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STUNTING AND ITS ASSOCIATED FACTORS IN SCHOOL-AGE CHILDREN OF WAH CANTONMENT, PAKISTAN.

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ABSTRACT

BACKGROUND: Stunting is used as one of the indicators of malnutrition in children. Children are considered stunted if their height-for-age is less than two standard deviations of the World Health Organization (WHO) Child Growth Standards median. Data related to stunting in older children is scanty so this study was planned. **OBJECTIVE:** To determine the frequency of stunting in school-going children of Wah Cantonment and its association with their gender and type of school. **METHODOLOGY:** The study was conducted using a cross-sectional design among primary and middle schools in Wah Cantonment, Pakistan, belonging to both the public and private sectors from August 2024 to October 2024, using a convenient sampling technique. Data was collected using a structured questionnaire and was analysed using SPSS version 25. **RESULTS:** 11.6% of the children were found to be stunted. Out of 60 children with stunting, 27 were males and 33 were females (p-value=0.27). 61.7% of these stunted children were found to be enrolled in public sector schools (p-value=0.02). **CONCLUSION:** The frequency of stunting was relatively lower than in other regions of Pakistan. There was no difference in stunting across genders. The majority of the children with stunting were enrolled in public sector schools, highlighting the need for targeted interventions in public schools to reduce stunting.

KEYWORDS: Child malnutrition, Gender bias, Literacy, Public sector, School-age population, Stunting

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INTRODUCTION

Stunting is used as one of the indicators of malnutrition in children.[1] Children are considered stunted if their height-for-age is less than two standard deviations of the

World Health Organization (WHO) Child Growth Standards median.[2] Children with stunting exhibit delayed growth and developmental delays as a result of nutritional deficiencies, frequent illnesses, and a lack of cognitive stimulation, so stunting in children is regarded as a major public health issue.[3] The global prevalence of stunting recorded in 2022 was 22.3%, so a target was set to reduce it to 13.5% by 2030. Due to the efforts of international organisations like the Food and Agriculture Organization (FAO), United Nations Children's Fund (UNICEF), and WHO, a steady decline in stunting is observed.[4]

According to a global study conducted in 2023 among low-middle-income countries, 32% of the children were found to be stunted.[5] According to recent estimates, the prevalence of childhood stunting has reduced from 34.7% to 21.2% in the Eastern Mediterranean region over the last two decades.[6] In Pakistan, the current prevalence of stunting is around 40%, and it is targeted to be reduced to 25.5% by 2025.[6,7] Understanding the factors associated with stunting is very important to achieve this target. Stunting and malnutrition have been linked to the consumption of low-quality and quantity food, increased food insecurity, and increased rates of infections. In Pakistan, the floods of 2022 further aggravated the situation, especially in areas that were heavily hit by flooding, as access to necessities like safe drinking water and healthcare was severely hampered.[8,9]

The literature was mainly focused on malnutrition in children under five, and global targets were also set, considering this particular age group. According to WHO, a child is defined as an individual under eighteen years of age, so stunting should also be assessed among children of school-going age.[9] Stunting in preschool has been studied quite extensively, but literature on school-age children is scanty**.** On a global level, studies were found, which were conducted among school-age children in Ethiopia, India, Peru, and Vietnam majorly.[2,10,11] On the national level, stunting and its associated factors were studied across different districts of Punjab in 2015, then among the children of Multan and then in the flood-affected districts of KPK.[12–14] As a result, studies evaluating regional differences in the occurrence of stunting are limited for older children. Our study will attempt to determine the frequency of stunting in school-going children of Wah Cantonment to address this gap in data related to stunting, especially among school-age children, and in order to determine factors associated with stunting in school-age children, the association of gender and type of school will also be assessed.

MATERAIL AND METHODS

The study was conducted using a cross-sectional design among primary and middle schools in Wah Cantonment, Pakistan, belonging to both the public and private sectors from August 2024 to October 2024.

School-going children of both sexes from the ages 6 to 12 years,[13] enrolled in primary and middle schools of Wah Cantonment were included in the study using a convenient sampling technique. Children with any inherited genetic disease or any autoimmune disease were excluded from the study.[15]

The minimum sample size required to conduct this study was calculated using the sample size calculation formula for prevalence studies considering P= 0.405[13] and the margin of error to be 5%. It was calculated to be 372. We included 519 children in our study as their parents consented to their inclusion in the study during the phase of data collection voluntarily.

$N = Z^2P (1-P) / e^2$

$N= (1.96)^2 \times 0.405 (1-0.405)/ (0.05)^2$

N= 372

Where Z = Value for 95% confidence interval, e = Alpha error, P = Prevalence

For conducting the study, ethical approval was granted by the Institutional Review Board of Wah Medical College, Wah Cantt, vide letter no. WMC/ERC/IRB/047 dated 27th May, 2024. After getting ethical approval, four schools from the public and private sector each were short-listed based on convenience of approach. Permission was acquired from Federal Govt. Educational Institutes Directorate, Wah Cantt and from the four private school administrations for data collection. After making a prior appointment, two members of the research team visited the schools every week during the phase of data collection. The consent forms were sent to the respective schools for prior permission from the parents. The children were enrolled in the study only after obtaining written informed consent from their parents.

A structured proforma was used to collect data regarding age (years), gender, type of school (public/private sector), height (cm), and nutritional status (normal/stunted). The child's name and father's name were also recorded but only for the purpose of identification. The height of the children was measured using wall-mounted stadiometers [16]. The age of the students was verified from the school record. The measured height (cm) and the recorded age (years) were plotted on the gender-specific "WHO z-score height-for-age charts (5-19 years)" for each child, which is available on the official WHO website.[17] The children with height-for-age less than two standard deviations of the WHO Child Growth Standards median were categorised as stunted.[18]

Data was analysed using SPSS version 25. For the age and height of the children, the median and IQR were calculated. Frequencies and percentages for the variables of gender, type of school and nutritional status of the children were calculated. The Chi-square test was used to establish the association of gender and type of school with the nutritional status of the children. A p-value < 0.05 was considered as significant.

RESULTS

The study included 519 children from Wah Cantonment, with a median age of 9.3 (4) years. The median height of the students was reported to be 132 (22.1) cm, as shown in Table I. The majority of the enrolled students were male (51.6%). Most of the participating students were enrolled in private sector schools (52.2%), as shown in Table II.

It was found that 11.6% (60 out of 519) of the children were found to be stunted. Out of 60 children with stunting, 27 were males and 33 were females (p-value=0.27) (Fig. I) and out of them, 61.7% were found to be enrolled in public sector schools (p-value=0.02) (Table III).

Table I. Descriptive statistics of age and height of the students (N=519)

Variable	Minimum value	Maximum Value	Median (IQR)
Age (years)	6	12	9.30 (4.0)
Height (cm)	96	186	132 (22.1)

Table II. Descriptive statistics of gender of students and their type of schools (N=519)

Variable	Frequency	Percentage
Gender		
Male	268	51.6
Female	251	48.4
School Type		
Public Sector	246	47.4
Private Sector	273	52.6

Table III. Distribution of stunting across types of schools

Status	School types			p-value*
	Public	Private	Total	
Stunted	37 (61.7)	23 (38.3)	60	0.02
Not-stunted	211(45.9)	248 (54.1)	459	

*** Chi-square test**

FIGURE

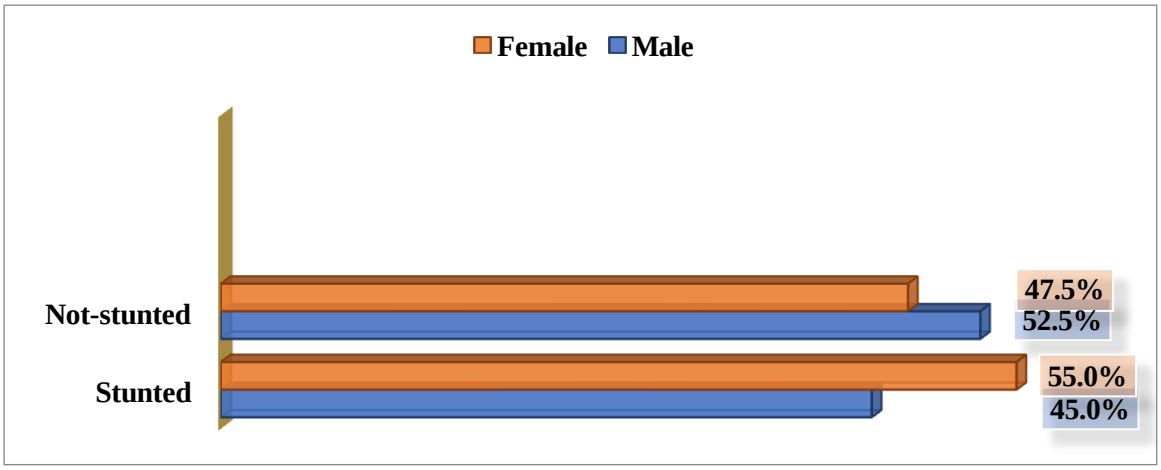

Figure I. Distribution of stunting across Gender (Chi-square test p-value=0.27)

DISCUSSION

This research was conducted to determine the frequency of stunting and associated factors among school-going children in Wah Cantt, Pakistan. The results showed that 11.6% of the children were found to be stunted. There was no difference in stunting across genders. The majority of the children with stunting were found to be attending public-sector schools. Stunting was shown to be prevalent in 23% of school-aged children in Pakistan, according to a recent systematic review.[19] Although the prevalence of stunting among school-going children in Wah Cantonment is lower than in other regions of Pakistan, it still underscores a notable public health issue, as stunting is frequently linked to chronic malnutrition, potentially affecting both cognitive and physical growth in the long run. This can result in the use of health resources, as stunting may contribute to chronic diseases and a compromised immune system, increasing a child's susceptibility to infections, as well as hindering growth and development.[20] This phenomenon may yield significant economic consequences, particularly in developing nations like Pakistan. Over time, this may lead to higher healthcare expenses and decreased workforce efficiency and overall productivity.[21]

A number of studies have been carried out globally to investigate the prevalence of stunting. In developed nations such as China, America, and the UK, the occurrence of stunting is less common compared to developing countries like India, Pakistan, Bangladesh, and Ethiopia, where it is more prevalent.[22] With 57% of cases, Ethiopia had the highest stunting among school-age children.[23] These data suggest that equity in resource distribution, improved socioeconomic position, adequate nutrition, high literacy rates, and superior healthcare services constitute key predictors of stunting.

In our study, there was no significant difference in the prevalence of stunting among boys and girls. This finding

contradicts Pakistan's cultural trends as the household resource allocation mostly favours the male child as they are considered inheritors of wealth.[24] This was noted in another study in the Punjab province of Pakistan, where females under five children were found to be at more risk of stunting due to gender-biased resource allocation of households. [25]. Another study conducted among children and adolescents in Sindh reported that 37% of females were stunted, as compared to 27% of males.[26]. The results of our study highlight the significance of education in relation to stunting, as the literacy rate in Wah Cantt is 100%.[27] Consequently, education is crucial in mitigating stunting, especially in lower middle-income nations. The solution to the issue of gender disparities is enhanced literacy and the empowerment of women. A countrywide survey in Pakistan utilising household data indicated that women's empowerment correlated with reduced stunting rates among young children, with consistent results across provincial regions.[28]

Interestingly, our study found that stunting was more prevalent among children attending public sector schools. This is consistent with findings from other regions. The prevalence of stunting was found to be much greater among students enrolled in public schools in the Hohoe Municipality of Ghana (12%) compared to those enrolled in private schools (3%).[29] Another study conducted in Faisalabad pointed out that around 71.6% of the stunted children included in the study were enrolled in public sector schools.[30] This disparity can be attributed to differences in socioeconomic status, access to nutritional resources, and overall living conditions. This is reflected in another study when it was found that in Multan District, the frequency of stunting among children living in rural areas was higher compared to the children living in urban society, with percentages of 58.7 and 41.3, respectively.[31]

Inadequate funding, a lack of access to balanced nutrition, and limited health services are all factors that public schools may face, which can lead to higher stunting rates. In contrast, private schools often have better resources and support systems, which can help mitigate the risks of malnutrition. Our results highlight the need for public school-based targeted interventions to reduce stunting. These interventions should aim to improve children's nutritional programs, health education, and healthcare access. By doing so, we can promote healthy growth and development in children, improving their educational outcomes and overall quality of life.

Stunting can be prevented through the implementation of various effective strategies. To prevent stunting in school-aged children in various regions of India and Bangladesh, food supplements were introduced in schools. This initiative is commendable, as it fosters the health and growth of children, thereby effectively preventing stunting.[32,33] Additionally, it is imperative to identify high-risk areas and allocate resources to them in order to prevent stunting and enhance the overall outcome. Resolving cultural norms is necessary, as females should receive the same nutrition as boys. This can be achieved by promoting education in regions where discrimination is prevalent. These measures would have a beneficial effect on the general welfare of children, which in turn would stimulate economic growth.

The intricacy of addressing stunting is underscored by the diverse findings concerning gender disparities and the distinction between public and private school students. These distinctions highlight the necessity of customised interventions to account for the unique environments of various educational systems and gender-specific challenges. Developing effective strategies to combat stunting and improve health is contingent upon understanding these dynamics.

Our study has some limitations. We used a non-random sampling technique and selected eight schools at our ease due to resource constraints. This will affect the generalizability of our findings. In this regard, a study involving more schools in the area and using a random type of sampling technique can further improve the results.

CONCLUSION

11.6% of the children were found to be stunted in Wah Cantonment. There was no difference in stunting across genders. The majority of the children with stunting were enrolled in public sector schools, highlighting the need for targeted interventions in public schools to reduce stunting.

ETHICS APPROVAL: The ERC gave ethical review approval.WMC/ERC/IRB/047 DATED 27TH MAY 2024.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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