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PREVALENCE AND DETERMINANTS OF UNDERWEIGHT: A STUDY ON SCHOOL-GOING CHILDREN OF FARMING HOUSEHOLDS IN RURAL AREAS OF DISTRICT DODA, JAMMU & KASHMIR, INDIA

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ABSTRACT

Background: Malnutrition is a serious public health problem that has been linked to substantial increase in the risk of mortality and morbidity. Adequate nutrition particularly at an early stage plays a key role to live an active and healthy life.
Objectives: To assess the prevalence of underweight and its determinants among 6-14 years old school going children of farming households in district Doda of Jammu and Kashmir, India.
Methods: The present study was conducted in district Doda of Jammu & Kashmir to assess the nutritional status (underweight) of 182 school going children (6-14 years) among farming households. Nutritional status of the children was assessed in terms of anthropometric measurement. Weight for age (WAZ) of the sample subjects were calculated and compared with WHO-2007 reference standard. Z-scores were calculated by using Anthro Plus software.
Results: Results indicate that out of the total children screened (N=182), 6.45 percent of male and 19.10 percent of female children were underweight. The main determinants of malnutrition were found to be child's gender, parents' education and economic status of the family.
Conclusion: There is a great need to focus the attention of the policy-makers for intervening in such areas, as nutritional status of children is a main indicator of

INTRODUCTION

Background

Malnutrition especially undernutrition is a major health problem affecting the development of the children in many developing countries of the world (Nandy *et al*. 2005, Thakur & Hautam, 2014). It continues to be the principal cause of ill-health and pre-mature mortality and morbidity among children of the developing countries (Katoch, 2012). It has been estimated that in 2014, 23.8 percent (159 million) of the children under-five worldwide suffering from the problem of stunting (HAZ) and 7.5 percent (50 million) from wasting (HWZ). Approximately 1 out of every 13 children in the world was wasted in 2014 (UNICEF, WHO and World Bank Group, 2015).

As per National Family Health Survey-4 (2015-16), there are variations between the states in each of the anthropometric measures of undernutrition among the children of under five years of age. For example, the prevalence of stunting varied between 19.7 percent in Kerala and 48.3 percent in Bihar, the prevalence of underweight varied between 11.9 percent in Mizoram and 47.8 percent in Jharkhand and the wasting varied between 6.1 percent in Mizoram and 29.0 percent in Jharkhand. The survey further indicated that the prevalence of underweight; stunting and wasting among < 5 years in 2015-16 in Jammu & Kashmir were 16.6 percent, 27.4 percent and 12.1 percent respectively. As per another study these rates were, 21.3 percent, 15.5 percent and 13.8 percent respectively (Yasmeen & Khan, 2012). The lack of progress over the past decade and the current high levels of undernourishment have led to India being recognized as having, perhaps, the worst undernutrition problem in the world. This high level of undernutrition in children in the country poses major challenge for child health and development.

The improved nutrition status helps to break the intergenerational cycle of poverty, enhance labour force performance, income earning, and wage rate, generates broad-based economic growth, provides a foundation for human development and leads to a lot of positive consequences for individuals, families, communities, and countries. There is much evidence that nutrition and economic development have a two-way relationship. For example, it was documented in a study (Yasmeen & Khan, 2012), that there is no doubt that a country's nutritional status is closely associated with its level of

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economic development, as such an increase in nutritional status can increase the economic growth rate permanently, and the short-term effect will be greater than the long-term effect. An increase in a number of calories available for work over the past 200 years must have made a significant contribution to the growth rate of per capita income (Robert W. Fogel, 2004)

There is surprisingly little research on nutritional status of school going children among rural farming households, as most of the studies had stressed on the pre-school children located in urban centers. Perhaps this research vacuum or lack of quantity of literature reflects a need to investigate into the nutritional status of school going children as this age is the age of learning which enhance the efficiency in the later life (Kudzai, 2014, Veugalers & Fitzgerald, 2005). All this motivates to investigate the determinants of underweight among rural farming households. With the use of Anthropometric indicators, this study assesses the prevalence of underweight among school going children of farming households in district Doda of Jammu & Kashmir. Specifically, the study identified the determinants of underweight among farming households and highlights the policy implications of the findings.

Objectives of the Study

The present study was carried out in district Doda of Jammu & Kashmir with the following objectives:

1. To assess the prevalence of underweight among 6-14 years old school going children of farming households in district Doda.
2. To investigate the determinants of underweight in the area under study.

MATERIAL AND METHODS

The purpose of the present study was to assess the prevalence of underweight among school going children of farming households in district Doda of Jammu and Kashmir.

Area under Study*:* The study was carried out in district Doda of Jammu & Kashmir, India. District Doda lies in the outer Himalayan range in Jammu & Kashmir State. It is located about 175 kilometers from Jammu and about 200 kilometer from Srinagar. It comprised of 7 tehsils, 10 educational zones and 10 CD blocks (Census India Bulletin, 2013, Census of India, 2011).

Sample size*:* 182 school-going children between the age group of 6-14 years constituted the study subjects for the present study.

Questionnaire: The information regarding anthropometric characteristics of the children and socioeconomic features of the family and parents were attained through a well designed questionnaire by visiting in schools and houses either from the parents themselves or any other family member.

Anthropometric Measurement: The present study was based on Anthropometric Assessment (indirect approach) to determine the prevalence of underweight among school aged children. For measuring the weight of the children a digital weighing machine was used.

The z-scores system was used to classify underweight i.e. weight for age (WAZ) following the internationally accepted cut-off points with reference to WHO 2007 standard (Onis *et al* 2007). A child who is below minus two standard deviation (-2SD) from the median of a reference population in terms of weight-for-age was considered as underweight.

Statistical Analysis

Data was entered and analyzed using statistical software *epi info 7(available at www.cdc.gov)*. Z-scores system was used to assess the nutritional status of the children by using software - WHO *Anthro Plus (version v1.0.4)* by comparing with WHO reference 2007. Chi-square tests were used to know the association of various determinants of underweight among the school going children of farming households.

RESULTS AND DISCUSSION

A total of 182 school-going children (Male - 93, Female - 89) of farming households were examined in district Doda of Jammu & Kashmir to know their nutritional status and its determinants.

Mean weight and height

The mean weight and height of present studied boys and girls were also compared with Indian Council of Medical Research (ICMR) reference data shown in Table 1. It is evident that the present studied boys and girls have lighter weight and shorter stature than reference population (ICMR).

It was observed in the present study that in the early ages the differences in the weight of children was less but after 10 years of age; it started widening. The highest difference in mean weight was found 9.4 kg for boys of 11 year of age and 7.5 kg for girls in 13 year of age. Results further revealed that the mean height of boys and girls had increased with age. Lowest height, 107.3 cm and 110.2 for boys and girls respectively

Table 1 Mean Weight and Height of the Children

Age in Years	N = 182	Mean Weight in Kg						Meant Height in CM					
		Boys			Girls			Boys			Girls		
		ICMR	Our Study	Diff.	ICMR	Our Study	Diff.	ICMR	Our Study	Diff.	ICMR	Our Study	Diff.
6	22	20.7	16.0±2.6	4.7	19.5	17.3±2.9	2.2	116.1	107.3±6.2	8.8	114.6	110.2±8.1	4.4
7	27	22.9	20.8±3.2	2.1	21.8	19.6±1.9	2.2	121.7	117.2±7.9	4.5	120.0	115.0±7.5	5.0
8	25	25.3	21.6±2.0	3.7	24.8	20.7±3.4	4.1	127.0	120.9±4.7	6.1	126.4	112.8±.6	13.6
9	34	28.1	24.9±3.5	3.2	28.5	22.9±4.1	5.6	132.2	129.0±10.5	3.2	132.2	126.9±9.2	5.3
10	37	31.4	27.8±5.1	3.6	32.5	27.1±7.3	5.4	137.5	132.9±7.7	4.6	138.3	132.8±8.6	5.5
11	12	32.2	25.8±5.5	6.4	33.7	28.2±7.4	5.5	140.0	131.7±12.8	8.3	142.0	128.8±4.5	13.2
12	12	37.0	27.6±0.5	9.4	38.7	34.7±5.2	4.0	147.0	136.6±2.1	10.4	148.0	143.1±6.1	4.9
13	8	40.9	38.0±1.4	2.9	44.0	36.5±11.2	7.5	153.0	148.0±2.8	5.0	150.0	148.5±7.1	1.5
14	5	47.0	40.5±5.2	6.5	48.0	35.0±0.0	13	160.0	152.3±10.5	7.7	155.0	143.1±0.0	11.9

Source: Primary Survey Data, 2016, Values are given as mean ± SD

were found for 6 year of age and highest height of 152.3 cm and 148.5 cm for boys and girls were found for 14 year and 13 years respectively.

Prevalence of Underweight (low weight-for-age)

Underweight (Weight for age) is the phenomenon of children being too light for their age, which is a measure of profound physical and cognitive underdevelopment. It is a manifestation of child undernutrition, which affects an estimated 13.9 percent of children globally and it is also believed to be responsible for early deaths of children under the age of five years (UNICEF, WHO & World Bank Group, 2015).

The description of the socioeconomic characteristics of the children and the prevalence of underweight (weight for age) is presented in Table 2. About 19.10 percent of the female and 6.45 percent of the male children were below the -2 z-scores for weight for age (underweight). The results found statistically significant (χ^2 =6.5912, df = 1, p < 0.05). These results indicate that a large segment of children were suffering from the problem of underweight in the area under study.

increasing the per capita family income. Better nutrition is associated with higher incomes, as it was found in the present study that the children of Below Poverty Line (BPL) (16.67 percent) and Anthodia (14.29 percent) families were at higher risk of underweight compared to children of Above Poverty Line families (APL) (5.00 percent). This association was found statistically significant (χ^2 = 4.7926, df = 2, p < 0.10). The reason is simple; income poverty limits the food intake for the family and responsible for frequent infections, large families, frequent pregnancy and a host of other impacts leading to malnutrition. This finding is supported by many studies conducted in less developed countries (Alderman, Hoogeveen & Rossi, 2005, Tangiguchi, 2003, Robert W. Fogel, 2004).

It was found that the prevalence of stunting was not associated with the land owned by the household, as it was found in the present study that 15.79 percent of the children were underweight whose parents' owned land less than 3 kanal and on the other hand 14.29 percent of children of parents owning ≥ 9 kanal of land were underweight. This finding is consistent with other studies (Victoria, Vaughan, Betty, Martines & Barcelos, 1986).

Table 2 Determinants of Underweight (Low Wight for Age)

Variable	N=182	Underweight	Normal	χ^2
Gender				
Male	93	06 (6.45)	87 (93.55)	χ^2 = 6.5912
Female	89	17 (19.10)	72 (81.90)	P < 0.05
Social Caste of the child				
GEN	123	13 (10.57)	110 (89.43)	
SC	41	08 (19.51)	33 (80.49)	χ^2 = 3.8800*
ST	15	01 (6.67)	14 (93.33)	
OBCs	3	01 (33.33)	2 (66.67)	
Mother's Education				
Illiterate	137	21 (15.32)	116 (84.68)	χ^2 = 3.6346
Literate	45	02 (4.44)	43 (95.56)	P < 0.10
Father's Education				
Illiterate	72	14 (19.44)	58 (80.56)	χ^2 = 4.9998
Literate	110	09 (8.18)	101 (91.82)	P < 0.05
Economic Status of the Family				
Anthodia	14	02 (14.29)	12 (85.71)	
BPL	108	18 (16.67)	90 (83.33)	χ^2 = 4.7926
APL	60	03 (5.00)	57 (95.00)	P < 0.10
Land Owned by the Family				
≤ 3 Kanal	19	03 (15.79)	16 (84.21)	
4 – 8 Kanal	72	07 (9.72)	65 (90.28)	χ^2 = 0.9491*
≥ 9 Kanal	91	13 (14.29)	78 (85.71)	

Source: Primary survey data, 2016 *Not Significant

A higher prevalence of underweight (19.51 percent) was found among children of Schedule Castes (SCs) and Other Backward Classes (OBCs) (33.33 percent) as compared to General Category (GEN) (10.57 percent). However, the results were not found significant. It was thought that risk of being illiterate is inversely related with the level of nutritional status of the children, specially, in rural areas where the education of the parent is a significant factor for the determination of income of the family. In the present study, it was estimated that the prevalence of underweight (15.32 percent) was high among the children of illiterate mothers and fathers (19.44 percent). A significant differences were found among the education of mothers (χ^2 = 3.6346, df = 1, P < 0.10), fathers (χ^2 = 4.998, df = 1, P < 0.05) and prevalence of underweight among children of farming households.

There is a wide and grown consensus that strong economic growth can lead to significant improvements in nutrition by

CONCLUSIONS

The Results from this study bear the following conclusions:

1. It was revealed that for all ages (6 - 14 years) and sexes, the prevalence of underweight (low weight for age) was 12.67 percent, where it was observed that female children were at higher risk of anthropometric failure in terms underweight as compared to male children.
2. There is a relationship between socioeconomic factors and nutritional status (underweight) of the school going children. This is quite evident from the results of the present study that socioeconomic factors also have a great impact on the nutritional status of the children. Results indicated that a high percentage of children coming from lower social caste, lower mother's and father's educational levels and lower economic status had reported as underweight compared to children

coming from higher social castes and economic status having educated parents.

From the findings of the present study it was observed that there is a relationship between socioeconomic factors and nutritional status. Therefore, there is need to address the problem of undernourishment particularly targeting the lower socioeconomic sections among rural farming households. To achieve this, the present study recommends that;

1. School-based feeding programs, such as Mid Day Meal Scheme should be strengthened effectively, so that it can play an important role in improving the nutritional status, increasing the enrollment and reduce the dropout rates.
2. Health and nutrition education should be provided to the community member particularly the lactating and expecting mothers among farming households, so as to improve their hygiene levels and help them to adopt better dietary patterns.
3. Regular studies to monitor the anthropometric indicators of the children must be carried out at school level, so that the malnourished children can be targeted at an early stage.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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