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

**ABSTRACT**

**Background:** Adolescent obesity is an increasing public health concern in Nigeria, driven by urbanization, sedentary lifestyles, and changing dietary habits. Understanding adolescents’ knowledge and perception of obesity and its comorbidities is essential for developing effective health promotion strategies.

**Aim:** To assess the knowledge and perception of obesity and its associated comorbidities among adolescents in Delta State, Nigeria, with a focus on urban-rural differences.

**Methods:** A descriptive cross-sectional study was conducted among 954 in-school adolescents aged 10–19 years in urban and rural secondary schools in Delta State between April and May 2024. A multistage sampling technique was used. Data were collected using a pre-tested structured questionnaire assessing socio-demographics, knowledge of obesity and key comorbidities (e.g., type 2 diabetes, dyslipidemia, asthma), perceptions of obesity determinants, and understanding of its causes and control. Data were analyzed using SPSS version 26, with Chi-square tests to determine associations (p < 0.05).

**Results:** Overall, 62.1% of respondents had good knowledge of obesity and its comorbidities, with significantly higher awareness among urban adolescents (60.7%) than rural adolescents (53.2%) (p < 0.05). Only 17.1% showed a positive perception of obesity determinants, and 6.9% demonstrated good understanding of its causes and control. Significant urban-rural disparities were observed in both knowledge and perception levels (p < 0.05).

**Conclusion:** Despite moderate knowledge, adolescents’ perceptions and understanding of obesity remain poor, particularly in rural areas. There is a pressing need for culturally tailored, school-based interventions to promote awareness and support healthy behaviors among Nigerian adolescents.

*Keywords: Adolescents, Comorbidities, Knowledge and perception, Nigeria, Obesity, Physical inactivity, Urban-rural differences*

**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 [1,2]. 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 [3].

In Nigeria, the burden of obesity among adolescents is increasing, particularly in urban settings due to westernized diets and sedentary behavior [4]. A study in Lagos reported the prevalence of overweight and obesity among adolescents as 13.8% and 9.4%, respectively [5], while a similar study in Bauchi metropolis found rates of 11.0% for overweight and 9.7% for obesity [6]. 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 [7,8].

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 [9]. Cultural norms in Nigeria, where larger body sizes are often equated with wealth and good health, further complicate perceptions and behavior around obesity [10].

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 [11]. These misconceptions can hinder effective preventive efforts. A study from South-East Nigeria emphasized that adolescents often lacked access to reliable nutrition information and had limited engagement in physical activity, especially among females [12]

National survey showed that obesity risk among adolescents was significantly associated with increased screen time and frequent consumption of processed snacks and sugary drinks [13]. Understanding adolescents’ knowledge and perception of obesity is essential for designing effective school- and community-based interventions [13]. 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 (592/954) had good knowledge of obesity and its comorbidities, with urban students (60.7%) outperforming rural peers (53.2%). However, only 17.1% (163/954) demonstrated positive perceptions of obesity determinants—13.6% in urban and 3.5% in rural areas—highlighting a gap between knowledge and attitude, particularly in urban settings. Interestingly, despite lower knowledge, rural adolescents showed slightly better perception relative to their knowledge level, possibly reflecting cultural differences. Knowledge of obesity causes and control was low overall (6.9%), with 5.6% in urban areas and just 1.5% in rural areas.

# 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. These findings reveal a critical gap between awareness and attitudinal readiness for preventive behaviors.

Similar findings were reported in Ogun State, where Taiwo et al. found that 63% of adolescents had knowledge of non-communicable diseases (NCDs), but 43.1% attributed NCDs to supernatural causes and over 70% viewed traditional foods as inherently healthy, regardless of composition or preparation method [21]. This partial awareness is also reflected in Osun State, where 58.2% of adolescents had good knowledge of obesity, yet only 24.1% expressed favorable attitudes towards its control and prevention [14]. In Lagos, although overweight and obesity prevalence was relatively low (6.6% and 1.4%, respectively), adolescents still held poor knowledge and negative attitudes toward obesity, despite 97.4% acknowledging the benefits of regular physical activity [15]. These examples reinforce the pattern of cognitive dissonance—awareness without behavioral change.

The influence of cultural perceptions remains a prominent factor explaining this knowledge–perception mismatch. In many Nigerian societies, larger body size symbolizes wealth, health, and prosperity, while thinness may be associated with poverty or illness [10,14]. This cultural narrative, particularly prevalent in urban areas where western and traditional values intersect, may hinder adolescents from acknowledging obesity as a health concern, despite exposure to health information.

Interestingly, a study in South Africa by Seabi et al. observed that although urban adolescents had more knowledge of obesity, their attitudes toward prevention were poorer than their rural peers who valued healthy eating due to traditional food practices [15]. Likewise, research from Ethiopia by Dejene and Tilahun revealed that rural adolescents demonstrated better behavioral intentions toward healthy living, despite having lower technical knowledge of obesity and its comorbidities [10]. These findings suggest that perception and practice may depend more on socio-cultural context than factual knowledge alone.

In this study, awareness of specific comorbidities such as metabolic syndrome (28.5%), dyslipidemia (14.8%), and polycystic ovarian syndrome (22.9%) was alarmingly low. This trend was similarly documented in Anambra State, where adolescents focused more on the appearance-related aspects of weight gain and were largely unaware of its metabolic implications [17]. Such a knowledge deficit may prevent adolescents from fully appreciating the urgency of obesity prevention or its long-term health consequences.

The observed inadequacy in understanding the causes and control of obesity reflects limitations in Nigeria’s current school health curricula. As Klemm et al. noted, adolescent dietary behaviors are influenced by multiple drivers, including peer pressure, media, family environment, and food marketing, necessitating more comprehensive interventions beyond classroom instruction [19].

Another critical gap in this study is the absence of disaggregated analysis by gender and age. Prior studies have shown that adolescent girls are more body image–conscious and respond differently to obesity-related health messages compared to boys [20]. Such segmentation is crucial for developing tailored interventions, especially during the highly variable stages of adolescence.

The role of familial and peer influence also warrants attention. Obulor et al. demonstrated that adolescents whose parents actively monitored their eating habits and physical activity were more likely to maintain healthy attitudes toward weight control and lifestyle choices [22,16]. Additionally, the effectiveness of school-based participatory health education has been evidenced in a recent study by Arora et al., who found significant improvements in adolescents’ knowledge and behaviors when interactive teaching strategies were employed over traditional didactic methods [23].

Finally, as global projections estimate 464 million adolescents will be overweight or obese by 2030 [3,24], and with Nigeria already facing rising obesity rates among youth [4–6], these findings underscore the need for urgent, integrated public health responses. School-based education, family involvement, community engagement, and policy advocacy must work in synergy to reshape adolescent knowledge, perception, and behavior regarding obesity and its related risks.

**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.

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**COMPETING INTEREST**

The authors declare no competing interest. The research was conducted independently, and no financial or personal relationships influenced the outcome of this study.

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**AUTHORS’ CONTRIBUTIONS**

Jarikre Eric conceived the study, carried out data collection, and prepared the initial manuscript draft. Esegbue PRC was responsible for the design of the research methodology and experimental procedures. Ofili CC provided overall oversight, contributed to data interpretation, and supervised the research process. Otutu MO developed and validated the soft models used in the study. Peter MB contributed to manuscript drafting. Ogbolu NC undertook the data analysis. All authors read and approved the final manuscript.

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