Anthropometric Measurements of Under 5 Years Children to Assess Their Nutrition Status and Growth

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Abstract

Background: The problem of malnutrition and weakness in children under 5 years of age in India is very abundant. Poverty and lack of education regarding nutrition and wellbeing are cited as the main causes of this problem. The study aims to raise awareness about this issue and highlights the importance of anthropometric measurements (such as height, weight, and body mass index) in identifying children at risk of malnutrition. Accurate anthropometric data is essential in assessing the effectiveness of health and nutrition interventions and guiding future planning. The study also acknowledges the role of cultural norms in dietary prospective study was conducted in the department of Pediatrics, MMMC&H Solan. Weight, Length and head circumference was done as per World Health Organisation (WHO) guidelines and 2017-2018 Anthropometry manuals by National Health and Nutrition Examination Survey, conducted by the National Centre for Health Statistics. **Results:** maximum participants (23.8%) belonged to 12–23 months of age whether the participant was girl (30.8%) or boy (35.6%). The wasting (severe and moderate) was observed among 22.1% of participants; while 30.3% participants were stunted (severe and moderate), 25.8% were underweight (severe and moderate). The proportion of wasting was higher among boys, whereas the proportion of stunting and underweight was higher among girls. **Conclusion:** Our study sheds light on the prevailing issues of malnutrition and weakness among children under 5 years in India, specifically in the Solan region. Poverty and lack of nutritional education emerge as primary contributors to this problem. Anthropometric measurements, including height, weight, and body mass index, play a pivotal role in identifying children at risk of malnutrition.

Keywords: malnutrition, anthropometric measurements, children

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Introduction

India as a country is facing a huge problem of malnutrition and weakness in children of age less than 5 years. It is apparent that poverty and lack of education in relation to nutrition and wellbeing of children is the major cause of these problems. Our study aims at generating awareness of this issue. Weight, height or length measurements will give us important hints on wellbeing, nutrition and health and thus these measures are very significant in locating infants and children who may already be at the risk of the same. Protein and calorie related malnutrition may cause generalized weakness, delayed wound healing and decreased resistance to infection. Anthropometric measurements are non-invasive quantitative measurements of the body. According to the Centers for Disease Control and Prevention (CDC), anthropometry provides a valuable assessment of nutritional status in children.

The core elements of anthropometry are height, weight, head circumference, Weight for height/ length, body mass index (BMI), body circumferences to assess for adiposity (waist, hip, and limbs), and skinfold thickness. According to the American Academy of Pediatrics and the Child Health and Disability Prevention (CHDP) Program Health Assessment Guidelines, accurate serial anthropometric measurements can help identify underlying medical, nutritional, or social problems in children. Some of the key indicators of the

nutritional status of a given population are based on anthropometric data. Accurate anthropometric data are critical to provide reliable information to policy makers, programme managers, researchers and advocates, especially in the nutrition field. The quality of anthropometric data is also important in assessing how health and nutrition interventions are implemented and in guiding subsequent planning. Therefore, in this study, we aimed to investigate the extent of undernutrition, overweight and obesity among under-five children. The findings are expected to provide important insights on this understudied area of pediatric nutrition in Solan among researchers, health policy makers and other stakeholders.

Material Method

After obtaining approval from the Institutional Ethical Committee, a prospective study was conducted in the department of Pediatrics, MMMC&H Solan.

Study Design: The study was a prospective observational; hospital based cross-sectional study.

Study Period: 3 Months

Sample Size: All children admitted in the pediatric ward over the next 3 months w.e.f the date of approval.

Selection of Patients: Children admitted in pediatric ward of MMMCH, MMU, Solan.

Inclusion criteria: Children From the age of 6 months to 5 years.

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Exclusion criteria: Patients who are on ventilator Or CPAP support.

Weight, Length and head circumference was done as per World Health Organisation (WHO) guidelines and 2017-2018 Anthropometry manuals by National Health and Nutrition Examination Survey, conducted by the National Centre for Health Statistics.¹ In the child of less than two years, length was measured, else height was measured. If accurate age was not possible, length was measured if the child is less than 85cm. Height was measured if the child was equal to or greater than 85cm. WHO growth charts were used to calculate weight for length/height.² WHO Classification was used to grade the nutritional status of the children.³ **Socioeconomic Status**

Modified Kuppuswami scale 2021 was used for the study.⁴

Education status

Education status of caretaker was assessed as per 2014 Indian government classification/description.⁵

Results

A total of 600 children participated in the study. In the study, boys and girls' frequency (%) accounted for 337 (56.2%) and 263 (43.8%). The age-wise distribution among boys and girls of children can be well observed in Table 1, as maximum participants (23.8%) belonged to 12–23 months of age whether the participant was girl (30.8%) or boy (35.6%). The wasting (severe and moderate) was observed among 22.1% of participants; while 30.3% participants were stunted (severe and moderate), 25.8% were underweight (severe and moderate) [Table 2]. The proportion of wasting was higher among boys, whereas the proportion of stunting and underweight was higher among girls.

Table 1: Distribu			
Age (in months)	Boys	Girls	Total
6-12	40(11.8)	20(7.6)	60(10)
13-23	110(32)	76(28.8)	186(31)
24-35	77(22.8)	71(26.9)	148(24.6)
36-47	48(14.2)	50(19.0)	98(16.3)
48-59	62(18.4)	46(17.4)	108(18)
Total	337(56.2)	263(43.8)	600(100)

 Table 2: Other demographic characteristics (Socioeconomic status and Education status)

Kuppuswamy Scale	Total		
26-29	26(4.3)		
16-25	456(76)		
11-15	76(12.6)		
5-10	33(5.5)		
Below 5	08(1.3)		
Education			
Pre-Primary	12(2)		
Primary	20(3.3)		
Upper Primary	56(9.3)		
Secondary	450(75)		
Senior Secondary	42(7)		
Above	20(3.3)		

Table 3: Prevalence of malnutrition	among	children	using	the
WHO child growth standards				

Characteristics							
	oys	irls	otal				
	n-337)	n-263)	n-600)				
Weight for Height (Z score)							
No wasting (>-2SD)							
	28(67.6)	91(72.6)	19(69.8)				
Moderate wasting							
(<-2SD)	2(12.4)	8(14.4)	0(13.3)				
Severe wasting (<-3SD)							
_	5(10.5)	8(6.9)	3(8.8)				
Overweight							
	5(7.4)	1(4.1)	6 (6)				
Obese							
	(2)	(1.9)	2(2)				
Weig	Weight-for-age (Z-score)						
No underweight (>-2 SD)							
	42(71.8)	03(77.1)	45(74.2)				
Moderate underweight (<-							
2SD)	0(23.7)	2(19.7)	32(22)				
Severe underweight (<-3							
SD)	5(4.5)	(3.2)	3(3.8)				
Height-for-age (Z-score)							
No stunting (>-2 SD)							
	20(65.2)	98(75.2)	18(69.7)				
Moderate stunting (-2 SD)							
	00(29.6)	2 (19.7)	52(25.3)				
Severe stunting (-3 SD)							
	7(5.2)	3(5.1)	0(5)				

Discussion

The time trend of undernourished children in India is showing a declining pattern, but the pace of reduction is not matching the criteria set by the United Nations Development Project under millennium development goals for India. This is matter of concern as undernutrition causes a significant contribution in under-5-year children mortality. The present study conducted in this area showed the prevalence of stunting, underweight, and wasting among the study participants as 30.3%, 25.8%, and 30.1%, respectively, which when compared to latest available data of NHFS-5 6(Himachal Pradesh), the prevalence for stunting (30.8%) and wasting (30.3%) were similar but it differentiated underweight (25.5%) rate. When comparing to NFHS-4 (Himachal Pradesh) which provides an older scenario, the prevalence rate of stunting, underweight, and wasting calculated in it was of lower range when compared with our study. The prevalence of stunting and underweight was coming out to be on lower side in our study in comparison to other studies. The present study showed the highest prevalence for stunting (41.3%), followed by underweight (30.8%) and least for wasting (24.3%). Similar trends for prevalence were noticed in NFHS-5 (Himachal Pradesh, stunting 30.8%, underweight 25.5%, and wasting 30.1%) and other studies but differed from Bose and Mandal's observation. In our study we also saw prevalence of obesity and overweight which was 6 and 2 % respectively, which was comparative of NFHS-5 data.

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Conclusion

In conclusion, our study sheds light on the prevailing issues of malnutrition and weakness among children under 5 years in India, specifically in the Solan region. Poverty and lack of nutritional education emerge as primary contributors to this problem. Anthropometric measurements, including height, weight, and body mass index, play a pivotal role in identifying children at risk of malnutrition.

The study emphasizes the significance of accurate anthropometric data in assessing the effectiveness of health and nutrition interventions. Moreover, it recognizes the influence of cultural norms on dietary practices, acknowledging the diversity in multicultural societies.

The findings reveal a considerable prevalence of stunting, underweight, and wasting among the studied children. This underscores the urgent need for targeted interventions and awareness programs to address the nutritional challenges faced by this vulnerable population. Our study contributes valuable insights that can inform policymakers, health professionals, and researchers in designing strategies to improve the nutrition status and overall well-being of children under 5 years in the Solan region.

References

1. Status WP. The use and interpretation of anthropometry. WHO technical report series. 1995;854(9).

- 2. WHO Multicentre Growth Reference Study Group: WHO Child Growth Standards: Length/ height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-forage: Methods and development. Geneva, World Health Organization, 2006.
- 3. World Health Organization, and Unicef. "WHO child growth standards and the identification of severe acute malnutrition in infants and children: a joint statement by the World Health Organization and the United Nations Children's Fund." Geneva: World Health Organization (2009).
- 4. Saleem SM. Modified Kuppuswamy socioeconomic scale updated for the year 2019. Indian J Forensic Community Med. 2019;6:1–3.
- Varghese NV, Malik G, editors. India higher education report 2015. New Delhi: Routledge India; 2015 Dec 22. National Family Health Survey (NFHS)-5, State and District Factsheets, Himachal Pradesh.

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