NUTRITION ASSESSMENT SURVEY OF SCHOOL CHILDREN OF DHARWAD AND HALIYAL TALUKS, KARNATAKA STATE, INDIA.

KR Pravin Chandra[1], Uma M Padennavar[2], T Sadashivappa[3], GN Prabhakara[4]

[1]Associate Professor, [2]Psychologist & Medical Social Worker, [3]Tutor, [4]Professor and Head, Community Medicine, SDM College of Medical Sciences and Hospital, Dharwad.

Corresponding author: krpravinchandra@rediffmail.com

ABSTRACT

This study was undertaken to find out the magnitude of the problem of under nutrition among the rural school going children of ages 4 to 14 years and also to identify the epidemiological factors influencing the nutritional status. All 1808 school going children of 49 villages of Dharwad and Haliyal taluks were included in the study undertaken during Mar-Apr 2005. Systematic random sampling was applied and 557 children were studied for nutritional assessment. Both the criteria for spotting under nutrition namely using the WHO/Govt. of India Road to Health card and also the CDC 2000 Standard for BMI for the given age and sex were followed. The morbidity rate in the universe was 62.9% and the nutrition related disorders rate was 59.4%. The anthropometric methods spotted 44.4% of children as underweight /having lean BMI. Nutrition related disorders were not related to either the father's or the mother's neither illiteracy nor they were related to type of the occupation of the father. They were associated with the presence of underweight/lean body mass index ($p<0.01$). More boys than girls had nutrition related disorders ($p<0.05$). Backward Hindu ($p<0.001$) as well as Muslim and Christians had more nutrition related disorders than forward Hindu children ($p<0.05$). The literacy status was higher among forward Hindu parents than backward Hindus ($p<0.02$) and least among Muslims ($p<0.05$). The backward community children had better weight for age / BMI profile than forwards ($p<0.005$). Higher BMI among the Siddhi community, a backward community originating from Arab slave trade from Africa living in the north eastern districts of Karnataka and Goa is documented in another one or two studies of this kind. The usefulness of WHO/GOI Road to Health card and the CDC-2000-BMI Standards for Nutritional Surveillance of school age children can yield higher dividends before clinical methods pick up or spot the nutrition related disorders. Periodic deworming, anti anaemia measures, nutrition education in addition to hygiene education and vitamin A supplementation in school age up to 14 years are recommended. Backward communities including Siddhi community need to be targeted. Literacy is not enough; what is needed is Nutrition education of the parents of the school age children.

Key words : Undernutrition; Rural children; School health; NCHS; Road to health; Anthropometry; CDC-2000-BMI; Siddhi community

INTRODUCTION

There are innumerable studies on the growth and nutrition monitoring of Under Five children but the studies on the children of school going age group are not many in literature. Many of the social characteristics bearing effect on nutrition of Under Four and Under Three years

children have been studied in large sample studies like National Family Health Survey of India.

This is a study of the entire population of rural school children of forty nine villages of Dharwad and Haliyal taluks of Karnataka state undertaken by SDM medical college with the logistic help of World Vision India – Uttara Kannada chapter. The objectives of the study were to find out the magnitude of the problem of under nutrition among the rural school going children of ages 4 to 14 years and to identify the epidemiological factors influencing the nutritional status.

MATERIAL AND METHODS

School children from 49 villages were examined by a team of doctors from SDMCMS&H during the period 14/03/2005 to 13/04/2005, a total of 1808 school children were examined. A general examination of the children was followed by specialist examination .Anthropometric investigations were followed by referral to SDM hospital for further needful examinations.

Study of the nutritional status of the children

A nutritional survey of the children was conducted on a sample of 557 children. These children were examined with emphasis upon nutritional disorders like malnutrition, under nutrition, micro-nutrient deficiency disorders. The disorders related to nutrition were picked up out of the total morbidity profile & were co-related to relevant socio-economic and anthropometric data.

Sampling

The list of children from the various villages enumerated to include all the children according to villages was obtained and serially numbered from 1 to 1808. At the end of the survey a total of 1796 children had been covered. Every 3^{rd} child starting from a random number was allocated for nutritional survey; thus 557 children formed the subjects for the nutritional survey by this systematic random sampling.

Anthropometric Methods

The height and weight of the children were recorded by the nursing staff using standard methods. Two accepted method were employed to categorised the children into lean, normal & obese classes: 1. the WHO/Govt of India "Road to health card" which is based on the NCHS standards of was used to differentiate the underweight children from the normal nutritional status of the child (children weighing less than 80% of the NCHS reference median standard of the 50^{th} percentile were considered underweight) (Gopalan, 1985). In addition the CDC 2000 standards for BMI were used as the reference standard for the given age and sex. A range of 80 to 120% of the 50^{th} percentile of this standard was taken to correspond to the 5^{th} and 95^{th} percentile values to identify the normal children who correspond to a range of BMI of 14 to 26. The 50^{th} percentile corresponds to BMI range of 15 to 20 and this standard is accepted by the IAP (CDC Growth Charts: United States, 2000).

Both the NCHS weight for age & the CDC 2000 BMI standards were used to identify all the children falling in the underweight &/ or lean BMI categories.

The occupations of the fathers of the children were classified into Class I through Class X according to National Classification Of Occupations 1968 Ministry of Labour Government

Of India (National Classification of Occupations,1968). Occupations from Class I to Class V are Non-manual and occupations: Class VI to X are Manual occupations.

RESULTS AND DISCUSSION

A sample of 557 children were examined for nutrition related disorders and morbidities. This included 260 boys and 297 girls. The boys : girls ratio was found comparable in each age-group (**Table-I**).

The illiteracy of the Father v/s Mother was 55.7% : 75.2%. This is comparable to the NFHS 1999 data for rural Karnataka which stands at 46.6% v/s 67.7% (The higher rate of illiteracy is known in the northern states of Karnataka.) The proportions of children according age and sex and according to the illiteracy of father and mother were found to be comparable. The proportion of illiteracy across the parents of boys v/s girls did not differ when considered for the father and mother separately (**Table-II a & b**). Illiteracy did not pose a drawback for the parents from sending their children to school.

The religious affiliation of 492 children was on record: among them 422 were Hindus including Jains , 40 were Muslims and 30 were Christians. The Hindus included 113 (26.8%) belonging to forward communities and 309 (73.2%) to backward communities. Higher proportion of girls (75.5%) than of boys (70.9%) was found to be schooling among the backward communities. Probably because some boys of these communities are school drop-outs sent to labour. The sex ratios across the forwards and backwards were comparable in each of the age groups (**Table-III**).

The occupation of the father was known in respect of 492 children among whom 68 (14%) pursued non-manual occupations and 424(86%) did manual jobs (**Table-IV**).

The total morbidities in the universe of children examined were 86% conditions per child (1546 morbid conditions in 1796 children). These conditions were found among 1130 children, some of whom had more than one condition, which worked out to a **morbidity rate of 62.9%.**

In contrast to this universe where all morbidities were studied by the clinicians, the sample taken for Nutrition Assessment Survey was studied by the authors for nutrition-related problems only. In this survey a total of 27 nutrition-related disorders were found totalling 484 conditions among 557 children yielding a value of 86.9% conditions per child (**Table-V**).

Among the above, only the leading 13 categories were considered for the purpose of relating to the background of socio-economic factors; these conditions were 429 in 557 children (77% conditions per child). These conditions were found among 331 children which worked out to a **nutrition-related disorder rate** of **59.4 %** (**Table-VI**). The highest number of conditions being at 10-14 years age-group amounting to 79% of conditions per child.

Five leading conditions among 557 children in order of frequency:

Sl No	Condition	ICD10 Code	No of cases	%
1	Anaemia	D53	142	**25.5**
2	Mal-nutrition	By clin exam only*	88	**15.8**
3	Dental caries	K02	51	**9.2**
4	Pain abdomen	R10	44	**7.9**
5	Intestinal Helminthiasis	B82	34	**6.1**

*The actual no. of mal-nourished children assessed by weight for age : Road to Health –NCHS-card plus CDC-BMI calculation is much more at 240 (children) (44.4%).The comparable figure for Under 5 children assessed by NFHS 99 for Karnataka state stands at 43.9% (National Family Health Survey, 1999).

Nutrition-related disorders were not associated with either father's or mother's illiteracy. They were of the proportions comparable to the total in the sample (59.4% of 557 children) (**Table-VII and VIII**).

The nutrition related disorders were not related to the type of occupation: neither manual nor non-manual ($p<0.50$) (**Table-IX**).

Nutrition-related disorders were associated with underweight /Lean BMI status rather than normal status (49.2%>37.6%) $p<0.01$(**Table X**). This confirms the universal observation that underweight / low BMI are sensitive to malnutrition and hence the weight for age-Road to Health- (WHO/GOI) Card-is popular.

Boys have higher prevalence of nutrition-related disorders than girls at all age-groups, $P<0.05$ (**Table-XI**).

Nutrition-related disorders were found far more prevalent among the backward Hindu communities than among the forward Hindu (64.1%>43.4%) $p<0.001$ (**Table XII**). The finding of the disorders among Muslim and Christian communities were worse (75% and 73.3% respectively) $p<0.05$

A significant association was found between, underweight / lean BMI of children with literacy of father $p<0.001$. (**Table-XIII**). The fact means that the above relation is a co-incidental one was elucidated by cross tabulating the communities against the literacy status. It was found that the literacy status was higher among forward communities than backward communities. (55.8%>41.7%, $p<0.02$). Also it was the least among Muslims (27.5%,$p<0.05$) against all Hindus (**Table-XV**).This fact means that the forward communities have higher literacy and the latter is the confounding variable showing relation with underweight/ lean BMI. Underweight/ Lean BMI is really associated with forward communities.

Mother's literacy had no such relation (**Table-XIV**). Studies of Under Four children have reported that children of uneducated mothers have a lower nutritional status of educated mothers [6]. It is again clear that the facts of the Under Fives may not apply to the 5-14 year school going children.

The backward communities have better bodyweight/ BMI profile (56% normals) and the forward communities have lean BMI / underweight, (60.2% are lean), $p<0.005$ (**Table-XVI**).

BMI profiles were not related to the type of occupation: manual or non-manual (**Table-XVII**).

It appeared that overall boys are leaner than girls (BMI). But it was not so, $p>0.50$. Also the apparent finding of leaner boys in the 10-14 years age-group was also not tenable, $p>0.50$ (**Table-XVIII**). It has been shown among the Under Five children that girls are more under-nourished than boys [7]. This bias against the girl child is again not tenable in the school-going age group as we found here. Our findings have a parallel in the NFHS 1999 report of the Under 4 children where boys are more likely to be wasted than girls , although they have about the same level of stunting and underweight (National Family Health Survey, 1999).

The nutrition related morbidity of 331 children out of 557 children examined is a high morbidity rate of over 59%. This is because of the rural background of these children where the inaccessibility to facilities combined with poor socio-economic status contributes to the findings.

The assessment of under nutrition/ lean body mass using the anthropometrical parameters of weight for age and body mass index standards form an easy and practical approach to spot nutritional morbidity disorders even before they manifest clinically. This is brought out by this study where around 44% of the cases are picked in sharp contrast to clinical examination alone (15.8%) - amounting to three times more of the yield. A strikingly similar rate of underweight of 43.9% has been reported by NFHS 99 for Karnataka (National Family Health Survey, 1999), where as it stands at 54% for All India.

Backwardness of the community (Hindu), Muslim and Christian religion, male sex and lean BMI / underweight are found to be associated significantly with the nutrition related disorders.

Higher BMI among the backward communities observed at very high statistical significance level is probably genetic in origin. This may also be because of a good number of Siddhi community people living in some of the villages. A total of 5776 Siddhi families have been counted in Haliyal taluka during the year 1996. The Hindu Siddhi children have shown better nutritional status than non-Siddhi children in the 5-14 years age group in an exclusive bio-medical study on the Siddhi community. The same study showed a very significant higher BMI among the 273 Siddhi adults than among the 224 non-Siddhis (BMI 20+ prevalent in 34.44% in Siddhis and 19.64% in the non-Siddhis $p<0.001$) (Prakash, 1998). The African genetic origin as well as the hunting and non-vegetarian food habits of this race probably explains this finding.

Recommendations:

1. The use of BMI-CDC cards for monitoring the growth of children in 5-14 years age group is emphasized. Nutrition surveillance rather than Nutrition monitoring as advocated by SK Ray is to be highlighted during the training of health care workers (Ray, 2005).

2. The measures to combat anaemia which is more among the girls at all age groups and also seen to increase in prevalence with increasing age should be undertaken.
3. The higher malnutrition observed among the boys is surprising; measures for nutritional supplementation are needed.
4. Anthelmintics should be given to all children once in 6 months.
5. Health Education sessions should be arranged in schools on topics of Environmental hygiene, Personal hygiene and Food and Water hygiene.
6. In view of the manifestations of Vitamin A deficiency up to the age of 14 years, supplementation of Vitamin A should be thought of till the high school level.
7. The backward communities have higher nutrition related morbidities in spite of having better body mass indices. This strongly calls for health education and nutrition education for these communities.
8. Adult education programme should be commenced in these villages in view of the high illiteracy beyond the normal village levels known in the district. Also literacy alone has not been enough to improve the nutritional status; what is required is Health Education and and Nutrition Education.

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Table I
No. of Boys and Girls acc. to Age Groups

Age groups	Boys	Girls		Total
< 5 Years	3	11		14
5 – 9 Years	128	123		251
10 to 14 Years	105	135		240
> 14 Years	24	28		52
Total	**260**	**297**		**557**

Table II a
Age Group and Sex of Children according to Literacy of Father

Age groups	BOYS		GIRLS		Total
	Literate	Illiterate	Literate	Illiterate	
< 5 Years	3	0	5	6	14
5 – 9 Years	59	58	49	59	225
10 to 14 Years	35	59	50	66	210
> 14 Years	6	14	11	12	43
Total	**103**	**131**	**115**	**143**	**492**

Table II b
Age Group and Sex of Children acc to Literacy of Mother

Age groups	BOYS		GIRLS		Total
	Literate	Illiterate	Literate	Illiterate	
< 5 Years	2	1	3	8	14
5 – 9 Years	40	79	28	79	224
10 to 14 Years	19	75	23	93	210
> 14 Years	4	16	3	20	43
Total	**65**	**169**	**57**	**200**	**491**

Notes: Illiteracy is more than literacy: 274 out of 492 (55.7%) Fathers are illiterate ; 369 out of 491 (75.2%) Mothers are illiterate and there is no difference between illiteracy of boy's parents v/s Illiteracy of girl's parents

Table III
Children acc. to Age Group, Sex and Type of Community

Age groups	Male		Female		Total
	Forward	Backward	Forward	Backward	
< 5 Years	0	3	2	9	14
5 – 9 Years	35	70	25	70	200
10 to 14 Years	20	62	22	68	172
> 14 Years	5	11	4	16	36
Total	**60**	**146**	**53**	**163**	**422**

Notes: The sex ratios across Forward and Backward communities are comparable; Total Hindus including Jains as above: 422; Muslims: 40; Christians: 30; Religion not recorded: 65; TOTAL: 557; Observation: Higher proportion of girls (75.5%) than boys (70.9%) are sent to school among the backward Hindus.

Table IV
Children acc. to Age Group, Sex and Type of Occupation of the Father

Age groups	Male		Female		Total
	Non-manual	Manual	Non-manual	Manual	
< 5 Years	2	1	4	7	14
5 – 9 Years	19	98	14	94	225
10 to 14 Years	11	83	14	102	210
> 14 Years	4	16	1	22	43
Total	**36**	**198**	**33**	**225**	**492**

Notes: Non-manual Jobs = 68 (14%); Manual Jobs = 424 (86%); Total = 492 (100%)

Table VI
No of Children with Nutritional Disorders

Nutritional Disorders	331	59.4%
Nil Disorders	226	40.6%
Total	557	100%

Notes: Only the leading 13 disorders have been considered for the purpose of relating to the social background

Table-V
Leading Nutrition Related Disorders Diagnosed by Clinical Examination only

Sl No *Acc to frequency*	**Diseases**	**<5 years**		**5-9 years**		**10-14 years**		**>14 years**		
		Male	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	
1	An (D53)	0	2 (18.2)	22 (17.2)	31 (25.2)	30 (28.6)	40 (29.2)	7 (29.2)	10 (35.7)	142 (25.5)
2	Malnutrition	1 (33)	0	30 (23.4)	14 (11.4)	16 (15.2)	23 (17)	2 (8.3)	2 (7.1)	88 (15.8)
3	D car(K02)	0	1 (9.1)	20 (15.6)	12 (9.8)	9 (8.6)	8 (5.9)	0	1 (3.6)	51 (9.2)
4	Pain abd(R10)	0	0	9 (7)	12 (9.8)	8 (7.6)	11 (8.1)	2 (8.3)	2 (7.1)	44 (7.9)
5	Helm.(B82)	0	0	7 (5.5)	7 (5.7)	5 (4.8)	12 (8.9)	1 (4.2)	2 (7.1)	34 (6.1)
6	DV(H52)	0	0	6 (4.7)	6 (4.9)	3 (2.9)	4 (3)	1 (4.2)	0	20 (3.6)
7	DH(H91)	0	0	4 (3.1)	8 (6.5)	3 (2.9)	1 (0.7)	1 (4.2)	0	17 (3.1)
8	Vit.A.def.(E50)	0	1 (9.1)	4 (3.1)	1 (0.8)	4 (3.8)	4 (3)	0	0	14 (2.5)
9	Xerosis(L85)	0	0	2 (1.6)	1 (0.8)	4 (3.8)	1 (0.7)	2 (8.3)	0	10 (1.8)
10	Bitots spot(E50)	0	0	2 (1.6)	0	3 (2.9)	1 (0.7)	0 (1.1)	0	6
11	Xerophthalmia(E50)	0	0	1 (0.8)	0	0	0	0	0	1 (0.2)
12	Rickets	1 (33)	0	0	0	0	0	0	0	1 (0.2)
13	Pk(A61)	0	0	1 (0.8)	0	0	0	0	0	1 (0.2)
	Total	**2 (66.6)**	**4 (36.4)**	**108 (84.4)**	**92 (74.8)**	**85 (81)**	**105 (77.8)**	**16 (66.7)**	**17 (60.7)**	**429 (77)**

Nutrition- Related Disorders Rate : 484 /557 = 86.9%
Boys have more conditions than girls in each age class

Table-V Contd.

Continuation of **Nutrition Related Disorders Diagnosed by Clinical Examination only**

Rank Acc to Frequency	**Diseases**	**<5 years**		**5-9 years**		**10-14 years**		**>14 years**		
		Male	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	
14	Under weight (E 45)	0	0	7 (5.5)	8 (6.5)	3 (2.9)	5 (3.7)	1 (4.2)	0	24 (4.3)
15	Icthyosis (L85)	0	0	1 (0.8)	2 (1.6)	2 (1.9)	2 (1.5)	0	0	7 (1.3)
16	Impetigo (L01)	0	0	1 (0.8)	3 (2.4)	1 (1)	0	1 (4.2)	0	6 (1.1)
17	Vit. B. def.	0	0	1 (0.8)	0	2 (1.9)	0	0	0	3 (0.5)
18	Adenitis (?TBL)	0	0	2 (1.6)	0	0	0	0	0	2 (0.4)
19	Goitre (E04)	0	0	1 (0.8)	0	0	1 (0.7)	0	0	2 (0.4)
20	Menorrhagia(N92)	0	0	0	0	0	1 (0.7)	0	1 (3.6)	2 (0.4)
21	Kwashiorkar(E40)	0	0	0	1 (0.8)	0	1 (0.7)	0	0	2 (0.4)
22	Gastroenteritis	0	0	0	0	1 (1)	0	0	1 (3.6)	2 (0.4)
23	Hypopigmentation	0	0	1 (0.8)	0	0	0	0	0	1 (0.2)
24	Gingivitis(K05)	0	0	1 (0.8)	0	0	0	0	0	1 (0.2)
25	Epistaxis(R04)	0	0	0	1 (0.8)	0	0	0	0	1 (0.2)
26	Dysuria(R30)	0	0	0	1 (0.8)	0	0	0	0	1 (0.2)
27	White Discharge	0	0	0	1 (0.8)	0	0	0	0	1 (0.2)
	Total	**0**	**0**	**15 (11.7)**	**17 (13.8)**	**9 (8.6)**	**10 (7.4)**	**2 (8.3)**	**2 (7.1)**	**55 (9.87)**

Nutrition- Related Disorders Rate : 484 /557 = 86.9%

Table VII
Literacy and Nutrition Related Disorders

Father's Literacy	Nut. Disorder	Nut. Normal	Total
Illiterate	172 (62.8)	102 (37.2)	274 (100)
Literate	127 (58.3)	91 (41.7)	218 (100)
Total	**299 (60.8)**	**193 (39.2)**	**492 (100)**

Father's Illiteracy does not correlate with Nutritional Disorders of children

Table VIII

Mother's Literacy	Nut. Disorder	Nut. Normal	Total
Illiterate	224 (60.7)	145 (39.3)	369 (100)
Literate	74 (60.7)	48 (39.3)	122 (100)
Total	298 (60.7)	193 (39.3)	491 (100)

Table-IX
Type of Occupation and Nutritional Disorders

Occupations	Nut. Disorder	Nut. Normal	Total	
Manual	261 (61.6)	163 (38.4)	424 (100)	
Non-Manual	38 (55.9)	30 (44.1)	68 (100)	
Total	**299 (60.8)**	**193 (39.2)**	**492 (100)**	

Nutritional disorders appear to be higher among children of parents where father is a manual laborers but it is not so :
Chi Square =0.807, df= 1, $p<0.50$ Not significant

Table-X
Nutrition Disorder & BMI of Children

Nut. Disorder	Wt/BMI Lean	BMI Normal	BMI Obese	Total
Nut. disorder	158(48.9)	159(49.2)	6(1.8)	323(100)
Nil	82(37.6)	135(61.9)	1(0.5)	218(100)
Total	**240(44.4)**	**294(54.3)**	**7(1.29)**	**541(100)**

Under weight / lean BMI is associated with presence of nutritional disorders
Chi Square = 9.52, df = 2, $p<0.01$

Boys- Age wise	Nut.Disorder	Nil	Total
< 5 yrs.	2 (66.7)	1 (33.3)	3 (100)
5-9 yrs	85 (66.4)	43 (33.6)	128 (100)
10-14 yrs	65 (61.9)	40 (38.1)	105 (100)
> 14 yrs	12 (50)	12 (50)	24 (100)
Total	164 (63.1)	96 (36.9)	260 (100)

Girls Age Wise	Nut.Disorder	Nil	Total
< 5 yrs.	5 (45.5)	6 (54.5)	11 (100)
5-9 yrs	76 61.8)	47 (38.2)	123 (100)
10-14 yrs	75 (55.6)	60 (44.4)	135 (100)
> 14 yrs	11 (39.3)	17 (60.7)	28 (100)
Total	167 (56.2)	130 (43.8)	297 (100)

All Boys	164 (63.1)	96 (36.9)	260 (100)
All Girls	167 (56.2)	130 (43.8)	297 (100)
Total	331 (59.4)	226 (46.6)	557 (100)

Table XII
Nutrition Disorder acc. to Community

Religion	Nut. Disorder	Nut. Normal	Total
SC	72 (62.1)	44 (37.9)	116 (100)
ST	4 (57)	3 (43)	7 (100)
OBC	122 (65.6)	64 (34.4)	186 (100)
Forwards	49 (43.4)	64 (56.6)	113 (100)
Hindus Total	247 (58.5)	175 (41.5)	422 (100)
Muslim	30 (75)	10 (25)	40 (100)
Christian	22 (73.3)	8 (26.7)	30 (100)
Religion not known	32 (49.2)	33 (50.8)	65 (100)
All	331 (59.4)	226 (40.6)	557 (100)
BC (SC+ST+OBC)	198 (64.1)	111 (35.9)	309 (100)
FW(Hindu+Jain etc	49 (43.4)	64 (56.6)	113 (100)
Total	**247 (58.5)**	**175 (41.5)**	**422 (100)**

Table-XIII
BMI acc. to Father's Literacy

Fathers Literacy	Wt/BMI Lean	BMI Normal	BMI Obese	Total
Illiterate	109 (41.1)	150 (56.6)	6 (2.3)	265 (100)
Literate	131 (63)	76 (36.5)	1 (0.5)	208 (100)
Total	**240 (50.7)**	**226 (47.8)**	**7 (1.5)**	**473 (100)**

Literate fathers have leaner / underweight children
Chi Square = 23.4, df= 2, p< 0.001

Table-XIV
BMI acc. to Mother's Literacy

Mothers Literacy	Wt/BMI Lean	BMI Normal	BMI Obese	Total
Illiterate	155 (43.8)	193 (54.5)	6 (1.7)	354 (100)
Literate	51 (43.2)	66 (55.9)	1 (0.9)	118 (100)
Total	206 (43.6)	259 (54.9)	7 (1.5)	472 (100)

Literacy of mother has no relation to BMI of children

Table-XV
Literacy acc. to Community

	Illiterate	**Literate**	**Total**
SC	78 (67.2)	38 (32.8)	116 (100)
ST	4	3	7
OBC	98 (52.7)	88 (47.3)	186 (100)
Forwards	50 (44.2)	63 (55.8)	113 (100)
Total Hindus	230 (54.5)	192 (45.5)	422 (100)
Muslim	29 (72.5)	11 (27.5)	40 (100)
Christian	15 (50)	15 (50)	30 (100)
Total	274 (55.7)	218 (44.3)	492 (100)

BC (SC+ST+OBC)	180 (58.3)	129 (41.7)	309 (100)
FW(Hindu+Jain etc	50 (44.2)	63 (55.8)	113 (100)

Literacy is higher among Forwards than Backwards,
Chi Square=6.56, df==1, p<0.02

Total Hindu	230 (54.5)	192 (45.5)	422 (100)
V/S			
Muslim	29 (72.5)	11 (27.5)	40 (100)
Total	259 (52.6)	203 (41.3)	492(100)

Literacy is higher among Hindus than Muslims,
Chi Square=4.83, df==1, p<0.05

Table-XVI
BMI acc. to Community

	Wt/BMI Lean	BMI Normal	BMI Obese	Total
SC	41 (36.9)	67 (60.4)	3 (2.7)	111 (100)
ST	4	3	0	7
OBC	80 (44.4)	97 (53.9)	3 (1.7)	180 (100)
Forwards	65 (60.2)	43 (39.8)	0	108 (100)
Hindus Total	190 (46.8)	210 (51.7)	6 (1.5)	406 (100)
Muslim	12 (30)	27 (67.5)	1 (2.5)	40 (100)
Christian	4 (13.3)	26 (86.7)	0	30(100)
Religion not known	34 (52.3)	31 (47.7)	0	65 (100)
All	240 (44.4)	294 (54.3)	7 (1.3)	541 (100)
BC (SC+ST+OBC)	125 (41.9)	167 (56)	6 (2.0)	298 (100)
FW(Hindu+Jian etc	65 (60.2)	43 (39.8)	0	108 (100)
Total	190 (46.8)	210 (51.7)	6 (1.5)	406 (100)
Backward communities have better bodyweight / BMI profile				

Chi Square = 11.91, df= 2, $p<0.005$

Table-XVII
Type of Occupation of Father & BMI of Children

Occupations	**Wt/BMI Lean**	**BMI Normal**	**BMI Obese**	**Total**
Manual	178 (43.2)	227 (55.1)	7 (1.7)	412 (100)
Non-Manual	28 (43.1)	37 (56.9)	0	65 (100)
Total	**206 (43.2)**	**264 (55.3)**	**7 (1.5)**	**477 (100)**

Occupation has no relation with the BMI profile of children

Table-XVIII
BMI acc. to Age and Sex of Children

Boys Age wise	UW/BMI Lean	BMI Normal	BMI Obese	Total
< 5 yrs.	0	3 (100)	0	3
5-9 yrs	53 (43.1)	69 (56.1)	1 (0.8)	123
10-14 yrs	52 (41)	49 (48)	1 (1)	102
> 14 yrs	11 (47.8)	12 (52.2)	0	23
Total	116 (46.2)	133 (53)	2 (0.8)	251
Girls Age Wise	**UW/BMI Lean**	**BMI Normal**	**BMI Obese**	**Total**
< 5 yrs.	3 (30)	7 (70)	0	10 (100)
5-9 yrs	50 (42)	67 (56.3)	2 (1.7)	119 (100)
10-14 yrs	58 (43.6)	73 (54.9)	2 (1.5)	113 (100)
> 14 yrs	13 (46.4)	14 (50)	1 (3.6)	28 (100)
Total	124 (42.8)	161 (55.5)	5 (1.7)	290 (100)
All Boys	166 (46.2)	133 (53)	2 (0.8)	251 (100)
All Girls	124 (42.8)	161 (55.5)	5 (1.7)	290 (100)
Total	240 (44.4)	294 (54.3)	7 (1.3)	541 (100)

Overall boys appear to be leaner than girls but it is not so :
Chi Square = 1.36, df=2, $p>0.50$