterside, Anochie & Akani, 2012). Cultural perceptions of body weight and healthiness also contribute to the prevalence of obesity among adolescents.

The issue of adolescent obesity demands urgent attention, particularly in developing societies like Nigeria, where a significant percentage of adolescents are in school. UNICEF (2015) reported that 54 per cent of adolescents in Nigeria are enrolled in secondary schools. A healthy student body is essential for meeting academic challenges; however, obesity, classified as a non-communicable chronic disease (WHO, 1998), hinders students' ability to cope with these demands. Onyiriuka (2013) emphasises that "obesity in childhood and adolescence is emerging as a major public health problem of our time," with associated risks including substantial loss of quality of life, social stigmatization, and mental health issues such as depression, anxiety, low self-esteem, and feelings of guilt. This study focuses on the Calabar Municipal Council in Cross River State, Nigeria, an area with a high number of school students suffering from obesity. Specifically, the study aims to examine the lifestyles and activities of adolescents and the challenges associated with obesity among secondary school students in this region. It seeks to investigate whether overeating leads to obesity among adolescents and whether a lack of physical activity is responsible for obesity among adolescents.

Understanding adolescent obesity is crucial for public health, especially in developing countries where the trend is accelerating. While prior research has established the relationship between eating habits, physical activity, and obesity, there remains a gap in understanding how these factors interact among adolescents in the Calabar Municipal Council. For instance,

Lathifah et al. (2024) found a correlation between eating patterns and physical activity, highlighting that children with low physical activity are 1.14 times more likely to be obese compared to those with moderate physical activity. Similarly, Yousif et al. (2019) revealed that eating habits had a strong impact on BMI. However, specific data on the interplay of these factors in Calabar Municipal Council is lacking. This research aims to fill this knowledge gap by providing empirical data on the determinants of obesity among adolescents in Calabar Municipal Council. By investigating the relationship between overeating, physical activities, and obesity, this study will offer insights into effective strategies for preventing and managing adolescent obesity in similar contexts.

**Theoretical framework: The Freudian Theory of Psycho-Analytic**

Sigmund Freud observed that man is made up of two primitive drives namely: the sex and aggressive drives. Freud further postulates that human sexuality and aggression are innate and if these primitive drives are not nurtured and regulated by society, the individual can be brutish and crude. (Etobe, 2005:44). He coined the term "**Fixation**" to refer to a state of incomplete or arrested developmental transition from one psychosexual stage to another. This fixation could be caused by not having full gratification in one phase before progressing to the next, so that, he/she still exhibits the behavioral pattern of the stage he has outgrown. (Etobe, 2005:44). The theory describes how personality develops throughout childhood. Freud believed that personality developed through a series of childhood stages in which the pleasure seeking energies of the Id becomes focused on certain erogenous areas. An erogenous zone is characterized as an area of the body that is particularly sensitive to stimulation. During the five psychosexual stages, which are the oral, anal, phallic, latent and genital stages, the erogenous zone associated with each stage serves as a source of pleasure. This psychosexual energy was described as the

With regards to this work, the oral phase is used to analyze the variables of obesity among adolescents. According to Freud, the oral phase is governed by the individual deriving pleasure or gratification through the mouth. This stage starts from birth to 7 years. A person during this stage of development lives his/her life from hand to mouth. If during this phase, the child derives much pleasure in eating, so that, he is fixated, his development will be arrested and this will adversely affect his personality in future by resulting in a manifest of pathology or physiological unhealthiness of obesity, drinking, eating excessively or gluttony, smoking and nail-biting. To suit these studies more effectively, it is therefore imperative that we include the elements of biology, medicine and the environment into Freud's theory by meta-theorizing that obesity is not just a product of psychological personality disorder, but a result of the combination of factors that include the psychological, biological, medical and environmental conditions.

**Materials and Method**

This study was conducted in five selected secondary schools within the Calabar municipality, a metropolitan city in Cross River State, Southern Nigeria. A total of 220 students, aged 11 to 19 years, were selected as respondents using a simple random sampling technique, forming the sample for this study. Inclusion criteria required students to have a Body Mass Index (BMI) above 0.8 for girls and 1.0 for boys. Before participation, the consent of the students identified as overweight was obtained, and their BMI was measured to confirm their obesity status. The BMI was calculated by dividing the student's waist measurement by their hip measurement.

Authorization to conduct the research in the selected schools was obtained from the Cross River State Ministry of Education and the Cross River State Universal Basic Education Board, Calabar. The study employed a descriptive design, utilizing an 8-item, self-structured,

close-ended questionnaire, which was personally administered to the respondents. Additionally, measurements of height, body weight, and waist circumference were taken and recorded on the reverse side of the questionnaire. These measurements followed the World Health Organization (WHO) standards (2007), where observations below the 15th percentile were rated as underweight, 15th to 84.5th percentile as normal weight, 85th to 97th percentile as overweight, and above the 97th percentile as obese.

The demographic data of respondents were analyzed using simple percentile methods, while the questionnaire responses were analyzed using the Chi-Square statistical tool. This methodological approach ensured the reliability and validity of the data collected, providing a comprehensive understanding of obesity determinants among adolescents in Calabar municipality.

## Hypothetical Questions
- There is no significant correlation between overeating and obesity among secondary school students in Calabar Municipal Council of Cross River State, Nigeria
- There is no significant relationship between lack of physical activities and obesity among secondary school students in Calabar Municipal Council of Cross River State, Nigeria

## Results

### Demographic characteristics of respondents
The study surveyed 220 secondary school students in Calabar Municipality, Nigeria: Out of the 220 respondents, 101 were male, accounting for 46% of the sample, while 119 were female, representing 54%. This slight majority of female participants highlights a relatively balanced gender distribution, though with a higher proportion of females. Respondents were categorized into two age groups: those under 15 years and those aged 15 years and above. The results indicated that 98 respondents (44.54%) were below 15 years, while 122 respondents (55.45%) were 15 years or older. This distribution suggests a slightly higher prevalence of older adolescents in the sample. The educational levels of respondents were divided between Junior Secondary School (JSS) and Senior Secondary School (SSS). Of the total sample, 118 students (53.63%) were in JSS, and 102 students (46.37%) were in SSS. This indicates a nearly even split between the two educational stages, with a slight majority in the junior level. The data also captured the primary mode of transportation used by the students to get to school. A significant majority, 166 students (75.46%), reported using vehicles, while 54 students (24.54%) indicated that they walked to school. This finding reflects a predominant reliance on vehicular transportation among the respondents.

*Table 1: demographic distribution of respondents*

| Demographic Characteristics of Respondent | Designation | Outcome | Percentage (%) |
|---|---|---|---|
| *Sex* | Male | 101 | 46% |
| | Female | 119 | 54% |
| **Total** | | **220** | **100** |
| *Age* | <15 | 98 | 44.54% |
| | 15 & > | 122 | 55.45% |
| **Total** | | **220** | **100** |
| *Educational Level* | JSS | 118 | 53.63% |
| | SSS | 102 | 46.37% |
| **Total** | | **220** | **100** |
| *Transportation to School* | Vehicle | 166 | 75.46% |
| | Trekking | 54 | 24.54% |
| **Total** | | **220** | **100** |

## Parametric statistics
### Hypothesis one

The hypothesis states that there is no significant correlation between overeating and obesity among secondary school students in Calabar Municipal Council of Cross River State, Nigeria. In this context, overeating is the independent variable, while obesity among secondary school students is the dependent variable. Both variables were measured on a continuous scale. To test this hypothesis, simple linear regression was employed, using an alpha level of 0.05. The results are presented in Table 2.

**Table 2: Summary simple linear regression analysis of overeating and obesity among secondary school students**

| Variables | Mean | Std. Deviation | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Overeating | 12.4529 | 3.83438 | | | | | | |
| Obesity | 16.3715 | 2.31111 | | | | | | |
| Model | Sum of Squares | df | Mean Square | F | R | R Square | Adjusted R Square | Sig |
| Regression | 259.153 | 1 | 713.355 | 55.232 | .352[a] | .062 | .061 | .000[a] |
| Residual | 1834.608 | 219 | 12.916 | | | | | |
| Total | 2093.761 | 220 | | | | | | |

P< 0.05

**Fieldwork 2023**

The results of the analysis, as presented in Table 2, indicate an r-value of .352a. The correlation coefficient measures the strength and direction of the relationship between variables. It is a commonly used indicator of effect size, where values of $\pm.1$ represent a small effect, $\pm.3$ a medium effect, and $\pm.5$ a large effect. The $R^2$ value of .062 suggests that 62% of the total variance in obesity is explained by the predictor variable, overeating. Additionally, the regression ANOVA results show that $F(1, 391) = 55.232$, $p < 0.05$, which is significant. Therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted. This indicates a significant linear relationship between the predictor variable (overeating) and obesity among secondary school students. The adjusted $R^2$ value (.061) shows a slight decrease from the unadjusted $R^2$ value (.062), suggesting that the model can be generalized to the population. Based on these results, it was concluded that overeating significantly contributes to obesity among secondary school students in Calabar Municipal Council of Cross River State, Nigeria.

### Hypothesis two

The hypothesis posits that there is no significant relationship between a lack of physical activity and obesity among secondary school students. In this study, the independent variable is the lack of physical activity, while the dependent variable is obesity among secondary school students. Both variables were measured on a continuous scale. To test the hypothesis, simple linear regression was applied with an alpha level of 0.05. The results are presented in Table 3.

**Table 3: Summary simple linear regression analysis of the relationship between lack of physical activities and obesity among secondary school students**

| Variables | Mean | Std. Deviation | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Lack of physical activities Obesity | 12.4529 | 3.83438 | | | | | | |
| | 15.8931 | 1.52990 | | | | | | |
| Model | Sum of Squares | df | F | R | R Square | Adjusted R Square | Sig |
| Regression | 6.873 | 1 | 2.951 | .087ᵃ | .007 | .005 | .087ᵃ |
| Residual | 910.639 | 219 | | | | | |
| Total | 917.511 | 220 | | | | | |

P > 0.05

The results of the analysis, as presented in Table 3, show an r-value of .087a. The correlation coefficient is a standardized measure of the relationship between variables. It is commonly used to assess the size of an effect, where values of ±.1 represent a small effect, ±.3 a medium effect, and ±.5 a large effect. The R2 value of .007 indicates that 7% of the total variance in obesity is explained by the predictor variable, lack of physical activity. Furthermore, the regression ANOVA results reveal that F (1, 391) = 2.951, p > 0.05, which is not significant. This suggests that there is no significant linear association between the predictor variable (lack of physical activity) and obesity among secondary school students. The adjusted R2 value of .005 shows a slight decrease from the unadjusted R2 value of .007, indicating that the model can be generalized to the population. Based on these results, it was concluded that the lack of physical activity does not significantly contribute to obesity among secondary school students in Calabar Municipal Council of Cross River State, Nigeria.

**Discussion of findings**

The findings from this study provide significant insights into the relationship between physical activity, eating habits, and obesity among secondary school students in Calabar Municipal Council, Cross River State, Nigeria. The results indicate varying levels of impact from these variables on obesity rates among the students.

The first hypothesis tested the correlation between overeating and obesity among secondary school students. The results, as shown in Table 2, reveal a significant positive relationship with an r-value of .352a. The R2 value of .062 indicates that 62% of the variance in obesity can be explained by overeating. This significant finding is supported by a high F-value of 55.232, with a p-value less than 0.05, leading to the rejection of the null hypothesis. These findings align with previous research that has established overeating as a major contributor to obesity among adolescents. For instance, Lathifah et al. (2024) demonstrated a strong correlation between eating patterns and BMI, emphasizing that poor dietary habits significantly impact weight gain. Yousif et al. (2019) also found that unhealthy eating behaviours are a critical factor in determining BMI levels among children and adolescents. In the context of Calabar Municipal Council, these results suggest that addressing overeating through nutritional education and promoting healthier eating habits could be effective in mitigating obesity rates among secondary school students.

The second hypothesis examined the relationship between a lack of physical activity and obesity among secondary school students. The results, as presented in Table 3, show a non-significant relationship with an r-value of .087a. The R2 value of .007 indicates that only 7% of the variance in obesity is explained by a lack of physical activity. The regression ANOVA results, with an F-value of 2.951 and a p-value greater than 0.05, suggest that the lack of physical activity does not have a significant linear association with obesity in this sample. This

finding contrasts with some existing literature that underscores the importance of physical activity in managing and preventing obesity. For example, studies by Tremblay et al. (2011) and Strong et al. (2005) have highlighted the critical role of physical activity in maintaining a healthy weight and preventing obesity among adolescents. However, the non-significant results in this study may reflect unique contextual factors within Calabar Municipal Council. It is possible that other factors, such as dietary habits, genetic predispositions, or socio-economic conditions, play a more dominant role in influencing obesity rates in this specific population.

The findings from this study highlight the complexity of addressing obesity among secondary school students in Calabar Municipal Council. While overeating appears to be a significant contributor to obesity, the lack of physical activity does not show a strong direct impact. This suggests that interventions focusing solely on increasing physical activity may not be sufficient in this context. Instead, a comprehensive approach that includes nutritional education, promoting healthy eating habits, and addressing socio-economic factors may be more effective in combating obesity.

**Study implications**

This study provides valuable insights into the determinants of obesity among secondary school students in Calabar Municipal Council. The significant correlation between overeating and obesity underscores the need for interventions that promote healthier eating habits. On the other hand, the non-significant relationship between lack of physical activity and obesity suggests that other factors may be more influential in this context. Future research should explore these factors in greater detail to develop comprehensive strategies for preventing and managing obesity among adolescents in this region. Given the significant impact of overeating on obesity, policies should prioritize nutritional education in schools. Educating students about healthy eating habits, portion control, and the importance of a balanced diet can help mitigate overeating and reduce obesity rates. Interventions should not only focus on increasing physical activity but also address dietary habits. Comprehensive health programs that integrate physical education with nutritional guidance are likely to be more effective in combating obesity.

Engaging parents and the community in nutritional education programs can amplify their impact. Policies should encourage parental involvement in promoting healthy eating habits at home and support community-based initiatives that provide access to healthy foods. Schools should implement programs that provide students with the knowledge and skills to make healthier food choices. This can include workshops, interactive sessions with nutritionists, and integrating nutritional education into the curriculum.

**References**

Yousif, M. M., Kaddam, L. A., & Humeda, H. S. (2019). Correlation between physical activity, eating behaviour and obesity among Sudanese medical students Sudan. *BMC Nutrition*, *5*(1). https://doi.org/10.1186/s40795-019-0271-1

Lathifah, A., Adnani, H., & Thi, W. M. (2024). The relationship between eating patterns and physical activity with obesity among elementary school children: A case-control study. *Jurnal Cakrawala Promkes*, *6*(1), 8–14. https://doi.org/10.12928/jcp.v6i1.9601

Adesina, A. F., Peterside, O., Anochie, I., & Akani, N. A. (2012). Weight status of adolescents in secondary schools in Port Harcourt using Body Mass Index (BMI). *Italian Journal of Pediatrics*, 38(1), 1-5.

Centres for Disease Control and Prevention (CDC). (2015). Defining childhood obesity. Retrieved from CDC Website**.**

Deurenberg, P., Westrate, J. A., & Seidell, J. C. (1991). Body mass index as a measure of body fatness: age- and sex-specific prediction formulas. *British Journal of Nutrition*, 65(2), 105-114.

Oniriuka, A. (2013). Weight Status and Eating Habits in Adolescent Nigerian Secondary School Girls. *South African Journal of Child Health*. 7(3): 108-112

Strong, W. B., et al. (2005). Evidence-based physical activity for school-age youth. *The Journal of Pediatrics*, 146(6), 732-737.

Tremblay, M. S., et al. (2011). A systematic review of sedentary behaviour and health indicators in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity*, 8(1), 1-22.

UNICEF. (2015). The state of the world's children 2015: Reimagine the future. Retrieved from UNICEF Website.

World Health Organization (WHO). (1998). Obesity: Preventing and managing the global epidemic. Report of a WHO Consultation. Retrieved from WHO Website**.**