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Research Article

NUTRITIONAL STATUS, SOCIO-ECONOMIC AND HYGIENIC CONDITION OF SCHOOL AGED CHILDREN OF A VILLAGE OF PUNE DISTRICT, MAHARASHTRA

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ABSTRACT

Introduction: The field of anthropometry encompasses a variety of human body measurements, such as weight, height and size; including skin fold thickness, circumference, lengths, and breadths. Anthropometry is a key component of nutritional status assessment in children and adults. Anthropometric data for children reflect general health status, dietary adequacy and growth and development over time. The main objective of the study was to diagnose and analyze the magnitude and causes of nutritional and health problems of the village.**Method**: Anthropometric reference data of 100 children between 7-14 years of age from a small village situated 30 km from Pune. Using this data BMI i.e. Body Mass Index was calculated which helps in determining whether an individual is overweight or underweight. **Result:**The overall study helped us to find out the socioeconomic condition, hygienic condition as well as nutritional status of children. All the anthropometric measurements of the girls and boys in 7-14 years age group was found to be significantly normal. **Conclusion:** The hygienic condition of the village was good enough and in turn BMI data shows that the socioeconomic condition of the village was also good.

Keywords: Nutritional status, BMI, Anthropometry, socioeconomic condition.

INTRODUCTION

The work focuses on the health status of the village children as well as their nutritional status, which reflects the hygienic condition of the village. The main aim of this study is to provide anthropometric data of children.[1-3]Anthropometry, the measurement of body size, weight and proportions, is an intrinsic part of any nutritional survey and can be an indicator of health, development and growth. Anthropometric values are closely related to nutrition, genetic makeup, environmental characteristics, social and cultural conditions, lifestyle, functional status and health.[4]It is frequently used to assess nutritional status and to study the growth and development of school-aged children and adolescents. Anthropometric evaluation is an essential feature of geriatric nutritional evaluation for determining malnutrition, being overweight, obesity, muscular mass loss, fat mass gain and adipose tissue redistribution. Socioeconomic conditions are consistent correlates of BMI. Low Body Mass Index and high levels of under nutrition are the major public health problems, especially among rural underprivileged adults in developing countries.Thus, the main objective of this study was to establish a relationship between nutritional statuses and the following anthropometric parameters- weight, height and weight-height ratio. Camps were arranged for collection of information on the sex, age, weight and height of children from the village.Anthropometry provides non-invasive, easy and cheap, but yet valuable information on nutritional

status. Anthropometric measures of most significance in children include: weight and height, weight-height ratio.[1-3.]Skin fold thickness at selected sites, [4-6] mid upper arm.[3,6,7] Comparing anthropometric data from children of different ages is complicated by the fact that children are still growing (we do not expect the height of a 5 yr to be the same as height of a 10 yr old) Thus, height is one of the very important components in the anthropometric data. Literature uses height as a marker of health as Deaton (2007) explains, "Height" is determined by genetic potential and by net nutrition, most crucially by net nutrition in early childhood.[8-11] "Net nutrition is the difference between food intake and the losses of activities and to disease."The most commonly used indices derived from the measurement of anthropometric data are stunting (low height for age), wasting (low weight for height), and underweight (low weight for age) and overweight (high/ more weight for age). Stunting is an indicator of chronic under nutrition, the result of prolonged food deprivation and/or disease or illness; wasting is an indicator of acute under nutrition, the result of more recent food deprivation or illness, underweight is used as a composite indicator to reflect both acute and chronic under nutrition.[12] These indices reflect distinct biological processes and their use is necessary for determining appropriate interventions. However, because they overlap, none is able to provide a proper result, some children who are stunted will also have wasting and/or be underweight; some children who are underweight will also have wasting and/or be stunted; and some children who have wasting will also be stunted and/or underweight.[13-15]

MATERIAL & METHOD

The numbers of camps were arranged for the collection of Anthropometric data. The project was approved by the Institutional Ethics Committee. The Anthropometric measurements of 50 girls and 50 boys in range of 7-14 years of age were taken by using standard Anthropometric instruments.Parents were contacted through schools and signed parental consent was obtained for children to participatein the study. The parents were provided with an information sheet and the study purpose was explained in their own language by study personnel (Marathi, Hindi, and English). Participation was entirely voluntary and patient's data was kept confidential. In children the most common Anthropometric indices used to measure growth are height-for-ages, weight-for-age and weight-for-height. Low height-for-age is considered an indicator of shortness or stunting. Height-for-age is the recommended indicator that best reflects the process of failure of a child to reach linear growth potential. Low weight-for-height for a child is considered an indicator of thinness or wasting and is generally associated with recent or ongoing severe weight loss. Weight loss in children presenting low weight-for-height is usually due to a recent illness and/or insufficient calorie intake. Weight-for-age is primarily a composite of weight-for-height and height-for-age, and fails to distinguish tall, thin children from short. Because it is influenced by both the height of the child and the weight, it is more difficult to interpret. The inclusion criteria for the study was school going child, a girl or a boy of a village, age between 7 and 14 years. Children were excluded from the study if they were not willing to participate and above 14 years of age.

Anthropometric measurements: - Children were measured for height and weight without shoes and in light clothing. Weight was measured using an electronic digital scale and height was measured using a height measuring board.[6,7,12] BMI-for-age was used to assess physical growth and to determine the prevalence of overweight and underweight of the children.

Subjects stood with their scapulae, buttocks and heels' resting against a wall, the neck was held in a natural, non-stretched position, the heels were touching each other, the toe tips formed a 45 degree angle and the head was held straight.[13-15.]

Body Mass Index (BMI): -BMI is generally considered a good indicator of not only the nutritional status, but also the socioeconomic condition of a population, especially adult populations of developing countries. BMI was estimated by dividing weight (kg) by square of height (m).[16, 17] Individuals were considered malnourished if their BMI was less than 18, normal from 18-25 and overweight if more than 25.

Descriptive statistics for all continuous variables were presented as the mean ± SD. Group comparisons were performed with the independent sample t test.

RESULTS

Table 1: Observed Anthropometric values of male subjects according to age.

Male subjects						Female subjects				
Age years	**No.**	**Weight (kg)**	**Height (cm)**	**Wt/Ht ratio (kg/cm)**	**BMI**	**No**	**Weight (kg)**	**Height (cm)**	**Wt/Ht ratio (kg/cm)**	**BMI**
7	**7**	20.92±1.64	104±12	0.20115	19.93±4.40	13	20.07±2.68	107±11	0.1875	17.88±4.36
9	**3**	23.50±1.80	103±15	0.22815	22.92±7.17	3	17.66±0.57	109±10	0.1620	15.19±4.30
10	**8**	23.92±2.62	119±10	0.20100	16.93±2.78	17	20.87±5.16	106±14	0.1968	19.20±6.03
11	**15**	25.73±3.90	128±07	0.20101	15.47±1.22	8	26.31±4.14	129±5	0.2039	15.53±1.78
12	**8**	26.18±2.50	129±02	0.20294	15.62±1.70	5	33.50±5.78	142±8	0.2359	16.38±1.59
13	**9**	30.72±4.94	136±06	0.22588	16.31±6.36	4	37.37±7.47	144± 3	0.2595	17.77±3.14

Table 2;Standard Anthropometric values of male subjects according to age. (p<0.05)

Male subjects					Female**subjects**			
Age years	**Weight (Kg)**	**Height (cm)**	**Wt/Ht ratio** (kg/cm)	Diff. between std and observed Wt/Ht ratios **(p values)**	**Weight (Kg)**	**Height (cm)**	**Wt/Ht ratio** (kg/cm)	Diff. between std and observed Wt/Ht ratios **(p values)**
7	22.9	121.7	0.18816	-0.0129	21.8	120.6	0.1807	-0.0068
9	28.1	132.2	0.21255	-0.0155	28.5	132.2	0.2155	0.054
10	31.4	137.5	0.22836	0.02736	32.5	138.3	0.2349	0.0381
11	32.2	140	0.23	0.02899	33.7	142	0.2373	0.0334
12	37	147	0.25170	0.04876	38.7	148	0.2614	0.0255
13	40.9	153	0.26732	0.04144	44	150	0.2933	0.0338

Table 3: Levels of malnutrition and obesity

BMI (wt/ht^2)	Levels of malnutrition/grades of obesity	No. of females	No. of males
Below 16	Severe level of malnutrition.	7	4
16 – 17	Moderate level of malnutrition.	1	0
17.1 – 18.5	Mid level of malnutrition.	7	5
18.6 – 20	Low weight but normal.	12	17
20.1 – 25	Normal.	18	23
25.1 – 30	First grade of obesity.	3	1
Above 30	Second grade of obesity.	2	0

Comparison of the anthropometric values according to age and gender participating subjects showed,for each age group weight were greater in males than females while height were greater in females.(Table 1,2).BMI was used to determine malnutrition and overweight (Table 3).[17,18]Malnutrition was found in 24% of the population (<18.5 BMI); with 15% of females and 9% males being malnourished. Data showed that 70% of the population were normal (BMI ≥18.5 &≤25); with 30% of females and 40% of males. Obesity/overweight was found in 6% of the population (BMI ≥25.1); with 5% of females & 1 % of males. (Table 3,Fig 1& Fig 2).

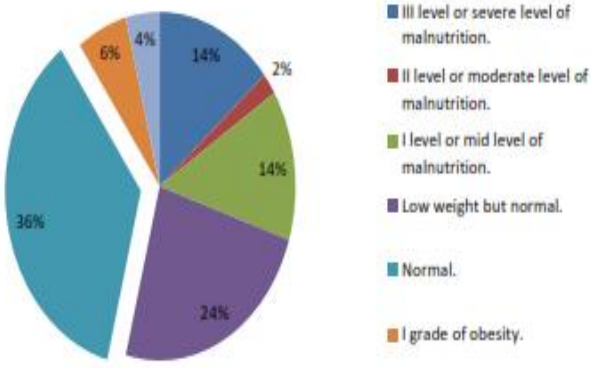

Fig 1: Data of female children

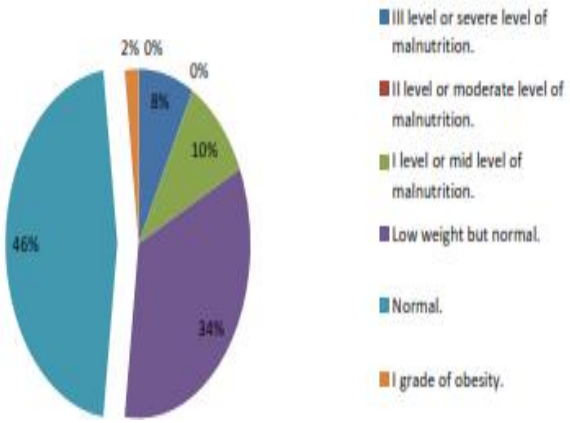

Fig2: Data of male children

DISCUSSION

According to the 2000 Centers for Disease Control[17] and Preventiongrowth charts, the majority ofchildren who were malnourished at 7 years of age remained in that same weight category at 5 years of age, whereas the normal weight category was most stable according to the International Obesity Task Force (IOTF).[13,14,19]However, for both the CDC and International Obesity Task Force references the underweight category showed the least stability. While in the case of adults malnourishment can occur at any age depending on the different conditions in which the villagers prevail also it can depend on hygienic condition of the village as well as the physical work performed by villagers in their day to day life.

From a public health standpoint, it is clear that different reference criteria can reveal dramatic differences in prevalence estimates of pediatric malnourishment. If a growth reference does not adequately describe the population in question, public health concerns may be spuriously increased or decreased, leading to inappropriate (or lack of) action. Furthermore, when strategies are designed to reduce rates of pediatric underweight and malnourishment, or if studies are planned to examine changes in growth, the use of different references may correspond to differences in the ability to detect changes over time. As a means of addressing the limitations inherent in the relative BMI categorizations, it would be prudent to express any changes over time in both categories (normal weight, underweight or malnourished) and absolute terms and not rely on a single indicator. This information would be useful given that an increase or decrease in absolute BMI could take place, but not correspond to a change in the weight category if individuals do not cross BMI threshold cutoffs.

The study has several strengths. It determined prevalence estimates from a large sample of young children representative of the school aged between 7 to 14 years. BMI was calculated from measured rather than reported heights and weights. But since the weight-height ratio is independent of age and taking into consideration weight in relation to height, it may be considered to have advantages over using either weight or height singly as an index of growth or nutritional status. Moreover, because most of the anthropometric parameters had a close relationship with this index. There is no internationally acceptable index to assess childhood malnutrition nor is there an established cutoff point to define underweight in children. A consistent and pragmatic definition for underweight in children and adolescents is required, BMI may therefore be appropriate. However, other alternatives may be considered in the future.

CONCLUSION

Almost all the anthropometric measurements of the girls in each age group were found to be significantly normal. The weight and weight-height ratio were not affected to a greater extent. This is true for almost all girls. However girls showed both overweight and underweight conditions. 66% girls had normal weight, 10% girls were overweight and 24% girls were underweight. This may be due to the lack of proper food intake or malnutrition. However malnutrition cannot be the only factor of being underweight, it may also be due to certain diseases or illness. Thus the girls aged between 7-13 yrs old showed the average height 1.15m; average weight 24.02 kg and average BMI 20.23 kg/m^2. Almost all the anthropometric measurements of the of boys were found to be significantly normal. 86% boys had normal weight,4% boys were overweight and 10% boys were underweight. The boys were 7-14 yrs old and showed the average height 1.23m, average weight 25.40 kg, average BMI 20.135 kg/m^2.

Thus the present data show that hygienic condition of the village was good enough. And in turn BMI data shows that the socioeconomic condition of the village was also good.

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Conflict of interest: Nil

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