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Anthropometric Assessment of Nutritional Status among Scheduled Caste Children (6-12 years) in Lucknow

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ABSTRACT

In the fast developing economy of India, the fruits of development have not been equally distributed among the various social strata. Those at the 'lower' stratum continue to remain impoverished and underdeveloped. The scheduled castes are considered to be one of the worst affected in terms of social and economic terms. The study was aimed to assess the dietary and growth pattern of the Dhanuk children residing in Bapu Nagar Basti, Lucknow, which is an unplanned Dalit settlement located in the center of the city. Children belonging to age groups between 6 to 12 years old were included in the study. Out of the 94 children interviewed and measured, 70 were included in the study based on the age criteria. Five anthropometric measurements were recorded – Height for Age, Weight for Age, Chest Girth, Upper Arm Girth, and Calf Girth. Based on the data, Daily Calorie Intake and Body Mass Index were calculated. The results displayed that of all the 70 children, 67% were stunted, 74.8% were underweight, 48% were underfed and 57.3% children were malnourished. The findings proved that the Dhanuk children of the Basti had lower nutritional and health standards than their counterparts belonging to other castes and almost 80% children had lower levels of health and nutrition as prescribed by World Health Organization.

Keywords: *Nutritional Status, Malnutrition, Anthropometry, Dhanuk, Scheduled Caste*

INTRODUCTION

Children of today are the human resource of tomorrow. This human resource which ought to be cared cherished and nurtured often remains neglected by the society and the institutions. Over the world, the problem of malnutrition is a very serious issue. World Health Organization defines malnutrition as deficiencies, excesses or imbalances in a person's intake of energy and/or

nutrients. In India, the problem of malnutrition is well spread, with India alone accounting for about 40% malnourished children in the world which adversely affects child mortality, disease prevalence and socio-economic growth (Measham & Chatterjee, 1999). The case of malnutrition is felt more strongly in the case of scheduled castes and scheduled tribes which despite decades of efforts, still remain a disadvantaged section in the Indian society. The historical exclusion from access to economic, educational, civil, and cultural rights mirrors its claims in the incidences of present day marginality and deprivation among them (Sikder, 2016). Thus, the children belonging to these communities are at a greater risk of poor health and malnutrition. A number of official and non-official reports prove with statistics that nutritional deficiency is common among these social groups (Pal, et.al, 2017). While malnutrition is spread in entire India, there are eight major states which share the majority of the burden. Uttar Pradesh is one among these states where the number of malnourished children is very high. While malnutrition may commonly affect all groups in a community, but infants and young children are the most vulnerable because of their high nutritional requirements for growth and development, including the school going children. Another factor to notice is that the studies of malnutrition at national and local levels have focused predominantly on children under 5 years of age (Bagilkar and Savadatti, 2015). Not much work has been done beyond these age groups which obscures the further insight into the problem of nutritional deficiency and malnutrition in school-going children. Through this study, an attempt has been made in this direction to understand how the lack of proper nutrition and growth manifests in the later, formative years of development. It is to be noted that children's growth and development do not occur in a linear fashion, but are influenced by each child's environment, nutrition and parental care. These factors play a critical role in a child reaching her/his full potential (Sohi, 2013) and the nutritional status of a child can be described in terms of anthropometry, i.e. body measurement, such as weight, in relation to age or height, which is reflective of the degree of underweight or wasting of that child.

Objectives

The objectives during the study were to assess the dietary and growth pattern of the children of Bapu Nagar Basti by collecting data regarding their daily meal composition, quantity and frequency. Another objective was to study the growth and nutritional status with the help of anthropometric measurements and analyze the presence of malnutrition in the children.

STUDY AREA AND METHODOLOGY

The study is entirely based upon primary data collected in Bapu Nagar Basti in the year 2016. The Basti is a Dalit habitation located in the center of Lucknow city. It is chiefly inhabited by Dhanuks who constitute about 96% of the total population of the Basti. Dhanuks are a scheduled caste in Uttar Pradesh and form 1.5% of the total scheduled population. They work as sanitation labourers in various offices around the city. At the time of the study, there were 291 males and 338 females in the Basti. Out of this total population of 629, 149 were children (below the age of 14 years), constituting roughly 24%. For the study, a total of 96 school going children were

interviewed and measured in the initial stage. In the next stage, 70 children were selected based on the age bracket of six to twelve years old. A combination of methods was used to gather data. To collect information related to dietary pattern of the children semi-structured interviews were conducted involving both the children and their parents, mostly mothers and grandmothers. Questions related to daily diet composition, quantity of food, number of meals in a day were asked. In order to ascertain the nutritional status, anthropometric measurements were taken, namely, height for age, weight for age, chest girth, arm girth and calf girth. Anthropometric rod was used to measure the height of the children. An electronic weighing machine was used to record the weight. To find the chest girth, arm girth and the calf girth, measuring tape was used and values were recorded in centimeter. At the time of taking the measurements, standard anthropometric procedures were followed. Children were wearing minimal clothing and were bare-footed. The measurements were taken twice and the average value was used for calculations.

The data was then used to calculate indices which are Body Mass Index (BMI) and Daily calorie Intake. BMI was calculated using the standard Adolphe Quetlet formula whereby the Bodyweight in kilograms was divided by height in meters squared. To calculate the Daily calorie Intakeof every child, information was collected from the children, their parents and sometimes grandmothers (if present at the time of the study). Daily meals were categorized as breakfast, lunch and dinner and questions were asked about the food items consumed during each meal. Quantity of food consumed during every meal was also taken into account. Countable food items (such as Chapati, White Bread, eggs, parathas etc.) were noted down and non-countable food items (rice, pulse, vegetable curry, milk, tea, coffee) were measured using a container having capacity of 100 grams. Parents were asked to fill the container with raw food items from their kitchen to show the approximate amount of food consumed by the child. This amount was then weighed on the electronic weighing machine and noted down (weight of the container was subtracted from the weight obtained on the machine). The final weight of the raw food item was then used to calculate the calories consumed. Attempt was made to calculate the value of calories consumed to the best possible near value. It shall be mentioned here that the calorie values of cooking oil, salt, sugar, spices used during the cooking of food were not taken into account. Values obtained are based on the weight of raw food consumed by the children.

RESULTSAND DISCUSSION

Table1 represents the various sectors where the people of the Basti are employed. Except those who are engaged in small-time business and shopkeepers, everyone else is working as a sanitation labourer. These jobs, in most cases, are passed down from one generation to another based solely on caste. It can be seen that most of the individuals are employed and in private sector and government sector. However, in both the sectors, the individuals are employed as sanitation workers and cleaners.

Table 1: Nature of Employment in the Basti

Occupation	Male	Female
Government Job	18.81 %	10.69%
Domestic Servant	13.28 %	6.82 %
Private Job	29.62 %	2.99 %
Business	2.61 %	0.12 %
Shopkeeper	4.83 %	0.10 %
Samvida	5.33 %	-
Retired Persons	3.50 %	1.30 %

Height for Age and Weight for Age: Stunting is an indicator of chronic deficiency, wasting is an indicator of acute under-nutrition and underweight is a composite measure of both chronic and acute under-nutrition (Arnold et al 2003;Gillespie and McNeill 1992).In the study, weight for age (WAZ) and height for age (HAZ) were used as they measure the child growth relative to its potential (Kynch and Maguire, 1998).The values recorded for Height and Weight (Table 2) were computed against the WHO standards for Height and Weight[1]. It showed that in all age groups, stunting and underweight was present in varying degrees.

Table 2: Weight for Age among the Children of Bapu Nagar Basti

Age (in Years)	Weight (Kg) for Age					
	Boys			Girls		
	Mean	z-score	z-score percentile	Mean	z-score	z-score percentile
6	21.98	0.39	65.17%	14.46	-2.38	0.20%
7	22.10	-0.33	37.0%	16.08	-2.78	0.27%
8	20.14	-1.87	3.07%	21.22	-1.26	10.38%
9	25.90	-0.66	25.46%	25.56	-0.76	22.36%
10	25.46	-1.49	6.81%	25.25	-1.55	6.06%
11	27.30	-1.70	14.46%	25.92	-2.10	1.79%
12	28.78	-2.04	2.07%	32.25	-1.43	07.64%

Table 3: Height for Age among the Children of Bapu Nagar Basti

Age (in Years)	Height (cm) for Age					
	Boys			Girls		
	Mean	z-score	z-score percentile	Mean	z-score	z-score percentile
6	102.64	-2.56	0.52%	102.23	-2.65	0.40%
7	110.88	-2.08	1.88%	106.48	-2.99	0.14%
8	120.40	-1.36	8.69%	117.42	-1.85	3.22%
9	129.26	-0.73	23.27%	128.52	-0.75	22.66%
10	131.53	-1.12	13.14%	131.60	-1.00	15.87%
11	140.61	-0.45	32.64%	134.87	-1.30	9.68%
12	140.30	-1.23	10.94%	143.95	-1.02	15.39%

For an overall average of all the age groups, 67% children were found to be stunted, of which 36% were boys and 31% were girls. As much as 74.8% children were found to be underweight of which 41% were boys and 33.8% were girls.

Chest Girth, Arm Girth, Calf Girth: The collected values were recorded using the standard method and used to analyze the body fat deposition along with BMI of the subjects. It was found that the values were inconsistent within the age groups and showed inadequate amount of body fat in the children. About 67% of the children were found to be bony and frail, of which 46% were boys and 29% were girls.

Table 4: Circumference measurements among Dhanuk children

Age	Chest Girth (cm)		Arm Girth (cm)		Calf Girth (cm)	
	Boys (±SD)	Girls (±SD)	Boy (±SD)	Girls (±SD)	Boys (±SD)	Girls (±SD)
6	53.45 (3.56)	49.78 (2.44)	14.78 (1.51)	13.65 (1.59)	17.08 (4.77)	17.01 (3.61)
7	56.62 (2.11)	55.80 (2.77)	15.06 (2.65)	14.46 (2.58)	19.62 (3.72)	18.56 (5.44)
8	59.92 (2.80)	65.60 (1.30)	15.90 (3.22)	17.00 (1.01)	21.94 (4.32)	22.04 (2.84)
9	63.34(0.98)	65.60 (3.61)	18.18 (3.03)	19.30 (0.68)	22.60 (1.55)	26.46 (1.41)
10	64.83 (1.51)	67.81 (5.63)	17.60 (4.66)	18.65 (2.47)	23.93 (2.95	23.15 (2.95)
11	68.66 (2.20)	64.37 (4.62)	17.35 (6.43)	17.12 (3.62)	22.15 (2.51)	21.87(3.55)
12	68.76 (4.04)	72.15 (1.40)	16.65 (2.67)	18.92 (3.99)	23.41 (1.82)	24.12 (0.47)

*Body Mass Index:*The data on height and weight was used to calculate the BMI for all the age groups in boys and girls. The growth references BMI-for-Age (5-19 years) prescribed by World Health Organization (2007) were used as the standard reference.

Table 5: Body Mass Index among Dhanuk Children

Age	Body Mass Index					
	Boys			**Girls**		
	BMI (±SD)	z-score	z-score percentile	BMI (±SD)	z-score	z-score percentile
6	20.36 (3.67)	2.34	99.04	13.84 (5.41)	1.19	11.70
7	17.98 (4.77)	1.26	89.62	14.18 (8.64)	-0.93	17.62
8	13.89 (2.15)	-1.54	6.18	15.39 (2.53)	-0.25	40.13
9	15.50 (5.84)	-0.40	34.46	15.47 (4.93)	-0.44	33.0
10	14.72 (2.91)	-1.22	11.12	14.58 (2.80)	-1.25	10.56
11	13.81 (7.41)	-2.34	0.96	14.25 (3.62)	-1.76	3.92
12	14.62 (5.05)	-1.93	2.68	15.55 (2.79)	-1.19	11.70

By computing against the standards provided by WHO (2007),57.3% children were found to be malnourished. The malnutrition was more severe in case of the boys as compared to the girls of the same age group. 27.3% boys and 26.8% girls were found to be malnourished. The data on the BMI value for different age groups is presented in table 5.

Daily Calorie Intake: The children had provided data about their daily meal composition and quantity. The calorie amounts present in cereals, pulses and vegetables was used to produce a detailed outcome of daily calorie intake of the children of the Basti.

Table 6: Food preference and meat recurrence in the diet of Dhanuk children

Food Type		Recurrence of Meat in Diet	
Vegetarian	16%	Weekly	9%
Eggetarian	22%	Fortnight	28%
Mixed	62%	Monthly	63%

Table 7: Daily calorie Intake among the children of Bapu Nagar Basti

Age (years)	Daily Calorie Intake	
	Boys (Mean±SD)	Girls (Mean±SD)
6	1156.60 (1.64)	1278.03 (6.46)
7	1274.60 (5.87)	1332.04 (2.11)
8	1542.60 (3.60)	1350.04 (4.87)
9	1372.40 (4.66)	1390.00 (5.83)
10	1505.00 (9.51)	1353.28 (7.81)
11	1819.83 (5.84)	1889.05 (3.60)
12	1741.16 (5.51)	1787.75 (4.73)

These calorie intake values were computed against the 'Estimated Calorie Needs per Day by Age, Gender, and Physical Activity Level' by United States Department of Agriculture (USDA)[2].

Based on the above calorie requirements, it was found that about 48% children were underfed in the Basti in terms of calories. Of this, the severity was more in case of the girls. Of the 48%, the percentage of girls and boys who were underfed calorie-wise was 27% and 21%, respectively. Table 4 represents the data for daily calorie intake in different age groups for boys and girls. Values are taken as average for each age group.

Conclusion

It is common perception that children belonging to 'lower' castes have poor nutritional status due to their disadvantaged socio-economic status. The present study reaffirms this knowledge.It was found in the study that of the total sample size, 67% children were stunted (based on HAZ), 74.8% children were underweight (based on WAZ), 57.3% children were malnourished (based on BMI) and 48% were underfed (based on Daily Calorie Intake). In almost all the measurements, the malnutrition was biased towards boys in general. Further research into the presence of this bias can be undertaken. In general, the Dhanuk children of Bapu Nagar Basti are malnourished and in need of better food-giving and care-giving.

Acknowledgement

Dietary Guidelines 2015-2020. https://health.gov/dietaryguidelines/2015/guidelines/appendix-2/.

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