Household, Maternal and Dietary Correlates of Stunting, Thinness and Their Co-Morbidity Among In-School Adolescent Girls in Southwestern Nigeria

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ABSTRACT

Background: *Undernutrition, particularly stunting and thinness, has a negative impact on adolescents' development. This study examined the prevalence and correlates of stunting, thinness, and their co-morbidity among in-school adolescent girls.*

Methods: *A descriptive cross-sectional study was conducted among 874 in-school adolescent girls (10–19 years) in southwestern Nigeria, selected using stratified random sampling. Data on sociodemographic and dietary factors were collected with an open data kit. Dietary adequacy was assessed using the Minimum Dietary Diversity for Women (MDD-W) based on 10 food groups. Weight and height were measured using standard procedures, and z-scores for height-for-age (stunting) and BMI-for-age (thinness) were computed with WHO AnthroPlus. Data were analysed using descriptive statistics, chi-square tests, and binary logistic regression in SPSS v27, with significance at $p<0.05$.*

Results: *Participants' mean age was 14.81 ± 1.74 years. Grains, white roots and tubers, and plantains (98.5%) were the most commonly consumed food groups. Stunting prevalence was 9.8%, thinness 11.7%, and co-morbidity 2.7%. Stunting was significantly associated with thinness ($X^2=31.578$, $p<(0.001)$. Nearly 38% of participants did not meet MDD-W ($p=0.001$. Younger girls were four times more likely to be stunted (OR=3.927, 95% CI: 2.413–6.390) and twice more likely to be thin (OR=2.122, 95% CI: 1.395–3.229). Maternal low education increased stunting risk, while consuming two meals daily increased thinness likelihood (OR=6.733, 95% CI: 0.590–76.851). Younger age (OR=10.398, 95% CI: 3.078–35.129) and peri-urban residence (OR=2.284, 95% CI: 1.003–5.203) significantly predicted co-morbidity.*

Conclusion: *Stunting, thinness, and their co-morbidity remain prevalent among adolescent girls, highlighting the need for urgent, context-specific nutrition interventions.*

Keywords: Stunting, thinness, co-morbidity, In-school adolescent girls, dietary diversity.

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INTRODUCTION

Adolescence is a critical, nutrition-sensitive stage of growth (1), particularly for girls, as it lays the foundation for adult health and reproductive outcomes (2). However, this period is also marked by vulnerability to malnutrition, which encompasses undernutrition, micronutrient deficiencies, and overnutrition (3). Undernutrition, in particular, remains a major concern and is commonly reflected in two key indicators: stunting and thinness. Stunting, a marker of chronic undernutrition, and thinness, indicative of acute undernutrition, both carry profound consequences for adolescent girls (3). These conditions impair health, linear growth, and weight gain, ultimately compromising overall development (3). If unaddressed, they may result in delayed or incomplete physical maturation, including late onset of puberty and reduced adult stature, with long-term implications for health and well-being (1).

Stunting, a height-for-age below the World Health Organization (WHO) growth standards, reflects chronic undernutrition, while thinness, defined as a Body Mass Index (BMI) for age below the 5th

percentile, indicates acute malnutrition (4). Together, these conditions contribute to a cycle of poor health, diminished cognitive development, and reduced productivity in adulthood, thereby perpetuating poverty and hindering socio-economic development on a global scale (5,6).

Globally, undernutrition remains a significant public health concern, particularly in low- and middle-income countries (LMICs), where the prevalence of stunting among adolescents is alarmingly high (7). Estimates from the United Nations Children's Fund (UNICEF) indicate that 21.3% of adolescents aged 10–19 years in LMICs are stunted, with girls disproportionately affected due to biological, social, and cultural factors that limit their access to adequate nutrition during critical growth phase (7). The co-existence of stunting and thinness further complicates their health status, exacerbating the risk of morbidity and mortality (8).

In Africa, the burden of adolescent undernutrition is particularly severe, with significant variations across regions and between gender (9). The prevalence of stunting among adolescents ranges from 20% to 50%, with the highest rates reported in Eastern and Western Africa (9). Thinness is also of critical concern and often co-exists with stunting, compounding risks of poor reproductive outcomes, such as obstructed labour, low birth weight, and maternal mortality, especially in adolescent pregnancies (10). Contributing factors include food insecurity, poverty, infectious diseases, and gender disparities in access to education and healthcare (11).

Sub-Saharan Africa bears a disproportionate share of the global burden, where the prevalence of stunting and thinness among adolescent girls is alarmingly high. These are driven by complex interplays of socio-economic, environmental, and cultural factors (12). The region's nutritional challenges are further compounded by the high prevalence of infectious diseases such as malaria and HIV/AIDS, which deplete nutrient stores and impede physical growth (13).

Nigeria continues to struggle with high rates of adolescent undernutrition, particularly stunting and thinness among girls. The challenge is more pronounced in the northern regions, where poverty, conflict, and cultural practices contribute to severe nutritional deficits (14). National surveys and studies indicate that stunting affects between 3% and 33% of adolescents, depending on the region, while approximately 20% are thin, with a significant overlap between the two conditions (15). The overlap referred to as co-morbidity in this study, poses a serious public health challenge, as it compromises both individual development and national socio-economic progress.

Addressing the dual burden of stunting and thinness among adolescent girls in Nigeria necessitates a comprehensive understanding of context-specific determinants. This study therefore examines the prevalence of stunting and thinness, as well as the factors associated with their co-morbidity, among in-school adolescent girls in southwestern Nigeria.

MATERIALS AND METHODS

Study participants

This descriptive cross-sectional survey targeted in-school adolescent girls aged 10 –19 years attending government-owned secondary schools in southwestern Nigeria.

Sample size determination

Taking each state as a population, Fisher's formula (16) was used to calculate the minimum sample size per state, with a 95% confidence level ($Z = 1.96$), a stunting prevalence of 33%, (15) and a margin error of ± 0.05. The minimum sample size was calculated to be 354 per state. After accounting for a 10% non-response rate (adding 35 participants per state), the target was approximately 389 adolescent girls per state, making a total of 778 participants for the two states surveyed. Data from 874 participants were collected, verified and exported to SPSS for analysis.

Sampling procedure

A multistage stratified random sampling procedure was used to select schools and students who participated in this study. In the first stage, two states, Osun and Ondo, were randomly selected by balloting without replacement from the six states in the region. In the second stage, in each state, local government areas (LGAs) were grouped by urban, peri-urban, or rural status, and two peri-urban and two urban LGAs were purposively selected. In the third stage, within each selected LGA, two secondary schools were randomly chosen by ballot from lists obtained from local education authorities. In the fourth stage, students in the senior arms were proportionately selected from these schools. School registers were used to generate a sampling framework from which final participants were selected using a systematic sampling technique with K^{th} interval. Girls attending boarding schools, privately owned schools, or orphanage homes were excluded because their meals are regulated.

Data collection procedure

Data collection was conducted concurrently over three weeks in April 2023. Before data collection,

four research assistants per state were recruited and trained for two days; they worked in pairs to minimize interpersonal bias.

Research instrument and measurement of variables

Data on sociodemographic characteristics and dietary factors were collected using a pre-tested, interviewer-administered questionnaire programmed into the Open Data Kit (ODK) platform. The questionnaire was first validated for content by experts in nutrition and public health, and subsequently pre-tested among a sample of adolescent girls in a non-study school to ensure clarity, cultural appropriateness, and reliability. Trained research assistants conducted face-to-face interviews with participants in the school setting, recording responses directly on electronic tablets. Each completed form was automatically saved on the device and uploaded to a secure server.

The minimum dietary diversity for women (MDD-W) score was determined using a 24-hour dietary recall food intake checklist. The adolescent girls were asked to describe the foods and drinks they consumed in the previous 24 hours. Two 24-hour diet recalls (one weekday and one weekend day, except party days) were completed for each girl. The MDD-W score was calculated for each participant, and the most varied diet has a score of 10 food groups. The WDD-W scale was drawn; those who scored 5 points and above were classified as meeting the MDD-W, and those below 5 points did not meet the MDD-W.

Anthropometric measurements were done following recommended standard procedures (17, 18). Weight was measured using a 150 kg Seca Weighing Scale, and height was obtained using a stadiometer (75–200 cm). Measurements were taken in triplicate, with averages recorded to the nearest 0.1 kg for weight and 0.01 cm for height. Age was classified into early adolescence (10-14 years) and late adolescence (15-19 years) (19). Height-for-age (stunting) and BMI-for-age (thinness) z-scores were computed using WHO AnthroPlus software (20).

Data analysis

Data were cleaned, and incomplete entries were removed as outliers. Verified data from 874 participants were exported from ODK into Excel and later opened in SPSS version 27. Analyses were done using descriptive (frequency, percentage, mean, and standard deviation) and inferential (Chi-square and binary logistic regression) statistics. The statistical significance was set to a p-value of less than 0.05. The outputs were presented using tables and figures.

Ethical approval

Approval for the study was obtained from the Health Research and Ethics Committee of the Institute of Public Health, Obafemi Awolowo University, Ile-Ife (IPHOAU/12/2205). Permission was also obtained from the Education and Development Research Committee in the Ministry of Education. Approval was given by the Local Inspectors of Education (LIEs) and principals of the selected schools as well. Consent was obtained from participants.

RESULTS

Household, maternal, and dietary factors of adolescent girls in two states of Southwestern Nigeria

Table 1 shows significant differences in residential location, mothers' marital status, mothers'/guardians' education level, daily meals consumed, out-of-home food intake, and MDD-W among adolescent girls between the two states ($p<0.05$). No differences were observed in household size, number of female adolescents in the households, or breakfast and snack consumption ($p>0.05$).

Dietary diversity of adolescent girls in Southwestern Nigeria

Grains, white roots and tubers, and plantains (98.5%) were the most commonly consumed food groups, followed by other vegetables (89.0%). The least consumed were other fruits (31.7%) and protein source food groups; dairy (31.8%), eggs (36.3%), in particular. Surprisingly, the meat, poultry, and fish consumption rate was high (79.2%) (Figure 1).

Personal characteristics, anthropometry, stunting, thinness, and co-morbidity status of adolescent girls in Southwestern Nigeria

Table 2 shows the personal characteristics, anthropometric indices, and their comorbidities in the adolescent girls in southwestern Nigeria. About 9% of the adolescent girls were stunted (with 1.1% severely stunted) and 11.4% were thin (with 2.2% severely thin) in Osun State. Compared to Ondo State, 11.2% were stunted (with 2.6% severely stunted) and about 12% thin (with 2.3% severely thin). Among the respondents, 9.8% were stunted, 11.7% were thin, and 2.7% had both stunting and thinness (comorbidity). Age, weight, height, BMI, stunting, thinness, and co-morbidity of the adolescent girls in both states were not significantly different ($p>0.05$).

Table 1: Household, maternal, and dietary factors of adolescent girls in two states of Southwestern Nigeria

Characteristics	Total Sample (n = 874)		Osun (n = 445)		Ondo (n = 429)		X^2	p-value
Household/Maternal Characteristics	Freq.	%	Freq.	%	Freq.	%		
Residential location								
Peri-urban	337	38.6	138	31.0	199	46.4	21.797	0.000*
Urban	537	61.4	307	69.0	230	53.6		
Household size								
Small	494	56.5	245	55.1	249	58.0		
Moderately large	342	39.1	182	40.9	160	37.3	1.260	0.532
Large	38	4.3	18	4.0	20	4.7		
Number of female adolescents in the household (except the index girl)								
None	21	2.4	10	2.2	11	2.6	0.462	0.794
1-2	722	82.6	365	82.0	357	83.2		
>2	131	15.0	70	15.8	61	14.2		
Mother's marital status								
Deceased	60	6.9	39	8.8	21	4.9		
Divorced/separated	122	14.0	71	16.0	51	11.9		
Married	678	77.6	327	73.5	351	81.8	17.241	0.002*
Single mother	8	0.9	2	0.4	6	1.4		
Widowed	6	0.7	6	1.3	-	-		
Mother's/guardian's education level								
No formal education	86	9.8	63	14.2	23	5.4		
Primary	62	7.1	40	9.0	22	5.1		
Secondary	496	56.8	248	55.7	248	57.8	34.679	<0.001*
Tertiary	230	26.3	94	21.0	136	31.7		
Dietary characteristics								
Breakfast consumption								
Yes	846	96.8	428	96.2	418	97.4	1.111	0.292
No	28	3.2	17	3.8	11	2.6		
Daily snack consumption								
Yes	818	93.6	416	93.5	402	93.7	1.111	0.574
No	56	6.4	29	6.5	27	6.3		
Daily meals consumed							33.092	<0.001*
One	4	0.5	1	0.2	3	0.7		
Two	106	12.1	80	18.0	26	6.1		
Three	658	75.3	322	72.4	336	78.3		
More than three	106	12.1	42	9.4	64	14.9		
Out-of-home foods							8.572	0.003*
Yes	352	40.3	158	35.5	194	45.2		
No	522	59.7	287	64.5	235	54.8		
MDD-W								
Met (score ≥ 5)	574	65.7	310	69.7	264	61.5	6.396	0.011*
Not met (score <5)	300	34.3	135	30.3	165	38.5		

*Significant at $p<0.05$, X^2 = Chi-square value, MDD-W = Minimum Dietary Diversity-Women

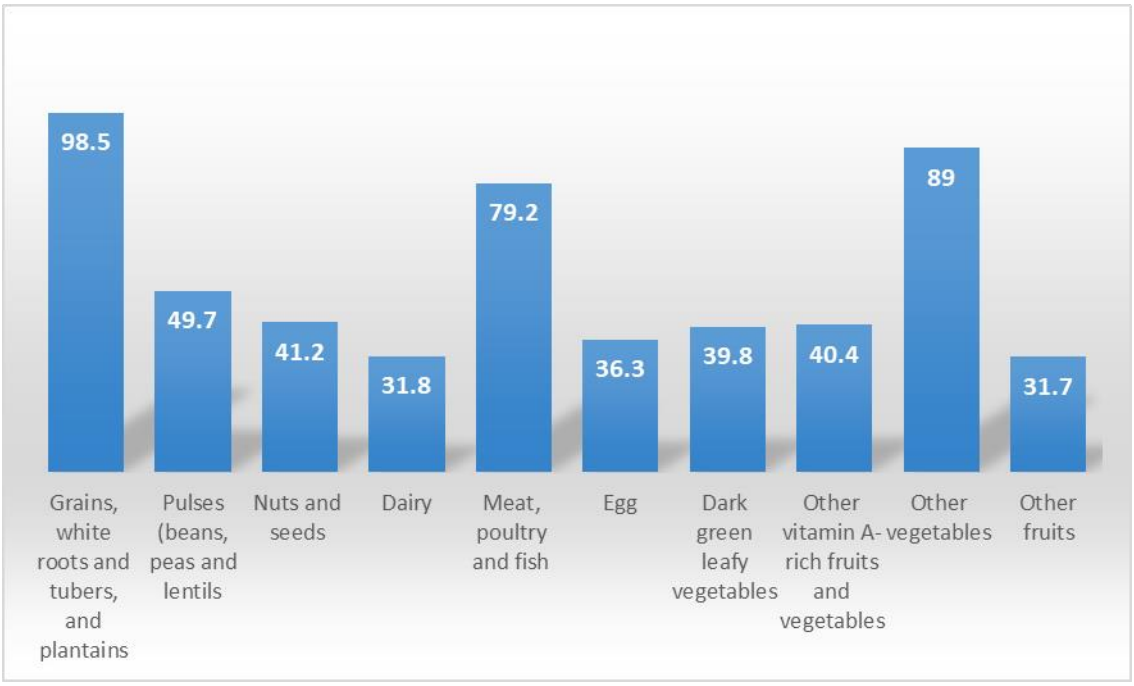

Figure 1: Minimum Dietary Diversity

Table 2: Personal Characteristics, Body Mass Index, Stunting, Thinness, and Co-morbidity Status of Adolescent Girls in Southwestern Nigeria

Characteristics	Total sample (n = 874)				Osun (n = 445)				Ondo (n = 429)				X^2	p-value
	Freq.	%	Mean	sd	Freq.	%	Mean	sd	Freq.	%	Mean	sd		
Personal characteristics														
Age(years)			14.81	1.741			15.04	1.680			14.56	1.772		
10-14	363	41.5			172	38.7			191	44.5			3.100	0.078
15-19	511	58.5			273	61.3			238	55.5				
Body Mass Index	-	-	18.82	2.857	-	-	18.67	2.621	-	-	18.97	3.08	-	0.125
Stunting			-	-										
Not Stunted	788	90.2			407	91.5	-	-	381	88.8	-	-		
Stunted	70	8.0			33	7.4	-	-	37	8.6	-	-	3.045	0.218
Severely stunted	16	1.8			5	1.1	-	-	11	2.6	-	-		
Thinness			-	-										
Not thin	769	88.0			394	88.5	-	-	375	87.4	-	-		
Thin	82	9.4			41	9.2	-	-	41	9.6	-	-		
Severely thin	20	2.3			10	2.2	-	-	10	2.3	-	-	3.178	0.365
Overweight	3	0.3			-	-	-	-	3	0.7	-	-		
Co-morbidity			-	-										
None	850	97.3			435	97.8			415	96.7			0.845	0.358
Co-morbidity	24	2.7			10	2.2			14	3.3				

Table 3: Association between stunting and thinness among adolescent girls in Southwestern Nigeria (n= 874)

Stunting	Thinness				X^2	p-value
	Not thin Freq. (%)	Thin Freq. (%)	Severely thin Freq.(%)	Overweight Freq. (%)		
Not stunted	708 (92.1)	63 (76.8)	15 (75.0)	2 (66.7)		
Stunted	51 (6.6)	15 (18.3)	3 (15.0)	1 (33.3)	31.578	<0.001*
Severely stunted	10 (1.3)	4 (4.9)	2 (10.0)	-		

*Significant at p<0.05

Table 4: Correlates of Stunting, Thinness, and their Comorbidity among Adolescent Girls in Southwestern Nigeria

Covariates	B	OR	95%CI	p-value	B	OR	95%CI	p-value	B	OR	95%CI	p-value
	Stunting				Thinness				Co-morbidity			
Age (years)												
10 -14	1.368	3.927	2.413 - 6.391	0.000*	0.752	2.122	1.395 - 3.229	0.000*	2.342	10.398	3.078-35.129	<0.001*
15 -19 (ref)		1.00								1.00		
Place of residence												
Peri-Urban	0.993	2.699	1.711 - 4.259	0.000*	0.157	1.170	0.769 - 1.781	0.464	0.826	2.284	1.003-5.203	0.049*
Urban (ref)		1.00				1.00				1.00		
Household size												
Large	1.492	4.447	0.598 - 33.075	0.145	0.143	1.153	0.393 - 3.387	0.795	0.000	1.000	0.127-7.856	1.000
Moderately Large	1.340	3.819	0.507 – 28.772	0.193	-0.123	0.885	0.294 - 2.663	0.827	0.108	1.114	0.139-8.952	0.919
Small (ref)		1.00				1.00				1.00		
No female adolescents in the household (except the index girl)												
None	-0.950	0.387	0.048 - 3.092	0.370	-1.123	0.325	0.041 - 2.582	0.288	- 17.745	0.000	0.000	0.998
1-2	-0.186	0.830	0.460 – 1.500	0.538	-0.209	0.811	0.469 – 1.403	0.455	-0.100	0.905	0.304-2.690	0.857
>2 (ref)		1.00				1.00				1.00		
Mother's/guardian's education												
No formal education	0.362	1.436	0.505 – 4.087	0.497	-1.158	0.582	0.196 – 1.734	0.331	-0.323	0.724	0.087-6.032	0.765
Primary	0.405	1.499	0.596 - 3.769	0.390	-0.647	0.524	0.195 – 1.403	0.198	-0.650	0.522	0.063-4.326	0.547
Secondary	0.343	0.955	0.268 – 3.404	0.943	-0.237	0.789	.498 – 1.248	0.311	-0.009	0.991	0.399-2.466	0.985
Tertiary (ref)		1.00								1.00		
Breakfast consumption												
Yes	-1.104	0.332	0.044 -2.471	0.281	-0.555	0.574	0.134 -2.454	0.454	- 17.669	0.000	0.000	0.998
No (ref)		1.00				1.00				1.00		
Daily snack consumption												
No	-0.093	0.911	0.353 – 2.350	0.847	0.424	1.527	0.724 - 3.221	0.226	- 17.669	0.000	0.000	0.998
Yes		1.00				1.00				1.00		
Daily meals consumed												
One	0.128	1.137	0.421-3.068	0.800	1.350	3.858	1.368 - 10.884	0.011*	0.703	2.019	0.180-22.611	0.569
Two	0.361	1.435	0.669 - 3.077	0.353	1.907	6.733	0.590 - 76.851	0.125	1.242	3.462	0.461-26.008	0.228
Three	0.352	0.879	0.267 – 3.304	0.356	0.032	2.756	1.089 – 6.973	0.032*	- 16.549	0.000	0.000	0.999
More than three (ref)		1.00				1.00			1.00			
Out-of-home foods												
Yes	-0.387	0.679	0.435 – 1.062	0.090	-0.088	0.916	0.603 – 1.392	0.680	-0.405	0.667	0.296-1.501	0.328
No (ref)		1.00				1.00			1.00			
MDD-W												
Met (score ≥ 5)	-0.084	0.920	0.578 – 1.463	0.723	0.151	1.163	0.746 – 1.813	0.504	0.245	1.278	0.524-3.116	0.590
Not met (score <5) (ref)		1.00				1.00			1.00			

*Significant at p<0.05

Association between stunting and thinness among adolescent girls in Southwestern Nigeria

The association between stunting and thinness among the respondents is shown in Table 3. Stunting was significantly associated (X^2 = 31.578, p = 0.000) with thinness. This suggests that a higher stunting rate is associated with a higher rate of thinness. One-third of those who were overweight were also stunted (33.3%).

Correlates of stunting, thinness, and their co-morbidity among adolescent girls in Southwestern Nigeria

Correlates of stunting, thinness, and their comorbidity among the respondents are shown in Table 4. Younger adolescents (10-14 years) were four times more likely to be stunted (OR = 3.927, 95%CI = 2.413 - 6.391) and twice as likely to be thinner (OR = 2.122, 95%CI = 1.395 - 3.229) than older adolescents (15-19 years). Those residing in peri-urban areas and those with larger household sizes were 2.6 times and 4.4 times more likely to be stunted, respectively. Those who consumed two meals per day were 6.7 times (OR = 6.733, 95%CI = 0.590 -76.851) more likely to be thin. Younger girls (OR=10.398, 95%CI=3.078-35.129) and those residing in peri-urban areas (OR=2.284, 95%CI=1.003-5.203) were ten times and twice as likely to have co-morbidity of stunting and thinness, respectively.

DISCUSSION

The prevalence of stunting, thinness, and their co-morbidity among adolescent girls in Nigeria indicates that chronic and acute undernutrition frequently overlap, compounding risks for adverse health outcomes. Similar patterns have been reported across sub-Saharan Africa. For instance, studies in Ethiopia documented higher prevalences of stunting (14.4%) and thinness (14.2%), among school-going adolescent girls, and 21.8% and 16.9% in another district, respectively, with co-morbidity as high as 9.7% (21, 22). In contrast, a study in Ghana recorded lower values for stunting (7.2%) and thinness (9.0%) among adolescent girls (23). Compared with these findings, the differences in prevalence rates of stunting, thinness, and the co-morbidity may be attributed to variations in study populations, food availability, dietary diversity, geographical locations, and socio-economic contexts. The double burden of chronic and acute undernutrition often stems from persistent poverty, food insecurity, recurrent infections, and limited access to healthcare, which impair both growth and weight gain in adolescents (21).

The result of higher odds of stunting and thinness among younger adolescents in the current study agrees with other studies (23, 24), which also found that younger adolescents were more likely to be undernourished due to the increased nutritional demands of rapid growth during early adolescence. The accelerated growth spurt increases nutritional requirements that may not be met due to inadequate dietary intake or poor nutrient absorption, making them particularly susceptible to the adverse effects of undernutrition. (8).

The peri-urban residence, larger household sizes, and fewer daily meals consumption are associated with higher odds of stunting and thinness, aligning with previous research in India (25) that found that adolescents from peri-urban areas were more likely to be undernourished than their urban counterparts due to limited access to healthcare and nutritious foods. Additionally, larger household sizes have been associated with food insecurity, as resources are often stretched thin, leading to inadequate dietary intake among children and adolescents (26).

The association between maternal literacy and adolescent nutritional status observed in this study is well-documented in the literature. Maternal education is a critical determinant of child and adolescent health, as literate mothers are more likely to have better knowledge of nutrition and health practices and tend to allocate household resources more effectively (27 -30). The finding that girls whose mothers were less literate had a higher likelihood of stunting aligns with the findings of studies conducted in sub-Saharan Africa, which have consistently shown that maternal education is protective against undernutrition (28).

The study also found that girls who consumed only two meals per day were almost seven times more likely to be thin compared to those who consumed three or more meals daily. This finding is consistent with the nutritional guidelines that emphasize the importance of regular meal consumption to meet the increased energy and nutrient needs of adolescents (31). Irregular meal consumption has been associated with a higher risk of undernutrition, as it can lead to insufficient caloric intake, which is particularly detrimental during periods of rapid growth. This may compromise optimal growth and pubertal development in adolescent girls, increasing their vulnerability to stunting, thinness, and delayed maturation. Such nutritional deficits can also impair cognitive performance and school participation, while predisposing girls to adverse reproductive health outcomes later in life.

Overall, this study's findings contribute to the growing body of evidence on adolescent undernutrition in sub-Saharan Africa and

highlight the need for targeted interventions that address the specific risk factors associated with stunting and thinness. The strong association between younger age, peri-urban residence, larger household size, maternal literacy, and undernutrition underlines the importance of a multi-sectoral approach that includes education, healthcare, and social protection measures to improve the nutritional status of adolescent girls in Nigeria.

Co-morbid stunting and thinness in adolescent girls have profound implications that extend across health, development, and socio-economic dimensions. Undernourished adolescent girls are at higher risk of complications during pregnancy and childbirth (32). Stunting is associated with an increased risk of obstructed labour due to a smaller pelvic size (32). At the same time, thinness is linked to low energy reserves, which can lead to maternal mortality, preterm births, and the delivery of low-birth-weight infants (8, 32). These complications can perpetuate a cycle of malnutrition and poor health across generations. Co-morbid stunting and thinness weaken the immune system, making adolescent girls more susceptible to infections. The body's compromised ability to fight infections can lead to more frequent and severe illnesses, further exacerbating nutritional deficits.

Addressing this dual burden requires substantial investment in adolescent health services, including nutrition programs, reproductive health care, and education. Integrated, multi-sectoral interventions targeting chronic and acute undernutrition in adolescents are needed in Nigeria.

The findings of this study have critical implications for school health policies and practices aimed at mitigating undernutrition among adolescent girls. Policy-makers should prioritize the implementation of school-based nutritional programs that not only provide balanced meals but also include regular nutritional assessments and education tailored to both early and late adolescents. Addressing nutritional deficiencies in schools can play a pivotal role in breaking the intergenerational cycle of malnutrition by enhancing cognitive function and overall health, thereby contributing to better academic performance and long-term well-being. Additionally, equity considerations must be central to these interventions, ensuring that resources and support are distributed fairly across urban, peri-urban, and rural areas, particularly for the most vulnerable populations. Targeted efforts to improve maternal education and household nutritional practices can further amplify the effectiveness of these programs, ultimately fostering a more equitable and health-promoting school environment.

Limitations

The study was limited to government-owned secondary schools in two states, potentially reducing the generalizability of the findings to all adolescent girls in southwestern Nigeria or to those in private or boarding schools. Data on sociodemographic and dietary factors were self-reported, which may introduce recall bias or social desirability bias, affecting the accuracy of the data collected.

CONCLUSIONS

This study revealed a notable prevalence of stunting, thinness, and their co-morbidity among in-school adolescent girls in southwestern Nigeria, with younger age, peri-urban residence, lower maternal education, and inadequate dietary practices emerging as significant risk factors.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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