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Prevalence of obesity among children and adolescents aged 5 to 19 years in Ghana

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Abstract

Introduction: Emerging epidemiological evidence indicates rising adiposity among pediatric and adolescent populations in low- and middle-income countries, including those in sub-Saharan Africa. In Ghana, existing findings remain fragmented, with limited national-level data delineating age- and sex-specific trends. Strengthening empirical understanding of these patterns is essential for informing early-life prevention efforts and policy prioritization.

Methods: A serial cross-sectional trend analysis was conducted using WHO Global Health Observatory data for Ghana from 1990–2022. Obesity was defined according to the WHO BMI-for-age criteria (> +2 SD). Prevalence estimates were disaggregated by age group (5–9, 10–14, 15–19 years) and sex. Descriptive analyses were performed in SPSS, and JoinPoint regression in R (NCI JoinPoint Software) was used to assess temporal trends and estimate annual percentage change.

Results: The prevalence of obesity in Ghana was relatively high among children and adolescents aged 5–19 years between 1990 to 2022. Prevalence increased from 2.34% to 8.95% among boys and from 2.15% to 15.17% among girls aged 5–9 years. Among adolescents aged 10–19 years, the prevalence of obesity increased from 0.85% to 3.94% among boys and from 0.34% to 4.13% in girls. Trends were positive for subgroups ($p < 0.001$) in the AAPC analysis, ranging from most boys at 8.10% to the least young adolescents at 1.83%.

Conclusion: Higher rates among younger children reveal an earlier onset of obesity, while narrowing sex differences reflect shifting behavioural and environmental influences.

Keywords: Obesity; Children; WHO Estimates; Adolescent; Ghana; BMI-For-Age; Regression; Epidemiology; Trend Analysis

1. Introduction

The prevalence of obesity among children and adolescents has risen dramatically in recent decades, making it one of the most pressing global public health issues. Data show that the number of overweight and obese children and adolescents aged 5 to 19 years increased more than fourfold globally between 1975 and 2016, reaching 340 million in 2016 [1,29].' This trend is not restricted to high-income countries, as studies from the United States [2,17,24].' Brazil [23], and Saudi Arabia [3]' similarly report rising prevalence among school-aged populations. Meta-analyses further confirm that childhood and adolescent obesity has become a worldwide phenomenon, with marked increases across both developed and developing regions [4,22,10]

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Although once considered a problem of wealthier nations, obesity in children and adolescents has emerged strongly in sub-Saharan Africa. Rapid urbanisation, changing dietary practices, and reduced physical activity have contributed to rising prevalence rates across several African countries [1,5].' In Ghana, systematic reviews [2,11] and surveys highlight a growing burden of overweight and obesity among school-aged children, with prevalence varying across urban and rural contexts [19,22]. More recent syntheses confirm that obesity among Ghanaian children and adolescents is a growing concern, but evidence is scattered and inconsistent across studies, with gaps in documenting differences by age and sex [6,7]. Addressing this gap is important, as understanding prevalence patterns in specific subgroups is essential for guiding national and school-level interventions.

Following the gaps identified in existing literature, this study was designed with three key objectives: to estimate the prevalence of obesity among children and adolescents aged 5 to 19 years in Ghana, to examine the age distribution of obesity within this age group, and to determine how obesity trends differ according to sex. By providing nationally relevant data, the study contributes to clarifying patterns of obesity in Ghana's younger population and adds to the broader epidemiological understanding of obesity trends in sub-Saharan Africa.

The remainder of this article presents the methods used to assess obesity prevalence in the study population, followed by the findings on the extent and distribution of obesity among Ghanaian children and adolescents. These results are then discussed in light of global, regional, and national evidence, with implications for future research, health policy, and preventive strategies.

2. Materials and methods

2.1. Study population and Setting

This serial cross-sectional study focuses on children and adolescents aged 5 to 19 years in Ghana. Specifically, it analyses WHO-estimated national figures for the prevalence of obesity in this age group using available data. While the WHO [26,27] dataset provides global estimates, our study zooms in on the Ghanaian population, offering prevalence insights tailored to national public health interests.

2.2. Variables

The main outcome variable for this study was obesity status, defined according to the WHO BMI-for-age classification for children and adolescents aged 5–19 years, with obesity defined as a BMI-for-age greater than 2 standard deviations above the reference median. The independent variables included age group (5–9, 10–14, and 15–19 years), sex (male or female), and year of observation, which allowed the analysis of obesity prevalence across age, sex, and temporal trends in Ghana.

2.3. Data Analysis

The Joinpoint Regression Program (developed by the National Cancer Institute, USA) was employed to conduct the analysis of the pooled WHO Global Health Observatory dataset on childhood and adolescent obesity in Ghana. The analysis began with descriptive statistics, where frequencies and percentages were computed to establish the mean prevalence of obesity among children and adolescents aged 5 to 19 years. This approach provided a clear picture of the burden of obesity within the population and enabled the identification of general patterns in the data.

Sex differences were also considered by conducting stratified analyses for males and females. The prevalence of obesity was compared between boys and girls within each age category, allowing for the assessment of gender-related disparities. To further explore trends over time, Joinpoint regression models were applied to estimate the Annual Per cent Change (APC) and the Average Annual Per cent Change (AAPC), with corresponding 95% confidence intervals. This statistical method allowed for the identification of points in time where significant changes in the trends occurred, offering a deeper understanding of temporal variations.

The combination of descriptive statistics and join point regression provided a comprehensive analytical framework. This approach allowed for a nuanced understanding of the burden of obesity, how it changes with age, and the differences that exist between male and female adolescents. By employing these methods, the study generated evidence that not only describes the magnitude of the problem but also highlights critical demographic and temporal factors that should inform intervention strategies.

3. Results

Table 1 The Prevalence Trend of Obesity Among Children and Adolescents Aged 5 To 19 Years in Ghana

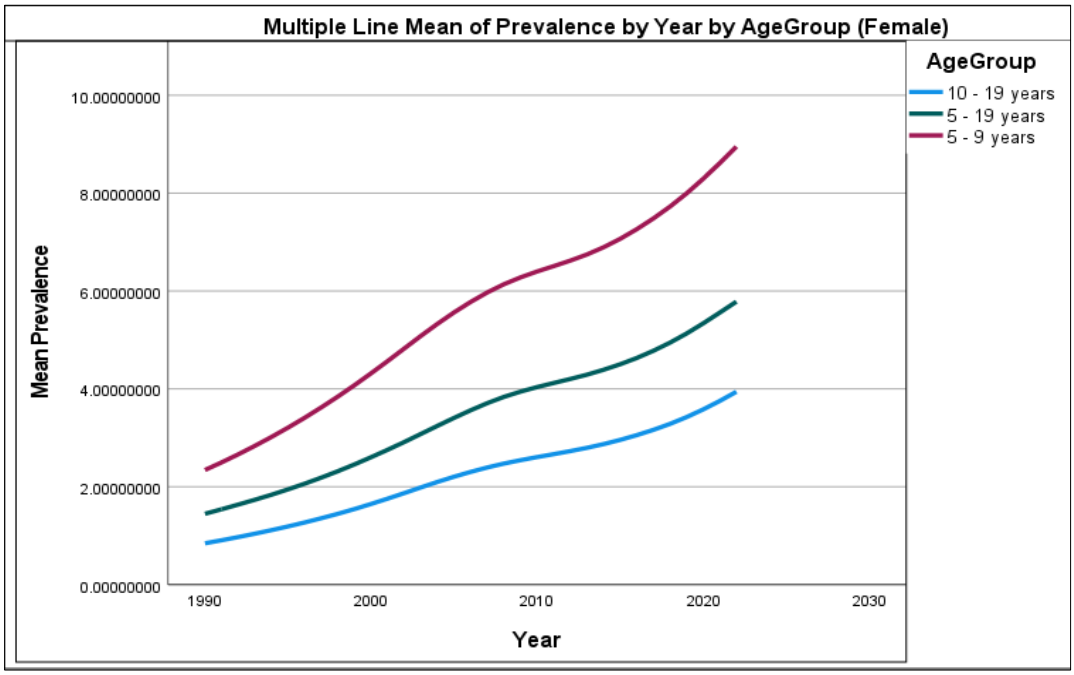
	Male		**Female**	
	Prevalence, % (95% CI)		**Prevalence, % (95% CI)**	
	1990	**2022**	**1990**	**2022**
Age group (yrs)				
5-9	2.34% (0.64-5.42)	8.95% (5.64-12.95)	2.15% (0.30-6.57)	15.17% (9.90-21.17)
10-19	0.85% (0.20-2.12)	3.94% (2.34-6.03)	0.34% (0.03-1.31)	4.13% (2.28-6.68)
5-19	1.45% (0.38-3.41)	5.78% (3.57-8.48)	1.07% (0.14-3.40)	8.20% (5.15-12.01)

Source: WHO, 2023

Table 1 shows the prevalence of obesity among children and adolescents aged 5–19 years by sex for the years 1990 and 2022. Across all age categories, there was a substantial increase in obesity prevalence over the 32-year period.

Among children aged 5–9 years, obesity prevalence increased from 2.34% (95% CI: 0.64–5.42) in 1990 to 8.95% (95% CI: 5.64–12.95) in 2022 among males, and from 2.15% (95% CI: 0.30–6.57) to 15.17% (95% CI: 9.90–21.17) among females. This represents approximately a fourfold increase in males and a sevenfold rise in females, indicating a larger upward shift in girls within this age group.

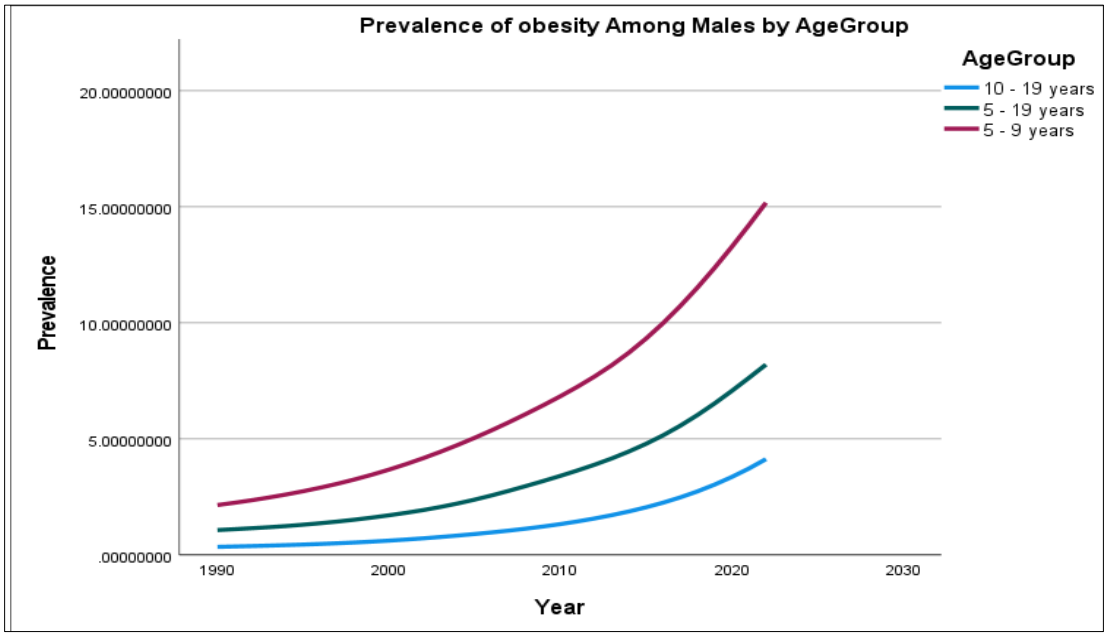
Similarly, among adolescents aged 10–19 years, male obesity prevalence increased from 0.85% (95% CI: 0.20–2.12) in 1990 to 3.94% (95% CI: 2.34–6.03) in 2022. In females, prevalence rose from 0.34% (95% CI: 0.03–1.31) to 4.13% (95% CI: 2.28–6.68) over the same period. Although both sexes experienced marked increases, female adolescents demonstrated a slightly higher prevalence in 2022. For the combined 5–19 years' group, obesity prevalence rose from 1.45% (95% CI: 0.38–3.41) to 5.78% (95% CI: 3.57–8.48) among males, and from 1.07% (95% CI: 0.14–3.40) to 8.20% (95% CI: 5.15–12.01) among females between 1990 and 2022.



Source: WHO, 2023

Figure 1 Trends in Obesity in Females from 1990 – 2022

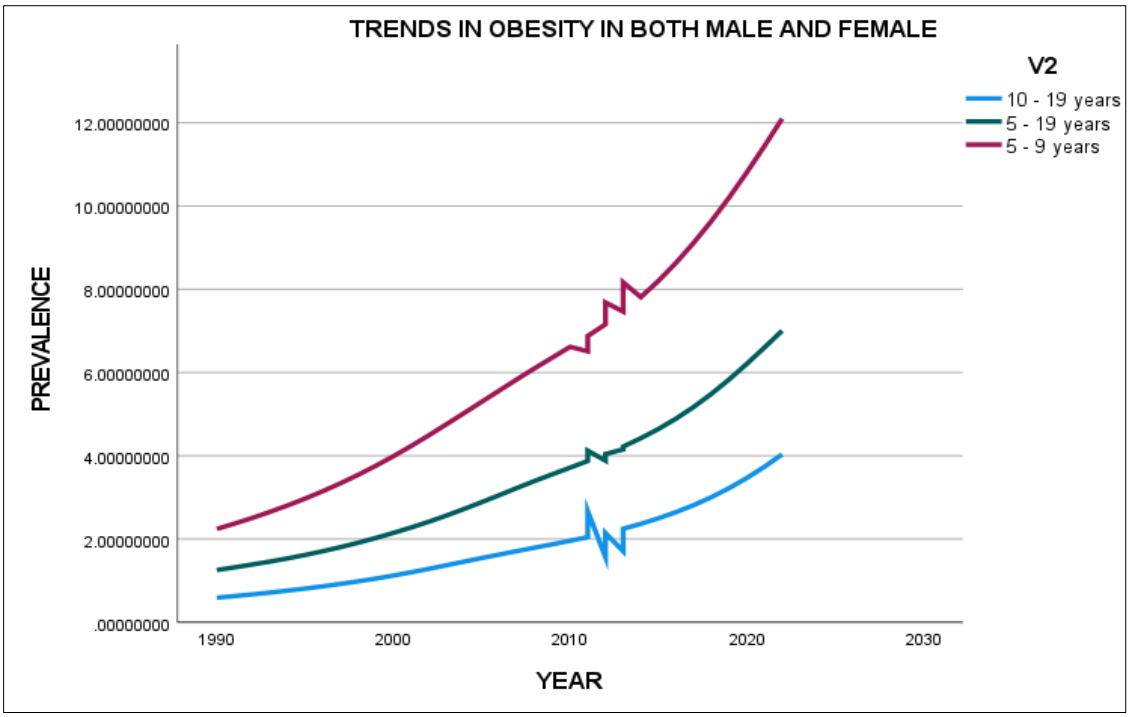
Figure 1 reveals that the increase in mean obesity prevalence observed in females aged between 5 and 19 between 1990 and 2022 is both dramatic and concerning. This is a clear and serious public health issue. The most remarkable finding in this case is the continuous and dominant prevalence observed in the younger cohort aged 5 to 9 years. Their prevalence began at approximately 2.5% in 1990 and climbed to almost 9.0% in 2022. Conversely, the older adolescent group aged 10 to 19 years consistently shows the lowest prevalence, which starts at around 1.0% and rises gradually to about 4%. This pattern of higher obesity prevalence in younger, pre-pubertal populations rather than older adolescents is an important epidemiological insight, indicating that the highest risk for developing obesity is in early childhood, clearly illustrating when obesity prevention efforts must be aimed to reduce the trend for the 5-19 total group.



Source: WHO, 2023

Figure 2 Trends in Obesity in Males from 1990 – 2022

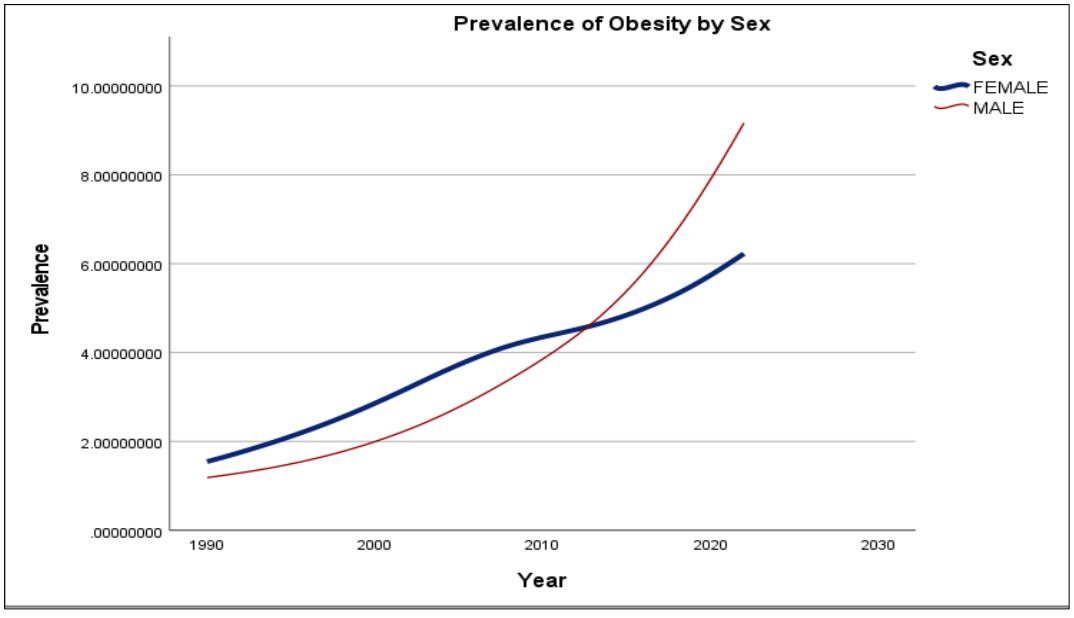
Figure 2 highlights the trend in obesity prevalence among males within different age groups-from 5–9 years, 5–19 years, and 10–19 years-from 1990 to approximately 2022. From the graph, it is observed that the trend for male obesity prevalence consistently goes up through the years in all age groups; this means that obesity among males is growing over time. The age group of 5–9 years has the highest rate throughout the period, followed by the 5–19-year-old group. The rates for the 10–19-year-old group are the lowest among the groups. The gap between groups increases after the year 2010, which means that the increase in the rate of obesity is getting faster among younger males compared to older males.



Source: WHO, 2023

Figure 3 Trends in Obesity Among Age Groups from 1990 – 2022

From Figure 3, it is evident that the trend for obesity among males and females in all age groups has been growing from 1990 to around 2022. The age group of 5–9 years always has the highest rate for both genders in the entire course, followed by the 5–19-year-old group, while the 10–19-year-old age group always retains the lowest rates. A clearly marked upward shift occurred in the year 2010, as reflected by the break in the lines, to show that during this period, the levels started growing upwards considerably.



Source: WHO, 2023

Figure 4 Obesity Trends in Both Genders from 1990 – 2022

According to Figure 4, the prevalence of obesity by sex has increased steadily from 1990 to around 2022 for both males and females. Initially, females had a higher prevalence of obesity compared to males; however, the rate of increase among males appears steeper over time. Around 2010, the two lines intersect, indicating that male obesity prevalence began to surpass that of females. By 2022, males show a noticeably higher obesity rate, suggesting a faster and more significant rise in obesity among males in recent years.

The table below summarises the calculated Average Annual Per Cent Change (AAPC), its 95% Confidence Interval (CI), the p-value for the trend, and the R-squared value of the model for each subgroup analysed over the period 1990-2022.

Table 2 AAPC Results by Subgroup

Sex	Age Group	AAPC (%)	95% CI	P-Value	R^2
Female	10-19 years	4.66	4.65 - 4.68	<0.001	0.967
Female	5-19 years	4.26	4.25 - 4.27	<0.001	0.970
Female	5-9 years	4.03	4.02 - 4.04	<0.001	0.958
Male	10-19 years	8.10	8.08 - 8.12	<0.001	0.992
Male	5-19 years	6.78	6.77 - 6.79	<0.001	0.994
Male	5-9 years	6.36	6.36 - 6.37	<0.001	0.999

Table 2 shows a consistent and statistically significant increase in obesity prevalence across all subgroups from 1990 to 2022. Overall, males demonstrated a faster rise in obesity compared to females, with the highest AAPC observed among males aged 10–19 years (8.10%), followed by males aged 5–19 years (6.78%) and 5–9 years (6.36%). Among females, the greatest increase was recorded in the 10–19-year group (4.66%), while the youngest age group (5–9 years) experienced the slowest increase (4.03%). All confidence intervals were narrow and did not cross zero, and the p-values were <0.001, confirming that the upward trends were highly statistically significant. Furthermore, the R^2 values ranged from 0.958 to 0.999, indicating excellent model fit and suggesting that changes in obesity prevalence over time were strongly explained by the year.

4. Discussion

4.1. Trend in Overall Obesity Prevalence (1990–2022)

This study demonstrates a substantial and sustained rise in obesity among children and adolescents aged 5–19 years from 1990 to 2022. Among children aged 5–9 years, obesity increased from 2.34% to 8.95% in males and from 2.15% to 15.17% in females. Among adolescents aged 10–19 years, prevalence rose from 0.85% to 3.94% in males and from 0.34% to 4.13% in females. All increasing trends were statistically significant ($p < .001$), with strong model fit across categories ($R^2 = 0.958–0.999$), and the highest Average Annual Percentage Change observed among male adolescents (8.10%). The acceleration observed after 2010 suggests strengthening obesogenic environments, consistent with global nutrition transition patterns where processed food consumption, sedentary lifestyles, and urbanisation intensify over time [25,18]. These findings reflect global reports, particularly the Global Burden of Disease analysis, which documented significant increases in childhood obesity burden across 195 countries over the past three decades, especially in low- and middle-income countries undergoing rapid lifestyle shifts [12].

4.2. Age-Specific Trends

Younger children consistently recorded higher obesity prevalence compared to adolescents across the study period. This early peak in childhood suggests that obesity onset is shifting to younger ages, raising concern for prolonged metabolic risk exposure and increased lifetime cardiovascular risk. The results corroborate international findings indicating that childhood is now the critical window for obesity emergence, largely driven by early-life dietary habits, reduced physical activity, exposure to high-calorie food marketing, and limited structured playtime [12,16]. Rapid weight gain during early childhood has been linked to long-term adiposity, insulin resistance, and persistence of obesity into adolescence and adulthood [11].' The upward trajectory after 2010 further suggests accelerating risk environments possibly influenced by digital media expansion, increased availability of ultra-processed foods, and reductions in active mobility among school-aged children [13].'

4.3. Sex-Specific Trends

Throughout the study period, females exhibited higher obesity prevalence compared to males in both age categories, although the rate of increase was faster among males, particularly after 2010. Historically, females in Ghana and similar settings have experienced higher obesity rates due to sociocultural influences favouring larger body size among women, gender-linked dietary behaviours, and hormonal factors [8,20].' However, the narrowing gender gap observed in recent years suggests evolving lifestyle patterns among males, likely reflecting increased sedentary behaviour, gaming culture, and dietary westernisation among boys. This shift aligns with emerging regional trends suggesting that traditional gender-related protective factors for males are diminishing as obesogenic exposures equalise across sexes [16,27,28].'

4.4. Public Health Implications

The consistent increase in childhood and adolescent obesity, particularly the early onset among children aged 5–9 years, signals an urgent need for intensified childhood nutrition and physical activity interventions. Policies promoting healthy school meals, restrictions on marketing unhealthy foods to children, community-based physical activity programs, and parental nutrition education are essential. Additionally, urban planning should prioritise active transport and safe recreation spaces to counter sedentary behaviours common in evolving urban environments. Without timely and coordinated preventive strategies, the rising early-life obesity trend risks escalating non-communicable disease burden in adulthood.

Abbreviations

- WHO: World Health Organisation;
- AAPC: Average Annual Percent Change;

5. Conclusion

This study shows a persistent and statistically significant rise in obesity among children and adolescents aged 5–19 years in Ghana between 1990 and 2022 [26], with the steepest increases occurring after 2010. Younger children consistently exhibited a higher prevalence than adolescents, indicating an earlier onset of obesity. Although females maintained a higher prevalence overall, males experienced faster increases, leading to a narrowing sex gap in recent years. These findings reveal a growing public health challenge driven by evolving dietary patterns, sedentary lifestyles, and broader socio-environmental changes, reinforcing the need for targeted, sustained, and multi-sector interventions beginning in early childhood.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Statement of ethical approval

Secondary data from publicly accessible internet sources served as the foundation for this investigation. There were no direct human participants, and no personally identifiable information was used. As a result, this study did not need informed consent or ethical approval.

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