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# A Study on the Nutritional Status of Preschool Children in Bhuj Taluka of Kutch district, Gujarat

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**ABSTRACT**
*Malnutrition is the prominent nutritional problem in the developing countries like India. The most vulnerable groups are children under five years, adolescent girls and pregnant and lactating mothers. Malnutrition continues to be a cause and consequence of disease and disability in the children who survive. The community based cross sectional study conducted on 200 preschool children to investigate the nutritional status of children aged between 3-5 years of rural areas of Bhuj Taluka of Kachchh district, Gujarat. The study was conducted on 200 children among which 76 were male & 124 were female. Analyzing anthropometric data found revealed that the mean height, weight and MUAC of males were 88.56 cm, 12.70 kg and 14.44 cm respectively while 92.11 cm, 12.42 kg and 14.51 cm respectively in case of female. Among the children 57% were under weight, 60% were stunted and 24.5% were found wasted. According to MUAC 35% children were normal and 12.5% children were severely malnourished in Bhuj Taluka of Kutch district, Gujarat. Such malnutrition results in increased susceptibility to infections, reduced work productivity, limited school performance, and slowed cognitive development and growth over the lifetime. This nutrition survey may establish baseline nutritional data and/or ascertain the overall nutritional status of a population. The factors influencing that nutritional status of preschool children are age, sex, weight, height, anemic status, vaccination, educational qualification of parents, family income, family size, living status etc. Thus some concrete steps must be taken to secure the future of India.*
*Keywords: Preschool Children, Underweight, Malnutrition*

## INTRODUCTION
Worldwide, adequate nutrition is being increasingly emphasized as a human right. The nutrition of preschool children is of considerable importance not only because of concern over their nutrition in formative stage of life but is also widely perceived to have a substantial and persistent impact on their physical and mental development and on their health status and productivity as adults [1]. Malnutrition plays a major role in half of the 10.4 million annual child deaths in the developing world.  Globally; prevalence of wasting and severe wasting in 2012 estimated almost 8 percent and just less than 3 percent respectively [2].  Malnutrition includes a wide range of clinical disorders that are the result of an inadequate intake of energy and protein as well as other nutrients. PEM popularly called "Malnutrition" is a great problem in all countries for decades. It is also a premier health problem in our country for a long time. Chronic mild PEM affects up to 50% of all children of the developing countries. Rising food prices may decrease the ability of households to purchase food. Because poor households use a relatively large proportion of income to purchase food, increases in the price of food can directly affect the amount and type of food their income can buy, which can be reflected by decreased amounts of fat and vegetables in meals, elimination of some meals, and an overall reduction in dietary diversity [3]. Especially children under-5 years of age are more vulnerable group. Kachchh district in Gujarat is a socio-economically backward and food consumption is also not as per recommendations. As far as known there is no any recent research available on nutritional status and morbidity pattern of preschool children among Kachchh district. The study has been designed to investigate the nutritional status of under five years children of Bhuj Taluka of Kutch district, Gujarat and to find out important associated factors influencing their nutritional status.

## MATERIALS AND METHODS

- Study Area:
  The survey was conducted in the rural areas of Bhuj Taluka of Kutch district, Gujarat from August - 2013 to December -2013 by questionnaire method.

- Study population:
  The families of different rural areas of those Talukas were enumerated first. Then only those household were selected, having 3-5 years children.

- Study design:
  Among several types of study design a cross sectional study was conducted. Subjects were selected randomly. Height and weight were measured using standard techniques. Nutritional status was assessed by height-for-age, weight-for-age and weight-for-height using the National Center for Health Statistics standards.

- Questionnaire:
  A pre-coded questionnaire was developed to obtain relevant information regarding socio-demographic status such as age, weight, family size, health condition, dietary pattern etc. The questionnaire was pre-tested before finalization.

- Anthropometric Measurements of Preschool Children:
  Anthropometric measurements were performed by following standard methods [4].

- Measurement of body weight:
  A weight balance (Health, Japan) was used to record body weight. The balance was standardized regularly before use. The body weight was recorded bare footed to the nearest 0.1 kg. Weighing was not done after a full meal or when the stomach was virtually empty.

- Measurements of the Height:
  For height measurement a stadiometer or portable anthropometer were used.

- Measurement of MUAC
  It was measured by a flexible and non-stretchable plastic tape to the nearest millimeter.

**Data analysis:**

After collection of data through interview and observation, it was cleaned & checked for analysis. Data entering into the computer were processed. All variables were checked for distribution. Appropriate statistical tests were performed to verify the results.

## RESULTS

**Table 1: Mean Height, Mean Weight & Mean MUAC of children by age & sex.**

| Age group (Yrs) | Mean Height (cm) | Mean Weight (kg) | Mean MUAC (cm) |
|---|---|---|---|
| Male | | | |
| 3.0 | 85.46 | 11.00 | 12.62 |
| 3.5 | 86.97 | 12.05 | 13.78 |
| 4.0 | 87.66 | 12.71 | 14.28 |
| 4.5 | 89.60 | 12.24 | 15.72 |
| 5.0 | 93.13 | 13.73 | 16.32 |
| Female | | | |
| 3.0 | 85.18 | 10.87 | 12.32 |
| 3.5 | 86.27 | 11.13 | 12.98 |
| 4.0 | 87.15 | 11.91 | 13.95 |
| 4.5 | 88.34 | 12.10 | 14.37 |
| 5.0 | 90.52 | 13.02 | 15.69 |

Table 1 depicts that the mean height, mean weight and mean MUAC of male are 88.56 cm, 12.34 kg & 14.54 cm while female are 87.01 cm, 12.58 kg & 13.86 cm respectively which is lower in comparison to WHO standard height, weight and MUAC.

**Table 2:** Distribution of children by weight for age (SD) according to age group.

| Age group (Yrs) | Weight for age (SD) of the children | | | |
|---|---|---|---|---|
| | ≤ - 3.00 SD (Severe underweight) | - 2.00 SD to 2.00 SD (Moderate underweight) | -1.99 SD to 1.00 SD (Mild underweight) | -0.99 SD to +0.99 SD (Normal) |
| 3.0 | 11 | 19 | 08 | 08 |
| 3.5 | 07 | 09 | 04 | 14 |
| 4.0 | 05 | 04 | 06 | 09 |
| 4.5 | 08 | 10 | 08 | 18 |
| 5.0 | 08 | 05 | 10 | 29 |
| Total | 39 (19.5%) | 47 (23.5%) | 36 (18%) | 78 (39%) |

Table 2 represents that according WHO standards, 19.5% children are severely under weight, 47% are moderately underweight, 18% children are mildly under weight and 39% children are normal according to weight for age indices.

**Table 3:** Distribution of children by height for age (SD) according to age group.

| Age group (Yrs) | Height for age (SD) of the children | | | |
|---|---|---|---|---|
| | ≤ - 3.00 SD (Severe stunted) | - 2.00 SD to 2.00 SD (Moderate stunted) | -1.99 SD to 1.00 SD (Mild stunted) | -0.99 SD to +0.99 SD (Normal) |
| 3.0 | 12 | 11 | 20 | 03 |
| 3.5 | 09 | 06 | 11 | 08 |
| 4.0 | 06 | 05 | 05 | 08 |
| 4.5 | 05 | 08 | 10 | 21 |
| 5.0 | 10 | 08 | 05 | 29 |
| Total | 42 (21%) | 38 (19%) | 51 (25.5%) | 69 (34.5%) |

According WHO standards, table 3 represents that 21% children are found to be severely stunted, 19% moderately stunted, 22.5% are mildly stunted and 34.5% are normal for their height for age criteria.

**Table 4:** Distribution of children by weight for height (SD) according to age group.

| Age group (Yrs) | Weight for height (SD) of the children | | | |
|---|---|---|---|---|
| | ≤ - 3.00 SD (Severe wasted) | - 2.00 SD to 2.00 SD (Moderate wasted) | -1.99 SD to 1.00 SD (Mild wasted) | -0.99 SD to +0.99 SD (Normal) |
| 3.0 | 08 | 08 | 05 | 25 |
| 3.5 | 05 | 07 | 04 | 18 |
| 4.0 | 03 | 04 | 04 | 13 |
| 4.5 | 02 | 04 | 02 | 36 |
| 5.0 | 03 | 05 | 04 | 40 |
| Total | 21 (10.5%) | 28 (14%) | 19 (9.5%) | 132 (66%) |

Table 4 represents that 10.5% children are found to be severely wasted, 14% moderately wasted, 9.5% are mildly wasted and 66% are normal for their weight for height indices.

**Table 5:** Distribution of nutritional status of children by height for age, weight for age & weight for height as Z-score (%).

| Age group (Yrs) | ≤ - 3.00 SD (Severe) | - 2.00 SD to 2.00 SD (Moderate) | -1.99 SD to 1.00 SD (Mild) | -0.99 SD to +0.99 SD (Normal) |
|---|---|---|---|---|
| Height for age | 21% | 19% | 25.5% | 34.5% |
| Weight for age | 19.5% | 23.5% | 18% | 39% |
| Weight for height | 10.5% | 14% | 9.5% | 66% |

Table 5 expresses that 21% children are found to be severely stunted (-3 SD and below), 19% moderately (-2.99 SD to -2.00 SD), 25.5% are mildly and 34.5% are normal according to height for age indices. Weight for age indices shows that 19.5% children are severely under weight (-3 SD and below), 23.5% are moderately under weight (-2.99 SD to -2.00 SD), 18% are children are mildly under weight and 39% children are normal according to weight for age indices. Weight for height indices represents that the prevalence of moderate wasting is 14% (-2.99 SD to -2.00 SD) and severe wasting is 10.5% (-3 SD and below) among the studied children.

**Table 6:** Distribution of children by different categories of MUAC.

| MUAC | Type | Number | | Total % |
|------|------|--------|--------|---------|
| | | **Male** | **Female** | |
| ≥14.5 | Normal | 31 | 33 | 64 (32%) |
| 13.5 – 14.4 | Mild malnutrition | 38 | 40 | 78 (39%) |
| 12.5 – 13.5 | Moderate malnutrition | 19 | 18 | 37 (18.5%) |
| <12.5 | Severe malnutrition | 9 | 12 | 21 (10.5%) |

Table 6 shows the distribution of children by different ranges of MUAC. In the study 32% are normal children, and 39%, 18.5%, 10.5% children are mild, moderate and severely malnourished according to MUAC measurement.

According to Gomez Classification the prevalence of mild (1st degree), moderate (2nd degree) and severe (3rd degree) malnutrition are 40.5%, 14.5% and 7.5% respectively, among them 18% male and 22.5% female are mild, 9.5% male and 5% female are moderate; 3% male and 4.5% female are severely malnourished.
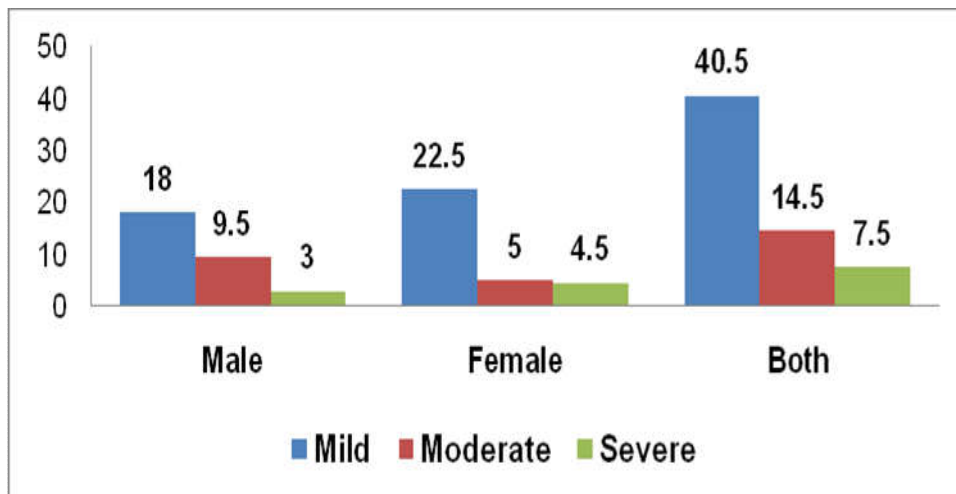


**Fig. 1:** Distribution of Nutritional Status by Gomez classification.

**Table 7:** Distribution of Nutritional Status by Waterlow classification.

| Height for age | Weight for Height | |
|----------------|----------|----------|
| | >80% | <80% |
| | Normal | Wasted |
| >90 % | 49% (98) | 14.5 % (29) |
| | Stunted | Both stunted & wasted |
| <90% | 27 % (54) | 9.5 % (19) |

According to Waterlow Classification, 14.5% and 27% children are wasted and stunted respectively. The prevalence of both stunted & wasted are 9.5% and 49% are normal.

## DISCUSSION

Childhood malnutrition is a major underlying cause of mortality worldwide, accounting for an estimated 2.2 million under-5 child deaths annually [6]. In Southeast Asia, multiple micronutrient deficiencies and chronic malnutrition occur in roughly one-third to one-half of preschool children.

Malnutrition results in increased susceptibility to infections, reduced work productivity, limited school performance, and slowed cognitive development and growth over the lifetime. Generally the diet in rural and urban area is not well balanced & traditional dietary habits often do not confirm balance nutrition. Again male eat better & more food than female. All these observed in this study are not unlike other parts of the country. Childhood malnutrition is characterized by growth failure. Anthropometric measurement is particularly important in assessing the nutritional status of children. 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. The study was carried out to find out the nutritional status of preschool children in Bhuj Talukas of Kutch district, Gujarat. The community based cross sectional study conducted on 200 preschool children .This nutrition survey may establish baseline nutritional data and/or ascertain the overall nutritional status of a population. The factors influencing that nutritional status of preschool children are age, sex, weight, height, anemic status, vaccination, educational qualification of parents, family income, family size, living status etc.

Analyzing anthropometric data we found that the mean height, weight and MUAC of males are 88.56 cm, 12.34 kg and 14.54 cm respectively while 87.01 cm, 12.58 and 13.86 cm respectively in case of female.

Among the children 61% are under weight, 65.5% are stunted and 34% are wasted. According to MUAC 32% children are normal.

According to Gomez classification, the nutritional status of the children show the prevalence of mild (1st degree), moderate (2nd degree) and severe (3rd degree) malnutrition are 40.5%, 14.5% & 7.5% respectively. Among them 18% male and 22.5% female are mild; 9.5% male and 5% female are moderate and 3% male and 4.5% female are severely malnourished.

According to Waterlow classification, 49%, 14.5% and 27% children are normal, wasted and stunted respectively. The prevalence of both stunted and wasted are 9.5%.

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