Original Article

Nutritional status of rural primary school children and their socio-demographic correlates: A cross-sectional study from Varanasi

Kaushik A[1], Richa[2], Mishra CP[3], Singh SP[4]

[1]Lecturer, Community Medicine, UP RIMS & R, Saifai, Etawah, [2]Assistant Professor, Community Medicine, Narayan Medical College, Sasaram, Bihar, [3,4]Professor, Community Medicine, IMS, BHU, Varanasi, UP.

Abstract

Research question: What is the nutritional status of primary school children in rural area of Varanasi and what factors are associated with malnutrition?

Objective: To assess the nutritional status of primary school children in rural Varanasi and to find out various socio-demographic correlates of nutritional status.

Study Design: Descriptive cross sectional study.

Setting: Four primary schools from Chiraigaon Community Development Block of Varanasi were selected for study purpose.

Participants: Eight hundred and sixteen students from four schools were involved in the study.

Results: Out of total 816 study subjects 429 or 52.6% (201 boys and 228 girls) were underweight and 75 or 9.2% (39 boys and 36 girls) were stunted. Educational status of the parents was found to be significantly associated with the nutritional status of school children

Conclusion: As the literacy status of the parents has been revealed to be strongly associated with nutritional status of children, there is an increasing need to focus the efforts towards the parents to improve the nutritional status of primary school children.

Keywords: Nutritional status, primary school children.

Introduction:

Children are considered to be the most important natural resource and biggest human investment for development in every community. However even after so many years of independence, our country has made a little progress in improving the health condition of our school children in comparison to the developed countries. Quality of life of school children, continues to be poor in India, the condition is still worse in rural areas[1]. School plays an important role in physical, mental and emotional development of children. Approximately twenty percent of the population in every country constitutes school age children (5-15 yrs.). About 200 million children belong to this group and majority of them reside in underprivileged areas in rural India[2]. There are a total Number of 785950 recognised primary/basic schools in India 2007-08, out of which 127247 are in Uttar Pradesh. The total number of students enrolled in these schools in India is 136229962 out of which 71469118 are boys and 64760844 are girls. Total students enrolled in Uttar Pradesh in primary/basic schools are 25832158; 13228067 boys and 12604091 girls[3].

Under nutrition remains one of the primary causes of ill-health among children in developing countries like India[4]. The problem of under nutrition is prevalent among children in almost all the states of our country[5]. The children living in rural areas of our country suffer disproportionately from this problem as compared to their urban counterparts[6]. Several recent studies[7-19] have reported the problem of under nutrition among school children in different parts of the country, there is scanty information regarding under nutrition among school children from rural areas of Varanasi, Uttar Pradesh.

To address these problems prevalent among primary school children the Government of India has launched School Health Programme and it is currently being implemented in 33 States/UTs. Services being offered under this programme include health check-up, treatment of minor ailments, health education, micronutrient supplementation and immunization services in close conjunction with the ministry of Human and Resource Development[20]. With this background the present study was conducted with following objectives:

Address for Correspondence :
Amit Kaushik, Lecturer, Community Medicine, UP RIMS & R, Saifai, Etawah UP.
Email: dramitkaushik@gmail.com

Objectives:

1. To assess the nutritional status of primary school children in rural Varanasi.
2. To identify various socio-demographic correlates associated with nutritional status of these children.

Material and Methods:

The present study was conducted in Chiraigaon Community Development Block of Varanasi, the field practice area of Rural Health and Training Centre, Institute of Medical Sciences, Banaras Hindu University, Varanasi. A list of all 106 government primary schools of Chiraigaon Community Development Block was prepared. Out of these 106 schools; four schools Primary School Barain, Bariyasanpur, Rustampur and Umraha were selected by purposive sampling for the study. All the students present in the school on the days of survey were included in the study, thus a total of 816 students were examined from four schools. The principals of the schools were approached for the present study. The purpose of study was explained to them and their written consent was obtained for conducting the study in their respective schools. The participating students were also explained about the study. Ethical approval was also obtained from Institutional Review Board of Institute of Medical Sciences, Banaras Hindu University. For students suffering from minor illnesses necessary treatment was given by our Rural Health Centre, Chiraigaon situated in the village. If needed necessary arrangements were made by linking them with Primary Health Centre, Chiraigaon.

Tools of study:

For study purpose semi-structured and pre-tested interview schedule was used. The interview schedule consisted of questions regarding socio-demographic profile of the study subjects like age, sex, caste, family income, type of family, education of mother, education of father, occupation of father, occupation of mother etc. The date of birth of the student was taken from the school records and the actual age of the child was recorded in years. The question about the caste was asked directly and they were stratified into General (Others), Backward (OBC) and Schedule caste (SC) groups. For monthly income of the family, statements were taken from parents through school authorities. The social class of the sample group was determined by modified B G Prasad classification. For the purpose of present study, a family was a unit comprising two or more persons related by blood, marriage or adoption and residing together in the same dwelling unit with a common kitchen. A family was considered nuclear when it consisted of husband, wife and their dependent children, and joint family if it included close relatives like sons, daughters who are not dependent, father, uncle, brother etc.

Anthropometric Measurements:

A. Weight: The weight of the child was recorded with the help of weighing machine (bathroom scale) with precision up to 100 grams. The weight of the study subjects was measured with minimum clothing, standing on the weighing machine bearing equal weight on both feet. Accuracy of the weighing machine was checked every morning before starting the survey by measuring a known weight. Zero error was checked every day before the start of survey and thereafter every ten readings.

B. Height: The height was measured while the child was standing by the side of a wall upright with heels close to each other and arm hanging by the side of the body. The height was measured from head to heels by an ordinary measuring tape.

Nutritional Status:

The mean weight and height of the children according to age and sex were compared with the median weight for age and height for age as per NCHS standards. Children with weight for age $\leq$80% of 50th percentile of NCHS Standards were taken as underweight and those with height $\leq$ 90% of 50th percentile of NCHS Standard were considered stunted.

Results & Discussion:

Table: 1
Age & Sex-wise distribution of study subjects:

Age (Completed Years)	Boys		Girls		Total	
	No.	%	No.	%	No.	%
5	12	3.1	12	2.8	24	2.9
6	57	14.8	66	15.3	123	15.1
7	69	18.0	78	18.1	147	18.0
8	72	18.8	60	13.9	132	16.2
9	63	16.4	99	22.9	162	19.9
10	51	13.3	69	16.0	120	14.7
11	33	8.6	24	5.6	57	7.0
12	27	7.0	24	5.6	51	6.3
Total	384	100	432	100	816	100

Total eight hundred sixteen students were included in the present study; out of which there were three hundred eighty four (47.1%) were boys and four hundred thirty two (52.9%) were girls. The mean age of the boys and girls was 8.40±1.87 and 8.37±1.78 years respectively. At school level enrollment of girls was higher as compared to boys. The students' ages ranged from 5 years (2.9%) to 12 years (6.3%). Maximum number of students was between 7-9 years of age and girls constituted 53.7% of that. Looking at the age trend we observed that there is a sudden drop in the proportion of students from 14.7% to 7.0 % from age 10 to 11 years. When we look the distribution of students in various classes the similar trend is not observed. This could be because the students of the higher ages were in the lower classes because of their repeated failures. The proportion of students declined from 22.4% in class I to 17.3% in class V. Similar drop in the proportion of students was also observed by other researchers in country. P Panda et al[7] reported a drop in the proportion of children from 10.8% to 5.0% from age 9 to 10 years.

Table: 2 Socio-demographic profile of study subjects: (n=816)

Specifications	No.	%
Caste		
SC	366	44.9
OBC	339	41.5
Others	111	13.6
Socio-economic Class		
2	42	5.2
3	159	19.5
4	375	45.9
5	240	29.4
Father's Education		
Illiterate	297	36.4
Primary & Middle	270	33.1
High School	117	14.3
Intermediate & Above	132	16.2
Mother's Education		
Illiterate	486	59.6
Primary & Middle	309	37.8
High School	21	2.6
Father's Occupation		
Agriculture	84	10.3
Business	42	5.2
Service	27	3.3
Skilled Labourer	285	34.9
Unskilled Labourer	378	46.3
Mother's Occupation		
ASHA	3	0.4
House Wife	585	71.7
Skilled Labourer	195	23.9
Unskilled Labourer	33	4.0
Type of Family		
Joint	447	54.8
Nuclear	369	45.2

Looking at the caste distribution of the study subjects 44.9% belonged to scheduled caste, 41.5% to other backward classes while the least were from others caste category i.e. 13.6%. As per the annual report of Human Resource Department 2009-10[3] 26.6% of the total enrolled students belonged to SC Category in Uttar Pradesh. In our study the representation of SC Category students was quite high. The reason for this distribution could be because of two factors. Firstly economic status of SC students might be poor leading them to enroll in government schools where education fee is not required and secondly the selected schools might have been catering to a population dominated by SC Category.

As per Modified B G Prasad Socio-economic classification approximately three-fourth of the students belonged to class III and above indicating a poor economic condition and this finding may be associated with the distribution of caste category.

Majority of students (54.8%) belonged to joint families. Illiteracy rates among fathers and mothers of the study subjects were 36.4% and 59.6% respectively. Education upto high school and was found to be 30.5% in fathers and only 2.6% in mothers. Illiteracy rate at district level in rural areas is 37.6%[8]. This figure for males is in accordance with our study however illiteracy rate in mothers was higher in our study. More than three-fourth (81.2%) of fathers were labourers, 46.3% of them were unskilled labourers. Majority of the mothers (71.7%)

were house-wives by occupation three were Accredited Social Health Activists and remaining were labourers.

Table: 3 Distribution according to height of children (Mean ± SD)

Age (completed Years)	BOYS				GIRLS			
	No.	Mean ± SD	Reference value (50th percentile of NCHS)	% of reference	No.	Mean ± SD	Reference value (50th percentile of NCHS)	% of reference
5	12	107.75±0.50	109.9	97.9	12	106.00±1.28	108.4	97.7
6	57	111.37±4.41	116.1	95.8	66	114.05±4.50	114.6	99.4
7	69	120.17±4.58	121.7	98.6	78	120.46±5.34	120.6	99.9
8	72	125.92±5.89	127.0	99.1	60	123.50±3.79	126.4	97.7
9	63	127.86±5.08	132.2	96.6	99	125.61±6.12	132.2	95.00
10	51	127.88±4.07	137.5	92.9	69	133.30±5.33	138.3	96.3
11	33	135.73±8.89	143.3	94.6	24	140.50±9.46	144.8	97.0
12	27	142.78±3.77	149.7	95.3	24	145.00±1.25	151.5	95.7
Total	384				432			

Mean height of both and girls was found to be increasing with age as depicted by table: 3. Boys were taller than girls up to the age of 9 years except at 6 years, when girls were taller. But girls again crossed over the boys at 10 years of age. The mean heights of both the girls and the boys in all age-groups were lower as compared to the NCHS standards. Mullick[9], S Khalil and Z Khan[10] in Aligarh district & Semwal et al[11] in their study also reported findings similar to our study. The total increase in height during the period of 5-12 years was 35.03 cm in case of boys and 39.00cm in case of girls. Maximum gain in height was seen in 6-7 years age group in case of boys and 9-10 years in case of girls.

Table: 4 Distribution according to weight of children (Mean ± SD)

Age (completed Years)	BOYS				GIRLS			
	No.	Mean ± SD	Reference value (50th percentile of NCHS)	% of reference	No.	Mean ± SD	NCHS Standard	% of reference
5	12	17.12±0.57	18.7	91.4	12	16.38±1.54	17.7	97.1
6	57	16.42±1.74	20.7	81.6	66	16.61±1.84	19.5	86.6
7	69	19.37±1.97	22.9	85.1	78	18.63±2.16	21.8	86.6
8	72	21.65±3.56	25.3	88.1	60	19.62±2.16	24.8	79.8
9	63	22.02±2.62	28.1	79.0	99	21.91±2.51	28.5	76.8
10	51	23.97±2.98	31.4	75.7	69	26.67±3.95	32.5	69.5
11	33	28.95±4.08	35.3	82.4	24	28.62±5.66	37.0	80.0
12	27	31.83±2.98	39.8	80.6	24	33.25±2.24	41.5	80.0
Total	384				432			

Mean weight of boys increased with age except between the age of five and six where a decrease in the mean weight of male participants was noted, while the weight of girls increased with age. Boys in all age-groups were heavier than girls except at the age of 6, 10 and 12 years, where the girls were heavier than boys. The mean weights of all children were lower in comparison to NCHS standards. Similar findings were reported by other researchers in the country[9-11]. The average weight at 5 years for boys was 17.12 kg and it increased to 31.83 kg at the age of 12 years thus accounting for an increase of 14.71 kg from 5-12 years of age. The girls showed an increase from 16.38 kg at 5 years of age to 33.25 kg at 12 years, thus gaining a total of 16.87 kg during the period of 5-12 years.

Table: 5 Distribution of correlation coefficient (r) between height and weight as per age and sex

Age	Boys			Girls		
	No.	Correlation Coefficient	p Value	No.	Correlation Coefficient	p Value
5	12	0.66	0.01	12	0.97	<0.01
6	57	0.50	<0.01	66	0.39	0.01
7	69	0.62	<0.01	78	0.63	<0.01
8	76	0.68	<0.01	60	0.33	0.01
9	63	0.74	<0.01	99	0.82	<0.01
10	51	0.82	<0.01	69	0.77	<0.01
11	33	0.87	<0.01	24	0.78	<0.01
12	27	0.54	<0.01	24	0.07	>0.05

Table: 5 shows the correlation coefficient between height and weight of children; maximum correlation among boys was revealed to be at the age of eleven years (0.87), while the corresponding age for the female counterparts was five years (0.97). Correlation coefficient was statistically significant at all ages for both sexes except at the age of twelve for girls. S Khalil and Z Khan[10] reported similar findings in their study in Aligarh District.

Table: 6 Prevalence of underweight and stunting among children

Sex	Underweight (Weight < 80% of 50th percentile of NCHS Standard) No. (%)	Stunting (Height < 90% of 50th percentile of NCHS Standard) No. (%)
Male	201(52.3)	39 (10.2)
Female	228 (52.8)	36 (8.3)

Table 6 reveals the nutritional status of the children studied. Out of total 816 study subjects 429 or 52.6% (201 boys and 228 girls) were underweight and 75 or 9.2% (39 boys and 36 girls) were stunted. Out of total underweight children 53.2% were girls and 46.8% were boys. Out of the total stunted children 52.0% were boys and 48.0% were girls. All the children who were stunted were also underweight. Different researchers in their studies conducted in different parts of country reported the prevalence of undernourished children ranging from 25.0% to 66.7[7,11-15]. Findings of our study are almost in coherence with the results of these studies. Prevalence of stunting in the present study was found to be slightly lower than reported by Ruchika Handa et al[15] and Major Mukherjee et al[16] in their studies who found it to be 17.3% and 13.8% respectively.

Table: 7 Socio-demographic correlates of nutritional status

Specification	Grade of under nutrition			Total	Test of significance
	Normal No. (%)	1 No. (%)	2 & 3 No. (%)		
Age					
5 & 6	90 (61.2)	51 (34.7)	6 (4.1)	147	
7	84 (57.1)	57 (38.8)	6 (4.1)	147	
8	57 (43.2)	66 (50.0)	9 (6.8)	132	χ^2 =60.48
9	57 (35.2)	75 (46.3)	30 (18.5)	162	*d f=12*
10	54 (45.0)	51 (42.5)	15 (12.5)	120	*p<0.001*
11	21 (36.8)	21 (36.8)	15 (26.4)	57	
12	24 (47.1)	24 (47.1)	3 (5.9)	51	
Sex					χ^2 =0.02
Male	183 (47.7)	162 (42.2)	39 (10.2)	384	*d f=2*
Female	204 (47.2)	183 (42.4)	45 (10.4)	432	*p>0.05*
Father's Education					
Illiterate	111 (37.4)	153 (51.5)	33 (11.1)	297	χ^2 =49.76
Primary & Middle	126 (46.7)	126 (46.7)	18 (6.6)	270	*d f=6*
High School	60 (51.3)	39 (33.3)	18 (15.4)	117	*p<0.01*
Intermediate & Above	90 (68.2)	27 (20.5)	15 (11.4)	132	
Mother's Education					χ^2 = 30.25
Illiterate	192 (39.5)	237 (48.8)	57 (11.7)	486	*d f=2*
Literate	195 (59.1)	108 (32.7)	27 (8.2)	330	*p<0.01*
Caste					χ^2 = 70.42
OBC	186 (54.9)	129 (38.1)	24 (7.1)	339	*d f=2*
SC	120 (32.8)	192 (52.5)	54 (14.8)	366	*p<0.01*
Others	81 (73.0)	24 (21.6)	6 (5.4)	111	
Socio economic Status					
2	27 (64.3)	12 (28.6)	3 (7.1)	42	χ^2 = 26.21
3	99 (62.3)	48 (30.2)	12 (7.5)	159	*d f=6*
4	165 (44.0)	171 (45.6)	39 (10.4)	375	*p<0.01*
5	96 (40.0)	114 (47.5)	30 (12.5)	240	

Results of uni variate analysis show that maximum percentage (64.8%) of underweight children belonged to age group nine and the least percentage (38.8%) belonged to age group 5 & 6 and this association between age of children and their weight was found to be statistically significant (χ^2 =60.48, *p<0.001*). Kaushik Bose et al[17] in their study also found the least percentage of underweight among the children of age group six. Around 52.0% children among both boys

and girls were found to be underweight. As far as educational status of the father is concerned 62.6% children were found to be underweight in the category where father was illiterate, while the least percentage (31.9%) of underweight children belonged to the category where father was educated up to intermediate and above and this difference was statistically significant (χ^2 =49.76, *p<0.01*). Educational status of the mother was also revealed to have a significant association with nutritional status of children (χ^2 = 30.25, *p<0.01*). Maj R Mukherjee et al[16] in their study also revealed the similar findings; prevalence of underweight was least (nine 3.43%) among children whose mothers were educated till graduation or beyond, while the highest prevalence (20 33.89%) was observed among children whose mothers were educated till primary level (χ^2 for linear trends= 53.50, p=0.000). Looking at the association between caste and nutritional status of children, the percentage of underweight children in the present study among caste category SC, OBC and others was 67.3%, 45.2% and 27.0% respectively and the association was found to be statistically significant (χ^2 = 70.42, *p<0.01*). The percentage of children belonging to the socioeconomic status class five who were underweight was 60.0%, whereas the corresponding figure for the class two was 35.6% and a statistically significant association was found between socio economic status and nutritional status of children (χ^2 = 26.21, *p<0.01*). B. Mukerji et al[18] also revealed the influence of socio-economic status on nutritional status among primary school children. Chandra et al[19] also found direct relationship of nutrition related morbidity and social class.

Table: 8 Results of multivariate analysis

Specification	Nutritional Status		Odds Ratio (OR)	p Value	Confidence Interval (CI)
	Normal No. (%)	Underweight No. (%)			
Age					
5	21 (87.5)	3 (12.5)	0.15	<0.01	0.03-0.63
6	69 (56.1)	54 (43.9)	0.82	>0.05	0.38-1.75
7	84 (57.1)	63 (42.9)	0.73	>0.05	0.35-1.53
8	57 (43.2)	75 (56.8)	1.34	>0.05	0.63-2.83
9	57 (35.2)	105 (64.8)	1.78	>0.05	0.84-3.74
10	54 (45.0)	66 (55.0)	1.18	>0.05	0.55-2.52
11	21 (36.8)	36 (63.2)	1.62	>0.05	0.66-3.97
12	24 (47.1)	27 (52.9)	1 Referent		
Caste					
SC	120 (32.8)	246 (67.2)	7.39	<0.01	4.40-12.42
OBC	186 (54.9)	153 (45.1)	2.25	<0.05	1.33-3.81
Others	81 (73.0)	30 (27.0)	1 Referent		
Father's Education					
Illiterate	111 (37.4)	186 (62.6)	3.58	<0.01	2.12-6.05
Primary & Middle	126 (46.7)	144 (53.3)	3.60	<0.01	2.16-6.00
High School	60 (51.3)	57 (48.7)	3.29	<0.01	1.83-5.90
Intermediate & Above	90 (68.2)	42 (31.8)	1 Referent		
Mother's Education					
Illiterate	192 (39.5)	294 (60.5)	1.54	<0.05	1.07-2.19
Literate	195 (59.1)	135 (40.9)	1 Referent		
Socio-economic Status					
2	27 (64.3)	15 (35.7)	0.44	<0.05	0.20-0.95
3	99 (62.3)	60 (37.7)	0.35	<0.01	0.22-0.57
4	165 (44.0)	210 (56.0)	0.80	>0.05	0.54-1.19
5	96 (40.0)	144 (60.0)	1 Referent		

Table: 8 reveals that risk of being underweight increased as the age of children increased. Results of univariate analysis show statistically significant association between age and the nutritional status of the children, while the similar association was not found in multivariate analysis. Risk of being underweight among children belonging to scheduled caste was 7.39 times higher (95% Confidence interval (CI): 4.40-12.42) and among those of other backward classes 2.25 times higher (95% CI: 1.33-3.81) compared to children of

others caste category both with significant association (Table: 8). Increasing educational status of father was associated with reduced risk of children being underweight, illiterate (odds ratio (OR) – 3.58, 95% CI: 2.12-6.05); primary & middle (OR - 3.60, 95% CI: 2.16-6.00); high school (OR - 3.29, 95% CI: 1.83-5.90), all with statistically significant trends. Children of illiterate mothers were at 1.54 time higher risk of being underweight in comparison to those of literate mothers (95% CI: 1.07-2.19). Lower the socio-economic status (SES) higher was the risk of children being underweight; SES class 2 (OR – 0.44, 95% CI: 0.20-0.95); SES class 3 (OR – 0.35, 95% CI: 0.22-0.57); and SES class 4 (OR – 0.80, 95% CI: 0.54-1.19).

References:

1. Local Action Creating Health Promoting Schools. The World Health Organization's Information Series on School Health (Online). WHO 2000. [Cited 2012 Nov 12]; Available from: URL:http://www.who.int/school_youth_health/media/en/88.pdf
2. UNICEF. The State of The World's Children (Online). 1999. [Cited 2012 Nov 12]; Available from: URL:http://www.unicef.org/sowc99/sowc99a.pdf
3. Annual Report 2009-10. Department of School Education and Literacy, Department of Higher Education, Ministry of Human Resource Development, Government of India. Dolphin Printo Graphics, 4E/7, Pabla Building, Jhandewalan Extn., New Delhi-110055. [Cited 2012 Nov 12]; Available from: URL:http://mhrd.gov.in/sites/upload_files/AR2009-10_Part1.pdf
4. Nandy S, Irving M, Gordon D, Subramanian SV, Smith GD. Poverty, child undernutrition and morbidity: new evidence from India. Bull World Organ. 2005; 83(3): 210-216.
5. Som S, Pal M, Bhattacharya B, Bharati S, Bharati P. Socieconomic differentials in nutritional status of children in the states of West Bengal and Assam. J Biosoc Sci. 2006; 38(5): 625-642.
6. Rajaram S, Zottarelli LK, Sunil TS. Individual, household, programme and community effects on childhood malnutrition in rural India. Matern Child Nutr. 2007; 3(2): 129-140.
7. Panda P, Benjamin AI, Singh S, Zachariah P. Health status of school children in Ludhiana City. Ind. J. Com. Med. 2000; 25(4): 150-55.
8. District Level Household Survey III, 2007-08. Fact Sheet Uttar Pradesh. Indian Institute for Population Sciences, Mumbai (Online). [Cited 2012 Nov 12]; Available from: URL: http://www.rchiips.org/pdf/rch3/state/UPradesh.pdf
9. Mullick, H. Assessment of Health Status of Urban Primary School Children of Jhansi (Uttar Pradesh). Thesis submitted for M. D. In Community Medicine. 1991; Bundelkhand University, Jhansi.
10. Khalil S and Khan Z. Physical growth and nutritional status of rural school going children (6-14 years) of Aligarh. Ind. J. Prev. Soc. Med. 2004; 35(3 & 4): 90-98.
11. Semwal J, Srivastava AK, Gupta S, Kishore S, Chandra R. Nutritional status of school children in rural areas of Dehradun district. Ind. J. Prev. Soc. Med. 2006; 37(1 & 2): 76-81.
12. Anathakrishnan S, Pani SP and Nalini P. A comprehensive study of morbidity in school age children. Ind. Paediatr. 2001; 38: 1009-1017.
13. Kokiwar PR and Sai Prasad GS. A Study of Nutritional Status of Children in a Village of A.P. Souvenir; 32nd Annual National Conference of IAPSM and 12th Annual Conference of MCIAPSM; 2005: 65.
14. Damodharan G, Ravichandran C, Vijayakumar V, Senguttuvan M. Nutritional status and pattern of illness in Chennai Corporation primary school children. Ooty Pedicon 2005 - Conference Abstracts.Pediatric Oncall [serial online] 2005 [cited 2010 March 8];2.Availablefrom:http://www.pediatriconcall.com/fordoctor/Conference_abstracts/ nutrition.asp.
15. Handa R, Ahmad F, Kesari KK, Prasad R. Assessment of nutritional status of 7-10 years school going children of Allahabad district: A Review. Middle-East Journal of Scientific Research. 2008; 3(3): 109-115.
16. Maj. Mukherjee R, Lt Col Chaturvedi S, Col Bhalwar R. Determinants of nutritional status of school children. MJAFI. 2008; 64: 227-231.
17. Bose K, Bisai S, Mukherjee S. Anthropometric characteristics and nutritional status of rural school children . The Internet Journal of Biological Anthropology. 2008; 2(1).
18. Mukerji B and Kaul KK. Anthropometric observations on urban primary school children. Indian J. Med. Res. 1970; 58(9).
19. Chandra Pravin KR, Uma MP, Sadashivappa T, and Prabhakara GN. Nutrition assessment survey of school children of Dharwad and Haliyal Taluks, Karnataka State India. Kathmandu University Journal of Sci., Eng. and Tech. 2006; 2(1): 1-6.
20. Annual Report 2010-11. Department of Health and Family Welfare, Ministry of Health and Family Welfare, Government of India. Page No. 71 [Cited 2012 Nov 12]; Available from: URL: http://mohfw.nic.in/showfile.php?lid=1091