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PREVALENCE OF MALNUTRITION IN SCHOOL CHILDREN

Gayatree Jadeja

Assistant Professor, Polytechnic in Food Science and Home Economics, AAU, Anand-388110 India
Email :gayatree@aau.in

ABSTRACT

The Study was conducted to determine the prevalence of underweight and obesity in school children of Dholka taluka of Gujarat state. Total 484 school children of two different age groups i.e. 6 to 12 years (school children) and 13 to 17 (adolescent) years were randomly selected from the purposively selected schools of Dholka taluka. The height, weight were measured for both age groups. The skin and hair colour were visually observed. All parameters were correlated with the body mass index. The results found were alarming. Majority girls of both groups had malnourishment symptoms compared to boys. 97% 6 to 12 years school children were underweight whereas in 13 to 17 years children 79% were found in underweight category. The data revealed that in 6 to 12 years boys as the age increases the BMI is significantly increase ($p<0.05$) in where as in adolescent girls significant increase (<0.001) was found in BMI. The skin colour was normal as the BMI is high in 13 to 17 years boys.

Keywords : *body mass index, Malnourishment, underweight*

INTRODUCTION

Agricultural progress in the last decade has made India self-sufficient in major food grains. Yet under nutrition continues to be major nutritional problem especially in rural populations. High prevalence of low birth weight, high morbidity and mortality in children and poor maternal nutrition of the other continue to be major nutritional concerns in India. For India, published data show that increased mortality is associated with low BMI (National Institute of Nutrition annual report, 1991 and Mehta *et al.,* 2020) and increased incidence of low birth weight with increasing reduction of the BMI of pregnant women (Naidu and Rao, 1994). While we are in the midst of combating these long-standing problems of under nutrition in children and women, a new situation has arisen.

Globally there are more than 850 million people undernourished. India being second after Bangladesh with respect to the prevalence of underweight children in the world. India has 49% of underweight children which contributes to 39% of the world's underweight children. School children contribute to 21.8% population, of these who are aged between 6-14 years, carry almost 63-73% prevalence of under nutrition. The prevalence varies state to state, depending on socioeconomic status and their residential location. The most affected group is rural population. (World Bank, 2006)

Malnutrition in children also encompasses micronutrient deficiencies. Iodine and Iron deficiency are most detrimental. A review of such studies examining the relationship between mental development and severe malnutrition concluded that, school-age children who suffered from early childhood malnutrition generally have poorer IQ levels, cognitive function, school achievement and greater behavioural problems than matched controls, and to lesser extent siblings. The detrimental effect was observed to affect their adolescence and later age (Grantham, 1995). One third of the world's population suffer from anaemia whereas 2.2 billion are iodine deficient. According to NFHS III the prevalence of anaemia is 70- 80 % in children (NFHS - 2005). Anemia in adolescent girls affects their physical work capacity and reproductive physiology. (Seshadri, 1997)

Gujarat has high level of child malnutrition which is 47 per cent as compared to the national average 21 per cent (World Bank Report, 2005). Growth faltering in malnourished children also hampers intelligence and physical capacity. These in turn lead to slowing down socioeconomic growth, reduces productivity and increased poverty and therefore economic cost of malnutrition becomes very high. (Mason, 2003)

In Gujarat it is seen that malnutrition is not only affecting children but adults are also suffering from many macro and micro nutrient deficiencies (NFHS III, 2005). The present study aimed for achieving better health of our people.

OBJETIVES

(1) To know the anthropometric measurements of school children (6-12 years)

(2) To know the anthropometric measurements of Adolescence (13-17 years)

METHODOLOGY

The prevalence of underweight and malnutrition is increasing rapidly, especially in underdeveloped countries. In describing the nutritional status of a population the body mass index (BMI) represents the most complete indicator and, at the same time, is the easiest to use. The study was conducted with the aims to find out the health status of two age group children by measurement of their height, weight and Body mass Index using personnel interview technique and to correlate the collected information with the health status of individual.

Taking into consideration the time restraints and convenience, most of the villages from *Bhal* region of Dholka taluka of Ahmedabad district were selected. For the school children selection the schools were purposively selected and then the four hundred eighty four respondents (484) were randomly selected. For the adolescents the purposive selection was done from the school as well as from the rural areas. The Height and weight were measured using standard techniques and BMI was calculated. Nutritional assessment was done on the basis of Body Mass Index (BMI). Respondants, 262 (136 boys and 126 girls) of 6 to 12 years (Group I) and adolescents 222 (117 boys and 105 girls) of 13 to 17 years (Group II) were selected from five different schools and their hair color and skin texture were visually observed. All these parameters were correlates with their BMI status.

Following standard techniques were used for measurements.

(1) Height : Height in centimeters was marked on a wall with the help of a measuring tape. All subjects were measured against the wall without foot wear and with heels together and their heads positioned in such a way that the line of vision was perpendicular to the body. A metal scale was brought down to the topmost pint on the head. The height was recorded to the nearest 1 cm.

(2) Weight: The weight was measured using a weighing machine (Bathroom Scale) with an accuracy of ±100 gm. The subjects were asked to remove their footwear before measuring their weight. The scales were recalibrated after each measurement. Accuracy of the weighing scale was verified from time to time against known weights

(3) Body Mass Index (BMI): BMI of the study subject was calculated by using the formula weight (kg)/ height^2 (m^2). For grading proposed criteria of BMI of Asians and CDC (2010) was adopted. Children as well as adolescents with BMI below 18.5 were considered underweight whereas BMI at or above 25 were considered overweight. Malnourishment is associated with the 'underweight' BMI categorization.

(4) Hair Color and Skin texture: The visual observation was done for the hair color (Rusty red, light and dark bands of color) and skin texture (dry skin, wrinkled skin). Childhood malnutrition is known to be associated with visible lightening of hair colour (hypochromotrichia). Decrease in melanin content is associated with periods of malnutrition as the role of aromatic amino acid availability in hair colour change. The skin becomes dry and flaky and hair may turn dry, dull and straw like in appearance because of malnutrition.

RESULTS AND DISCUSSION

Group I (School children, 6-12 years): School children (6 to 12 years) from five schools were examined for anthropometric measurements.

Table 1: Anthropometric measurements of school children (6-12 years) (n=262)

Sr. No.	Anthropometric measurements	Group I (School Children)					
		Girl (n=126)		Boy (n=136)		Total (n=262)	
		F	%	F	%	F	%
(A)	**BMI**						
1	**< 18.5 (Under weight)**	125	99.2	131	96.4	256	97.7
2	**18.5 to 24.9 (Normal)**	1	0.8	4	2.9	5	1.9
3	**≥ 25 (Over weight)**	0	0.0	1	0.7	1	0.4
(B)	**Brown rusty hair**	90	71.4	61	44.8	151	57.6
(C)	**Dry Skin**	82	65.1	78	57.4	160	61.1

The body mass index was calculated using height and weight measurements and the data were categorized for under weight, normal and overweight. Table 1 results indicate that out of 262 school children 98% school children were in the underweight category. Almost all the girls were of underweight category. So this is the indication of severe malnutrition problem. Brown rusty hair problem was observed in 57% school children and the 61% children were having the dry skin which is the indications of protein and vitamin deficiencies. When the body mass index was compared with the hair and skin observations by correlating individual hair and skin data with their BMI, the result revealed that around 97% and 98% school children were in the underweight category, respectively which may be the result of protein and vitamin deficiencies.

Group II (Adolescence, 13 to 17 years): Adolescence is known to be a "second opportunity" for growth as it facilitates catch-up growth for children experiencing nutrition deficits in their early life. However, as discussed above, stunting appeared to be a persistent phenomenon beyond the early life among rural children and it had significant impact at 10+ years of age. Thus the majority of children enter adolescence with poor nutritional status (Joshi *et.al.* 1998, Rao *et.al.* 1998a,b, 2000b; Kanade *et.al.* 1999). We had therefore, examined the adolescence of 13 to 17 years (105 girls and 117 boys) from five different schools.

Table 2: Anthropometric measurements of Adolescence (13-17 years) (n=262)

Sr. No.	Anthropometric measurements	Group II (Adolescence)					
		Girl (n=105)		Boy (n=117)		Total (n=222)	
		F	%	F	%	F	%
(A)	**BMI**						
1	**< 18.5 (Under weight)**	79	75.2	98	83.8	177	79.7
2	**18.5 to 24.9 (Normal)**	25	23.8	18	15.4	43	19.4
3	**≥ 25 (Over weight)**	1	0.95	1	0.8	2	0.9
(B)	**Brown rusty hair**	55	52.4	37	31.6	92	41.4
(C)	**Dry Skin**	50	47.6	23	19.7	73	32.8

Table 2 indicates the body mass index of adolescence. 79% adolescence was in the underweight category. Here the percentage of boys were higher than the girls. In adolescent girls, short stature that persists into adulthood is associated with increased risk of adverse reproductive outcomes (Thance *et.al*., 1997, Kirchengast and Winkler 1996).

Adolescence of 41% were suffered from protein malnutrition as they had brown rusty hair as well as 32% adolescence were having the vitamin deficiency because they have dry skin. Prevalence of brown rusty hair and dry skin were observed more in the adolescence girls compared to adolescence boys. The adolescence that has brown rusty hair was having the underweight problem same way adolescence have dry skin may because of vitamin deficiencies. Adolescence boys were higher in underweight category as compared to adolescence girls. Adolescence demands high level of activity and growth, dietary requirements both quantitatively as well as qualitatively are of great importance. A failure to consume an adequate diet during adolescence can potentially retard growth (Johnson *et.al*., 2002).

Table 3: Correlation of profile and BMI of school children (n=262)

Sr. No.	Profile	Correlation Coefficients	
		Female	Male
	(A) School Children		
1	**Age**	0.114 (NS)	0.230 (**)
2	**Brown rusty Hair**	0.006 (NS)	-0.104 (NS)
3	**Dry Skin**	-0.013 (NS)	0.076 (NS)
	(B) Adolescent		
1	**Age**	0.476 (**)	0.170 (NS)
2	**Brown rusty Hair**	0.075 (NS)	0.125 (NS)
3	**Dry Skin**	0.068 (NS)	0.185 (*)

* Significant difference ($p < 0.05$) and ** Highly significant difference ($p<0.01$), NS=Non significant

The Table-3 depicted that in school boys as the age is increase the BMI is significantly increase ($p<0.05$). In adolescent girls as the age increase the BMI is also significantly increased ($p<0.01$). The skin colour became normal as the BMI is high in adolescent boys ($p<0.05$).

CONCLUSION

The study concludes that a majority of adolescent girls had malnourishment symptoms compared to boys. Adolescents are expected to enjoy good health, but this does not seem to be the case in the rural areas of developing countries like India, where malnutrition is rampant. In the light of the above discussion, it is necessary to discuss some strategies required for improving the nutritional status of our people.

Most problems related to child health will need awareness in rural mothers. Efforts are necessary for exploring non-nutritional avenues such as imparting knowledge about nutritional needs during childhood and adolescence and creating nutritional and health awareness among young rural girls and boys to ensure a better quality of life.

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