Original Article

The Prevalence of Stunting among Students of 6th Grade Primary Schools in Dhi Qar Governorate-Iraq in 2024

Sadiq Mohsin Muosa, Mazin G. Al-Rubaey

Department of Community Medicine, College of Medicine, Al-Mustansiriyah University, Baghdad, Iraq

Abstract

Background: Stunting affects school-age children's health, mental development, and academic performance. Thus, the purpose of this study was to determine the prevalence of stunting among primary school-age children in the governorate of Dhi Qar, Iraq. **Subjects and Methods:** An institution-based cross-sectional study was done among school children of 6th-grade students in primary schools in Dhi Qar Governorate. Multistage random sampling was done to select the schools. Data on sociodemographic and chronic diseases of children were collected using a structured questionnaire. Anthropometric measurements were done to assess the status of stunting. Data were entered into Excel 356, then transformed to SPSS version 27 for further analysis. $P < 0.05$ was considered significant. **Results:** A total of 3054 school-age children with the mean age of 144.07 ± 10.25 months participated in the study. The overall prevalence of stunting among primary school children was 3.6%. **Conclusion:** Stunting was a major problem among school-age children, but in Iraq depending on this study, there is an acceptable rate of 3.6% which differs from global NGO results; thus, we must do more research to find the details of the prevalence of stunting, not only in adolescents but in all other age groups.

Keywords: Nutritional status, prevalence, school-age children, stunting

Introduction

Adolescents are vulnerable to malnutrition due to their rapid growth and development, as well as their high macro and micronutrient demands.[1] Adolescence is also a window of opportunity for establishing lifelong dietary habits that support the nutritional well-being of generations.[2] The burden of malnutrition in developing countries among adolescents is high.[3]

Stunting is a major public health problem in most developing countries. Stunting is influenced by various factors, including family sociocultural determinants, mothers' occupation, mothers' education, adolescents age[4] and grade, dietary diversity score, meal frequency, and food insecurity status.[5] These factors include also education level, income, employment, and family living habits which can influence children's nutritional conditions. The family as the smallest unit in society has an important role in preventing stunting in children.[6]

The global overall prevalence of adolescent stunting was 10.2% (95% confidence interval: 8.3%–12.2%). Per region, the total estimate was lowest in Europe at 5.5% and highest in Southeast Asia at 19.8%. In boys, stunting prevalence ranged from 1.8% in the British Virgin Islands to 45.2% in Yemen, with the regional estimate being lowest in the Western Pacific (7.9%) and highest in Africa (21.7%). The rate of stunting in girls varied from 0% in Niue to 36.5% in Myanmar. The Western Pacific had the lowest regional estimate of stunting among girls (5.0%), whereas Southeast Asia had the highest (18.2%).[7]

Childhood stunting has been associated with micronutrient deficiencies, repeated enteric infections that increase both nutrient loss and energy requirements, and helminthic infections.[8] Two studies identified associations between

Access this article online

Quick Response Code:

Website: https://journals.lww.com/ircm

DOI: 10.4103/IRJCM.IRJCM_49_24

Address for correspondence: Dr. Mazin G. Al-Rubaey, Department of Community Medicine, College of Medicine, Al-Mustansiriyah University, Baghdad, Iraq.
E-mail: mazinalrubaye@gmail.com

Submitted: 21-Dec-2024 **Revised:** 29-Dec-2024
Accepted: 02-Jan-2025 **Published:** 31-Mar-2025

How to cite this article: Muosa SM, Al-Rubaey MG. The prevalence of stunting among students of 6th grade primary schools in Dhi Qar Governorate-Iraq in 2024. IRAQI J COMMUNITY MED 2025;38:142-5.

the gut microbiome and childhood stunting. Stunting was, however, consistently related with a large number of potential pathogens, including *Escherichia*/*Shigella*, *Campylobacter*, and *Neisseria*. Specific taxonomic groups, such as *Veillonella*, *Neisseria*, *Streptococcus*, and *Haemophilus*, were found to be more common in stunted children across geographies in both duodenal and fecal samples.[9,10]

One probable explanation for observed discrepancies across research is variation in the definition of stunting among studies. While the WHO, growth standard using Z-scores height-for-age z-scores (HAZ <−2) is widely employed to define stunting, some studies defined stunting as a change in Z-scores between two time points. There is ongoing debate over the optimal way to detect children with growth deficiencies and stunting.[11] Some researchers argue that children described as "not stunted" by WHO standards could have significant growth deficits and experience stunting even if they fit into the normal growth range, and that crossing the stunting cutoff does not significantly change their risks and consequences of stunting. They suggest that a more sensitive definition of stunting should be based on a child's growth between two-time points.[11]

Stunting among school-age children is becoming one of the most significant health issues worldwide. Out of 667 million children aged under 5 years, 159 million are too short (stunted) for their age and 52% of them are living in developing countries. About 46.5% of these children are from sub-Saharan Africa of which half of them are severely stunted.[12]

Stunting is usually considered to occur mostly in early life, around the age of 3 years. Children who are stunted when they enter school are more likely to have a background of poor nutrition. However, if their environment improves, children can show catch-up development, implying that interventions among school-age children can enhance efforts in the preschool years to prevent stunting and its impact on children's health and education. School age is a stage of physical and mental development; therefore, continuous undernutrition slows their growth, and it could also increase the susceptibility of children to disease.[12]

Despite continued prevention efforts, child undernutrition remains a major public health problem. Stunting is associated with an increased risk of mortality during childhood. Even when it does not cause death, stunting can impose lifelong damage on a child's health and development.[12]

The negative effects also have a significant impact on the economy, in which s/he lives, studies, and works. Other disadvantages include the following: during their schooling years, stunted children are more likely to repeat grades and drop out, limiting their income-earning capacity later in life. Furthermore, stunted children are less likely to reach their full physical and cognitive development, reducing their productivity.[13]

The aim of this study was to assess the prevalence of stunting in Dhi Qar-Iraq adolescents.

Subjects and Methods

A cross-sectional study was conducted among school-attending adolescents aged 10–14 years. The study was conducted in Dhi Qar, a southern city in Iraq. Administratively, the city is divided into five districts. A total of 3054 pupils of 6th grade primary schools were involved. A multi-stage random sampling procedure was used to select schools. A total of 58 schools were included in the study. From each selected school, all pupils in the 6th class were enrolled.

Stunting was assessed according to the WHO definition for adolescents. Height was measured in centimeters to the nearest 0.5 cm. Weight was measured using a portable standing digital scale to the nearest 10 g. Measurements were transformed into HAZ-scores based on sex and age in the year using WHO AnthroPlus software.[14]

HAZ-scores were categorized according to WHO stunting cutoffs (stunted: <−2 standard deviation [SD]; not stunted: ≥−2 SD).[15] Data were collected using a questionnaire by trained data collectors. WHO AnthroPlus software was used to convert height and weight measurements to Z-scores for 5–19 years.[15]

Ethics approval

This study was approved by the ethical committee of Department of Family and Community Medicine, Medical College, Al-Mustansiriyah University, Baghdad, Iraq, on 28th of April 2024. (3304) Verbal consent was obtained from the participants before filling the questionnaire. Participants were informed that their participation in this study is voluntary, no incentives or compensations will be offered in return, and that they have the right to withdraw from the study at any stage. All the participants' information was kept private by keeping it in a secured folder in a password-protected computer owned by the study investigators. No information was shared with any other individuals or entities.

Results

A total of 3054 school-attending adolescents were included in the study, the mean age of participants was 144 ± 10.3 months.

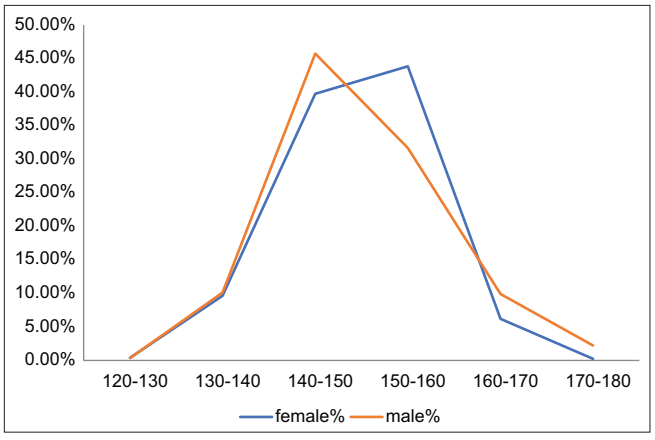

Figure 1: Percent of each height group (in cm) according to sex

For the majority of school adolescents, the mean education level of fathers and mothers was intermediate school level. Table 1 shows the sociodemographic distribution of pupils according to sex, age in years, and year of birth. The highest number (2035) were born in 2012.

Figure 1 shows the percent of each height group (in cm) according to sex where 46% of male students were within the height group (140–150 cm) while 44% of female students were within the height group (150–160 cm).

About 35.43% of the total students were having (−1–0) height-for-age Z-score groups. About 34.72% of male students and 36.02% of female students were within (−1–0), respectively, as shown in Table 2 and Figure 2.

The correlation coefficient (r) for HAZ in relation to all social variables was weak, as shown in Table 3.

The mean of total students for HAZ was shifted to stunting in public schools in comparison to private [Table 4].

There is a statistically significant difference between sexes stunting prevalence [Table 5].

Discussion

In the current study, the prevalence of stunting was 3.14% for both sexes, where 3.67% in females and 2.51% in males which was a lower rate in comparison with a global rate of 10% and other countries except some developed countries,[7,12] we think the change in economic status of Iraqi families after 2003 was the major factor influence nutritional status of adolescents.

This result gives us that the nutritional status is in a good position between countries in the world. The stunting is higher in public schools than in private 3.8%–2.22%, respectively, and both males and females in private schools are lower than public in stunting, which go with the economic level of families.

Furthermore, we see the prevalence of borderline group (HAZ −1–−2 z-score) 15.1% which is high percent and may transform to stunting in any nutritional crises.

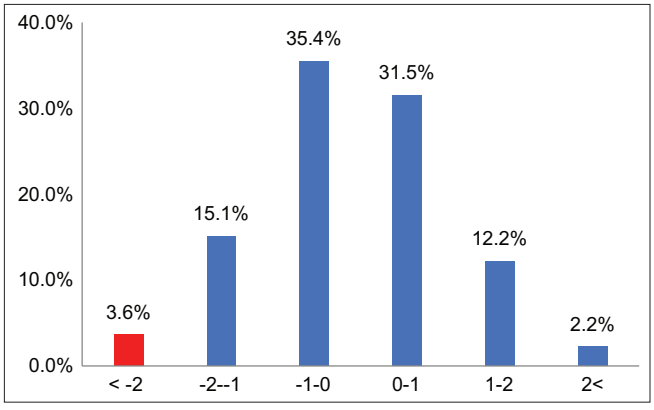

Figure 2: Percent of height age Z-score groups for total students

Table 1: Sociodemographic distribution of pupils according to sex, age in years, and year of birth

Year of birth	Female	Male	Total	Age (years)
2008	9	11	20	16
2009	45	43	88	15
2010	95	110	205	14
2011	288	249	537	13
2012	1122	913	2035	12
2013	101	68	169	11
Total	1660	1394	3054	

Table 2: Percent of height age *Z*-score groups according to sex

HAZ groups	Female (%)	Male (%)	Total (%)	Female	Male	Total
5–4	0.00	0.07	0.03		1	1
4–3	0.42	0.36	0.39	7	5	12
3–2	3.67	2.51	3.14	61	35	96
2–1	16.02	13.99	15.09	266	195	461
1–0	36.02	34.72	35.43	598	484	1082
0–1	30.66	32.57	31.53	509	454	963
1–2	11.57	12.91	12.18	192	180	372
2–3	1.63	2.65	2.10	27	37	64
3–4	0.00	0.22	0.10		3	3

HAZ: Height-for-age *Z*-score

Table 3: Variables (social) with correlation coefficient (*r*) for height-for-age *Z*-score

Correlation coefficient	Variables	*r* for HAZ
Spearman's rho	Disease	0.045
Kendall's tau_b	Mother education	0.107
Kendall's tau_b	Father education	0.072
Pearson correlation	Brothers total numbers	−0.106
Kendall's tau_b	Rank between brothers	−0.012

HAZ: Height-for-age *Z*-score

Table 4: Prevalence of short stature percent according to type of school

	Female	Male	Grand total	Female	Male	Grand total
Private	5	5	10	3.45	1.64	2.22
Public	63	36	99	4.16	3.31	3.80
Total	68	41	109	3.67	2.51	3.14

Table 5: Height-for-age *Z*-score means, number, and standard deviation for sex

Sex	HAZ			
	Mean	*n*	SD	*P*
Female	−0.1660	1660	1.01976	0.001
Male	−0.0409	1394	1.04525	
Total	−0.1089	3054	1.03319	

HAZ: Height-for-age *Z*-score, SD: Standard deviation

There is a statistically significant difference between sex stunting prevalence and the mean of total students for HAZ was shifted to stunting in public schools in comparison to private. The correlation coefficient (r) for HAZ in relation to all social variables is weak and has no correlation.

Conclusion

We conclude from the current study, that the prevalence of stunting in Dhi Qar-Iraq with acceptable range and like rate in developed countries. Because of the difference between males and females in stunting rate, we advise to strength the knowledge of the population about the health and nutrition of females and there must be no difference in care and nutrition between males and females. The private school has better nutritional status students than public schools.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Das JK, Salam RA, Thornburg KL, Prentice AM, Campisi S, Lassi ZS, *et al.* Nutrition in adolescents: Physiology, metabolism, and nutritional needs. Ann N Y Acad Sci 2017;1393:21-33.
2. Ivers LC, Cullen KA. Food insecurity: Special considerations for women. Am J Clin Nutr 2011;94:1740S-4S.
3. Manyanga T, El-Sayed H, Doku DT, Randall JR. The prevalence of underweight, overweight, obesity and associated risk factors among school-going adolescents in seven African countries. BMC Public Health 2014;14:887.
4. Gagebo DD, Kerbo AA, Thangavel T. Undernutrition and associated factors among adolescent girls in Damot sore district, Southern Ethiopia. J Nutr Metab 2020;2020:1-11.
5. Tamrat A, Yeshaw Y, Dadi AF. Stunting and its associated factors among early adolescent school girls of Gondar town, Northwest Ethiopia: A school-based cross-sectional study. Biomed Res Int 2020;2020:1-6.
6. Harahap H, Syam A, Palutturi S, Syafar M, Hadi AJ, Ahmad H, *et al.* Stunting and family socio-cultural determinant factors: A systematic review. Pharmacogn J 2024;16:268-75.
7. Caleyachetty R, Thomas GN, Kengne AP, Echouffo-Tcheugui JB, Schilsky S, Khodabocus J, *et al.* The double burden of malnutrition among adolescents: Analysis of data from the global school-based student health and health behavior in school-aged children surveys in 57 low- and middle-income countries. Am J Clin Nutr 2018;108:414-24.
8. Chibuye M, Mende DR, Spijker R, Simuyandi M, Luchen CC, Bosomprah S, *et al.* Systematic review of associations between gut microbiome composition and stunting in under-five children. NPJ Biofilms Microbiomes 2024;10:46.
9. Kamng'ona AW, Young R, Arnold CD, Kortekangas E, Patson N, Jorgensen JM, *et al.* The association of gut microbiota characteristics in Malawian infants with growth and inflammation. Sci Rep 2019;9:12893.
10. Robertson RC, Edens TJ, Carr L, Mutasa K, Gough EK, Evans C, *et al.* The gut microbiome and early-life growth in a population with high prevalence of stunting. Nat Commun 2023;14:654.
11. de Onis M, Branca F. Childhood stunting: A global perspective. Matern Child Nutr 2016;12 Suppl 1:12-26.
12. Bazie GW, Seid M, Egata G. Prevalence and predictors of stunting among primary school children in Northeast Ethiopia. J Nutr Metab 2021;2021:1-7. 8876851
13. De Onis M, Blössner M. The World Health Organization Global Database on Child Growth and Malnutrition: methodology and applications. Int J Epidemiol 2003;32:518-26. [doi: 10.1093/ije/dyg099].
14. Yallew WW, Tadesse AW, Noor RA, Fawzi W, Berhane Y. Correction: Stunting and thinness in school-attending adolescents in Addis Ababa. BMC Nutr 2023;9:15.
15. Blössner M, Siyam A, Borghi E, Onyango A, De Onis M. WHO Anthro for Personal Computers Software for assessing growth and development of the world's children. Geneva, Switzerland: World Health Organization; 2009.