RESEARCH ARTICLE

A study on Anthropometric Measurements of Preschool children

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Manuscript Info	*Abstract*
  Vijayasree. Bandikolla	Anthropometric measurements are main indicators in assessing nutritional status. Nutritional status is a sensitive indicator of community health and nutrition. The present study is an attempt to assess the nutritional status of pre-school children of two villages, Andhra Pradesh, India. Anthropometric measurements of 200 rural preschool children (3-5years) were selected. Anthropometric measurements i.e. height and weight of each subject were taken according to the procedures. For Measurements of Height and Weight, weight for height' and 'height for age' index by water low classification was selected. MUAC measurements were also taken and compared with the WHO standards. The analysis depicted that the weight of boys and girls belonging to all regions in the age groups from 3-5 years. The heights and weights of the children were lower than the NCHS standards.

INTRODUCTION

Childhood malnutrition is characterized by growth failure. Anthropometric measurements especially that of children is particularly important in assessing their nutritional status. According to Dawson (1992), heights and weights of children, particularly those less than 5 or 6 years of age, and pregnant/lactating women, are accepted measures for monitoring their growth and nutritional status, and are also considered as an indicator of the nutritional status of the entire community. Three indicators used for classification by comparison with a reference population (NCHS/ WHO International growth reference) are: weight for height; weight for age and height for age.

Growth monitoring involves following changes in a child's physical development, by regular measurement of weight, and sometimes of length. It is an important tool in individual care, for early detection of health and nutrition problems in growing children (Healy *et al.,* 1988). Deceleration in linear growth at an early age has been shown to be associated with increased risk of subsequent mortality (Van Lerberghe, 1988). Indications of growth failure alone are not readily related to specific causes, and often more information is needed to decide on the response. Growth monitoring also has the advantage of recording responses to intervention. In general, growth monitoring may provide for earlier detection of the need for intervention than one−time screening measurements (see previous section). Moreover, the trend measurement can distinguish children of adequate achieved size who are running into problems. Descriptions of growth monitoring methods are widely available − see for example the detailed reviews by Lotfi (1988), Yee & Zerfas (1987) and a special edition of the Indian Journal of Pediatrics (Vol. 55, No. 1, 1988).

Materials and Methods

Data: The sample of the present study was collected from two (kantheru and Namburu) of the Guntur district of Andhra pradesh, India. For the present study 120 families were considered. With in which 100 from kantheru and 100 from Namburu. Preschool children (100 boys and 100 girls) 200 samples were taken for the study, aged 1 to 5 years were taken as a study population.

Anthropometric Measurements
Height (cm)
The height of the adults was measured using the method described by Jellifee (1966). The subject was made to stand on an even floor with back touching the wall, the feet parallel with heels, buttocks and shoulders and back of head touching upright. The head was made erect with the lower border of the orbit measures and the arms hanging at the side in a natural manner.
Weight (Kg)
        The weight was measured by using procedure described by Jellifee (1966) using bathroom scales. The balance was placed on an even floor. The subject with light clothes (0.4-0.6 kg) were requested to stand on the center of the balance (foot rest plate) with head erect. The weight was recorded avoiding parallax error. The weight was expressed in kilograms. To minimize the error, the same balance was used throughout the study and the balance was checked periodically with standard weight adjusting to read zero in the resting position.
The Anthropometric measurements i.e. height and weight of each subject were taken according to the procedures described by Jelliffe (1966). The height and weight of the preschool children were compared with international (NCHS) as well as national (ICMR) standards (Gopaldas and Sheshadri1987). These anthropometric measurements were also compared with the ICMR Standards given by ICMR (1989).

The malnutrition was assessed through 'weight for age' (Jelliffe,1966), 'weight for height' and 'height for age' index(Waterlow, 1972; Waterlow *et al*., 1977) standard. The NCHS growth standards were used as reference (Frisancho, 1990).

MUAC (Mid Upper arm Circumference)

 A range of Mid-Upper Arm Circumference (MUAC) Measuring Tapes are available through UNICEF Supply Division. MUAC tapes are predominately used to measure the upper arm circumference of children but also that of pregnant women, helping identify malnutrition. There are different types of MUAC tape available. All are graduated in milli meters and some are colour coded (red, yellow and green) to indicate the nutritional status of a child or adult. The colour codes and gradations vary depending on the tape type.
The MUAC measurement was taken (in centimeters) on each subject following theStandard techniques (Lohman *et al*.,1988).

Results and Discussion

Table 1: **Gradations of malnutrition among Kantheru and Namburu children**

Kantheru			Namburu		
Weight for age					
Grades of malnutrition	Boys No %	Girls No %	Total No %	Boys No %	Girls No %	Total No %
Normal	11 (22.0)	9 (18.0)	20 (20.0)	18 (36.0)	15 (30.0)	33 (33.0)
Grade I	7 (14.0)	13 (26.0)	20 (20.0)	11 (22.0)	16 (32.0)	27 (27.0)
Grade II	25(50.0)	18 (36.0)	43 (43.0)	7 (14.0)	11 (22.0)	18 (18.0)
Grade III	7 (14.0)	10 (20.0)	17 (17.0)	14 (28.0)	8 (16.0)	22 (22.0)
Total	50 (100)	50 (100)	100 (100)	50 (100)	50 (100)	100 (100)
Height for age					
Normal	14 (28.0)	12 (24.0)	26 (26.0)	19 (38.0)	16 (32.0)	35 (35.0)

Grade I	5 (10.0)	14 (28.0)	19 (19.0)	10 (20.0)	12 (24.0)	22 (44.0)
Grade II	23 (46.0)	10 (20.0)	33 (33.0)	7 (14.0)	10 (22.0)	17 (17.0)
Grade III	6 (12.0)	9 (18.0)	15 (15.0)	11 (22.0)	8 (16.0)	19 (38.0)
Grade IV	2 (4.0)	5 (10.0)	7 (7.0)	3 (6.0)	4 (8.0)	7 (14.0)
Total	50(100)	50 (100)	100 (100)	50 (100)	50 (100)	100 (100)
Height for weight						
Normal	22(44.0)	24 (42.0)	46 (92.0)	20 (40.0)	17 (14)	37 (37.0)
Grade I	10(22.0)	12 (24.0)	22 (44.0)	14 (28.0)	21 (42.0)	35 (35.0)
Grade II	8(16.0)	8 (16.0)	16 (32.0)	6 (12.0)	10 (22.0)	16 (16.0)
Grade III	7(14.0)	5 (10.0)	12 (24.0)	8 (16.0)	1 (2.0)	9 (9.0)
Grade IV	3(6.0)	1 (2.0)	4 (8.0)	2 (4.0)	1 (2.0)	3 (3.0)
Total	50(100)	50 (100)	100 (100)	50 (100)	50 (100)	100(100)

Table1: shows the gradation of malnutrition among preschool children was classified on the basis of weight for age, height for age and weight for height nutritional anthropometric indices (Table 2). According to weight for age index, 20.0 pe rcent kantheru and 33.0 per cent namburu children were found to be normal. Whereas kantheru 20.0 per cent and 27.0 per cent namburu children were suffered by mild malnutrition (Grade I). The prevalence of severe malnutrition (Grade III) was higher among kantheru (17.0%) compared to namburu (22.0%) preschool children. The preschool girls children of both villages were suffered more by different grades of malnutrition than boys except grade III malnutrition. Preschool children from both the villages were suffering from malnutrition. Like weight for age and height for age indices, this index also show that girls were more malnourished. The present study results in accordance with the studies and grades of malnourished children should be advocate good Nutritional programmes and implementation is also very important. According to WHO report (WHO, 1989a) Growth failure, and indeed the deprivation syndrome, have commonly been equated with "malnutrition". This has caused some misunderstanding since it has implied dietary inadequacy as necessarily a primary cause. Results of anthropometry are commonly and appropriately used as indicative of "nutritional status". It would be more accurate in this context (though perhaps less compelling) to refer to anthropometric status. The following terms are considered accurate and appropriate.Underweight or overweight, for deviations of body weight from expected weight−for−age; wasted or obese, for deviations of body weight from expected weight−for−height; and stunted, for deviations of height below expected height−for−age.The weight of boys and girls of both the villages 3-5years were compared with the ICMR standards except of boys in the age group of 1.5-2.0 years. Similarly, a number of studies in India. Hanumantha Rao *et al*(1994) and Bilasini *et al* (1997) have reported that weight of preschool children were comparable to Indian standards but were less than those of international standards (NCHS and Harvard).

Table 2: WHO cut-off points For MUAC

Indicators	Standards	Mean ±SD Boys	Mean ±SD Girls
Red	0 – 11.5 cm	10.1 ± 7.6	9.9 ±5.4
Yellow	11.5 cm – 12.5 cm	12.8 ± 2.7	12.7±9.8
Green	11.5 cm – 12.5 cm	13.6 ± 9.1	13.2±7.7

WHO cut-off points for MUAC

Table 2 shows mean values of MUAC (Mid upper arm circumference) for both genders including boys and girls were presented and compared with WHO standards. The mean values of MUAC for boys indicating red was 10.1 ± 7.6, Yellow were 12.8± 2.7 and Green was 13.6±9.1 cm. The mean MUAC for girls indicating red was 9.9 ±5.4, Yellow was 12.7± 9.8 and Green was 13.2±7.7 cm. The mean MUAC for both boys and girls were below the standards. A range of Mid-Upper Arm Circumference (MUAC) Measuring Tapes are available through UNICEF Supply Division. MUAC tapes are predominately used to measure the upper arm circumference of children but also that of pregnant women, helping identify malnutrition.

Measurement of MUAC is a quick and reliable method for screening children to identify those who are seriously malnourished (Kaur *et al*.,2005).There are several practical and theoretical advantages of using MUAC rather than

weight-for-height for the determination of nutritional status. The present study clearly showed the malnourishment in children throughsomatic measurements and agreed with the studies.Several studies shows that, in terms of age independence, precision, accuracy, sensitivity and specificity, MUAC is the best case– detection method for severe and moderate malnutrition and that it is also simple, cheap and acceptable (Myatt *et al.,*2006).

Conclusion

Anthropometry is the measurement of the human body. Anthropometric measures are used to assess the nutritional status of individuals and population groups, and as eligibility criteria for nutrition support programs. Common anthropometric measures are height, weight, and mid-upper arm circumference (MUAC).The present study indicates the nutritional status of these pre-school children was serious with high rates of under nutrition were observed in both boys and girls.

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World Health Organization (WHO) and UNICEF issued a joint statement on WHO child growth standards and the identification of severe acute malnutrition in infants and children. To reflect this, a new standard MUAC tape (2009).