A study to assess undernutrition and its sociodemographic correlates in under-five children in urban and rural areas of Rishikesh, Uttarakhand

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Abstract

Context: Nutrition is one of the most important factors that affect a child's health. It plays a vital role in the prevention and control of disease morbidity and mortality. It is a major public health problem in a developing country like India. **Aims:** To assess undernutrition in under-five children and various sociodemographic factors affecting it. **Settings and Design:** A community-based cross-sectional study was conducted among under-five children of rural and urban Rishikesh. A total sample size of 400 under-five children was taken. Multistage sampling was done to select the areas and systematic random sampling was done for selection of households. **Subject and Methods:** A predesigned, pretested, and semistructured questionnaire was used to collect information on the sociodemographic characteristics and status of undernutrition in study participants. **Statistical Analysis Used:** Data was entered into excel sheets and analyzed using SPSS version 23 utilizing appropriate statistical methods. **Results:** The prevalence of underweight was 37.3%, stunting 43.3% and wasting 24.5%. Underweight (40.5% v/s 35.0%), stunting (46.5% v/s 40.0%), and wasting (27.0% v/s 22.0%) was more prevalent in urban areas as compared to rural areas. Sociodemographic factors such as religion, caste, parental education, father's occupation, and family size emerged as significant predictors of under nutrition. **Conclusion:** Undernutrition in under-five children was quite high. Since childhood malnutrition is multifactorial, there is no single cause big enough to blame but a multifaceted approach is required to combat malnutrition.

Keywords: Sociodemographic factors, under-five, undernutrition

Introduction

Undernutrition means insufficient intake of energy and nutrients to fulfil the human needs for maintaining good health. An individual's need for nutrition varies according to his age. In most literature, undernutrition is used synonymously with malnutrition.[1] Child undernutrition is assessed by measuring height, weight, and age and these parameters are compared to international standards. Stunting (inadequate length/height for age) tells about chronic undernutrition, wasting (inadequate weight for height) tells the acute undernutrition, and underweight (inadequate weight for age) is a composite indicator that includes the elements of both stunting as well as wasting.[2] Deficiencies are not only the result of inadequate dietary intake but also due to the impaired absorption of nutrients and reduced appetite.[3] Undernutrition is not a result of single factor but it is more complex and related to multiple causes which leads to stunting

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and wasting. These both are known risk factors for child mortality and morbidity. A severely stunted child is four times at higher risk of dying and a severely wasted child is nine times at higher risk of dying.[4] The World Health Organization (WHO) estimates that undernutrition is the main underlying cause for mortality in under-five children, directly and indirectly related to 35% of all deaths.[5] Similarly, in developing countries like India, undernutrition is also one of the commonest and major underlying cause of mortality in under-five children. Various studies and surveys in India have been conducted to find the burden of undernutrition among under-five children and its associated factors. One of the important surveys done in India is the National Family Health Survey. According to NFHS-4 data, 36% under-five children are underweight, 43.3% are stunted and 24.5% are wasted.[6] In Uttarakhand, the prevalence of underweight, stunting, and wasting according to NFHS-4 is 26.6%, 33.5%, and 19.5%, respectively. These parameters are comparatively more in rural areas than urban areas.[6] The nutritional status of the children should be periodically assessed and monitored so that we can take timely and appropriate preventive measures.[7] Also, it is important to get a recent data on child nutritional status and associated factors to understand the current situation of undernutrition in Uttarakhand. As a result, this study was planned with an aim and objective to assess undernutrition in under-five children and various sociodemographic factors affecting it. With this study, we get to know the lacunas in child nutrition and further policies and programme can be strengthened in this respect.

Subject and Methods

A community-based cross-sectional study was conducted in urban and rural areas of Rishikesh, Uttarakhand, from June 2019 to October 2019. The study participants were all under-five children of Rishikesh, Uttarakhand. Stunting is an important indicator of chronic undernutrition as it tells about growth restriction.[8] It is more common than wasting and all the risk factors for wasting and underweight are also associated with it.[9] So, sample size was calculated taking prevalence of stunting in urban and rural areas. Assuming the prevalence of stunting in urban area as 32.5% and rural area as 34% (NFHS-4 data of Uttarakhand),[6] 95% confidence interval (CI) and 10% absolute precision sample size was calculated as 168 for urban and 173 for rural areas. Considering a 10% non-response rate, the final sample size came out to be 200. As a result, 200 children from the urban areas and 200 children from the rural areas of Rishikesh, Uttarakhand were taken making a total sample size of 400.

Inclusion criteria

All children aged 6–59 months.

All those children whose parents/guardians gave consent to participate in study.

All those who were present at the time of study.

Exclusion criteria

Children who had diagnosed/known case of congenital or metabolic abnormality.

All those whose parents/guardians did not give consent to participate in study or showed hostile behaviour.

All those who were not present at the time of visit.

Study method

Ethical clearance was taken prior to the conduction of the study. A predesigned, pretested, semistructured questionnaire was used to collect data on the sociodemographic characters of the study participants which was followed by anthropometric measurement. Written informed consent from the study participants were taken after explaining purpose and procedure of study.

Study tool

The anthropometric measurements were done using the anthropometric calculator provided by the Department of Nutrition, World Health Organization Geneva, Switzerland. The weight and height were calculated and converted into weight for age, height for age, and weight for height which were calculated in standard deviation values (transformed as Z – scores) using reference median as recommended by the WHO (2006). Children whose Z score were less than two standard deviation (<-2 SD) on the basis of weight for age, height for age, and weight for height nutritional indices were considered to be underweight, stunted, and wasted, respectively.

Data analysis

Data was entered into excel sheet and analyzed using SPSS version 23. For continuous variable mean and SD was calculated and t test was applied to compare the mean and Chi square test was applied to test proportions. *P* value <0.05 was considered significant.

Ethical clearance

Study was ethically approved by the ethical committee of institute. The protocol and importance of the study was explained to the parents of the study participants before recruitment into the study followed by a signed informed consent by parents.

Sampling technique

The study sample is obtained by the multistage sampling method. The total population of Rishikesh is 260343 people; 52.9% of the population (137943) are residing in urban areas and 47.1% population (122400) are residing in rural area. It has 26 wards in the urban area and 87 villages in the rural area. According to the 2011 census, the total household in India is 24.84 crores and the total number of children aged 0–6 years is 16.45 crores. Hence, the probability of under-five children per households is = 16.45 Cr/24.84 Cr = 0.66 (among three households there is chances of two under-five children). Hence, we covered 300 households

in urban and 300 household in rural areas. In urban area, five wards (ward 1, 3, 4, 10, and 13) were selected by simple random sampling (18.5% of total urban population). In rural areas, five villages (Shyampur, Shiddar wala, Sahab nagar, Raiwala, and Garhi maychak) were selected by simple random sampling (19.5% of total rural population). Systematic random sampling was used to find out the households for survey for equal probability chance. A house-to-house survey was conducted if any household was found closed or there were no children under-five age group, then the next household was selected for the survey. A landmark in center of the locality such as a temple, market place was considered for the selection of the first house.

Results

Table 1 depicts the prevalence of underweight, stunting, and wasting as 37.3%, 43.3%, and 24.5%, respectively, in under-five children. Underweight and stunting was more prevalent in urban areas than rural areas being 40.5% vs 35.0% and 46.5% vs 40.0%, respectively. Whereas wasting was more prevalent in urban areas (27% V/s 22.0%) as compared to rural areas and these differences were not statistically significant.

Table 2 shows that a majority of children belonged to the 24–59 months age group (62.7%). The mean age of children was 31.96(+-17.89) months. 97.5% of children belonged to Hindu religion, 51.3% to OBC category, 60.7% to nuclear family, and 46.7% to lower middle socioeconomic status. When the educational status of the parents was considered, 82.3% of mothers and 89.3% of fathers were literate. 59.0% of fathers were skilled/semi-skilled workers by occupation. Stunting was significantly more in children belonging to the 6–23 months age group, whose mothers (52.1%) and fathers (62.7%) were illiterate by education and whose fathers (47.9%) were skilled and semi-skilled workers by occupation. Wasting was significantly more in children whose mothers (35.2%) and fathers (39.5%) were illiterate by education and whose fathers (29.7%) were skilled and semi-skilled workers by occupation.

Discussion

In the present study, the prevalence of underweight was 37.3%, stunting was 43.3%, and wasting was 24.5%, respectively. This data was found to be comparable with the data of NFHS 4[6] in India, according to which the prevalence of underweight, stunting, and wasting were 36%, 38%, and 21%, respectively, but was high if compared with the findings of Uttarakhand NFHS 4 data where underweight, stunting, and wasting were found to be 26.35%, 33.5%, and 19.5%, respectively. Similar findings were shown by Anwar F *et al.*[10] (2013) from Varanasi and Meshram II *et al.*[11] (2016) from Surat, the prevalence of underweight, stunting, wasting being 35.2%, 43.1%, 31.5% and 44%, 39%, and 22.5%, respectively. The present study reported that the prevalence of undernutrition was more in under-five children of urban areas than the rural areas in being underweight (40.5% v/s 35.0%), stunting (46.5% v/s 40.0%), and wasting (27.0% v/s 22.0%). Similar findings were shown by Navya N *et al.*[12] (2017) in coastal district in Karnataka but Yadav SS *et al.*[13] in Haryana showed that undernutrition was more in rural areas than urban areas. In present study, stunting was significantly high in 6–23 months age group (51.8%) while wasting was present more in 24–59 months age group (27.5%). Similar findings were reported by Rao S *et al.*[14] in Pune and Ramachandran P *et al.*[15]. In the present study, stunting (52.1%,) and wasting (35.2%) was significantly high in children of illiterate mothers as compared to children of literate mothers. Similar results were reported by Meshram II *et al.*[16] in the tribal areas of nine states, Shaili Vyas *et al.*[17] in Uttarakhand, and Bharati S *et al.*[18] upon analysis of the NFHS-2 database. In the present study, stunting (62.7%,) and wasting (39.5%) were significantly high in children whose fathers were illiterate. Similar findings were shown by Shaili Vyas *et al.*[17] in Uttarakhand. Also, in the present study, stunting (47.9%) and wasting (29.7%) were significantly high in children whose fathers were skilled/semi-skilled workers as compared to children whose fathers were professional/semi-professional/arithmetic skilled workers. Similar findings were shown by Shaili Vyas *et al.*[17] (2016) in Uttarakhand. The present study indicated that stunting and wasting were high in children belonging to lower socioeconomic class, respectively. These findings are similar to the studies done by Shaili Vyas *et al.*[17] in Uttarakhand and Striessnig E *et al.*[19] by analyzing the NFHS-4 data. As shown in the present study, stunting was not much affected by the caste of family but wasting was more in the schedule caste (32.0%). Similar to this finding,

Table 1: Distribution of under-five children according to the prevalence of undernutrition in urban and rural areas of Rishikesh				
Variables	Areas		Total (*n*=400) No (%)	Chi square value, df, *P*
	Urban (*n*=200) No (%)	Rural (*n*=200) No (%)		
Underweight				
Underweight (< -2 SD)	81 (53.6)	70 (46.4)	151 (37.7)	Chi square: 1.28, Df: 1, *P*: 0.25
Normal	119 (47.8)	130 (52.2)	249 (62.3)	
Stunting				
Stunting (< -2 SD)	93 (53.8)	80 (46.2)	173 (43.3)	Chi square: 1.72, Df: 1, *P*: 0.189
Normal	107 (47.1)	120 (52.9)	227 (56.7)	
Wasting				
Wasting (< -2 SD)	54 (55.1)	44 (44.9)	98 (24.5)	Chi square: 1.35, Df: 1, *P*: 0.24
Normal	146 (48.3)	156 (51.7)	302 (75.5)	

Variables	Total (*n*=400) No (%)	Height for age		Weight for height	
		Stunting (*n*=173) No (%)	Normal (*n*=227) No (%)	Wasting (*n*=98) No (%)	Normal (*n*=302) No (%)
Age groups (in months)					
6-23	149 (37.3)	72 (51.8)	67 (48.2)	29 (19.5)	120 (80.5)
24-59	251 (62.7)	101 (40.2)	150 (59.8)	69 (27.5)	182 (72.5)
		Chi-square: 4.84, *P* value: 0.02		Chi-square: 3.25, *P* value: 0.071	
Religion					
Hindu	390 (97.5)	166 (42.5)	224 (57.5)	95 (24.3)	295 (75.7)
Muslims	4 (1.0)	4 (100.0)	0 (0.0)	1 (25.0)	3 (75.0)
Sikh	6 (1.5)	3 (50.0)	3 (50.0)	2 (33.3)	4 (66.7)
*Cells of Muslims and Sikhs combined for Chi square		Chi square: 1.977, *P* value: 0.15		Chi square: 0.001, *P* value: 0.97	
Caste					
General	128 (32.0)	51 (39.8)	77 (60.2)	31 (24.0)	97 (76.0)
OBC	205 (51.3)	93 (45.3)	112 (54.7)	48 (24.0)	157 (76.0)
SC	50 (25.0)	22 (44.0)	28 (56.0)	16 (32.0)	34 (68.0)
ST	17 (4.25)	7 (41.2)	10 (58.8)	3 (17.6)	14 (82.4)
		Chi-square: 1.020, *P* value: 0.796		Chi-square: 2.08, *P* value: 0.554	
Type of Family					
Nuclear	243 (60.7)	104 (42.7)	139 (57.3)	64 (26.3)	179 (73.7)
Joint	156 (39.3)	69 (44.2)	88 (55.8)	34 (21.7)	123 (78.3)
		Chi-square: 0.051, *P* value: 0.820		Chi-square: 1.13, *P* value: 0.28	
Socioeconomic status					
Upper class	28 (7.0)	11 (39.2)	17 (60.8)	4 (14.2)	24 (85.8)
Upper middle class	42 (10.5)	17 (40.4)	25 (59.6)	9 (21.4)	33 (78.6)
Middle class	105 (26.3)	47 (44.7)	58 (55.3)	23 (21.9)	82 (78.1)
Lower middle class	187 (46.7)	81 (43.3)	106 (56.3)	50 (26.7)	137 (73.3)
Lower class	38 (9.5)	144.7)	21 (55.3)	12 (31.5)	26 (68.5)
		Chi-square: 0.443, *P* value: 0.979		Chi-square: 3.712, *P* value: 0.446	
Educational status of mother					
Illiterate	71 (17.7)	37 (52.1)	34 (47.9)	25 (35.2)	46 (64.8)
Literate	329 (82.3)	136 (41.3)	193 (58.7)	73 (23.0)	256 (77.0)
		Chi-square: 5.03, *P* value: 0.024		Chi-square: 8.28, *P* value: 0.003	
Educational status of father					
Illiterate	43 (10.7)	27 (62.7)	16 (37.3)	17 (39.5)	26 (60.5)
Literate	357 (89.3)	146 (40.9)	211 (59.1)	81 (22.7)	276 (77.3)
		Chi-square: 7.49, *P* value: 0.006		Chi-square: 5.88, *P* value: 0.01	
Occupation of father					
Professional/Semi-professional	164 (41.0)	60 (36.6)	104 (63.4)	28 (17.0)	136 (83.0)
Skilled worker/Semi-skilled worker	236 (59.0)	113 (47.9)	123 (52.1)	70 (29.7)	166 (70.3)
		Chi-square: 5.03, *P* value: 0.024		Chi-square: 8.28, *P* value: 0.003	

Chaudhary P *et al.*[20] (2017) in Jaipur has also revealed the same findings. The prevalence of stunting and wasting was almost equal in joint families (44.2%) and nuclear families (42.7%).

Conclusion and Recommendations

The present study shows that almost half of under-five children had chronic malnutrition and one fourth had acute malnutrition. Stunting and wasting were significantly higher among children whose parents were illiterate and father were skilled and semiskilled by occupation. For better nutritional status of under-five children, improving education and empowerment of mothers is the need of hour, as this will influence the nutrition and wellbeing of the family and children in particular. The results

of this study will be helpful for policy makers to plan for better health services for under-five children to prevent undernutrition and its consequences, so our nation can be more healthy, productive, and strong. This study result will also be helpful to the practice of primary care physicians who can understand the real situation of undernutrition in under-five children and can prevent it and its consequences with proper monitoring and timely intervene.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients

understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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