International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

Evaluation Of Nutritional Status Of School Going Tribal Children By Using Anthropometric Measurement In Selected Areas Of Eastern Uttar Pradesh

Tanvi Twara[1], Sanskriti Upasna[2], Aruna Agrawal[3], G.P Dubey[4]

[1]Junior Research Fellow, [2]Junior Research Fellow & PhD Scholar, [3]Professor, [4]Distinguished Professor;
Dept. of Kriya Sharir, Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University, Varanasi.

Corresponding Author: Tanvi Twara

Received: 06/05/2015 *Revised: 25/05/2015* *Accepted: 28/05/2015*

ABSTRACT

Background: Anthropometric assessment is the most important component for monitoring the growth in childhood and adolescent period. World Health Organization (WHO) has recommended various anthropometric indices to evaluate the nutritional status of children. The prevalence of undernourished children is very high in India. Keeping the above facts in view, present study was designed to assess the nutritional status of school going tribal children using anthropometric indices.
Methods: Studies were carried out in various primary and secondary government schools located at Chandawali and Sonbhadra. The Gomez and Waterlow's classification scale were applied to calculate the degree of malnutrition among children. A total of 1221 children were selected from schools of tribal areas in which 728 were boys and 493 were girls.
Results: Boys were found to be more malnourished than the girls. Difference was seen in the mean height and weight of boys and girls of same age group. Degree of malnutrition among tribal children is high. It was found that 51.10% of school going tribal children under study had evidence of under nutrition.
Conclusion: Weights of tribal children were more affected by under nutrition in comparison to height. Nutritional status assessment as per 'weight for age' focused more severity of under nutrition than 'height for age'. Thus 'Weight for age' criteria is more useful for screening children population and their health evaluation as it is a composite index which shows both stunting and wasting where as 'height for age' reflects skeletal growth i.e stunting only which occur because of chronic under nutrition.

Keywords: Anthropometric measurement, Gomez classification, Waterlow's classification, tribal children, Nutritional status.

INTRODUCTION

Nutritional status of school going children is affected because of malnutrition caused by a number of conditions and circumstances. Children belonging to the age group of 5-14 years mostly suffer from lack of proper nutrition because of their rapid body growth. United Nations Children's Fund (UNICEF), WHO and World Bank updated their joint database on child malnutrition in 2013 which shows that globally 92 million children under five years were underweight and 67 percent underweight children lives in Asia and 29 percent in Africa. Children with low birth weight or under nutrition in early childhood carry this to school going age and further to adulthood which harms their overall

performance in all spheres of life. It was estimated various researchers that 30-80 percent of all preschool children in developing countries suffer from protein energy malnutrition as assessed by the manifestation of syndrome, nutritional index and weight deviations. Good nutritional status of school going children is very important because it is clear now that cognitive impairment is associated with inadequate nutrition. [1]

In India the prevalence of undernourished children is very high. In almost all states of India under nutrition is prevalent among children. [2] About 33 percent of malnourished children population of the world resides in India. As we know India is a developing country with its own geographically isolated life style and it still has various tribal areas. It has been observed that children living in tribal localities suffer more from under nutrition therefore the mortality and morbidity rate are very high. Uppal in 2005 suggested that children belonging to socially backward groups like scheduled caste and scheduled tribes are highly susceptible to under nutrition. [3] Their economic conditions are poor and they are still away from modern life style and development.

The main objective of this study is to carryout anthropometric assessment of children population in scheduled tribes of Eastern Uttar Pradesh to estimate their nutritional status. World Health Organization has recommended various anthropometric indices to evaluate the nutritional status of children. [4] To assess malnourished children, anthropometric indices assessments considered as a very good tool. [5,6] Anthropometric assessment is an inexpensive and noninvasive means of determining short and long term nutritional status. It's a sensitive indicator of health, growth and development in infants and children. Anthropometric evaluation is very useful in determining malnutrition, overweight, obesity and fat mass gain. Values obtained from anthropometry are closely related to nutrition, genetic makeup, social and cultural conditions, lifestyle and health. [7-9] It has now been established that the body mass index (BMI) is the most important status among children including adolescents. Therefore present study was planned to assess the nutritional status of school going children in tribal areas by applying anthropometric indices.

MATERIALS AND METHODS

The present field study has been conducted in various government primary and higher primary schools in tribal localities of Chandawali and Sonbhadra District. A total of 1221 children of schedule tribes aged between 5 to 14 years were selected for this study. The subjects were randomly selected and necessary approval was obtained from the authorities prior to the commencement of the study. Out of the total children 728 were boys and 493 were girls. The height was recorded in the nearest centimeter (cm). On the collected data Gomez and Waterlow classification were applied to calculate the severity of under nutrition. Two indicators were used: weight for age (WFA) and height for age (HFA), to assess the severity of malnutrition. On the basis of nutritional status of the children, grading of malnutrition was done.

Statistical Analysis: All data were evaluated statistically by independent sample 't' test and χ^2 test. Independent sample t test and χ^2 test were performed by using the SPSS 16 version. P-value is used to indicate the statistical significance.

RESULTS

This study was planned to assess the physical growth of boys and girls of tribal areas with very low economic status. A total of 1221 children were selected in which

728(59.62%) were boys and 493(40.38%) were girls. A significant difference was seen between the mean weight of boys and girls at all ages which is presented in Table 1. Mean weight of girls is higher than the mean weight of boys at all ages except 9+ as shown in the table. A significant difference was seen in weight of boys and girls in age group 5, 10 and 13 whereas highly significant difference was seen in age group 12.

Table 1: Means and standard deviations of weight for boys and girls

Age	Boys			Girls				
	No.	Mean Weight	SD	No.	Mean Weight	SD	t-value	P value
5+	60	16.37	3.05	52	17.52	3.17	-1.944	0.05
6+	86	18.38	2.99	44	19.25	4.14	-1.374	0.17
7+	83	19.82	2.98	47	20.70	3.74	-1.468	0.14
8+	69	22.62	3.36	58	23.33	3.01	-1.237	0.21
9+	69	25.63	4.40	55	25.38	5.25	0.290	0.77
10+	57	27.67	4.23	47	29.42	4.81	-1.968	0.05
11+	57	29.08	4.53	44	31.16	4.58	-1.482	0.14
12+	84	31.34	4.90	39	34.77	5.89	-3.390	0.001
13+	89	34.77	6.07	50	37.03	7.67	-1.905	0.05
14+	74	37.99	9.13	57	38.98	9.70	-0.600	0.55

There is also a significant difference in the mean height of boys and girls as shown in Table 2. Mean height of girls is higher than the boys except the age group 7, 9 and 11 which doesn't show much difference. Boys of age 9 years were slightly taller than the girls. The study by Medhi et al. (2007) showed that the mean heights of girls are higher at the ages 10, 11 and 12 than boys which is similar to the results of our study. [10] Mean height of girls of age group 5,6,8,10 and 12 are higher than the boys in our study and it is also similar to the study done by Manna et al. (2011). [11] Statically a significant difference was seen between height of boys and girls of age group 5,6 and 10.

Table 2: Means and standard deviations of height for boys and girls

Age	Boys			Girls				
	No.	Mean Height	SD	No.	Mean Height	SD	t-value	P value
5+	60	105.16	5.46	52	106.98	3.68	-2.040	0.05
6+	86	109.49	6.31	44	112.55	4.41	-2.874	0.01
7+	83	116.76	5.22	47	116.30	6.76	0.430	0.668
8+	69	120.48	8.31	58	122.24	5.41	-1.398	0.165
9+	69	125.18	7.96	55	125.98	7.50	-0.569	0.570
10+	57	129.74	8.56	47	133.10	7.33	-2.100	0.05
11+	57	136.09	7.68	44	136.16	7.55	-0.050	0.960
12+	84	138.25	7.68	39	140.21	9.75	-1.204	0.231
13+	89	143.15	9.61	50	144.89	7.39	-1.110	0.269
14+	74	148.60	11.46	57	149.54	8.47	-0.523	0.602

The nutritional classification according to Gomez (weight for age) in relation to sex is given in Table 3. It shows that boys (57.28%) suffer more from under nutrition in comparison to girls (41.98%). Boys have highest number in every categories of malnutrition in comparison of girls.

Table 3: nutritional status (weight for age) of tribal children as per sex

Sex	No.	normal	%	Nutritional status					
				Mild	%	Moderate	%	Severe	%
Boys	728	311	42.71	196	26.92	200	27.47	21	2.88
Girls	493	286	58.01	85	17.24	104	21.09	18	3.65

χ^2 =31.37, df=3, p<0.001

Nutritional status according to Gomez classification (weight for age) as per age group shows high prevalence of under nutrition in age groups 7,9,12, 13 and 14 as shown in Table 4. Children with age group 14 years show highest percentage (7.63%) of impaired nutritional status. Age groups 7+ and 12+ have higher percentages of mildly impaired nutritional status and age group 8+, 9+, 10+ and 11+ were over 25 percent.

Table 4: Nutritional status (weight for age) of tribal children as per age group

Age	No.	Normal	%	Malnutrition					
				Mild	%	Moderate	%	Severe	%
5	112	59	52.67	27	24.11	21	18.75	5	4.46
6	130	69	53.07	30	23.08	27	20.77	4	3.08
7	130	56	43.08	41	31.54	29	22.31	4	3.08
8	127	71	55.90	38	29.92	16	12.60	2	1.57
9	124	61	49.19	32	25.80	28	22.58	3	2.42
10	104	54	51.92	26	25.00	21	20.19	3	2.88
11	101	56	55.44	30	29.70	14	13.86	1	0.99
12	123	47	38.21	39	31.70	34	27.64	3	2.43
13	139	61	43.88	17	12.23	57	41.01	4	2.88
14	131	63	48.09	1	0.76	57	43.51	10	7.63

χ^2 =117.9, df=27, p<0.001

The Nutritional status according to Waterlow's classification (height for age) is highlighted in Table 5 as per sex and in Table 6 as per age. Boys show highest percentage of stunting (50.13) in comparison to girls (34.28). Children of age group 9+ and 12+ have shown highest percentage of stunting. Children with age group 14+ have highest percentage (6.10) of severe stunting. Stunting was higher in boys in all the three degree of malnutrition in comparison to girls.

Table 5: Nutritional status (height for age) of tribal children as per sex

Sex	No.	Normal	%	Nutritional status					
				Mild	%	Moderate	%	Severe	%
Boys	728	363	49.86	175	24.04	173	23.76	17	2.33
Girls	493	324	65.72	107	21.70	50	11.14	12	2.43

χ^2 = 103.1, df =27, p<0.001

Table 6: Nutritional status (height for age) of tribal children as per age

Age	No.	Normal	%	Malnutrition					
				Mild	%	Moderate	%	Severe	%
5	112	79	70.53	29	25.89	3	2.68	1	0.89
6	130	76	58.46	30	23.07	24	18.46	0	0
7	130	80	61.53	39	30	11	8.46	0	0
8	127	71	55.90	31	24.40	23	18.11	2	1.57
9	124	62	49.19	32	25.80	24	19.35	6	4.83
10	104	56	53.84	20	19.23	26	25	2	1.92
11	101	64	63.36	30	29.70	5	4.95	2	1.98
12	123	59	46.34	33	26.83	26	21.13	5	4.06
13	139	71	51.07	19	13.67	46	33.09	3	2.15
14	131	68	51.90	19	14.50	36	27.48	8	6.10

$\chi^{2=}$43.70, df= 3 and p< 0.001

DISCUSSION

In the present study 51.10 percent of children were found to be underweight. Boys were found to be more malnourished when compared with girls. A very low standard of nutrition was seen among school going tribal children. DC Dhingra in 1977 had done nutritional survey among school going children in Delhi Corporation School and found the prevalence of malnutrition up

to 50 percent. [12] Another study done by Indirabai and Malika (1976) in Tirupati on urban school children reported 47 percent malnutrition in these children. [13] In our study it was seen that girls very much reached the normal growth pattern after adolescence whereas boys remain undernourished. Similar result was seen in another study done by MK Tiwari (2007). [14] Weight for age shows more severity of under nutrition (51.10) than height for age (43.73) in tribal children. So it is clear from our study that wasting is more in tribal children than stunting. In spite of mid- day meal program started by government not much improvement in health of children is observed.

CONCLUSION

It is concluded from the study that the nutritional status of tribal children from eastern Uttar Pradesh is very poor. Nutritional statuses of girls are better than boys but still both are under nourished. Gomez classification and Waterlow classification both shows different level of under nutrition. Gomez classification shows more severity of under nutrition in comparison to Waterlow classification (height for age). Hence "weight for age" focused more severity of nutrition status then "height for age". So we can say that children living in tribal areas are not gaining required weight with increasing age but they gain height.

It is also observed that poverty is not only the main reason of under nutrition but lack of nutritious food is also one of the big reasons of under nutrition in tribal areas. It is very important for our government to create awareness about affordable nutritious food products among tribal people. It is also important to impart knowledge to them about nutritive values of locally available food and about the kind of food and its amount which should be included in their diet. It is seen that they are used to eating large amount of rice and potato because of low prices but they can get green leafy vegetables also at cheap price. As a student of food science I think a proper counseling should be given to tribal people on nutritious food and meal pattern.

The Indian government has taken steps towards providing nutritious food to school going children through mid-day meal scheme but the improvement in nourishment is still inadequate as suggested by the study in this paper. The problem may lie in the implementation of such schemes, where preparation and distribution of food is not monitored and guidelines are not followed strictly. Moreover, the mid-day meal excludes the kids who do not go to school. The government should come up with programs which include such secluded population as well.

ACKNOWLEDGEMENT

I would like to thanks Dr. T.B Singh and Dr. Grish Singh from bio-statistician department for their valuable suggestion and help in working on SPSS.

REFERENCES

1. Green M & Rogers P. Impaired cognitive functioning during spontaneous dieting.Psychological Medicine. A Journal of Research in Psychiatry and the Allied Sciences. 1995; 25(5):1003-10.
2. Som S, Pal M, Bhattacharya B, Bharati S, Bharati P. Socio-economic differentials in nutritional status of children in the states of West Bengal and Assam. J BiosocSci. 2006; 38: 625-42.
3. Uppal M, Kumari K, Sidhu S. Clinical assessment of health and nutritional status of scheduled caste preschool children of Amritsar. Anthropologist 2005; 7: 169-171.
4. World Health Organization. Physical status: use and interpretation of

anthropometry; report of a WHO Expert Committee. Geneva: World Health Organization, 1995; 452. (WHO technical report series no.854).
5. De Onis M. and Habicht J.P. Anthropometric reference data for international use: recommendations from a World Health Organization Expert Committee. The American Journal of Clinical Nutrition. 1996; 64:650-58.
6. Abudayya A, Thoresen M and Abed Y, Holmboe- Ottesen G. Overweight, stunting, and anemia are public health problems among low socioeconomic groups in school adolescents (12-15 years) in the North Gaza Strip. Nutrition Research. 2007; 27:762-71.
7. Villareal DT, Apovian CM, Kushner RF and Klein S. The Obesity Society: Obesity in older adults: technical review and position statement of the American Society for Nutrition and NAASO. Am J ClinNutr 2005; 82:923-34.
8. Grinker JA, Tucker KL, Vokonas PS and Rush D. Changes in patterns of fatness in adult men in relation to serum indices of cardiovascular risk: the Normative Aging Study. Int J ObesRelatMetabDisord 2000; 24:1369-78.
9. Forster S and Gariballa S. Age as a determinant of nutritional status: a cross sectional study. Nutr J. 2005; 4:28.
10. Medhi GK, Hazarika NC and Mahanta J. Nutritional status of adolescents among tea garden workers.Indian J pediatr. 2007; 74(4): 343-7.
11. Manna PK, Debasis D, Bera TK, Chatterjee K and Ghosh D. Anthropometric Assessment of Physical Growth and Nutritional Status among School Children of North Bengal. Anthropologist. 2011; 13(4): 299-305.
12. Dhingra DC, Anand NK and Gupta S. Health status of school children of various socio-economic groups. Ind Pediatr. 1977; 14: 243-246.
13. Indirabai K and Malika R. A comprehensive study of school children of Tirupati city, Andhra Pradesh. Ind Pediatr. 1976; 13: 751-758.
14. Tiwari MK, Sharma KK, Bharati S, Adak DK, Ghosh R and Bharati P. Growth and nutritional status of the Bharia-a primitive tribe of Madhya Pradesh. Coll Anthropol. 2007; 31: 95-101.

How to cite this article: Twara T, Upasna S, Agrawal A et. al. Evaluation of nutritional status of school going tribal children by using anthropometric measurement in selected areas of eastern Uttar Pradesh. Int J Health Sci Res. 2015; 5(6):347-352.

****