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Nutritional status of children in Uttarakhand: A case study

ANURADHA DUTTA[1], AMRESH SIROHI[2], PRATIBHA SINGH[3], SUDHA JUKARIA[4], SHASHI TEWARI[4], NIVEDITA PRASAD[1], DEEPA JOSHI[1], SHWETA SURI[1] and SHAYANI BOSE[1]

[1]Department of Food and Nutrition, College of Home Science, G. B. Pant University of Agriculture and Technology, Pantnagar (U.S. Nagar, Uttarakhand), [2]Krishi Vigyan Kendra, Matela, P.O. Kosi (Almora, Uttarakhand), [3]Krishi Vigyan Kendra, Kashipur (U.S.Nagar, Uttarakhand), [4]Krishi Vigyan Kendra, Jeolikote, (Nainital, Uttarakhand)

ABSTRACT: Malnutrition is a growing problem in developing countries like India. Therefore it is important to examine the nutritional status of children and scale-up measures to tackle the growing cases of malnutrition. In the present study children of Uttarakhand state were examined for their nutritional status. Children of age (0 to 6 years) were selected randomly from three locations of Uttarakhand. A structured questionnaire was framed to collect baseline information. The study revealed that children residing in the *Tarai* region were the most undernourished of the three regions studied. The results showed that 53.73 per cent of children were underweight however 43.28 per cent of children under five years of age were found to be wasted.

Key words: Anthropometric assessment, children, malnutrition, POSHAN Abhiyan, Uttarakhand

POSHAN Abhiyan or National Nutrition Mission is a flagship program of the Government of India which aims to improve the nutritional status of children, pregnant woman, and lactating mothers. On the occasion of International Woman's day, in the year 2018, the Honorable Prime Minister launched the POSHAN (Prime Minister Overarching Scheme for Holistic Nutrition) ABHIYAN from Jhunjhunu in Rajasthan (POSHAN Abhiyan portal, 2020). According to the Ministry of Woman & Child Development (2020) from the year 2018 onwards, a total of 20, 79, 13,864 activities have been performed in the whole country in which 850, 52, 14,693 people have participated under the POSHANA bhiyan.

POSHAN Abhiyan was envisaged because malnutrition is a major health problem in developing countries. According to NFHS -4 data 35.70 per cent of children under 5 years are underweight and 58.7 per cent of children below 1 year are anemic (National Family Health Survey, 2015-16).

In the article Helping India Combat Persistently High Rates of Malnutrition (2013), the World Bank estimated that India is one of the highest-ranking countries in terms of malnutrition where cases are double that of Sub Saharan Africa (World Bank report, 2013).According to the new mortality estimates Levels & Trends in Child Mortality published by UNICEF, World Health Organization, Population Division of the United Nations Department of Economic and Social Affairs, and World Bank Group, the under-five mortality rate (deaths per 1,000 live births) in India has declined to 34 in 2019 from 126 in 1990 (United Nations report, 2019).The country registered a 4.5 per cent annual rate of reduction in under-five mortality between the years 1990-2019. The number of under-five deaths in India dropped from 3.4 million in 1990 to 824,000 in 2019(United Nations report, 2019).

Malnutrition is mainly of three types: overnutrition, undernutrition, and deficiency in micronutrients. Children coming from low-income groups are more malnourished than the high-income group. In the high-income group and in urban areas the prevalence of overnutrition is higher. In contrast in the low-income groups and rural areas, the prevalence of underweight is more (Sahu *et al*., 2015). Food distribution, dietary pattern (that focuses on variety in the diet), poverty, and cultural beliefs are the main causes of malnutrition in India.

In the year 2020 prime minister announced the entire September month as "Rashtriya POSHAN Maah". In Uttarakhand 7278 activities were performed in which 173342 people participated (both in POSHAN Maah and POSHAN Jan Andolan) (POSHAN Abhiyan portal, 2020). One of the two objectives of this campaign was tracking malnutrition in children. To fulfill this objective three Krishi Vigyan Kendras in three agro-climatic situations of the state (mid hills, low hills, and plain regions) took up the task of tracking malnutrition in children in the month of September 2020 in the backdrop of the COVID-19 pandemic, which severely hampered the process of data collection.

MATERIALS AND METHODS

Locale of the study/Study area: A community-based study was conducted among rural children residing in

three regions of Uttarakhand state namely Mid hills (Almora), Low hills (Jeolikote), and *Tarai* region (Udham Singh Nagar).

Study population: Children of age (0 to 6 years) were selected randomly from three regions of Uttarakhand. Due to the prevailing COVID-19 conditions, it was possible to collect information from 67 respondents after following guidelines given by the government for standard operating procedures.

Data collection: A questionnaire was framed based on available questionnaires at the Krishi Vigyan Kendras for collecting baseline information on general characteristics and nutritional profile of the study children. The nutritional profile included the anthropometric estimations of the study children. Weight, height, age, and gender of the study children were recorded. The weight of the children was measured with the least clothing using a SECA digital weighing balance. Height was measured by using an anthropometric rod. Anthropometric indices such as weight for height and weight for age were assessed using standard z-score World Health Organization standard (WHO, 2006).The weight for height reflects the presence of acute and chronic malnutrition in children while the weight for age indices reflects the occurrence of underweight. Data collection was done by professionals working in the KrishiVigyanKendras of the selected regions.

Statistical analysis: The statistical tools used for the analysis of the nutritional status of the study children were Mean, Frequency and Standard Deviation (Snedecor and Cochran, 1980).

RESULTS AND DISCUSSION

Nutritional status of the study children

The results showed that out of all children (n=67) studied 49.25 per cent were boys and 50.75 per cent were girls (Table 1). The mean weight of 10.92 kg ±2.86 and mean height of 86.33cm ±12.70 was reported in the study children. Of the total children, the majority belonged to 2-3 year age group (Figure 1).As per the area-wise distribution of children, the highest number of children belonged to mid-hills (44.77 per cent) followed by the *Tarai* area/plains (32.85 per cent) and low hills (22.38 per cent) as shown in Figure 2.

The nutritional assessment of study children presented in Table 2 revealed that the majority of children have normal (46.26 per cent) weight for height while 31.34 per cent of children were moderately malnourished, and 11.94 per cent children were severely malnourished. Thus, the study results revealed that 43.28 per cent children have low weight for height i.e. wasting. On the other hand, 7.47 per cent of children were obese and 2.99 per cent were overweight. Rehan *et al.* (2020) studied the prevalence of underweight and stunting in children under five years in urban and rural areas of Uttarakhand and reported that the prevalence of underweight was 37.3 per cent, stunting 43.3 percent and wasting 24.5 per cent.

According to the NFHS-4 report shown in Table 3, in Uttarakhand state 19.5 per cent of children under five years of age have low weight for height and are considered as wasted while 43.28 per cent of children were found to be wastedin the present study (National Family Health Survey, 2015-16). Based on the weight for age analysis, 46.27 per cent of the children belonged to the normal category, while 29.85 per cent of children were moderately malnourished and 23.88 per cent were severely malnourished. Thus a total of 53.73 per cent of children were underweight.As per the NFHS-4 report, in Uttarakhand, 26.6 per cent of children less than 5 years were underweight or have low weight-for-age.

Table 3 revealed that when the data for low weight for height (wasting) and weight for age (underweight) of the children under study was compared with the NFHS-4 data for Uttarakhand, unfortunately their nutritional status was found to be poor than the NFHS-4 state data. This shows that the percentage of wasted and underweight children were more in the study population as compared to the NFHS data for Uttarakhand state. However this might be due to the smaller sample size taken in the study.

Table 1: General characteristics of study children (n=67)

Particulars	Number (n)	Percentage (%)
Age		
Less than 1 year	4	5.97
1-2 years	9	13.43
2-3years	22	32.83
3-4years	13	19.40
4-5years	15	22.38
5 years and above	4	5.97
Gender		
Male	33	49.25
Female	34	50.75

Table 2: Nutritional status of the study children (n=67)

Particulars	Number (n)	Percentage (%)
Anthropometric Indices		
Weight for Height		
Obese	5	7.47
Overweight	2	2.99
Normal	31	46.26
Moderately malnourished	21	31.34
Severely malnourished	8	11.94
Weight for Age		
Normal	31	46.27
Moderately malnourished	20	29.85
Severely malnourished	16	23.88

Table 3: NFHS-4 data for nutritional status of children of Uttarakhand state

Nutritional Attributes	NFHS-4 data	Present study
Low Weight for Height/ Wasting	19.5%	43.28 %
Low Weight for Age/ Underweight	26.6 %	53.73%

Table 4: Age-wise distribution of mean weight (in kg) & height (cm) among Boys and Girls

Age (Years)	Mean Weight(Kg) Boys	Mean Weight(Kg) Girls
Less than 1 year	6.35±0.63	4.10±0.14
1-2	10.05±1.98	7.80±2.66
2-3	11.42±2.71	9.56±1.71
3-4	11.96±1.20	11.20±1.55
4-5	13.92±2.63	11.67±1.35
5 and above	15.83±2.57	12.60±0.00
Age (Years)	Mean Height(Cm) Boys	Mean Height(Cm) Girls
Less than 1 year	61.15±5.86	51.94±5.57
1-2	81.98±5.11	69.96±4.33
2-3	82.82±8.28	85.06±11.36
3-4	90.84±7.80	89.62±2.17
4-5	101.27±11.60	93.74±4.50
5 and above	100.83±10.11	95.00±0.00

*Mean ± S.D.

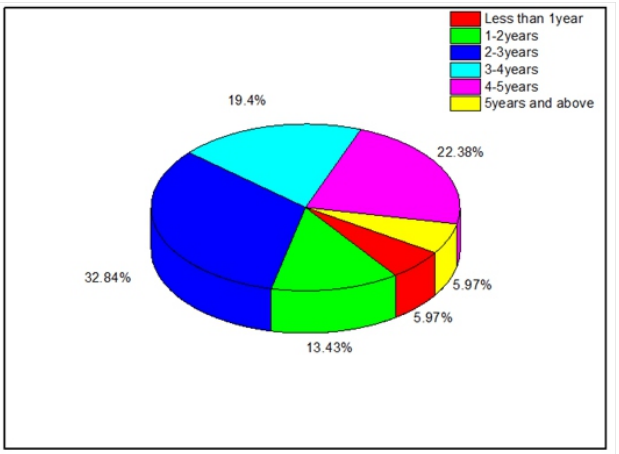

Figure 1: Age-wise distribution of study children

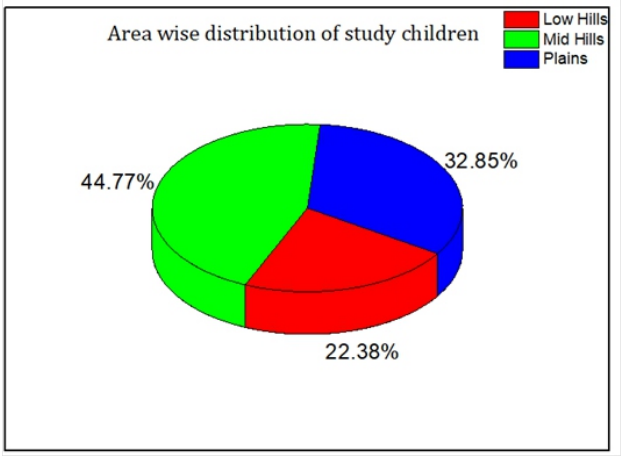

Figure 2: Area wise distribution of study children

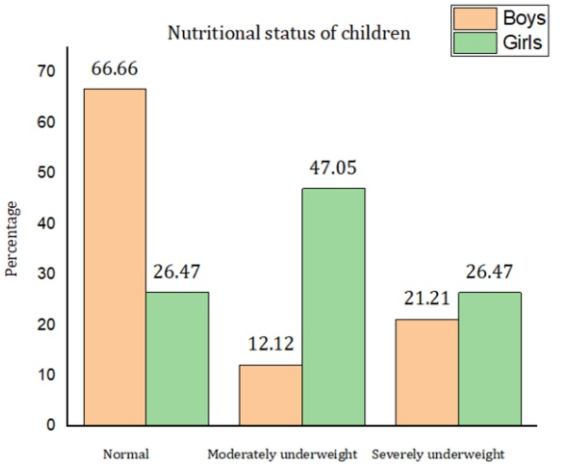

Figure 3: Comparison of nutritional status of girls and boys

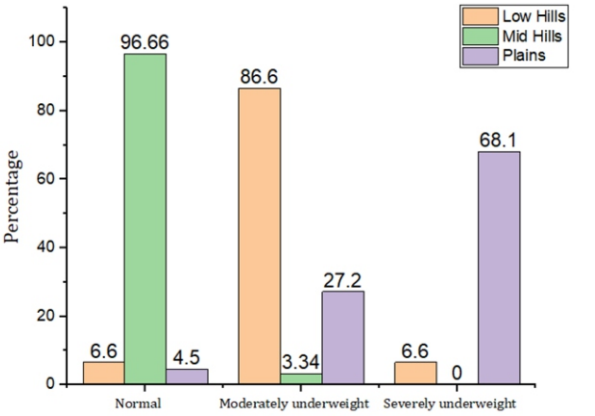

Figure 4: Distribution of children based on the different study area

Comparison of nutritional status of boys and girls in the study area

Comparison of nutritional status of the boys and girls as shown in Figure 3 revealed that a majority of boys (66.66 per cent) fall in the normal category while the majority of girls (47.05 per cent) were moderately underweight. Likewise, the rate of severe undernutrition was high in girls (26.47 per cent) as compared to boys (21.21 per cent). The data revealed that the nutritional status of the girl child is of great concern.

Based on the comparison of nutritional status of children among different study areas (Figure 4), it can be stated that the highest portion of severely underweight children belonged to the *Tarai* region per cent (68.10 per cent) while the highest percentage of moderately underweight children belonged to low hills (86.60 per cent). However, the highest portion of normal children belongedto mid-hills (96.66 per cent).The nutritional status assessment indicated that children residing in the *Tarai* region (Udham Singh Nagar) require immediate focussed attention. This can be taken as one of the reasons why

Udham Singh Nagar has been identified as an aspirational district of the country.

Age-wise comparison of nutritional status of study children

The age-wise distribution of mean weight and height of boys and girls is shown in Table 4. The results showed that the mean weight of boys in every age group was higher than that of girls. The mean weight of boys from 0 to 5 years and above ranged from 6.35 to 15.83 kg while that of girls of the same age group ranged from 4.10 to 12.60 kg.

The mean height of boys in the age group of 0 to 5 years and above ranged from 61.15 to 100.83 cm. The mean height of girls from 0 to 5 years and above ranged from 51.94 to 95.00 cm. This data is in agreement with the findings presented in Table 1.

CONCLUSION

In the present study, children from three different geographical locations of Uttarakhand state were examined for their nutritional status. The study concluded that 46.26 per cent of children had normal weight for height whereas 31.34 per cent of children were moderately malnourished, 11.94 per cent of children were severely malnourished. The study reported that 43.28 per cent of children under five years of age were found to be wasted .The study also reported that 7.47 per cent of the children under study were found to be obese and 2.99 per cent were overweight. However, 53.73 per cent of children were underweight. The gender-wise analysis shows that the nutritional status of boys was better than that of girls. Children residing in the *Tarai*/ plain region were the most undernourished among the three regions studied. Comparison of the nutritional status of children in the study area with that of the NFHS-4 data for Uttarakhand state revealed that the percentage of underweight and wasted children is higher in the three selected regions of Uttarakhand.

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