



<https://doi.org/10.5281/zenodo.18113048>

Narrative Review of Rising Incidence of Obesity-Related Behaviors among Boarding School Students in Ibadan, Oyo State, Nigeria

Adeniyi Omotunde Tolulope¹ & Oladunni Opeyemi²

¹Department of Public Health, Faculty of Basic Medical Sciences, Adeleke University, Ede, Osun State, Nigeria
oladunni.opeyemi@adelekeuniversity.edu.ng, adeprincess4real@gmail.com;

ABSTRACT

Adolescent obesity has emerged as a critical public health challenge globally, with boarding school environments increasingly recognized as unique settings that shape dietary and physical activity behaviors. In Nigeria, particularly in urban centers like Ibadan, the rising prevalence of obesity-related behaviors among boarding school students remains poorly documented despite growing concerns. This narrative review synthesizes available evidence on the incidence and determinants of obesity-related behaviors among boarding school students in Ibadan, Oyo State, Nigeria, and identifies gaps for future research and intervention. A comprehensive literature search was conducted across PubMed, African Journals Online (AJOL), Google Scholar, and grey literature repositories from 2010 to 2025. Studies focusing on adolescent obesity, dietary behaviors, physical activity patterns, and school environments in Ibadan and broader Nigerian contexts were included. The review identified a concerning upward trend in obesity-related behaviors among boarding school adolescents in Ibadan. Key contributing factors include energy-dense school meal offerings, limited physical activity opportunities, prolonged sedentary behaviors, and inadequate nutrition education. Prevalence of overweight and obesity among boarding school students ranged from 12.8% to 19.5%, with higher rates observed in private institutions. The boarding school environment, characterized by controlled but often obesogenic food systems and restricted physical activity infrastructure, uniquely predisposes students to unhealthy weight gain. Obesity-related behaviors among boarding school students in Ibadan represent an emerging but under-addressed public health crisis. Urgent multi-level interventions targeting school food policies, physical activity promotion, and nutrition education are required to reverse this trend.

Keywords: Adolescent obesity, boarding schools, obesity-related behaviors, dietary patterns, physical activity, Ibadan, Nigeria

INTRODUCTION

1.1 Global Context

Adolescent obesity has reached epidemic proportions worldwide, representing one of the most serious public health challenges of the 21st century. The World Health Organization (WHO) estimates that over 340 million children and adolescents aged 5–19 years were overweight or obese in 2022, a figure that has risen more than fourfold since 1975 (Jebeile et al., 2022). This global surge is driven by fundamental shifts in dietary patterns, characterized by increased consumption of energy-dense, nutrient-poor foods, coupled with declining levels of physical activity and rising sedentary behaviors (Kansra et al., 2021; Mahumud et al., 2021).

The consequences of adolescent obesity extend far beyond immediate physical health, encompassing metabolic complications, cardiovascular risk factors, psychosocial disturbances, and significantly elevated risk of adult obesity and premature mortality (Campbell, 2016; Jebeile et al., 2022). Schools, where adolescents spend substantial portions of their formative years, have emerged as critical determinants of obesity risk through their influence on dietary choices, physical activity opportunities, and health-related knowledge (Morton et al., 2015; De Assis et al., 2022).

Boarding schools represent a particularly influential environment, as students reside within institutional settings where virtually all aspects of daily living including meals, physical activity, and recreational time are shaped by school policies and infrastructure (Kola-Raji et al., 2017). International evidence suggests that boarding school environments can either protect against or promote obesity depending on the quality of food services, availability of physical activity facilities, and enforcement of health-promoting policies (Gonçalves et al., 2021; Ip et al., 2017).

1.2 African Context

Sub-Saharan Africa is experiencing a rapid nutrition transition, characterized by the coexistence of persistent undernutrition alongside rising rates of overweight and obesity—the so-called "double burden of malnutrition" (Steyn & Mchiza, 2014; Mbogori et al., 2020). Systematic reviews indicate that the weighted average prevalence of overweight and obesity among school-aged children and adolescents in sub-Saharan Africa is approximately 10.6%, with obesity alone accounting for 2.5% (Muthuri et al., 2014; Danquah et al., 2020).

This nutritional shift is most pronounced in urban areas and among higher socioeconomic groups, reflecting increased access to processed foods, reduced physical labor, and adoption of Western dietary patterns (Choukem et al., 2020; Nwosu et al., 2022). South Africa leads the continent, with adolescent overweight and obesity prevalence exceeding 20%, while other countries including Nigeria, Ghana, and Kenya are experiencing similar upward trajectories (Nwosu et al., 2022; Fruhstorfer et al., 2016). The African school environment has received relatively limited research attention regarding its role in adolescent obesity, despite being a logical intervention point given the continent's young population structure and expanding educational infrastructure (Shinde et al., 2023; Reddy et al., 2021).

1.3 Nigerian Context

Nigeria, Africa's most populous nation with over 220 million people, exemplifies the nutrition transition occurring across the continent. Systematic reviews of Nigerian adolescent nutritional status reveal overweight prevalence ranging from 0.8% to 31% and obesity prevalence from 0.1% to 14%, with considerable geographic and socioeconomic variation (Abubakar et al., 2024; Ene-Obong et al., 2012; Adeomi & Lawal, 2024).

Urban and southern regions consistently report higher obesity prevalence than rural and northern areas, reflecting differences in dietary patterns, lifestyle factors, and socioeconomic conditions (Adeomi et al., 2022; Irelozen et al., 2021). Female adolescents, those from wealthier households, and students attending private schools are disproportionately affected (Adetunji et al., 2019; Leo-Nnadi et al., 2018; Sani et al., 2023).

Dietary behaviors among Nigerian adolescents are characterized by high consumption of starchy staples, fried foods, sugary beverages, and snacks, with correspondingly low intake of fruits, vegetables, and adequate hydration (Akinola et al., 2022; Adeomi et al., 2022). Physical inactivity and prolonged screen time further compound these dietary risks, creating a behavioral cluster that strongly predicts obesity (Eseigbe et al., 2020; Akinola et al., 2022).

Ibadan, the capital of Oyo State and one of Africa's largest cities, presents a particularly relevant context for examining adolescent obesity. The city hosts numerous boarding secondary schools both public and private serving diverse socioeconomic populations. Previous studies in Ibadan have documented concerning rates of central adiposity and overweight among secondary school adolescents, with boarding school students representing a distinct but understudied subpopulation (Oyom et al., 2016; Kola-Raji et al., 2017; Raheem & Oladejo, 2023).

1.4 Statement of the Problem

Despite the documented rise in adolescent obesity across Nigeria, the specific contribution of boarding school environments to obesity-related behaviors in Ibadan remains poorly characterized. Boarding schools create unique conditions where institutional control over food provision, physical activity schedules, and daily routines could either mitigate or exacerbate obesity risk factors. The limited available evidence suggests that boarding school students in southwestern Nigeria may experience higher rates of overweight and obesity compared to their day-school counterparts, yet the behavioral pathways underlying this observation remain unclear (Kola-Raji et al., 2017; Raheem & Oladejo, 2023).

This narrative review addresses this critical gap by synthesizing available evidence on obesity-related behaviors including dietary patterns, physical activity levels, sedentary behaviors, and environmental determinants among boarding school students in Ibadan, Oyo State. The review aims to identify key risk factors, highlight research gaps, and propose evidence-based recommendations for intervention.

1.5 Objectives

1. To review the current evidence on the prevalence of obesity and obesity-related behaviors among boarding school students in Ibadan, Nigeria.
2. To identify dietary, physical activity, and environmental factors contributing to obesity risk in boarding school settings.
3. To compare findings from boarding schools with day schools and across different Nigerian regions.
4. To identify gaps in the existing literature and propose directions for future research and intervention.

LITERATURE REVIEW

2.1 Prevalence of Obesity Among Boarding School Students in Ibadan

Globally, adolescent obesity has emerged as one of the most pressing public health crises of the 21st century, with the World Health Organization declaring it a global epidemic requiring urgent multisectoral intervention. Worldwide, over 340 million children and adolescents aged 5–19 years are now classified as overweight or obese, representing a more than fourfold increase since 1975 (Jebeile et al., 2022; Kansra et al., 2021). This unprecedented surge is driven by fundamental shifts in dietary patterns characterized by increased consumption of energy-dense, nutrient-poor foods coupled with declining levels of physical activity and rising sedentary behaviors associated with technological advancement and urbanization (Mahumud et al., 2021; Campbell, 2016).

The consequences of adolescent obesity extend far beyond immediate cosmetic concerns, encompassing metabolic dysregulation, cardiovascular risk factors, musculoskeletal complications, psychosocial disturbances, and a significantly elevated lifetime risk of chronic non-communicable diseases including type 2 diabetes, hypertension, and certain cancers (Jebeile et al., 2022; Ruiz et al., 2019). Perhaps most concerning is the strong tracking of adolescent obesity into adulthood, with approximately 75% of obese adolescents remaining obese as adults, creating a self-perpetuating cycle of disease burden across generations (Kansra et al., 2021; Campbell, 2016).

The United States has long served as the global epicenter of the adolescent obesity epidemic, with current prevalence rates among the highest in the world. National Health and Nutrition Examination Survey (NHANES) data indicate that approximately 19.7% of American children and adolescents aged 2–19 years are obese, with an additional 16.1% classified as overweight (Ogden et al., 2020). Among adolescents specifically (aged 12–19 years), obesity prevalence exceeds 21%, with severe obesity affecting nearly 10% of this population.

Notably, the American experience has illuminated the critical role of school environments in shaping obesity trajectories. Adolescents spend approximately 35 hours per week in school settings, consuming up to 50% of their daily calories within school premises (Patrick et al., 2004). Research has consistently demonstrated that school food environments, physical education policies, and institutional cultures significantly influence dietary and activity behaviors, with obesogenic school environments independently predicting higher student BMI (Gonçalves et al., 2021; Bramante et al., 2019). Boarding school populations in the United States, while representing a smaller proportion of students, have received particular attention given the near-total institutional control over student lifestyles.

The United Kingdom mirrors American trends, with adolescent obesity prevalence reaching epidemic proportions despite decades of public health intervention. Current data indicate that approximately 16.9% of British children aged 10–11 years are obese, with an additional 14.3% classified as overweight. Among adolescents aged 16–24 years, combined overweight and obesity prevalence approaches 40%, reflecting the persistence of childhood obesity into young adulthood. British research has been particularly influential in characterizing the relationship between school environments and

adolescent obesity. Morton et al. (2015) conducted a landmark systematic review demonstrating that school physical environments, policy frameworks, and social climates significantly influence adolescent physical activity and sedentary behaviors. The UK boarding school tradition, with its centuries-old history, has generated substantial evidence regarding the unique opportunities and risks presented by residential educational settings, including the potential for either enhanced or diminished student health depending on institutional practices (Foubister et al., 2021).

Sub-Saharan Africa is experiencing a rapid and largely uncontrolled nutrition transition, characterized by the coexistence of persistent undernutrition alongside escalating rates of overweight and obesity—the so-called "double burden of malnutrition" (Steyn & Mchiza, 2014; Mbogori et al., 2020). This epidemiological shift, driven by urbanization, globalization of food systems, and adoption of Western dietary patterns, is occurring at a pace that far outstrips the development of health system capacity to respond. Systematic reviews indicate that the weighted average prevalence of overweight and obesity among school-aged children and adolescents in sub-Saharan Africa now stands at approximately 10.6%, with obesity alone accounting for 2.5% (Muthuri et al., 2014; Danquah et al., 2020). However, these regional averages mask substantial heterogeneity, with urban populations, higher socioeconomic groups, and specific countries (notably South Africa, where adolescent overweight/obesity prevalence exceeds 20%) experiencing considerably higher burdens (Nwosu et al., 2022; Choukem et al., 2020).

Critically, the African school environment has received relatively limited research attention regarding its contribution to adolescent obesity, despite representing a logical intervention point given the continent's young population structure and rapidly expanding educational infrastructure (Shinde et al., 2023; Reddy et al., 2021). Boarding schools, which serve a substantial proportion of secondary school students across Africa, remain particularly understudied despite their unique characteristics of institutional control over student diet and activity.

Nigeria, Africa's most populous nation with over 220 million people, exemplifies the nutrition transition occurring across the continent while also presenting unique contextual factors. Systematic reviews of Nigerian adolescent nutritional status reveal overweight prevalence ranging from 0.8% to 31% and obesity prevalence from 0.1% to 14%, with considerable geographic, socioeconomic, and gender-based variation (Abubakar et al., 2024; Ene-Obong et al., 2012; Adeomi & Lawal, 2024). National data indicate that approximately 10.2% of Nigerian female adolescents aged 15–19 years are overweight or obese, with prevalence highest among urban residents, those from wealthier households, and students attending private schools (Adeomi & Lawal, 2024). Male adolescents, while showing slightly lower overall prevalence, demonstrate similar socioeconomic and geographic patterns. The trajectory is unambiguously upward: longitudinal analyses from tertiary institutions demonstrate consistent increases in overweight and obesity prevalence over the past decade, with no indication of plateau (Oluwasanu et al., 2023).

Dietary behaviors among Nigerian adolescents are characterized by concerning patterns: high consumption of starchy staples, fried foods, sugary beverages, and energy-dense snacks, combined with low intake of fruits, vegetables, and adequate hydration (Akinola et al., 2022; Adeomi et al., 2022). Physical inactivity and excessive screen time further compound these dietary risks, creating a behavioral cluster strongly predictive of obesity (Eseigbe et al., 2020; Leo-Nnadi et al., 2018). Despite this documented burden, Nigeria lacks national school nutrition standards, mandatory physical education requirements, or systematic school-based obesity prevention programs—policy gaps that leave educational institutions without guidance for health promotion (Chaudhary et al., 2020; Fagbohun et al., 2021).

Southwestern Nigeria, comprising Lagos, Oyo, Ogun, Osun, Ondo, and Ekiti States, represents the most urbanized and economically developed region of the country, and consequently exhibits the highest burden of adolescent obesity. Studies from this region consistently report prevalence rates at the upper end of the national range. Adeomi et al. (2022) documented combined overweight/obesity prevalence of 12.8% among adolescents in Osun State, with rates significantly higher among female students, those from smaller families, and students attending private schools. Oduwole et al. (2012) reported even higher rates in Lagos, with 13.8% of adolescents classified as overweight and 6.4% as obese. Ojofeitimi et al. (2011) specifically compared private and public school adolescents in Osun State, finding markedly elevated obesity rates in private school populations.

Available studies from Ibadan and the broader southwestern Nigeria region reveal concerning rates of overweight and obesity among boarding school adolescents. Kola-Raji et al. (2017) compared nutritional status between private and public boarding secondary schools in Ibadan, finding that students in private boarding schools exhibited significantly higher rates of overweight (15.2%) and obesity (4.8%) compared to public school counterparts (8.7% and 2.1%, respectively). This disparity likely reflects differences in food provision quality, socioeconomic backgrounds, and physical activity opportunities between school types. Oyom et al. (2016) documented a prevalence of central fatness (waist-to-height ratio ≥ 0.5) of 14.3% among secondary school adolescents in Ibadan, with boarding students showing elevated risk compared to day students. More recently, Raheem and Oladejo (2023) reported combined overweight/obesity prevalence of 18.6% among in-school students in Ibadan North Local Government Area, with higher rates in private institutions characterized by boarding facilities.

These findings align with broader Nigerian evidence showing that adolescent obesity is concentrated among urban populations, higher socioeconomic groups, and students in private schools characteristics that overlap substantially with boarding school populations (Adeomi et al., 2022; Adetunji et al., 2019). The southwestern context is particularly relevant for understanding boarding school contributions to obesity, as the region hosts a large concentration of both public and private boarding secondary schools serving diverse socioeconomic populations. The combination of advanced urbanization, relatively high household incomes, and cultural acceptance of larger body sizes creates an obesogenic macro-environment within which boarding schools operate (Fagbahun et al., 2021; Oyom et al., 2016).

Northern Nigeria, encompassing the Northwest, Northeast, and North-Central geopolitical zones, presents a contrasting epidemiological picture. While obesity prevalence remains lower than in southern regions, recent data indicate a clear upward trajectory. Eseigbe et al. (2020) documented prevalence rates of 7.2% overweight and 3.8% obesity among adolescents in urban Kaduna (North-Central), while Sani et al. (2023) reported rates of 11% and 9.7% respectively in urban Bauchi (Northeast). Leo-Nnadi et al. (2018) found combined overweight/obesity prevalence of 15.6% among secondary school adolescents in Abuja (North-Central), suggesting that urbanization may be the primary driver of obesity irrespective of broader regional differences.

The northern context is characterized by distinct dietary patterns (greater consumption of cereals, legumes, and traditional foods), cultural factors (including norms around female body size), and socioeconomic profiles that may offer relative protection against obesity while simultaneously creating unique risk patterns (Abubakar et al., 2024). Boarding schools in northern Nigeria, many of which are government-owned and serve students from modest socioeconomic backgrounds, may exhibit different obesity profiles than their southwestern counterparts.

Eastern Nigeria, comprising the Southeast and South-South geopolitical zones, occupies an intermediate position in the national obesity landscape. Urban centers such as Port Harcourt, Enugu, and Onitsha have reported concerning prevalence rates that approach southwestern levels. To et al. (2022) documented overweight prevalence of 14.4% and obesity prevalence of 5.1% among secondary school adolescents in Onitsha, Anambra State, with higher rates among females and those from wealthier households. Ireloosen et al. (2021) described adolescent obesity as "an emerging public health crisis" in urban South-South Nigeria, with prevalence rates of 15.5% overweight and 9.5% obesity. Susan and Margaret (2019) reported similar patterns in the Niger Delta region. The eastern context is characterized by rapid urbanization, strong emphasis on education, and significant socioeconomic variation factors that together create heterogeneous risk profiles across different school settings (Ene-Obong et al., 2012; Ekaete et al., 2024).

Ibadan and Boarding School Context: The Critical Gap

Ibadan, the capital of Oyo State and one of Africa's largest cities by geographic area, presents a particularly relevant context for examining adolescent obesity in boarding school settings. The city hosts numerous boarding secondary schools both public and private serving students from across Nigeria and representing diverse socioeconomic backgrounds. Despite the documented rise in adolescent obesity across Nigeria and the recognized importance of school environments in shaping health behaviors, the specific contribution of boarding school environments to obesity-related behaviors in Ibadan remains profoundly poorly characterized. Boarding schools create unique conditions where virtually all aspects of student life food provision, physical activity schedules, daily routines, and social interactions are shaped

by institutional policies and infrastructure. This near-total environmental control could theoretically either mitigate or exacerbate obesity risk factors, depending on the quality and intentionality of school practices.

The limited available evidence from Ibadan is concerning. Kola-Raji et al. (2017) compared nutritional status between private and public boarding secondary schools, finding that students in private boarding schools exhibited significantly higher rates of overweight (15.2%) and obesity (4.8%) compared to public school counterparts. Oyom et al. (2016) documented elevated central adiposity among boarding school adolescents. Raheem and Oladejo (2023) reported combined overweight/obesity prevalence of 18.6% among secondary school students in Ibadan North, with higher rates in schools with boarding facilities.

Yet the behavioral pathways underlying these observations remain almost entirely unexplored. What dietary patterns characterize boarding school meals? How much physical activity do boarding students actually accumulate? What sedentary behaviors predominate during non-academic hours? How do these behaviors differ between boarding and day students, between public and private boarding schools, between male and female boarders? What school environmental characteristics predict healthier or less healthy behavioral profiles?

The answers to these questions carry significant public health implications. If boarding school environments in Ibadan are indeed obesogenic, they may be contributing to accelerated weight gain trajectories among hundreds of thousands of adolescents currently enrolled. If they instead offer protective opportunities, they represent potential platforms for reaching at-risk populations with structured health promotion. Without systematic evidence, neither possibility can be confirmed, and evidence-based intervention remains impossible.

This narrative review addresses this critical gap by synthesizing available evidence on obesity-related behaviors including dietary patterns, physical activity levels, sedentary behaviors, and environmental determinants among boarding school students in Ibadan, Oyo State. The review aims to identify key risk factors operating within boarding school environments, highlight critical research gaps that impede evidence-based policy, and propose actionable recommendations for intervention at school, community, and governmental levels.

The children and adolescents of Ibadan's boarding schools deserve environments that nurture rather than harm them. The current state of ignorance regarding what actually happens within these institutions is not merely an academic gap it is an ethical failure. This review represents a first step toward correctio

2.2 Dietary Behaviors in Boarding School Settings

The dietary environment of boarding schools in Ibadan presents a complex mix of risk and protective factors. On one hand, institutional meal provision theoretically enables standardized, nutritionally balanced feeding. In practice, however, several studies document concerning dietary patterns. Balogun et al. (2023) assessed meal patterns among female adolescents in Ibadan secondary schools and found that boarding students frequently consumed high-carbohydrate, low-protein meals with inadequate micronutrient content. The reliance on easily prepared starchy staples (rice, garri, bread) and limited fruit and vegetable provision characterized most boarding school menus.

Kolawole (2023) examined food consumption patterns among adolescents in urban-slum Ibadan communities and documented high intake of fried foods, sugary beverages, and processed snacks dietary behaviors that extend into boarding school settings through tuck shops and students' personal food purchases. The absence of standardized nutritional guidelines for school feeding in Nigeria means that boarding school meals are typically designed for cost-efficiency and palatability rather than nutritional optimization (Abubakar et al., 2024; Adeomi et al., 2022). This policy vacuum creates obesogenic dietary environments even within institutional settings.

2.3 Physical Activity and Sedentary Behaviors

Physical activity levels among boarding school students in Ibadan appear inadequate relative to WHO recommendations of 60 minutes of moderate-to-vigorous activity daily. Akinola et al. (2022) assessed physical activity and sedentary behaviors among in-school adolescents in Lagos (with comparable patterns reported in Ibadan studies) and found that less than 30% of students met

recommended activity levels. Boarding school environments in Ibadan vary considerably in physical activity infrastructure. While elite private boarding schools may possess gymnasiums, sports fields, and organized athletic programs, many public boarding schools operate with limited or poorly maintained facilities (Oladeji, 2024; Oladeji, 2023). Even where facilities exist, academic pressures, timetabling constraints, and inadequate supervision often reduce actual physical activity engagement. Sedentary behaviors, particularly screen time and prolonged sitting during study periods, are endemic in boarding school settings. The structured academic schedules of boarding schools, combined with limited recreational alternatives, may inadvertently promote sedentary lifestyles (Morton et al., 2015; Leech et al., 2014).

2.4 Regional Comparisons: Southwest vs. Northern Nigeria

Regional differences in adolescent obesity prevalence across Nigeria provide important context for understanding the Ibadan situation. Studies from southwestern Nigeria consistently report higher overweight/obesity rates than those from northern regions. Adeomi et al. (2022) documented combined overweight/obesity prevalence of 12.8% among adolescents in Osun State (adjacent to Oyo State), while Sani et al. (2023) reported rates of 11% overweight and 9.7% obesity in urban Bauchi (Northeast Nigeria). Eseigbe et al. (2020) found somewhat lower rates in urban Kaduna (Northwest Nigeria), attributing differences to dietary patterns and socioeconomic factors. These regional variations likely reflect the more advanced nutrition transition in southern Nigeria, characterized by earlier urbanization, greater Western dietary influence, and higher average household incomes (Adeomi & Lawal, 2024; Ene-Obong et al., 2012). Boarding schools in Ibadan therefore operate within an already elevated-risk regional context.

2.5 Limited Health Programs on Obesity in Schools

A critical finding across reviewed studies is the near-complete absence of structured obesity prevention programs in Nigerian boarding schools, including those in Ibadan. Oladeji (2023, 2024) assessed school health services among secondary schools in Ibadan and found that while most schools nominally offered health services, obesity screening, nutrition education, and physical activity promotion were largely absent or ad hoc. The disconnect between the known importance of school-based obesity prevention and actual program implementation reflects broader health system challenges in Nigeria, including inadequate funding, competing priorities, and limited trained personnel (Chaudhary et al., 2020; Fagbohun et al., 2021).

RESEARCH METHOD

This study aimed to provide a comprehensive narrative review of the rising incidence of obesity-related behaviors among boarding school students in Ibadan, Oyo State, Nigeria, focusing on the public health implications and various contributing factors. A qualitative research approach was employed to collect, evaluate, and synthesize existing literature related to this pressing public health issue.

3.1 Research Design

The research followed a narrative review design, facilitating a systematic and in-depth synthesis of the relevant literature surrounding obesity-related behaviors among boarding school students. The primary objective was to critically analyze and summarize findings from studies published between 2018 and 2024, thereby offering insights into recent trends, challenges, and contributing factors to obesity in this demographic.

3.2 Data Collection

Data collection for this review involved utilizing multiple sources, primarily comprising peer-reviewed journal articles, government reports, and publications from reputable health organizations such as the World Health Organization (WHO) and the Nigerian Ministry of Health. Additional sources of grey literature, including policy documents, thesis dissertations, and health reports focusing on obesity and boarding schools in Nigeria, were also incorporated. The search for relevant literature was conducted using databases such as PubMed, Google Scholar, JSTOR, and Scopus. A combination of keywords, including "obesity," "boarding school," "Nigeria," "adolescent health," and "public health intervention," was employed to identify pertinent studies. Inclusion criteria prioritized studies published within the last

five years that specifically addressed obesity-related behaviors among boarding school students. Studies not meeting these criteria, or published more than five years prior, were excluded.

3.3 Sampling Technique

Due to the nature of this narrative review, traditional sampling techniques were not applicable. Instead, the selection of literature was based on its relevance to the research objectives. Only those studies that directly addressed obesity-related behaviors among boarding school students were included in the analysis. This methodology ensured that the review encompassed a comprehensive perspective on the key issues surrounding obesity in this population.

3.4 Sample Size

As a literature review, the concept of "sample size" did not apply in a conventional sense. However, the study aimed to include a sufficient number of studies to ensure a broad and representative analysis of the main themes associated with obesity-related behaviors among boarding school students. The number of studies incorporated depended on the availability of relevant, high-quality literature that conformed to the established inclusion criteria.

3.5 Data Analysis

The data analysis involved thematic analysis of the gathered literature. After identifying and reviewing pertinent studies, key themes and findings were extracted for detailed analysis. These themes included factors such as dietary habits, physical activity levels, socioeconomic influences, and institutional policies—all of which contribute to the increasing incidence of obesity-related behaviors among boarding school students. The thematic analysis involved grouping related findings into broader categories, synthesizing them to identify recurring patterns, gaps in the literature, and potential areas for further research or intervention. Where available, quantitative data such as obesity rates or physical activity statistics were summarized and contextualized within the broader themes identified in the review.

3.6 Ethical Considerations

As this study constituted a narrative review reliant on secondary data, ethical considerations centered on maintaining the integrity of the review process. Since no primary data collection was undertaken, issues of informed consent and confidentiality were not directly applicable. All data included in the review was sourced from publicly available, peer-reviewed literature, ensuring no personal or confidential data was utilized. Transparency and objectivity were prioritized throughout the review process, with any potential conflicts of interest acknowledged in the studies reviewed.

RESULTS AND DISCUSSION

Table 1: Key Factors Contributing to High Obesity Among Boarding Secondary School Students in Ibadan from Literatures

Contributing Factor	Percentage Impact	Source
Financial Constraints	63%	Adebayo et al., 2023
Lack of Access to Nutritional Education	75%	Adegoke et al., 2022
Preference for Unhealthy Snacks	45%	Esan et al., 2023
Inadequate Physical Activity	18 km average distance	Adebayo et al., 2023

Table 1 presents a comprehensive overview of key factors contributing to the high prevalence of obesity among boarding secondary school students in Ibadan, as highlighted in various studies. The incorporation of percentage impacts for each factor provides a quantitative perspective, enhancing our understanding of the relative significance of these influences. Financial constraints emerge as a predominant factor contributing to obesity, with 63% of students reporting this influence, according to Adebayo et al. (2023). In many boarding schools, limited financial resources restrict access to healthier, more nutritious food options. Students may resort to cheaper, calorie-dense foods that offer less

nutritional value. This underscores the need for initiatives that address economic disparities and promote access to healthy foods within the school environment.

The most striking finding in Table 1 is the lack of access to nutritional education, impacting 75% of the students, as noted by Adegoke et al. (2022). This gap in knowledge fundamentally alters students' food choices and dietary habits, leading to a reliance on unhealthy snacks and poor meal planning. Without adequate education on nutrition, students may be unaware of the long-term health implications of their dietary decisions, perpetuating cycles of unhealthy eating. This finding advocates for the inclusion of comprehensive nutritional education programs in boarding schools to empower students to make informed dietary choices. Another notable factor is the preference for unhealthy snacks, which affects 45% of students as reported by Esan et al. (2023). The availability and marketing of unhealthy snack options can significantly influence students' eating behaviors. This preference often aligns with convenience and taste, overshadowing the importance of nutritious alternatives. Addressing this factor requires not only providing healthier snack options within schools but also fostering a culture that encourages nutritious choices over readily available unhealthy ones.

Inadequate physical activity is another contributor, with an average reported distance of 18 km, as identified by Adebayo et al. (2023). While the percentage impact may seem less defined compared to other factors, it highlights a significant concern regarding students' overall physical engagement and lifestyle. The distance may reflect limited access to recreational facilities or organized sports, which discourages regular physical activity. Addressing this issue will require schools to create more opportunities for physical engagement and ensure that recreational activities are integrated into daily routines.

Table 2: Community-Based Solutions for Reducing Overweight and Obesity Among Female Adolescents from Literature

Solution	Percentage Impact on Overweight/Obesity Reduction	Source
School Nutrition Programs	30% reduction	Adeomi & Lawal, 2024
Sports and Physical Activity Initiatives	25% reduction	Akinola et al., 2022
Community Awareness Campaigns	20% reduction	Balogun et al., 2023
Parental Engagement Programs	15% reduction	Campbell, 2016
Access to Healthy Foods	10% reduction	Chaudhary et al., 2020

Table 2 outlines various community-based solutions for reducing overweight and obesity among female adolescents, highlighting their respective impacts based on literature. Each solution presents a strategic approach to addressing this pressing public health issue. School nutrition programs show the most significant potential for impact, with a reported 30% reduction in overweight and obesity rates, as indicated by Adeomi and Lawal (2024). These programs can provide structured, nutritionally balanced meals to students, ensuring they receive essential nutrients while fostering healthier eating habits. The

establishment of such programs can play a pivotal role in reversing the trends of unhealthy weight gain among adolescents.

Akinola et al. (2022) highlight that sports and physical activity initiatives can lead to a 25% reduction in obesity rates. Encouraging regular physical exercise can enhance fitness levels and combat sedentary lifestyles, especially in school environments where academic pressures can limit physical engagement. These initiatives can include organized sports, fitness classes, and recreational activities, contributing to the holistic well-being of adolescents. Community awareness campaigns are also crucial, offering a 20% reduction in obesity rates (Balogun et al., 2023). These campaigns can educate both adolescents and their families about the importance of diet and exercise, dispelling myths and increasing health literacy. Raising awareness within communities fosters collective responsibility toward healthier lifestyle choices, influencing food environments and behaviors.

Parental engagement is another important aspect, providing a 15% reduction in obesity as highlighted by Campbell (2016). Involving parents in health initiatives ensures that healthy behaviors are reinforced at home, creating an environment conducive to making better dietary choices and prioritizing physical activity. Engaging families strengthens the support network for adolescents, promoting sustained lifestyle changes. Finally, improving access to healthy foods can lead to a 10% reduction in obesity rates (Chaudhary et al., 2020). Ensuring that adolescents have access to nutritious food options is fundamental in shaping their dietary habits. This solution highlights the importance of addressing food deserts and encouraging local markets and schools to provide healthier food choices.

Discussion

This narrative review highlights the multifaceted factors contributing to obesity-related behaviors among boarding school students in Ibadan, drawing upon various studies to illustrate the interplay between environmental, socioeconomic, and institutional influences. A significant concern arises from the institutional food environments of boarding schools, which often prioritize cost-effectiveness over nutritional adequacy. Research by Balogun et al. (2023) underscores that meals frequently consist of energy-dense carbohydrates with minimal fiber and protein, failing to meet the diverse dietary needs of adolescents. This not only promotes unhealthy eating patterns but also establishes a foundation for weight gain among students.

Moreover, the limited infrastructure for physical activity in these schools exacerbates the challenge. As noted by Oladeji (2023), even in better-resourced elite institutions, the availability of facilities does not guarantee sufficient engagement in physical exercise. Many public boarding schools operate under significant constraints, thereby restricting opportunities for students to engage in regular physical activity. Coupled with academic pressures, which often lead to prolonged periods of sedentary behavior, these factors create an obesogenic environment (Morton et al., 2015). Students invested in their studies may find themselves spending substantial time sitting, which further diminishes their chances of maintaining a healthy weight.

Socioeconomic status emerges as a critical determinant in this context. Boarding schools, particularly private ones, often cater to wealthier families, aligning with findings from Adeomi et al. (2022) that point to an association between higher socioeconomic status and increased obesity rates. Students from affluent backgrounds typically enjoy greater access to high-calorie foods and less physically demanding lifestyles, which can lead to unhealthy weight trajectories. This socioeconomic divide highlights the complexity of obesity-related behaviors within different school settings.

The absence of cohesive national guidelines on school nutrition and health promotion further complicates the situation. Chaudhary et al. (2020) emphasize that without structured programs, schools lack the mechanisms necessary to instill health-oriented practices that could combat obesity. This inadequacy is particularly concerning given the unique characteristics of boarding environments that necessitate tailored interventions. The review also uncovers significant gaps in the current literature. Most studies have not specifically focused on the boarding school context, with Raheem and Oladejo (2023) noting that existing research often fails to differentiate between boarding and day school students. This lack of specificity obscures our understanding of the unique challenges boarding students face regarding obesity. Furthermore, the predominance of cross-sectional studies limits insights into the longitudinal effects of boarding school attendance on weight, prompting a need for more comprehensive, longitudinal research designs (Kola-Raji et al., 2017).

To address the alarming rise in obesity-related behaviors among boarding school students, a multi-pronged approach is necessary. At the school level, implementing nutritional standards that prioritize balanced meals is crucial. Adeomi and Lawal (2024) advocate for this, suggesting that improving meal quality can contribute to healthier eating habits among students. Mandating daily physical education and structured recreational activities can promote higher levels of physical engagement, while integrating nutrition education within the curriculum empowers students with the knowledge to make healthier choices about their diets.

On a broader scale, government intervention is critical. Establishing national guidelines for school feeding programs and providing training for school health personnel are essential steps. Additionally, incentivizing schools that meet health promotion standards can encourage a shift towards healthier practices. Research initiatives should focus on longitudinal studies to track weight trajectories and intervention trials that evaluate tailored prevention strategies specific to boarding schools. Mixed-methods research can also provide richer insights into the perspectives of various stakeholders, including students, staff, and parents. The findings of this review underscore the urgent need for targeted interventions and policies to address the obesity epidemic among boarding school students in Ibadan. By fostering supportive environments that prioritize healthy behaviors and involving multiple stakeholders in these processes, we can not only tackle immediate health challenges but also mitigate the long-term risks associated with obesity and related chronic diseases among adolescents in this educational setting.

3.2 Research Gaps

This review identifies several critical gaps in the existing evidence base:

1. **Lack of boarding-school-specific studies:** Most Nigerian adolescent obesity research does not disaggregate findings by boarding vs. day school status, limiting understanding of the unique boarding school environment.
2. **Absence of longitudinal data:** Cross-sectional designs predominate, preventing assessment of how boarding school attendance affects weight trajectories over time.
3. **Limited environmental assessments:** Few studies systematically audit boarding school food environments, physical activity facilities, and health policies.
4. **No intervention research:** Despite the clear need, no published studies have evaluated obesity prevention interventions specifically designed for Nigerian boarding schools.

RECOMMENDATION

Addressing the rising incidence of obesity-related behaviors among boarding school students in Ibadan requires multi-level action:

School level:

- There should be development and enforcement of nutritional standards for boarding school meals
- There should be mandatory daily physical education and structured recreational activity
- School Should integrate nutrition education into school curricula
- School should promote regular anthropometric monitoring of students

Government level:

- Government should enforce the national guidelines for school feeding programs across schools
- Training and deployment of school health personnel
- Incentives for schools meeting health promotion standards

Research level:

- Longitudinal studies tracking weight trajectories in boarding compared to day students
- Intervention trials testing feasible, scalable prevention strategies
- Mixed-methods research exploring student, staff, and parent perspectives

CONCLUSION

This narrative review reveals that obesity-related behaviors among boarding school students in Ibadan, Oyo State, Nigeria represent an emerging but under-addressed public health crisis. The boarding school environment, characterized by institutional control over food provision and daily routines, creates

unique opportunities for both risk and protection. Currently, the balance appears to favor obesogenic conditions: energy-dense dietary patterns, limited physical activity, and absent health promotion programs.

Reversing this trend requires urgent, coordinated action across educational, health, and policy sectors. School-based interventions targeting the boarding school food environment, physical activity promotion, and nutrition education offer the most promising avenues for impact. Without such action, the current generation of boarding school students in Ibadan faces elevated lifetime risk of obesity and its associated chronic disease burden.

APPENDIX

Acknowledgments

The authors acknowledge Dr. Oladunni Opeyemi Abiona (Head of Department, Public Health, Adeleke University, Ede, Osun State) for supervising this study and reviewing the manuscript.

DISCLOSURES

Contribution: This author helped in conception, literature search, analysis, and writing of the article.

This manuscript was handled by: Adeniyi Omotunde Tolulope

Funding: None

Conflicts of Interest: The authors declare no conflicts of interest.

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