

A Study on Anthropometric Measurements among Children Aged 1-5 Years

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Abstract

Introduction: The wide spread poverty, illiteracy, malnutrition non-availability of safe drinking water, unhygienic living conditions, poor maternal and child health services have been reported in several studies as the possible contributing factors for dismal health conditions prevailing among the tribal communities in India. *Methodology:* In order to fulfill the chief objectives of the study the information on health and nutritional status of the tribal children, such as socio-demographic and child rearing conditions, anthropometric measurements, clinical examination, morbidity pattern and dietary intake are collected and described the methods followed in the present study. Children were classified based on age group i.e. 1-<2 years, 2-<3 years, 3-<4 years, 4-<5 years and 5-<5.5 years. *Results:* High Prevalence of Undernutrition in terms of underweight (62.1%), stunting (62%) and wasting (38.1%) was observed among tribals than non tribals. P Value is significant. Prevalence of underweight, stunting and wasting was found similar in both the sexes. *Conclusion:* Mean mid upper arm circumference among different age group is higher in non tribal children which indicates good muscle mass in non tribal children than tribal children.

Keywords: MUAC; BMI; Malnutrition.

Introduction

The tribal groups in India inhabit widely varying ecological and geo-climatic conditions (hills, forests, deserts, etc.) and are at different stages of social, cultural and economic development process. The scheduled tribes differ considerably from one another in biological characteristics, language, cultural practices, beliefs and socio-economic characteristics. The health of these tribal groups is a function the interaction between socio-cultural practices, genetic characteristics and the environmental conditions [1] (Basu, 1996). The overall health status of the tribal community depends upon the effects of environment in which they live, genetic characteristics, cultural

patterns, the lifestyles, health care delivery services in tribal areas and the detached attitude largely in accepting the modern health care services at the initial stages of the disease. Basu suggested that there is an urgent need for initiating area specific, group specific and health need specific action research studies among the tribal communities in India so that the health oriented action research studies ultimately help the authorities in formulating effective need based health care strategies among the various tribal groups in India.

The wide spread poverty, illiteracy, malnutrition non-availability of safe drinking water, unhygienic living conditions, poor maternal and child health services have been reported in several studies as the possible contributing factors for dismal health conditions prevailing among the tribal communities in India. It has been found that certain areas like Madhya Pradesh, Orissa, Rajasthan, Gujarat, Assam and in some other areas, certain diseases like, goiter, yaws, malaria and guinea: worm are endemic (Government of India, 1989). Primitive tribal groups of India have special health problems because of their ignorance, unhygienic conditions, lack of health education and non-availability of health care facilities in their habitation areas.

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Received on 08.06.2017, Accepted on 19.06.2017

The general agreement is that the health status of the tribal population in India is very poor and many scholars have tried to establish this with the help of morbidity, mortality and health statistics [2-5] (Basu, 1996, 1993, 1996; Bardhan et al. 1989; Rizvi, 1986; Roy Burman, 1986; Swain *et. al.*, 1990; and many others). The low health status of the tribal community in general is closely linked with factors such as their poverty, illiteracy, lack of infrastructure facilities for medical care in the area where they inhabit.

Methodology

The present study is an effort in exploring the health and nutritional status of tribal children and Non-Tribal children through cross-sectional survey carried out in HD Kote Taluk which represent a considerable tribal population during Nov 2010 to July 2012.

In order to fulfill the chief objectives of the study the information on health and nutritional status of the tribal children, such as socio-demographic and child rearing conditions, anthropometric measurements, clinical examination, morbidity pattern and dietary intake are collected and described the methods followed in the present study.

Children were classified based on age group i.e. 1-<2 years, 2-<3 years, 3-<4 years, 4-<5 years and 5-<5.5 years.

A questionnaire was developed for collecting the detailed information about the child (name, age, gender, birth order), parental consanguinity, child rearing health practices and socio economic status. The ages of the children were obtained from birth record and also interviewing mother with the help of local event calendar. Socio-economic status of the study subjects was classified into Class I (≥ 3239), Class II (1620-3239), Class III (972-1620), Class IV (486-972) and Class V (< 486) by using modified B.G. Prasad Classification based on Consumer Price Index of December 2009 of 657 (Correction Factor = 32.39). Nutritional Status was assessed by the anthropometric measurements (Height, Weight, Mid upper arm circumference), Clinical observations and dietary assessment.

Height/Length

Measurement of height is to show the linear growth rate of an individual. Height of children under two years of age was measured in supine position using Horizontal measuring rod and older children were measured using stadiometer. The subject should

stand erect looking straight on the leveled surface with heels together and toes apart.

Weight

The prevalence of protein-calorie malnutrition appears to be best indicated by weight deficiency and by growth failure in children. Weight was measured by electronic weighing balance with minimum clothing. The subjects should stand on the centre of the platform without touching anything else.

Mid upper Arm Circumference (MUAC)

The arm circumference is considered as a useful and practical means of assessing the protein energy deficiency in early childhood. The mid-upper arm circumference is recognized to indicate the status of muscle development.

The measurement was taken on the left hand. The mid-point between the tip of the acromion of scapula and the tip of olecranon of the fore-arm bone was marked. The arm was left hanging freely and the flexible measuring plastic tape is gently, but firmly placed embracing the arm without exerting too much pressure on the soft tissue. The reading was taken to the nearest millimeter.

Anthropometric Indices

Anthropometric Indices are derived by using any two of the anthropometric measurements with or without considering the age to measure the period of malnutrition or frequent infections. The age specific indices coupled with height and for weight were used only for children as 'age' is the most important determinant of body size. The indices, calculated for the present study were height for age, weight for age, weight for height, Body Mass Index (BMI)

Height for Age

The height-for-age index is an indicator of linear growth retardation and cumulative growth deficits. Children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age (stunted) and are chronically malnourished. Stunting reflects failure to receive adequate nutrition over a long period of time and is also affected by recurrent and chronic illness. Height-for-age, therefore, represents the long-term effects of malnutrition in a population and does not vary according to recent dietary intake.

Weight for Age

Weight-for-age is a composite index of height-for-age and weight-for-height. It takes into account both acute and chronic malnutrition. Children whose weight-for-age is below minus two standard deviations from the median of the reference population are classified as underweight.

Weight for Height

The weight-for-height index measures body mass in relation to body length and describes current nutritional status. Children whose Z-score is below minus two standard deviations (-2SD) from the median of the reference population are considered thin (wasted) for their height and are acutely malnourished. Wasting represents the failure to

receive adequate nutrition in the period immediately preceding the survey and may be the result of inadequate food intake or a recent episode of illness causing loss of weight and the onset of malnutrition.

Results

This table shows distribution of tribal and non tribal children according to Standard deviation classification. High Prevalence of Undernutrition in terms of underweight (62.1%),stunting (62%)and wasting (38.1%) was observed among tribals than non tribals. P Value is significant. Prevalence of underweight, stunting and wasting was found similar in both the sexes.

Table 1: Prevalence(%) of underweight, stunting and wasting among tribal and non tribal by gender

	Under weight		Stunting		Wasting	
	Male	Female	Male	Female	Male	Female
Tribal	159(58.5)	150(65.8)	172(63.2)	141(61.8)	94(34.6)	95(41.7)
Non tribal	92(34.2)	78(33.8)	87(32.3)	84(36.4)	64(23.8)	60(26)

P Value<0.05

Table 2: Mean MUAC among different age groups in tribal and non tribal children

Ages (years)	Tribal	Non-Tribal
1-<2	13.4453	15.36
2-<3	12.9756	15.1589
3-<4	13.063	15.3171
4-<5	14.0658	15.1892
5-5.5	13.4074	15.0702

P Value<0.05

This table shows mean MUAC among non tribal is greater than tribals indicating better muscle mass among non tribals than tribals. P Value is significant

Above chart shows 56.8% of tribal children have

microcephaly and 29% of non tribal children have microcephaly. The placings of head circumference and the weight on their respective chart more or less correspond with each other.

Table 3: Comparison of Head circumference among tribal and non tribal children

Percentile	Tribal	Non Tribal
<3rd Centile	284 56.80%	145 29.00%
>3rd Centile	216 43.20%	355 71.00%

P Value <0.05

	Tribal	Non Tribal
Underweight	175 35%	94 18.80%
Normal	308 61.60%	350 70%
Overweight	16 3.20%	35 7%
Obese	1 0.20%	21 4.20%

P value<0.05

Above table shows more number of tribal children are underweight (35%) where as more number of non tribal children belongs to overweight (7%) and obesity (4.2%).

Discussion

As per the above table there is lot of variations in prevalence of undernutrition in the present and past studies. Our study among tribal children is comparable to study done by Jai Prabhakar et al on jenukuruba tribes of Mysore and Roa et al . Higher prevalence of undernutrition was also observed among them as compared to the prevalence among children in general. In comparison to NFHS 3 Tribal

children are more under nourished while non tribal children are better compared to NFHS 3 study.

The present study revealed the widespread prevalence of undernutrition among pre-school children of this tribal community. Analysis of pooled data obtained from several studies has shown that children with mild to moderate degrees of malnutrition have a relative risk of 2.2 for death under five years of age and children with severe malnutrition have a relative risk of 6.8. Also, the population attributable risk for death due to potentiating effect of malnutrition on infectious diseases varies with the percentage of children, with weight for age less than 80 per cent of the reference point, following a quadratic relation³ and 21 per cent of all deaths occurring among under-fives is attributable to malnutrition.

Table 5: Prevalence of Under nutrition in various studies

	Roa et al ⁶	Jai Prabhakar et al ⁷	Medhi et al ⁸	Pramila et al ⁹	Das et al ¹⁰	NFHS 3 ¹¹	Present study Tribals	Non Tribals
Underweight	61.60%	60%	51.70%	59.60%	38.20%	40.00%	62.10%	34%
Stunting	51.60%	46%	47.40%	78.20%	26.10%	45.00%	62%	34.40%
Wasting	32.90%	31.40%	21.20%		12.70%	23.00%	38.10%	24.90%

Conclusion

Among the tribal children, 62.1% of children were underweight, 62% of children were stunted and 38.1% of children were wasted while among non tribal population 34% of children were underweight, 34.4% were stunted and 24.9% of children were wasted .

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