

Prevalence of malnutrition among Primary School children of rural areas of Bikaner district (Rajasthan)

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Prevalence of malnutrition among 986 rural primary school children (7-12 years) of Bikaner district (Rajasthan) was studied by using anthropometric measurements. It was found that the greater percentage (47.87 %) of them were boys than girls (52.12%). Majority of them were Hindu (98.98%) and belonged to schedule caste (52.83%). Mean height and weight of the subjects was found to be 86.98 – 94.24 per cent and 68.99 – 79.09 per cent of the NCHS (1990) standards, respectively. On the basis of weight for age 7.71 to 63.69 per cent subjects were undernourished and 0.40 to 0.80 per cent were over nourished. Whereas, based on BMI 17.24 to 26.67 per cent subjects were noted to be undernourished and 0.81 to 8.52 per cent subjects were obese / overweight. Findings of present study indicate great scope of nutrition intervention for prevention and control of malnutrition.

Key Words : Prevalence, Malnutrition, Under nourished, Prevention, Intervention, Nutrition

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INTRODUCTION

In primary schools, children receive primary or elementary education from the age of about six to twelve years coming after pre-school and before secondary school. In most parts of the world, primary education is the first stage of compulsory education, and may be available without charge or may be offered in a fee-paying independent school (<http://search.eb.com/eb>).

School going children are most important segment

of a society who are vulnerable to retardation in growth because of under nutrition. It is estimated that majority of the undernourished people in the world live in Indian subcontinent and most of them are children. At school age certain specific biological, psychological and nutritional needs must be met to ensure the survival and healthy development of a child. The health and welfare of this age group is important because they are the future of our country and working hands of tomorrow. Utmost care must be exercised to promote their health and to protect them from diseases. Two of the most pressing problems of majority of children in India are malnutrition and education (Joseph, 2005).

Freedom from hunger and malnutrition is a basic human right and their alleviation is fundamental prerequisite for human and national development. Usually referred to as silent emergency, it has devastating effects on children, society and future humankind. The term malnutrition refers to both under nutrition as well as over-

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nutrition. Better nutrition means stronger immune system, less illness, better health and productive community. In developing countries like India various forms of malnutrition affect a large segment of population and both macro and micronutrients deficiencies are of major concerns.

Globally, malnutrition among school age children is becoming a major public health concern. According to Mitra *et al.* (2007) more than 200 million school age children are stunted and underweight and if no action is taken, about one billion school children may grow up by 2020 with impaired physical and mental development.

According to National Family Health Survey IV (2015-2016) 23 to 30 per cent of children (5-12yr) were found to be thin and 11 to 24 per cent of them were overweight in rural and urban areas of Rajasthan.

Looking into paucity of available literature about prevalence of malnutrition among rural primary school children, present study, had therefore been planned and executed.

METHODOLOGY

Subject selection:

The study was conducted on 7-12 years old rural children studying in Government primary schools of Bikaner district (Rajasthan). First step of the study taken by the investigator was to obtain exhaustive list of all rural Government primary schools of Bikaner district (Rajasthan). Thereafter, fifty per cent of those schools having at least hundred child population within 50 km distance from the college, were selected. Thus, the study was conducted at six rural Government primary schools of Bikaner *i.e.* Govt. primary school of *Pemasar, Kahara, Nagasar sugni, Ridmalsar Purothian, Gigasar* and *Dholera no.1*.

After seeking prior permission and having discussion with respective school authorities, a list of all children (986 in number) aging 7-12 years of both the gender was prepared. These children were studying in class 1st to 5th standards. Regularity in attending the school as well as willingness of the children to co-operate during the study was also taken care before selection of the subjects.

Data collection:

Questionnaire interview schedule was developed for the assessment of malnutrition based on anthropometric measurements. For data collection, following information

was collected at school level:

General information:

Data regarding general information like – name, age, gender, date of birth, religion, caste, address and phone number of each of the subject was noted with the help of school records as well as interviewing the child.

Specific information:

Prevalence of malnutrition among the study population was assessed by using anthropometric measurements as follows:

Anthropometric measurements:

Some of the body measurements which are simple and easy to measure and at the same time give maximum information on the nutritional status of primary school children (Gibson, 1990) were considered for the present study. The subjects were assessed for their “weight for age”, (Jelliffe, 1996), height for age (Jelliffe, 1966) and body mass index (BMI) (WHO, 2007).

Weight and height of each of the subject was compared with the reference value given by NCHS (1983) to find out percentage of the standard values.

For interpretation of the nutritional status based on weight for age and height for age, McLaren (1976) classification was used.

To assess prevalence of malnutrition based on of BMI, in terms of severe malnutrition, moderate malnutrition, mild malnutrition, over weight and obesity, the obtained data was compared with the child growth standard values given by WHO (2007).

Statistical analysis of the data:

Percentage, mean and standard deviation of data were calculated during present study for statistical analysis of findings. The statistical analysis was carried out with the help of Microsoft excel 2007

OBSERVATIONS AND ASSESSMENT

The results obtained from the present investigation and the relevant discussions have been summarized under following heads:

Age and gender:

Table 1 indicates distribution of the subjects

according to their age and gender. As per the subject selection criteria of the study, a total of 986 children, were assessed for the prevalence of malnutrition. Age wise distribution of the subjects, clearly revealed that 54.97 per cent of them were aging 7-9 years and 45.04 per cent of them were of 10-12 years age.

When the subjects were classified according to their gender, 28.70 per cent of them were girls and 26.26 per cent were boys in younger age (7-9 years) group. In elder age category (10-12 years), 23.43 per cent were girls and 21.60 per cent were boys. Thus, the total subjects comprised of 47.87 per cent boys and 52.12 per cent girls. Results of present study clearly indicate reduction in gender biasness with respect to at least enrolment in schools. Khera (2002) while assessing impact of mid-

day meal programme on the enrolment of children in primary schools of Rajasthan also observed greater enrolment of girls than boys which is almost in line with present findings about younger age group.

Education:

The subjects were inquired about their class in which they were studying and relevant information has been depicted in Table 1. The table shows that irrespective of age 16.02, 16.73, 25.45, 19.57 and 22.21 per cent of the subjects were studying in class I, II, III, IV and V standard, respectively in different Government schools. It is obvious from the table that greater number (15.41-16.43%) of younger children (7-9 years) were studying in class 1st to 3rd as compared to their elder counter parts (0.20- 9.02%).

Table 1: Distribution of the subjects according to their general profile

Age (years)	Gender			Class					Caste				Religion		
	Boys	Girls	Total	1	2	3	4	5	General caste	Backward caste	Schedule caste	Schedule tribe	Hindu	Muslim	Sikh
7-9	259 (26.26)	283 (28.70)	542 (54.97)	156 (15.82)	152 (15.41)	162 (16.43)	61 (6.18)	11 (1.11)	143 (14.50)	96 (9.73)	303 (30.70)	0 (0)	537 (54.46)	4 (0.4)	1 (0.10)
10-12	213 (21.60)	231 (23.43)	444 (45.03)	2 (0.2)	13 (1.32)	89 (9.02)	132 (13.38)	208 (21.09)	123 (12.47)	103 (10.44)	218 (22.10)	0 (0)	439 (44.52)	5 (0.50)	0 (0)
Total n=986	472 (47.87)	514 (52.12)	986 (100)	158 (16.02)	165 (16.73)	251 (25.45)	193 (19.57)	219 (22.21)	266 (26.97)	199 (20.18)	521 (52.83)	0 (0)	976 (98.98)	9 (0.92)	1 (0.1)

Note: Values in parenthesis indicate percentage of the subjects

Table 2 : Distribution of the subjects according to their height

Age (in years)	Gender (n=986)	Height (cm) NCHS standards	No. of subjects	
			Mean \pm SD (cm)	Percentage of standard value
7	Girls (n=82)	120.6	110.04 \pm 8.83	91.24
	Boys (n=86)	121.7	108.28 \pm 9.18	88.97
8	Girls (n=97)	126.4	118.15 \pm 9.92	93.47
	Boys (n=81)	127	119.68 \pm 8.84	94.24
9	Girls (n=104)	132.2	121.13 \pm 10.46	91.63
	Boys (n=92)	132.2	123.79 \pm 10.84	93.64
10	Girls (n=87)	138.3	126.82 \pm 10.98	91.70
	Boys (n=92)	137.5	125.15 \pm 13.03	91.02
11	Girls (n=89)	142	131.81 \pm 11.69	92.82
	Boys (n=77)	140	130.33 \pm 10.75	93.09
12	Girls (n=55)	148	128.73 \pm 14.27	86.98
	Boys (n=44)	147	132.84 \pm 13.42	90.37
			122.43 \pm 13.18	

Note: Values in parenthesis indicate percentage of the subjects

Similarly, greater percentages of elder children (13.38 – 21.09%) were found to be studying in class 4th to 5th than the younger subjects (1.11 – 6.18%).

Caste:

Table 1 reveals that majority of the subjects (52.83%) were from schedule caste followed by 26.97 per cent from general category and 20.18 per cent from other backward caste.

Religion:

Table 1 reflects that immaterial of the age groups and gender, majority of the subjects were Hindu (98.98%). Remaining of them were Muslim (0.92%) and only 0.1 per cent were Sikh. None of the subjects belonged to other religions of the society. According to Rajasthan census (2011) also, majority (88.49%) of the state population is constituted by Hindus.

Anthropometric assessment:

Height for age :

Height is affected only by long term nutritional deprivation and it is considered as an index of chronic or long duration malnutrition (Srilakshmi, 2008). It is clear from the Table 2 that the mean height (cm) of 7-9 years old girl and boy subjects was 91.63 - 93.47 and 88.97 – 94.24 per cent of the NCHS standards, respectively. Similarly, the mean height (cm) of 10 -12 years old girl

and boy subjects was 86.98 – 92.82 and 90.37 – 93.09 per cent of NCHS standards, respectively. The table clearly reveals a gradual increase in height of subjects with the increment in their age. Kapoor (2016) also observed gradual increase in height of both the genders of 6-9 years of age.

Nutritional status based on height for age:

Table 3 presents grades of malnutrition of girl and boy subjects based on their height measurements. It can be viewed from the table that almost equal percentage of girl and boys subjects are falling in normal (23.32 – 23.93%), short height (17.64 – 22.51%) dwarf (4.86 – 4.96 %) and giant (1.31 – 1.41%) category based on their height for age. On the whole 47.26 per cent subjects had normal height, 40.16 per cent had short height, 9.84 per cent were dwarf and 2.79 per cent were assessed as giant.

Present results regarding 50 per cent prevalence of stunting (short height + dwarf), is almost in line with the findings of Mitra *et al.* (2007) who found that 47.5 per cent children under their study were stunted.

Weight for age:

Weight of an individual indicates the current nutritional status. It is proportional to the dietary intake and any fluctuation may lead to malnutrition of either deficit or excess (Gibson, 1990). It can be perceived from

Age (in years)	Gender (n=986)	Dwarf (<80%)	Short (80-93%)	Normal (93-105%)	Giant (>105%)
7	Girls (n=82)	3 (0.30)	47 (4.76)	30 (3.04)	2 (0.20)
	Boys (n=86)	7 (0.70)	58 (5.88)	19 (1.92)	2 (0.20)
8	Girls (n=97)	7 (0.70)	36 (3.65)	49 (4.96)	5 (0.50)
	Boys (n=81)	5 (0.50)	22 (2.23)	52 (5.27)	2 (0.20)
9	Girls (n=104)	9 (0.91)	49 (4.96)	43 (4.36)	3 (0.30)
	Boys (n=92)	9 (0.91)	26 (2.63)	51 (5.17)	6 (0.60)
10	Girls (n=87)	9 (0.91)	35 (3.54)	42 (4.25)	1 (0.10)
	Boys (n=92)	14 (1.41)	31 (3.14)	44 (4.46)	3 (0.30)
11	Girls (n=89)	7 (0.70)	34 (3.44)	46 (4.66)	2 (0.20)
	Boys (n=77)	7 (0.70)	19 (1.92)	51 (5.17)	0 (0)
12	Girls (n=55)	14 (1.41)	21 (2.21)	20 (2.02)	0 (0)
	Boys (n=44)	6 (0.60)	18 (1.82)	19 (1.92)	1 (0.10)
Overall total (7-12)	Girl (n=514)	49 (4.96)	222 (22.51)	230(23.32)	13(1.31)
	Boys (n=472)	48 (4.86)	174 (17.64)	236(23.93)	14(1.41)
Grand total (n=986)		97 (9.84)	396 (40.16)	466 (47.26)	27 (2.74)

Note: Values in parenthesis indicate percentage of the subjects

McLaren (1976)

the Table 4 that mean value for 7-9 years old girl and boy subjects was 73.82 – 77.75 and 72.49 – 79.09 per cent of NCHS standard values. Likewise, mean body weight of 10 – 12 year old girl and boy subjects was 68.99 – 76.44 and 72.84 – 76.46 per cent of standard values. Weight measurement of the subjects also clearly indicated

a gradual increment in the values with the advancement of the age, although the mean values were lesser (23.54 – 31.01%) than the standard values given by NCHS (1990). Further, it can be seen from the table that on the basis of NCHS standards, except 7 year old subjects, boys at all other age categories showed greater

Table 4: Distribution of the subjects according to their weight for age

Age (in years)	Gender (n=986) Girls (n=82)	Weight (kg) NCHS standards	No. of subjects	
			Mean weight \pm SD (kg)	Percentage of standard value
7	Boys (n=86)	21.8	16.95 \pm 2.43	77.75
	Girls (n=97)	22.9	16.6 \pm 2.47	72.49
8	Boys (n=81)	24.8	19.51 \pm 3.15	78.67
	Girls (n=104)	25.3	20.01 \pm 2.69	79.09
9	Boys (n=92)	28.5	21.04 \pm 3.12	73.82
	Girls (n=87)	28.1	21.92 \pm 2.9	78.01
10	Boys (n=92)	32.5	23.21 \pm 3.65	71.42
	Girls (n=89)	31.4	23.46 \pm 3.84	74.71
11	Boys (n=77)	33.7	25.76 \pm 4.71	76.44
	Girls (n=55)	32.2	24.62 \pm 3.95	76.46
12	Boys (n=44)	38.7	26.7 \pm 4.4	68.99
		37	26.95 \pm 4.46	72.84
			21.86 \pm 4.71	

Note: Values in parenthesis indicate percentage of the subjects

Table 5 : Age wise distribution of the subjects according to their grades of malnutrition based on their weight for age

Age (in years)	Gender (n=986)	No. of the subjects according to their grades* of malnutrition based on body weight					
		Severe malnutrition (<60%)	Moderate malnutrition (61-80%)	Mild malnutrition (80-90%)	Normal (91-110%)	Overweight (110-120%)	Obese (120% and above)
7	Girls (n=82)	3 (0.30)	49 (4.96)	17 (1.72)	12 (1.21)	0 (0)	1 (0.10)
	Boys (n=86)	3 (0.30)	69 (6.99)	10 (1.01)	3 (0.30)	1 (0.10)	0 (0)
8	Girls (n=97)	3 (0.30)	46 (4.66)	33 (3.34)	14 (1.41)	1 (0.10)	0 (0)
	Boys (n=81)	2 (0.20)	52 (5.27)	16 (1.62)	10 (1.01)	0 (0)	1 (0.10)
9	Girls (n=104)	10 (1.01)	69 (6.99)	18 (1.82)	6 (0.60)	1 (0.10)	0 (0)
	Boys (n=92)	1 (0.10)	63 (6.38)	19 (1.92)	8 (0.81)	1 (0.10)	0 (0)
10	Girls (n=87)	11 (1.11)	63 (6.38)	4 (0.40)	9 (0.91)	0 (0)	0 (0)
	Boys (n=92)	8 (0.81)	67 (6.79)	9 (0.91)	6 (0.60)	2 (0.20)	0 (0)
11	Girls (n=89)	11 (1.11)	43 (4.36)	24 (2.43)	8 (0.81)	2 (0.20)	1 (0.10)
	Boys (n=77)	1 (0.10)	54 (5.47)	10 (1.01)	11 (1.11)	0 (0)	1 (0.10)
12	Girls (n=55)	13 (1.31)	33 (3.34)	6 (0.60)	3 (0.30)	0 (0)	0 (0)
	Boys (n=44)	10 (1.01)	20 (2.02)	12 (1.21)	2 (0.20)	0 (0)	0 (0)
Overall total	Girls (=514)	51 (5.17)	303 (30.73)	102(10.34)	52 (5.27)	4 (0.40)	2 (0.20)
	Boys (n=472)	25 (2.53)	325(32.96)	76(7.70)	40 (4.05)	4(0.40)	2(0.20)
	Grand total (n=986)	76 (7.71)	628 (63.69)	178 (18.05)	92 (9.33)	8 (0.81)	4 (0.40)

Note: Values in parenthesis indicate percentage of the subjects

* McLaren, (1976)

percentage of standard values (68.99 to 78.67%) than their girl counter parts (74.71 to 79.09%).

among subjects on the basis of their weight measurements. Prevalence of mild, moderate and severe malnutrition was found to be 7.70 – 10.34, 30.73 – 32.96 and 2.53 – 5.17 per cent, respectively for girl and boy subjects. Immaterial of the age group 0.40 - 0.80 per

Nutritional status based on weight for age:

Table 5 depicts data regarding grades of malnutrition

Table 6 : Age wise distribution of the subjects according to their BMI (WHO 2007)

Age (in years)	WHO standard	Gender (n=986)	No. of subjects						Mean BMI of the subjects						
			Severe under nutrition-3SD	Moderate under nutrition-2SD	Mild nutrition- 1 SD	Normal Status + 1SD	Over Weight > +1SD	Obesity > +2 SD	Severe under nutrition -3SD	Moderate under nutrition- 2SD	Mild nutrition - 1SD	Normal Jstatus +1SD	Over-weight > +1SD	Obesity > +2SD	Overall
7	15.6	Girls (n=82)	4 (0.40)	13 (1.31)	30 (3.04)	29 (2.94)	6 (0.60)	0 (0)	10.87	12.25	13.38	14.94	19.97	-	14.15
	15.5	Boys (n=86)	13 (1.31)	18 (1.82)	20 (2.02)	27 (2.73)	4 (0.40)	4 (0.40)	11.77	12.65	13.60	15.06	19.94	22.97	14.38
8	15.9	Girls (n=97)	15 (1.52)	17 (1.72)	26 (2.63)	32 (3.24)	7 (0.70)	0 (0)	11.30	12.35	13.47	15.24	21.66	-	14.11
	15.8	Boys (n=81)	18 (1.82)	14 (1.41)	24 (2.43)	20 (2.09)	4 (0.40)	1 (0.10)	11.82	13.02	13.88	15.19	21.78	23.89	14.11
9	16.2	Girls (n=104)	12 (1.21)	21 (2.12)	39 (3.95)	23 (2.33)	8 (0.81)	1 (0.10)	11.62	12.80	13.86	15.62	21.93	28.29	14.53
	16.3	Boys (n=92)	17 (1.72)	24 (2.43)	25 (2.53)	18 (1.82)	7 (0.70)	1 (0.10)	12.09	13.14	14.16	15.63	21.88	26.57	14.52
10	16.6	Girls (n=87)	14 (1.41)	29 (2.94)	24 (2.43)	11 (1.11)	9 (0.91)	0 (0)	11.97	13.23	14.35	16.12	21.95	-	14.6
	16.9	Boys (n=92)	18 (1.82)	25 (2.53)	16 (1.62)	20 (2.09)	13 (1.31)	0 (0)	12.32	13.49	14.54	16.11	22.17	-	15.24
11	17.2	Girls (n=89)	18 (1.82)	26 (2.63)	22 (2.23)	17 (1.72)	5 (0.50)	1 (0.10)	12.34	13.44	14.73	17.38	22.38	31.24	14.99
	17.5	Boys (n=77)	21 (2.12)	31 (3.14)	12 (1.21)	4 (0.40)	9 (0.91)	0 (0)	12.45	13.64	14.87	16.34	22.73	-	14.71
12	17.8	Girls (n=55)	10 (1.01)	12 (1.21)	14 (1.41)	11 (1.11)	8 (0.81)	0 (0)	12.60	14.17	15.31	18.71	23.71	-	16.47
	18.3	Boys (n=44)	10 (1.01)	13 (1.31)	11 (1.11)	6 (0.60)	4 (0.40)	0 (0)	13.10	14.08	15.31	17.68	22.83	-	15.45
Overall total		Girl n=514 (52.12)	73 (7.40)	118 (11.96)	155 (15.72)	123 (12.47)	43 (4.36)	2 (0.20)	11.78	13.04	14.18	16.33	21.93	9.92	14.80
		Boy n=472 (47.87)	97 (9.83)	125 (12.67)	108 (10.95)	95 (9.63)	41 (4.15)	6 (0.60)	12.25	13.33	14.39	16.00	21.88	12.23	14.73
Grand total n=986			170 (17.24)	243 (24.65)	263 (26.67)	218 (22.11)	84 (8.52)	8 (0.81)	12.08	13.21	14.11	15.80	22.03	25.24	14.68

Note: Values in parenthesis indicate percentage of the subjects

cent of the subjects were also found to be belonging to obese/ overweight grades of malnutrition.

The table clearly reveals that greater percentage of subjects were found to be suffering from moderate malnutrition (63.69%) followed by mild (18.05) and severe malnutrition (7.71%).

Irrespective of age only 4.05 – 5.27 per cent subjects fell in normal category with reference to their mean body weight. This clearly indicated that 95.95 per cent boy subjects and 94.73 per cent girl subjects were malnourished. Mitra *et al.* (2007) also noted that 90 per cent of children under their study were malnourished at Chhattisgarh.

Further, prevalence of malnutrition based on weight for age indicates that greater percentage of girl subjects (5.27%) were severely malnourished than the boy subjects (4.05%). But equal percentage of both the genders was found to be falling in the category of overweight and obesity.

Body mass index:

In recent years, BMI has become the most widely used diagnostic tool for screening and identifying underweight, overweight and obesity in population for both adults and children (Gibson, 1990). It is the only indicator that includes all the three measurements of anthropometry *i.e.* weight, height and age. Thus, BMI of each of the subjects was assessed based on their individual weight and height measurements.

Age and gender wise distribution of the subjects according to their BMI as per WHO classification (2007) has been displayed in Table 6. Overall mean BMI of 7-9 years and 10 -12 years old girls subjects varied from 14.11- 14.53 and 14.60 – 16.47 and for boy subjects it ranged from 14.11 – 14.52 and 14.71- 16.45, respectively.

The table clearly displays age wise prevalence of malnutrition among girl and boy subjects. Accordingly 12.47 per cent girls and 9.63 per cent boy fell in normal category. Prevalence of mild, moderate and severe malnutrition among girl subjects was noted to be 15.72, 11.96 and 7.40 per cent, respectively. Similarly, 10.95, 12.67 and 9.83 per cent of boy subjects fell in the category of mild, moderate and severe malnutrition.

On the basis of BMI greater percentage of the subjects were found to be suffering from mild malnutrition (26.67%) than moderate (24.65%) or severe malnutrition (17.24%).

It can be clearly assessed from the table that 0.60 – 4.36 per cent and 0.20 – 4.15 per cent of all the subjects belonged to overweight and obese category as their mean BMI values were ranging from 21.30 – 23.71 and 0 – 31.24, respectively. Similar work related to the present investigation was also carried out by Inkhya *et al.* (2016); Khetarpal (2016) and Kumawat *et al.* (2016).

Conclusion:

During present study total of 986 rural primary school children comprising of 514 girls and 472 boys were assessed. Prevalence of malnutrition was found to be varying on the basis of criteria of assessment. Based on BMI, under nutrition was noted to be prevalent among 17.24 – 26.67 per cent subjects, whereas 7.71 – 63.69 per cent of them were noted to be undernourished when assessed for their weight for age. Over nutrition and obesity was noted to be prevalent among 8.52 and 0.81 per cent, respectively on the basis of BMI but it was 0.80 and 0.40, respectively based on their weight for age. Similarly, 40.16 per cent were short heighted and 9.84 per cent were dwarf when assessed for their height for age. Giantism was also observed among 1.29 to 3.86 per cent of them. Looking at the vast prevalence of malnutrition, the study emphasizes at most need of nutrition intervention.

LITERATURE CITED

- Gibson (1990).** Principles of nutritional assessment p.cm.IBSN 0-19505838-0 nutrition –evaluation. I. Title .RC621.G52 613.2-Dc20 89-3411 CIP.
- Inkhya, S., Bika, M.S., Shekhawat, K. and Mani, R. (2016).** A cross sectional study to prevalence of malnutrition in school children 6-12 years of age of Bikaner, Rajasthan. *Internat. J. Appl. Res.*, 2(5): 867-870.
- Jellife, D.P.(1996).** *The assessment of the nutritional status of the community.* WHO Monograph, series no. 53. WHO, Geneva.
- Joseph, L. (2005).** *SOS: Our education initiatives- mid day meal scheme.* Nandi foundation. Scientific programme and Abstracts. Nutrition Society of India 37 Annual Meeting.
- Kapoor, S. (2016).** Lifestyle patterns and prevalence of overweight and obesity among rural school children of Age 6 to 9 Years of District Una, Himachal Pradesh. *Online Journal of Health and Allied Sciences*, 15 (4): 1-6 Oct-Dec 2016 ISSN 0972-5997.
- Khera, R. (2002).** The Hindu, online edition of India's National

newspaper 20 nov Wednesday.

Khetarpal, A. (2016). Nutritional status of pre-school children (3-5 years). *Internat. J. Research in Economics & Social Sci.*, **5** (12) : 72-78.

Kumawat, R., Acharya, R., Sharma, G., Sethia, R., Shekhawat, K. and Meena, R. (2016). A descriptive cross-sectional study to assess prevalence of malnutrition in school children 6 – 14 years of age in rural and urban area of Bikaner, Rajasthan, India. *Internat. J. Community Medicine & Public Health*, **3** (5) : 1079-1083.

McLaren, D.S. (1976). W.W.C. Classification of nutritional status in early childhood. *Lancet*, **2** : 146-148.

Mitra, M., Kumar, P.V., Chakraborty, S. and Bharati, P. (2007). Nutritional status of Kamar tribal children, Chittisgarh.

Indian J. Pediat., **74** (4) : 381-384.

NCHS (1990). *Nutrition monitoring and assessment*. Edited by Gopaldas, T. and Seshadri, . Oxford University Press. UNICEF, New Delhi, India.

NFSH -4 (2015-16). National Family Health Survey- 2015-16.

Srilakshmi, B. (2008). *Nutrition Science*. 3rd Ed. New Age International Publishers. New Delhi, India.

■ WEBLIOGRAPHY

Census (2011). Rajasthan, <https://www.census2011.co.in/data/religion/state/8-rajasthan.html>.

<http://search.eb.com/eb>

WHO (2007). https://www.who.int/growthref/who2007_bmi_for_age/en/.

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