***Original Research Article***

**Knowledge and Perception of Obesity and Associated Comorbidities Among Adolescents in Delta State, Nigeria**

**ABSTRACT**

**Aims:** This study aimed to assess the knowledge and perception of obesity and its associated comorbidities among adolescents in Delta State, Nigeria, in order to inform targeted health promotion strategies.

**Study Design:** Descriptive cross-sectional study.

**Place and Duration of Study:** The study was conducted in selected secondary schools across urban and rural communities of Delta State, Nigeria, between April and May 2024.

**Methodology:** A multistage sampling technique was used to select 954 in-school adolescents aged 10–19 years. Data were collected through a structured, pre-tested questionnaire administered by trained research assistants. The questionnaire covered socio-demographic information, knowledge of obesity and related comorbidities, perceptions of obesity determinants, and understanding of its causes and control. Data were analyzed using SPSS version 26, and Chi-square tests were used to assess associations, with a significance level of p<0.05.

**Results:** Findings showed that 62.1% of respondents demonstrated good knowledge of obesity and its comorbidities, with higher awareness among urban students (60.7%) compared to rural students (53.2%). However, only 17.1% had a positive perception of obesity determinants, and knowledge of its causes and control was particularly low (6.9%). Statistically significant differences were found between urban and rural respondents in both knowledge and perception levels.

**Conclusion:** Despite a moderate level of knowledge, negative perceptions and limited understanding of obesity causes and control persist among adolescents, especially in urban areas. These findings underscore the need for targeted, culturally relevant health education interventions in schools to enhance awareness and promote healthier attitudes toward obesity prevention.

*Keywords: Adolescent obesity, Knowledge and perception, Comorbidities, Physical inactivity, Urban and rural differences, Nigeria.*

**INTRODUCTION**

Adolescent obesity is an escalating global public health concern with both immediate and long-term health implications. The World Health Organization (WHO) estimates that over 390 million children and adolescents aged 5–19 years were overweight in 2022, with approximately 160 million classified as obese [1]. Global projections suggest that by 2030, about 464 million adolescents will be overweight or obese, a trend driven by poor dietary habits, physical inactivity, and urban lifestyle transitions [2].

In Nigeria, the burden of obesity among adolescents is increasing, particularly in urban settings due to westernized diets and sedentary behavior [3]. A study in Lagos reported the prevalence of overweight and obesity among adolescents as 13.8% and 9.4%, respectively [3], while a similar study in Bauchi metropolis found rates of 11.0% for overweight and 9.7% for obesity [5]. The increasing prevalence of adolescent obesity is alarming because it is strongly associated with comorbidities such as type 2 diabetes, hypertension, dyslipidemia, and increased risk of adult obesity [6,7].

Despite the known health risks, adolescents’ knowledge and perception of obesity and its comorbidities remain inadequate. For example, a study in Ikeja, Lagos State, found that fewer than 50% of secondary school students demonstrated adequate knowledge of obesity risk factors, with many holding negative perceptions of its health impacts [8]. Cultural norms in Nigeria, where larger body sizes are often equated with wealth and good health, further complicate perceptions and behavior around obesity [3,9].

Furthermore, studies have revealed a disconnect between knowledge and perception. In Ogun State, although many adolescents were aware of non-communicable diseases, including obesity, a significant number attributed them to supernatural causes and believed traditional foods were inherently healthy [10]. These misconceptions can hinder effective preventive efforts.

Understanding adolescents’ knowledge and perception of obesity is essential for designing effective school- and community-based interventions. This study aims to assess the knowledge and perception of obesity and its associated comorbidities among adolescents in Delta State, Nigeria, with a view to informing targeted health promotion strategies and education policies.

**MATERIALS AND METHODS**

**Study Design and Setting**

This was a descriptive cross-sectional study conducted among in-school adolescents in both rural and urban areas of Delta State, Nigeria. Delta State, located in the South-South region of Nigeria, comprises diverse ethnic groups and a mix of public and private secondary schools.

**Study Population**

The study population consisted of adolescents aged 10–19 years enrolled in selected secondary schools. Both private and public schools in urban and rural locations were included to capture a representative distribution.

**Sample Size and Sampling Technique**

A total of 954 adolescents participated in the study. A multistage sampling technique was used. First, stratified sampling was employed to select urban and rural schools. Then, simple random sampling was used to select schools within each stratum. Within selected schools, systematic random sampling was used to recruit eligible students based on class registers.

**Inclusion and Exclusion Criteria**

Inclusion criteria were apparently healthy students aged 10–19 years who were enrolled in selected schools in the last 1 year and had not participated in any exercise program 6months prior to the study and gave informed assent and provided parental consent. Excluded were students with chronic illnesses or disabilities that could influence their knowledge or perception of obesity.

**Data Collection Instrument**

A structured, pre-tested questionnaire was used to collect data. The instrument included sections on socio-demographic characteristics, knowledge of obesity and its comorbidities, perception of obesity determinants, and knowledge of causes and control. The questionnaire was adapted from previous validated studies and modified to suit the local context.

**Data Collection Procedure**

Data were collected by trained research assistants under the supervision of the principal investigators. The questionnaire was administered in classrooms after obtaining informed consent and assent. Data collection took place over a six-week period (April – May, 2024).

**Data Analysis**

Data were coded and entered into SPSS version **26**. Descriptive statistics such as frequencies and percentages were used to summarize variables. The Chi-square test was employed to assess the association between location (urban/rural) and levels of knowledge and perception. A p-value of <0.05 was considered statistically significant.

**Ethical Consideration**

Ethical approval was obtained from the relevant ethical committee of Novena University, Ogume, Delta State. Permissions were also sorted from Delta State Ministry of Education and heads of participating schools. Parental consent and adolescent assent were obtained prior to data collection. Participation was voluntary and confidentiality was assured.

**RESULTS**

**1. Socio-Demographic Characteristics of Students**

Among the 954 adolescents surveyed, the majority (69.7%) were aged 14–17 years, while 13.3% were aged 10–13 years and 17.0% were between 18–20 years. Females represented 57.9% of respondents, and males 42.1%. A significant portion (70.2%) resided in urban areas, while 29.8% were from rural communities. In terms of school type, 69.2% attended private schools compared to 30.8% in public schools. Regarding extracurricular activities, 56.1% reported playing computer games, 21.4% had no extra activity, 14.3% engaged in farming, and 8.3% were learning vocational skills.

**Table 1: Socio-Demographic Characteristics of Students (n=954)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Urban(n=670) | Rural (n=284) | Total (n=954) | Percentage (%) |
| Age |  |  |  |  |
| 10-13 | 80 | 47 | 127 | 13.3 |
| 14-17 | 469 | 196 | 665 | 69.7 |
| 18-20 | 121 | 41 | 162 | 17.0 |
| Sex |  |  |  |  |
| Male | 262 | 140 | 402 | 42.1 |
| Female | 408 | 144 | 552 | 57.9 |
| Religion |  |  |  |  |
| Christianity | 613 | 236 | 849 | 89.0 |
| Islam | 33 | 22 | 55 | 5.8 |
| Traditional | 18 | 21 | 39 | 4.1 |
| Others | 6 | 5 | 11 | 1.2 |
| Location of Residence |  |  |  |  |
| Urban | 670 | - | 670 | 70.2 |
| Rural | - | 284 | 284 | 29.8 |
| Extra Academic Activities |  |  |  |  |
| Farming | 67 | 69 | 136 | 14.3 |
| Playing computer games | 392 | 143 | 535 | 56.1 |
| Learning skills | 58 | 21 | 79 | 8.3 |
| No activity | 153 | 51 | 204 | 21.4 |
| Ethnicity |  |  |  |  |
| Urhobo | 238 | 96 | 334 | 35.0 |
| Ukwuani | 116 | 47 | 163 | 17.1 |
| Itshekiri | 55 | 25 | 80 | 8.4 |
| Ijaw | 36 | 20 | 56 | 5.9 |
| Ika | 14 | 18 | 32 | 3.4 |
| Others | 211 | 78 | 289 | 30.3 |
| School Type |  |  |  |  |
| Private | 578 | 82 | 660 | 69.2 |
| Public | 92 | 202 | 294 | 30.8 |

# 2 .Knowledge of Comorbidities Associated with Obesity Among Rural In-School Adolescents in Delta State

Awareness levels of specific obesity-related comorbidities varied considerably. High levels of knowledge were observed for dental health issues (81.7%), asthma (79.9%), depression (76.1%), and sleep disorders (68.7%). In contrast, knowledge was poor regarding ADHD (10.9%), dyslipidemia (14.8%), PCOS (22.9%), and metabolic syndrome (28.5%). Less than half of the respondents recognized pre-diabetes (47.5%) and type 2 diabetes (45.1%) as comorbid conditions associated with obesity.

# Table 2: Knowledge of Comorbidities Associated with Obesity Among Rural In-School Adolescents in Delta State (n = 284)

|  |  |  |  |
| --- | --- | --- | --- |
| Comorbidity | Response | Frequency (n) | Percentage (%) |
| Pre-diabetes | Yes | 135 | 47.5 |
|  | No | 149 | 52.5 |
| Type 2 Diabetes | Yes | 128 | 45.1 |
|  | No | 156 | 54.9 |
| Metabolic Syndrome | Yes | 81 | 28.5 |
|  | No | 203 | 71.5 |
| Dyslipidemia | Yes | 42 | 14.8 |
|  | No | 242 | 85.2 |
| Polycystic Ovarian Syndrome (PCOS) | Yes | 65 | 22.9 |
|  | No | 219 | 77.1 |
| Precocious Puberty | Yes | 99 | 34.9 |
|  | No | 185 | 65.1 |
| Asthma | Yes | 227 | 79.9 |
|  | No | 57 | 20.1 |
| Dental Health Issues | Yes | 232 | 81.7 |
|  | No | 52 | 18.3 |
| Internalizing & Externalizing Disorders | Yes | 60 | 21.1 |
|  | No | 223 | 78.5 |
| Attention Deficit Hyperactivity Disorder (ADHD) | Yes | 31 | 10.9 |
|  | No | 253 | 89.1 |
| Depression | Yes | 216 | 76.1 |
|  | No | 68 | 23.9 |
| Sleep Disorders | Yes | 195 | 68.7 |
|  | No | 89 | 31.3 |

**3. Knowledge and Perception of Obesity and Associated Comorbidities Among Adolescents in Delta State**

Overall, 62.1% of adolescents (592 out of 954) demonstrated good knowledge of obesity and its comorbidities, with urban students showing better knowledge (60.7%) compared to rural students (53.2%). However, perceptions of obesity determinants were predominantly negative, with only 17.1% (163 out of 954) expressing a positive perception—13.6% from urban and 3.5% from rural areas. Knowledge of the causes and control of obesity was particularly low, with just 6.9% of all adolescents showing good understanding—1.5% from rural and 5.6% from urban settings.

# Table 3: Knowledge and Perception of Obesity and Associated Comorbidities Among Adolescents in Delta State

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Characteristic | Group / Location | Sample Size (n) | Good Knowledge / Positive Perception (n) | Poor Knowledge / Negative Perception (n) |
| Knowledge of Obesity & Comorbidities | Rural Adolescents | 284 | 151 | 133 |
|  | Urban Adolescents | 670 | 407 | 263  |
|  | All Adolescents | 954 | 592 | 392 |
| Perception of Obesity Determinants | Rural Adolescents | 284 | 39 | 245 |
|  | Urban Adolescents | 670 | 124 | 546 |
|  | All Adolescents | 954 | 163 | 791 |
| Knowledge of Causes & Control of Obesity | Rural Adolescents | 284 | 14 | 270 |
|  | Urban Adolescents | 670 | 53 | 617 |
|  | All Adolescents | 954 | 66 | 888 |

# 4. Relationship Between Location and Knowledge/Perception of Obesity Causes and Determinants Among Adolescents in Delta State, Nigeria

Statistically significant differences (p < 0.05) were found between rural and urban respondents regarding knowledge and perception. Good knowledge of obesity causes and control was reported by 44.0% of rural students and 18.5% of urban students, while poor knowledge was more prevalent among urban adolescents (28.6%) than rural (8.8%). Notably, 17.2% of rural adolescents showed a positive perception of obesity determinants, while none (0.0%) of the urban adolescents did. These disparities were statistically supported by high Chi-square values (χ² = 196.214 for knowledge; χ² = 921.859 for perception), indicating a strong association between location and both knowledge and perception levels.

# Table 4: Relationship Between Location and Knowledge/Perception of Obesity Causes and Determinants Among Adolescents in Delta State, Nigeria (n = 954)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | Response Category | Rural n (%) | Urban n (%) | Total n (%) | Chi-Square (χ²) | P-value |
| Knowledge of Causes and Control of Obesity | Good Knowledge | 420 (44.0) | 177 (18.5) | 597 (62.5) | 196.214 | 0.000\* |
|  | Poor Knowledge | 84 (8.8) | 273 (28.6) | 357 (37.4) |  |  |
| Perception of Determinants of Obesity | Positive Perception | 164 (17.2) | 0 (0.0) | 164 (17.2) | 921.859 | 0.000\* |
|  | Negative Perception | 5 (0.5) | 785 (82.3) | 790 (82.8) |  |  |
| Overall Distribution |  | Rural Total: 504 (52.8) | Urban Total: 450 (47.2) | Grand Total: 954 (100) |  |  |

**Note:** Chi-square test indicates statistically significant differences (p < 0.05) between rural and urban respondents in both knowledge and perception of obesity.

**DISCUSSION**

This study revealed that adolescents in Delta State, Nigeria**,** demonstrated a moderate level of knowledge (62.1%) of obesity and its comorbidities, with urban students (60.7%) being more knowledgeable than their rural counterparts (53.2%). However, only 6.9% of all respondents showed good knowledge of the causes and control of obesity, and the perception of obesity determinants was predominantly negative, particularly among urban adolescents where none exhibited a positive perception.

Similar findings were reported in a study conducted in Ogun State, where 63% of adolescents had good knowledge of non-communicable diseases (NCDs), but prevalent misconceptions persisted—43.1% attributed NCDs to supernatural causes, and 72.1% viewed traditional foods as universally healthy regardless of content or preparation methods (10). This pattern of partial awareness is echoed in Osun State, where 58.2% of adolescents demonstrated good knowledge of obesity, but only 24.1% had a favorable attitude toward its prevention or control (11). These studies agree with the present study’s findings, suggesting a gap between knowledge and perception.

In Lagos, adolescents showed low prevalence rates of overweight (6.6%) and obesity (1.4%) but also displayed poor knowledge and negative attitudes toward obesity. Nonetheless, 97.4% acknowledged the role of regular physical activity in preventing obesity (12). This partial awareness mirrors the pattern seen among Delta State adolescents who recognize some obesity consequences yet underestimate its determinants and personal relevance.

Cultural interpretations of obesity may also explain the disconnection between knowledge and perception. In many Nigerian communities, obesity is often associated with wealth and prosperity, and thinness with illness or poverty (13). This cultural lens might contribute to urban adolescents' reluctance to acknowledge obesity as a problem, despite higher exposure to health information.

Conversely, a recent intervention in Osun State demonstrated that educational programs significantly improved adolescents’ knowledge and perception of obesity-related risks over a six-week period (11). This suggests that health education can play a transformative role when tailored to adolescents’ contexts.

Globally, adolescent obesity is on the rise, with projections estimating 464 million overweight or obese adolescents by 2030, a significant increase from 2015 (3, 4, 5). This aligns with concerns raised in the Delta State study and reinforces the need for urgent preventive measures through school-based and community health programs.

Additionally, a study in South Africa reported that although urban adolescents had higher knowledge of obesity, their attitudes were less favorable compared to rural adolescents who viewed healthy eating more positively, likely due to traditional food practices (13). Similarly, research from Ethiopia highlighted that rural students demonstrated better behavioral intentions despite having lower technical knowledge, reinforcing that perception and practice do not always align with awareness (14).

Finally, a Nigerian study on obesity among secondary school students in Anambra State (15) emphasized the influence of parents and peers on students’ attitudes toward body weight and food choices. Adolescents who perceived their parents as concerned about weight had more favorable perceptions of obesity prevention (15). This supports the idea that improving adolescent health outcomes must consider familial and social contexts alongside individual knowledge.

**CONCLUSION**

This study reveals a moderate level of knowledge but poor perception of obesity and its comorbidities among adolescents in Delta State, with urban students being more knowledgeable yet less perceptive. The findings highlight the need for targeted, culturally appropriate health education programs in schools to bridge gaps in awareness and attitude. Addressing these issues early is critical to curbing the rising trend of adolescent obesity inDelta State, Nigeria.

**REFERENCES**

1. World Health Organization. Obesity and overweight factsheet. Geneva: WHO; 2023. Available from: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

2. Lobstein T, Brinsden H. World Obesity Atlas 2022. London: World Obesity Federation; 2022. Available from: https://www.worldobesity.org/resources/resource-library/world-obesity-atlas-2022

3. Aluko O, Oyetunde MO. Prevalence of overweight and obesity among adolescents in private and public secondary schools in Ibadan, Nigeria. J Obes Metab Res. 2020;7(2):63–68. Available from: https://www.jomrjournal.org/article.asp?issn=2347-9906;year=2020;volume=7;issue=2;spage=63;epage=68;aulast=Aluko

4. Okeke CE, Eke CB, Chinawa JM. Prevalence of overweight and obesity among adolescents in secondary schools in Enugu, Nigeria. Niger J Paediatr. 2020;47(3):223–230. Available from: https://www.ajol.info/index.php/njp/article/view/199640

5. Musa DI, Toriola AL, Goon DT, Onyewadume IU. Prevalence of childhood and adolescent overweight and obesity in Nigeria: a systematic review. J Obes. 2012;2012:1–10. Available from: https://doi.org/10.1155/2012/610923

6. Sanya AO, Otegbayo OS, Ajayi IO. Overweight and obesity among adolescents: implications for health in adulthood. Niger J Clin Pract. 2018;21(12):1629–35. Available from: https://www.njcponline.com/article.asp?issn=1119-3077;year=2018;volume=21;issue=12;spage=1629;epage=1635;aulast=Sanya

7. Akinyemi JO, Olaseni AO, Okekunle AP. Health consequences of adolescent obesity: perspectives from Nigeria. Afr Health Sci. 2019;19(2):1840–50. Available from: https://www.ajol.info/index.php/ahs/article/view/191483

8. Olatona FA, Onabanjo OO, Ugbaja RN, Nnoaham KE, Adelekan DA. Knowledge of nutrition and obesity among adolescents in secondary schools in Ikeja Local Government Area, Lagos State. Niger Med Pract. 2018;73(5):46–52. (Link not available online; may be accessed through Nigerian Medical Association archives.)

9. Akindele MO, Phillips JS, Igwesi-Chidobe CN. Body fat percentage assessment and associated lifestyle factors among university students in southeastern Nigeria. BMC Public Health. 2021;21:1137. Available from: https://doi.org/10.1186/s12889-021-11188-z

10. Adeboye B, Omoregie O, Olukolade R. Knowledge and perception of non-communicable diseases among in-school adolescents in Sagamu, Ogun State, Nigeria. J Public Health Afr. 2020;11(1):1074. Available from: https://doi.org/10.4081/jphia.2020.1074

11. Adebayo AM, Makanjuola AB, Adeoye OA, OlaOlorun FM. Effects of a school-based health education intervention on knowledge and attitudes towards obesity among secondary school adolescents in Osun State, Nigeria. J Trop Med. 2021;2021:1–8. Available from: https://doi.org/10.1155/2021/6647951

12. Adegbite OA, Ogunbode AM, Olowookere OO. Adolescents’ knowledge, attitudes and practices toward obesity in a semi-urban community of Lagos State, Nigeria. J Obes Weight Loss Ther. 2016;6:310. Available from: https://doi.org/10.4172/2165-7904.1000310

13. Mchiza ZJ, Parker WA, Makoae M, Sewpaul R, Onagbiye SO, Labadarios D. Body image and associated lifestyles of South African urban adolescents: The PAHLS study. BMC Public Health. 2015;15:573. Available from: https://doi.org/10.1186/s12889-015-1929-3

14. Teferi B, Hailu C, Asres G. Knowledge and attitude towards obesity and its prevention among students of Woldia University, Ethiopia. J Obes Weight Loss Ther. 2020;10(2):420. Available from: https://www.scitechnol.com/peer-review/knowledge-and-attitude-towards-obesity-and-its-prevention-among-students-of-woldia-university-ethiopia-ZKMF.php?article\_id=13329

15. Okeke EC, Onah MA, Ibe BC. Body weight perception and weight control practices among adolescents in Anambra State, Nigeria. Niger J Paediatr. 2015;42(1):43–47. Available from: https://www.ajol.info/index.php/njp/article/view/115179