

Socioeconomic Factors, Living Conditions and Child Undernutrition among School going Children in Rural Areas of district Doda, Jammu & Kashmir, India: A Preliminary Study

Research Article

Om Raj Katoch¹, Aroon Sharma²

¹Assistant Professor, Department of Economics, Govt. Degree College Ramban, Jammu & Kashmir

²Associate Professor, Department of Economics, University of Jammu, Jammu & Kashmir

*Corresponding author: Om Raj Katoch, Department of Economics, Govt. Degree College Ramban, Jammu & Kashmir, Mob. 09419166014; Email: orkatoch@gmail.com

Article Information: Submission: 03/05/2016; Accepted: 18/05/2016; Published: 28/05/2016

Copyright: © 2016 Katoch OR, et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Background: Malnutrition especially undernutrition is a major health problem affecting the development of the children in many developing countries of the world. It continues to be the principal cause of ill-health and pre-mature mortality and morbidity among children.

Objectives: To assess the nutritional status of 6-14 year old school going children and the association among socioeconomic factors, living conditions and child undernutrition.

Methods: The present study was conducted in village Ganota of Doda district, Jammu & Kashmir to assess the nutritional status of 100 school going children (5-14 years). Nutritional status of the children was assessed in terms of anthropometric measurement. Weight for age (WAZ), height for age (HAZ) and body mass for age (BMIZ) of the sample subjects were calculated and compared with WHO-2007 reference standard. Data were entered and analyzed using statistical software epi info 7 and Anthro Plus.

Results: Results show that out of the total children screened (N=100), 36.00 percent were found stunted, 9.00 percent underweight and 2.00 percent were observed as wasted. It was further observed that female children were at higher risk of undernutrition in terms of stunting (42.86 percent of the female children), whereas underweight (11.39 percent and wasting (2.53 percent) were prevalent only in male children. Besides poverty, there are other socio-economic factors – (mother's education, birth order in the family, joint family system, social and economic categories) and living conditions – (nature of sanitation, cooking area and fuel used) that directly or indirectly affect the nutritional status of the school-going children. Conclusion: There is a great need to focus the attention of the leaders and policy-makers for intervening in such areas, as nutritional status of children is a main indicator of development and a pre-condition for the society to progress.

Keywords: Undernutrition; Stunting; Wasting; Underweight; Socioeconomic factors; Living conditions

Introduction

Child undernutrition globally

Malnutrition especially undernutrition is a major health problem affecting the development of the children in many developing countries of the world. [1-3]. It continues to be the principal cause of

ill-health and pre-mature mortality and morbidity among children of the developing countries. 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 [4].

As per UNICEF about 150 million children under five years old are underweight, and more than 20 million suffer from severe malnutrition. It is further estimated that 350 million women have nutritional anemia. Some 40 million children suffer from vitamin A deficiency, some of whom go blind. Some 250,000 children go blind or partially blind and survive. Iodine deficiency disorders (IDD) affects 200 million to 300 million people with goiter, and at least 6 million suffer from cretinism.

The picture of ill-health is much grim in developing countries when compared to developed countries of the world. It is estimated that under-five mortality rate in the developing regions is estimated at 72 children per 1000 live births, while in developed countries only 6 children per 1000 live birth die before the age of five [5]. A study conducted at international level revealed that nutrition has profound effects on health throughout the human life course and linked with cognitive and social development especially in early childhood. The prevalence of stunting and wasting has affected at least 165 million and 52 million respectively in 2011 globally. The fetal growth restriction, which increases the risk of neonatal deaths is caused by maternal undernutrition and it is estimated that undernutrition in aggregate is a cause of 45 percent child deaths in 2011 [6].

Indian Scenario

The children of today are the future of tomorrow; this powerful quotation assumes a very special importance in the context of a nation like India as children between the age group of 0-14 comprise one third of the total population in the country [7]. Despite the fact that India has made an impressive progressive in science, medicine, information technology and a tremendous economic performance, with the gross domestic product (GDP) rising 10.26 per cent in 2010-11 and 5.6 per cent in 2014-15 [8], human development still reveal an unacceptable situation - contributing to India's poor rank of 136 among 183 countries on the Human Development Index (HDI) in 2013. 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.

As per a Joint Report of UNICEF, WHO & World Bank (2015), as compared to its neighbouring countries, India has the highest percentage of children aged less than five years that are wasted (15.1

percent) [4]. In terms of underweight, it is at second place (29.4 percent), Nepal is at first (30.1 percent). Stunting (38.7 percent) placed India at third place among its neighbours. The reduction rate of child undernutrition in India as per the *Report* was very low.

A study conducted by Subramanyam et al. by using data from cross-sectional waves of the National Family Health Survey (NFHS) conducted in India for the years 1992-93, 1998-99 and 2005-06 [9]. The study found a substantial variation between the states in each of the anthropometric measure of undernutrition among the children of under three years of age. For example, in 2004-05 the prevalence of underweight varied between 14.25 percent in Mizoram and 55.22 percent in Madhya Pradesh, the prevalence of stunting varied between 25.72 percent in Goa and 49.25 percent in Bihar and the wasting varied between 9.69 percent in Mizoram and 33.18 percent in Bihar. The prevalence of underweight, stunting and wasting in 2004-05 in Jammu and Kashmir were 23.59 percent, 32.38 percent and 18.34 percent respectively. As per another study these rates are, 21.3 percent, 15.5 percent and 13.8 percent respectively [10]. This high level of undernutrition in children in the country poses major challenge for child health and development.

Statement of the Problem

Nearly every nation has a serious health problem owing to malnutrition in one of its forms [11]. The assessment of growth in children is important for monitoring health status, identifying deviation from normality and determining the effectiveness of interventions [12]. The significance of timely detection of poor growth in early life resides in its association with adverse functional consequences, including poor cognition and educational performance, low adult wages, lost productivity and, when accompanied by excessive weight gain later in childhood increase the risk of nutrition-related chronic diseases [13]. Poor health and nutritional status among the school going children may contribute to high rate of school dropout, absenteeism, and poor academic performance [14,15]. In addition, hungry school children tend to be nervous, irritable, disinterested and unable to fully concentrate in the classroom [16,17].

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

Table 1.1: Mean Weights and Height of the Children.

Age in Years	N = 100		Mean Weight in Kg				Meant Height in CM			
			Boys		Girls		Boys		Girls	
	M	F	ICMR	Our Study	ICMR	Our Study	ICMR	Our Study	ICMR	Our Study
6	3	9	20.7	15.67± 0.57	19.5	17.11 ± 0.87	116.1	102.67 ± 1.52	114.6	105.67 ± 6.26
7	6	3	22.9	23.5 ± 1.64	21.8	18.67 ± 0.57	121.7	125.16 ± 1.32	120.0	114.67± 1.54
8	15	0	25.3	25.93 ± 1.33	24.8	---	127.0	141.33 ± 20.22	126.4	---
9	9	6	28.1	31.33 ± 9.50	28.5	29.5 ± 7.12	132.2	129.80 ± 3.89	132.2	139.16 ± 4.87
10	25	0	31.4	28.24 ± 3.19	32.5	---	137.5	134.36±5.76	138.3	---
11	0	0	32.2	---	33.7	---	140.0	---	142.0	---
12	6	0	37.0	31.83 ± 4.20	38.7	---	147.0	141.50 ± 6.02	148.0	---
13	3	0	40.9	32.67 ± 1.52	44.0	---	153	147.33 ± 1.52	150.0	---
14	12	3	47.0	37.75 ± 6.70	48.0	42.66 ± 0.57	160.0	146.25 ± 7.79	155.0	159.67 ± 2.30
Total	79	21								

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

both a foundation for human development and the scaffolding needed to ensure to reach its full potential, and leads to a lot of positive consequences for individuals, families, communities, and countries. It means that improving the nutrition status of the children can have significant payoffs in terms of generating economic benefits and reducing costs. For example, a study conducted in Brazil in which a sample of more than 3000 individuals tracked over a period of thirty years found that infants who were breastfed longer than 12 months, achieved an additional year of education and higher incomes about three times higher than those with less than 1 month [18]. As per the Global Nutrition Report 2014, the scaling up nutrition specific intervention to address undernutrition has a benefit-cost ratio of 60.

There is surprisingly little research on nutritional status of school going children as most of the studies had stressed on the pre-school children. 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 [17,19]. All this motivates to investigate the impacts of socio-economic factors and living conditions on the nutritional status of the school going children. Using primary data from village *Ganota*, this study makes a modest attempt to answer two questions.

- 1) The first, which socio-economic factors are associated with the nutritional status of the school-going children?
- 2) The second question is whether living conditions have any impact on the nutritional status of school-going children or not?

Therefore, the purpose of this study was to know the impacts of socio-economic factors and living conditions on nutritional status of school-going children in rural areas of district Doda.

Objectives of the Study

The present study was carried out in village *Ganota* district Doda with the following objectives:

- 1) To assess the nutritional status of 6-14 year old school going children of village *Ganota*, district Doda.
- 2) To investigate the prevalence of stunting, wasting and underweight in the village.
- 3) To investigate the association among socioeconomic factors, living conditions and child undernutrition.

Material and Methods

The purpose of the present study was to assess the nutritional status of the school going children of village *Ganota* in district Doda:

Area under Study: The study was carried out in village *Ganota* of district Doda, Jammu & Kashmir, India. According to District Handbook [20], the district Doda, like other districts has derived

Mainly, there are 'two approaches' or levels at which a person's energy balance can be estimated. One is 'Direct Approach' to measure energy intake and/or expenditure directly. The second is 'Indirect Approach' which includes the anthropometric and other symptoms which indirectly reflect an inadequate energy balance and the measurable indicators of negative consequences of an unduly low energy balance.

its name from its district headquarters at Doda. The records reveal that one of the ancient Raja of Kishtwar whose dominion extended beyond Doda persuaded on utensil maker namely Deeda a migrant from Multan (Pakistan) to settle permanently in his territory and set up a utensil factory there. Deeda is then said to have settled in village which later on came to be known after him. With the passage of time, the name Deeda got distorted into Doda, the name which continues to be known at present time.

Doda district lies in the outer Himalayan range in Jammu And Kashmir State. District Doda is located about 175 kilometer from Jammu and about 200 kilometer from Srinagar. It is comprised of 7 tehsils and 10 CD blocks.

Sample size: 100 school-going children between the age group of 6-14 years constituted the study subjects for the present study. The subjects were chosen randomly, as the study is a preliminary investigation and the results show some trends of variation in terms of nutritional status and socio-economic factors and living conditions.

Questionnaire: After getting consent from the parents, the information regarding anthropometric characteristics of the children and demographic features of the family and mothers were collected through a well designed questionnaire cum interview schedule by visiting their houses either from the mothers themselves or any other family member.

Factors studied: For the association with the nutritional status of the school going children; the factors studied included, socio-economic factors - family type, family size, mothers' educational level social caste, income of the family, economic category i.e BPL/APL, social category, land owned, age, sex and birth order of the child and living conditions - house sanitation/nature of house, type of cooking area and fuel used.

Anthropometric Measurement: The present study was based on Anthropometric Assessment (indirect approach¹³) to identify the undernourished school aged children. Anthropometry now-a-days has become a practical tool for determining the nutritional status of children and the well being of the children is indicated in a best way by the nutritional status globally [21]. The anthropometric information was collected with the help of a self design questionnaire.

Digital Weighing Scale: For weighing children a digital weighing scale was used. The scale had a maximum capacity Of 200 kg. The weight measurement was recorded to the nearest 0.5 kg.

Stature Meter: A stature meter/height measuring tape has been used for measuring the height of the children. The instrument had a maximum capacity of 200 CM. The stature meter was fixed along with the wall and children were allowed to stand in bare foot for measurement. The height measurement was recorded to the nearest

The WHO Reference 2007 is a reconstruction of the 1977 National Center for Health Statistics (NCHS)/WHO reference. It uses the original NCHS data set supplemented with data from the WHO child growth standards sample for under-fives. To develop this reference the same statistical methodology was used as in the construction of the WHO standards for school aged children and adolescent to monitor the nutritional status of children aged 5-19 years.

Table 1.2: Socioeconomic Factors and Prevalence of Child Under nutrition .

Factors	N = 100	¹ Stunting (HAZ)	² Underweight (WAZ)	³ Wasting (BMIZ)	Chi-square Value
Sex of the Child					
Male	79	27 (34.18)	9 (11.39)	2 (2.53)	3.4 P = 0.182563
Female	21	9 (42.86)	0 (0.00)	0 (0.00)	
Total	100	36	9	2	
Birth Order					
1 st	30	6 (20.00)	3 (10.00)	0 (0.00)	6.1 P = 0.0278806
2 nd – 3 rd	55	28 (50.90)	6 (10.90)	1 (1.81)	
4 th – 5 th	15	6 (40.00)	0 (0.00)	1 (6.66)	
Total	100	40	9	2	
Social Category					
GEN	79	24 (30.38)	3 (3.80)	0 (0.00)	6.1** P = 0.047535
SC	21	12 (57.14)	6 (2.86)	2 (9.52)	
Total	100	36	9	2	
Family Type					
Nuclear	67	24 (35.82)	3 (4.48)	1 (1.49)	3.4 P = 0.182563
Joint	33	12 (36.36)	6 (18.18)	1 (3.03)	
Total	100	36	9	2	
Mother's Education					
Illiterate	84	36 (42.85)	5 (5.95)	1 (1.19)	13.6*** P = 0.001125
Literate	16	2 (12.50)	5 (31.25)	1 (6.25)	
Total	100	36	9	2	
Family Members					
Less than 4 Members	12	3 (25)	0 (0.00)	0 (0.00)	2.1 P = 0.717
Between 4 - 7 members	82	30 (36.58)	9 (10.97)	2 (2.43)	
8 & Above Members	6	3 (50.00)	0 (0.00)	0 (0.00)	
Total	100	36	9	2	
Economic Category					
APL	76	18 (23.68)	1 (1.31)	0 (0.00)	8.5** P = 0.014478
BPL	24	12 (50.00)	8 (33.33)	2 (8.33)	
Total	100	30	9	2	
Level of Income					
Less than 1.5 lakhs	61	24 (39.34)	6 (9.83)	2 (3.27)	
1.5 lakh to 3 lakhs	27	12 (44.44)	3 (11.11)	0 (0.00)	
3 lakhs & above	12	0 (0.00)	0 (0.00)	0 (0.00)	
Total	100	36	9	2	
Land Owned					
Less Than 3 Kanals	19	6 (31.58)	0 (0.00)	0 (0.00)	8.9 P = 0.063291
between 3 - 5 Kanals	33	18 (54.55)	9 (27.27)	2 (6.06)	
5 & Kanals	48	12 (25.00)	0 (0.00)	0 (0.00)	
Total	100	36	9	2	

Source: Survey Data, 2016 (figures in parentheses are percentage of number indicated in the row) *** Significant at 1%, **Significant at 5% level

¹ **Stunting (HAZ):** Children who are less than two standards deviation below the median of the reference population in terms of height-for-age are considered short for their age or stunted.

² **Underweight (WAZ):** Children who are less than two standards deviation from the median of the reference population in terms of body mass index-for-age are considered underweight

³ **Wasting (BMIZ):** Children who are less than two standards deviation from the median of the reference population in terms of body-mass-index for their age are considered wasted.

0.5 cm.

The z-scores system were used to classify three measures of child undernutrition i.e. height for age (*stunted*), weight for age (*underweight*) and body mass index for age (*wasting*), following the internationally accepted cut-off points with reference to WHO 2007

standard [22]. A child who is below minus two standard deviation (-2SD) from the median of a reference population in terms of height-for-age, weight-for-age and body-mass-index for age is considered as stunted, underweight and wasted respectively.

Statistical Analysis

Table 1.3: Living Conditions and Prevalence of Child Under nutrition.

Living Conditions	N = 100	Stunting (HAZ)	Underweight (WAZ)	Wasting (BMIZ)	Chi-square Value
Nature of House					2.4 P = 0.303303
Pucca	64	12 (18.75)	3 (4.68)	0 (0.00)	
Kacha	36	22 (61.11)	6 (16.67)	2 (5.56)	
Total	100	34	9	2	
Type of Cooking Area					9.9** P = 0.041454
Separate Kitchen	58	18 (31.03)	3 (5.17)	0 (0.00)	
Inside the Bedroom	15	9 (60.00)	0 (0.00)	0 (0.00)	
Open Verandah	27	9 (33.33)	6 (22.22)	2 (7.40)	
Total	100	36	9	2	
Cooking Fuel Used					9.1** P = 0.010565
Wood	69	27 (39.13)	3 (4.35)	0 (0.00)	
LPG	31	9 (29.03)	6 (19.36)	2 (6.45)	
Total	100	36	9	2	
Toilet Facility at Home					21.7*** P = 0.000225
Yes	60	12 (20.00)	3 (5.00)	0 (0.00)	
No	40	24 (60.00)	6 (15.00)	2 (5.00)	
Total	100	36	9	2	

Source: Survey Data, 2016 (figures in parentheses are percentage of number indicated in the row) ***Significant at 1%, **Significant at 5% level.

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 2007¹⁴. Statistical techniques were used for testing the significance of association between the socioeconomic factors, living conditions and nutritional status of the school going children.

Results and Discussion

A total of 100 school-going children (Male - 79, Female - 21) were examined. The findings of the study revealed that the Girls were slightly taller (except for age group 7) and heavier (age groups 6 and 14) than boys (Table 1.1). Both the boys and girls were shorter (except for 7 & 8) and lighter (except for age groups 7, 8 and 9) compared to the Indian Council for Medical Research (ICMR) reference data for their ages and sex.

Table 1.2, shows that out of the total children screened (N=100), 36.00 percent were found stunted, 9.00 percent underweight and 2.00 percent observed as wasted. It was further observed that female children were at higher risk of undernutrition in terms of stunting (42.86 percent of the female children), whereas underweight (11.39 percent and wasting (2.53 percent) were prevalent only in male children. But no significant association was found.

Undernutrition in the present study was lower for first births and consistently increases with increasing birth order for all measures of nutritional status (except for stunting for birth orders 4th – 5th). Our findings are similar to that of NHFS-3, where the rate of undernutrition

for the first birth in 2005-06 was 41.00 percent, it is 47.80 percent if the birth order is 2nd - 3rd, 54.30 percent for birth order 4th – 5th and it is 61.00 percent for the birth orders 6th and above. This may be the reason that after the birth of a new baby, the old one gets neglected. No significant association was found between birth order and child undernutrition. Social category is also an important determinant of undernutrition, as majority of the children belonging to Schedule Caste category (57.14 percent) were suffering from stunting.

The findings of the present study revealed that all the three level of undernourishment - stunting (36.36), underweight (18.18 percent) and wasting (3.03 percent) were prevalent more among the children belonging to the joint families as compared to nuclear families. This may be the reason that the per-capita calories consumption becomes less in joint family system. But no significant association was found. Economic category determines the purchasing power of the households to purchase the commodities from the market. It was found that the children belonging to the Below the Poverty Line (BPL) category were suffering from stunting (50.00 percent), underweight (33.33 percent) and wasting (8.33 percent).

Table 1.2 show that 61.00 percent of the children belong to low family income level, out of which stunting, underweight and wasting were 39.34 percent, 9.83 percent and 3.27 percent respectively. At higher level of income no case of malnourishment has been found.

It was found that 84.00 percent of the children belong to illiterate mothers, 42.00 percent of them were stunted, 5.95 percent underweight and 1.19 wasted.

Significant differences ($p < 0.05$) were found among the mother's

education, birth order in the family, social and economic categories and the prevalence of child undernutrition. These results agree with several studies carried out by Jane E Miller et al, [23], Abuya B A et al, [24], Ahmad E et al, [25] and Kumkum Kumari [26].

Living Conditions and Child Undernutrition

The living conditions depend upon the factors like type of house, the availability of safe drinking water, sanitation, type of cooking area, type of cooking fuel used, health environments and the nature of the head of the family. The living conditions are very important factor needed for the proper growth of the child. For example, a study conducted in USA in which 11723 low-income families were investigated. The findings of the study shows that the children of low-income families, who receive public housing subsidies are less likely to have anthropometric indications of undernutrition than those of low-income not receiving housing subsidies [27].

Table 1.3 shows that all the measures of undernutrition were more associated with the household cooking inside the bedroom (60.00 percent stunting, 22.22 percent underweight and 7.40 percent wasting) or in an open space (44.44 percent stunting). The households use wood as fuel for cooking the food were at higher risk of stunting (39.13 percent) as compared to the households used LPG. A higher number of children were suffering from the problem of stunting (60.00 percent), underweight (15.00 percent) and wasting (5.00 percent) not having toilet facility at home and face unhygienic problems.

Significant differences ($p < 0.05$) were found between the types of cooking area, fuel and toilet facility available at home and the prevalence of undernutrition. These results agree with several studies reported [28,29].

Summary and Conclusions

Undernutrition among children is increasingly recognized as a major prevalent and important public health problem in many developing countries including in India, which has a long-term consequences for the human and economic development [30]. Income is the most important and influential determinants of child undernutrition, as greater incomes at household level make it easy to invest more in food consumption, access to clean drinking water, good hygiene and adequate health and child care arrangements [31].

It was found that besides poverty, there are other socio-economic factors - (mother's education, birth order in the family, joint family system, social and economic categories of the children) and living conditions - (nature of sanitation, cooking area and fuel used) that directly or indirectly affect the nutritional status (undernutrition) of the school-going children. The present study showed a higher prevalence of stunting (36.00 percent) among the selected school going children as compared to other studies - NHFS-3, Subramanyam et al. [9] and Yasmeen & Nelofar, [10]. This is possible due to that the sample drawn from a particular village having lower socio-economic status and this cannot be compared to the national findings in the same age group.

There is a great need to focus the attention of the leaders and policy-makers for intervening in such areas, as nutritional status of

children is a main indicator of development and a pre-condition for the society to progress.

Conflict of Interests

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

Acknowledgement

The authors gratefully acknowledge the support and co-operation given by the parents and children participated in the field survey.

References

1. Smith LC, Lawrence H (1999) Explaining Child Under nutrition in Developing Countries: A Cross-Country Analysis. Food Consumption and Nutrition Division International Food Policy Research Institute FCND Discussion Paper NO. 60.
2. Nandy S, Irving M, Gordon D, Subramanian SV, Smith GD (2005) Poverty, Child Under nutrition and Morbidity: New Evidences from India. Bulletin of World Health Organization: the International Journal of Public Health 83: 210-216.
3. Thakur R, Gautam RK (2014) Prevalence of Under nutrition among school going boys (5-18 years) of a central India city (Sagar). Human Biology Review 3: 364-383.
4. UNICEF - WHO - World Bank Group joint child Under nutrition estimates Key findings of the 2015 edition, Levels and trends in child under nutrition.
5. United Nations (2010) Human Development Report. The Real Wealth of Nations: Pathways to Human Development. UNDP; New York USA.
6. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, et al. (2013) Maternal and child under nutrition and overweight in low-income and middle-income countries.
7. Census of India 2011, District and Census Handbook Doda. Directorate of Census operation J&K.
8. Economic Survey 2014-15, Government of India Ministry of Finance Department of Economic Affairs Economic Division February, 2015.
9. Subramanyam MA, Kawachi I, Berkman LF, Subramanian SV (2011) Is Economic Growth Associated with Reduction in Child Under nutrition in India? PLoS Med 8: e1000424.
10. Khan Y, Khan N (2012) Nutritional status of Children (0-24 months) in Jammu, Kashmir & Ladakh regions". International Journal of Scientific and Research Publications, 2.
11. Global Nutrition Report (2014) Actions and Accountability to accelerate the world's progress on nutrition. IFPRI; Washington DC, USA.
12. World Health Organization (1995) Under nutrition: the global picture"; Geneva.
13. Victora CG, Adair L, Fall C, Hallal P, Martorell R, et al. (2008) Maternal and Child Under nutrition: Consequences for Adult Health and Human Capital. The Lancet 371: 340-357.
14. Rausch R (2013) Nutrition and Academic Performance in School-Age Children The Relation to Obesity and Food Insufficiency. J Nutr Food Sci 3: 190.
15. Tate WF (2013) How does health influence school dropout? Washington University in St. Louis.
16. Soemantri AG, Pollitt E, Kim I (1985) Iron deficiency anemia and educational achievement among school age children in a rural community in Indonesia. Am J Clin Nutr 42: 1221-1228.
17. Chinyoka K (2014) Impact of poor nutrition on the academic performance of grade seven learners: A case of Zimbabwe. International journal of learning & development 4: 73-84.

18. UNICEF (2009) Strategy for improved nutrition of children and women in developing countries" UNICEF, New York, NY USA.
19. Veugeliers PJ, Fitzgerald AL (2005) Dietary intake and risk factors for poor diet quality among children in Nova Scotia. *Can J Public Health* 96: 212-216.
20. Census of India 2011, District and Census Handbook Doda. Directorate of Census operation J&K.
21. de Onis M, Oxyango AW, Borghi E, Siyam A, Nishida C, et al. (2007) Development of a WHO growth reference for school age children and adolescents. *Bulletin of the World Health Organization* 85: 660-667.
22. World Health Organization (2007) Growth Reference Data for 5-19 Years. Geneva.
23. Miller JE, Rodgers YV (2009) Mother's Education and Children's Nutritional Status: New Evidence from Cambodia. *Asian Development Review* 26: 131-165.
24. Abuya BA, Ciera J, Kimani-Murage E (2012) Effect of mother's education on child's nutritional status in the slums of Nairobi. *BMC Pediatr* 12: 80.
25. Ehtisham A, Salman K, Zulfia K (2011) Nutritional status in children (1-5 yrs)- A Rural Study. *Indian Journal of Community Health* 2: 84-86.
26. Kumari K (2007) Differentials of nutritional status in school-age children and the associated factors. *Health and Population Perspectives and Issues* 30: 268-277.
27. Meyers A, Cutts D, Frank DA, Levenson S, Skalicky A, et al. (2005) Subsidized housing and children's nutritional status: data from a multisite surveillance study. *Arch Pediatr Adolesc Med* 159: 551-556.
28. Henry FJ (1980) Environmental sanitation infection and nutritional status of infants in rural St. Lucia, West Indies. *Trans R Soc Trop Med Hyg* 75: 507-513.
29. Priya B, Parul G (2011) Nutritional status and access to clean fuels: Evidence from South Asia. Paper presented in Agricultural and Applied Economics Association's 2011 AAEA and NAREA joint annual Meeting, Pittsburg, Pennsylvania.
30. Bisai S, Bose K, Ghosh A (2008) Prevalence of Under nutrition of Lodha Children aged 1-14 Years of Paschim Medinipur District, West Bengal, India. *Iran J Pediatr* 18: 323-329.
31. Katoch OR (2012) Child undernutrition: Cause and Consequences *Radix International Journal of Social Science* 1: 1-12.