Assessment of nutritional status of children attending paediatric outpatient department at a tertiary care hospital

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ABSTRACT

Background
The nutrition status is always neglected issue of public health. The high prevalence of malnutrition in NFHS data gives alarm to work for the children who are assets of our country in future.

Objectives
To study the nutritional status of children attending pediatric OPD by anthropometric measurements and to know the health status of these children and their relation with nutritional status.

Methods
The nutritional profile of children of age group 0-5 years attending Paediatric OPD at New Civil Hospital (NCH), Surat was studied. Stratification to get equal representation of both gender by enrolling 50 boys and 50girls of each age group 0-6 months, 6-12 months, 1-2 years, 2-3 years, 3-4 years and 4-5 years was done. Total 600 children of age group of 0-5 years were enrolled.

Results
As per WHO growth standards, 17.5%, 46% and 39.33% children had wasting, stunting and underweight respectively. Total malnutrition cases were 386 with a prevalence of 64.3 %. Age group wise prevalence of under nutrition was highest in 37-48 months age group (69.2 %). As per assessment of nutritional status of children aged 6-60 months using MUAC, 45.8 % children have mild to moderate malnutrition whereas 1.8 % has severe malnutrition.

Conclusion
Malnutrition is more in boys compared to girls. Malnutrition was more prevalent in 12-60 months age group children and was found statistically significant. Reduction of malnutrition in 0-5 age group can be ensured by availability of supplementary feed.

Keywords: Malnutrition, Mid Upper Arm Circumference, Wasting, Stunting

INTRODUCTION
Periodic growth monitoring of children is an important indicator of the health and nutritional wellbeing of the population. Child under nutrition remains a major public health problem in many countries, and continues to hamper children's physical growth and mental development.[1]

Malnutrition is a silent emergency.[2] It is frequently part of a vicious cycle that includes poverty and disease. These three factors are interlinked in such a way that each contributes to the presence and permanence of the others. Socioeconomic and political changes that improve health and nutrition can break the cycle; as can specific nutrition and health interventions. Several authors have examined the association between anthropometry and morbidity. The leading childhood diseases are diarrhoea, respiratory infections, measles, tuberculosis etc. It is known that a child may get affected several times in a year; the incidence increases with the aggravation of a state of malnutrition.[3] The three main indicators used to define under nutrition, i.e., underweight, stunting, and wasting, represent different histories of nutritional insult to the child. Occurring primarily in the first 2–3 years of life, linear growth retardation (stunting) is frequently associated with repeated exposure to adverse economic conditions, poor sanitation, and the interactive effects of poor energy and nutrient intakes and infection. Low weight-for-age indicates a history of poor health or nutritional insult to the child, including recurrent illness and/or starvation, while a low weight-for-height is an indicator of wasting (i.e., thinness) and is generally associated with recent illness and failure to gain weight or a loss of weight.[4] As reported by UNICEF, in India, about 46% of children below three years have stunting (height-for-age <Median-2SD), while 47% have underweight and 16% are wasted.[5]

Mid-upper-arm circumference (MUAC) is being used as an alternative index of nutritional status for children during famines or refugee crises and as an additional screening tool in non-emergencies, and is based on a single cut-off value for all the children less than five years of age.[6] In 2005, the World Health Organization (WHO) recommended a MUAC cut-off of 110 mm as an independent diagnostic criterion for severe acute malnutrition. However a higher cut off point of 115 mm was recommended later by WHO as it allows to identify a more accurate number of infants and children with severe acute malnutrition and has a high specificity of more than 99% over the age range 6–60 months.[7]

The present study was undertaken to study the nutritional status of children attending pediatric OPD at New Civil Hospital Surat by anthropometric measurements and to know the health status of these children and their relation with nutritional status.

METHODS

It was a cross sectional study involving Children of age group 0-5 yrs attending pediatric OPD at NCH, Surat during period of October to November 2012. Children visiting OPD for Vaccination i.e. Children having no present health complaints are excluded. Calculated sample size was 540 (5% precision, under nutrition prevalence 47%, design effects 2 and α-risk 10%).

It was essential to get representation of each age group as nutrition and nutritional status vary with age. So it was decided to study each group 0-6 months, 6-12 months, 1-2 years, 2-3 years, 3-4 years and 4-5 years. To get equal representation of each sex, boys and girls of each of the above age group were enrolled. It was decided to enroll 50 each of boys and girls for above all age groups to take care of the above and to achieve at least sample size of 540. Pre-tested structured questioner was used which include questionnaire related to nutrition, health complaints (Past and in last two months) and immunization status. Indicators of nutritional status assessment (Height, Weight, Mid Upper Arm circumference) were recorded accurately. Enrollment of children was continuous once data collected started till get desired sample for each age and sex (i.e 50 for each sex in each age group). Standard statistical method was used in the analysis of the data with use of MS Excel and Open epi software.

WHO growth chart was used for the assessment of malnutrition. Based on the age, body weight and height, a number of indices such as height-for-age, weight-for age and weight-for-height have been suggested. The children are classified using three categories: 'underweight' (low weight-for-age), 'stunting' (low height-for-age) or 'wasting' (low weight-for-height).

RESULTS

Out of total study population, 17.5 % were wasted, 46.7 % children were stunted and 39.3 % children were underweight. Males were comparatively more malnourished than females. (Table 1)

Table 1 Distribution According to Nutritional Indicators

Indicators	Boys (%)	Girls (%)	Total (N=600)
Wasting	56 (53.3)	49 (46.7)	105 (17.5 %)
Stunting	150 (53.6)	130 (46.4)	280 (46.7 %)
Underweight	121 (51.3)	115 (48.7)	236 (39.3 %)

As per WHO chart: Cut-off is considered as <2sd

A child either underweight, wasted or stunted or any combination of the three was considered as having malnutrition which comes to be 386 (64.3 %). Age group wise prevalence of under nutrition was highest in 37-48 months age group (69.2 %) and lowest in 0-12 months age group (59.1 %). On comparing prevalence of under nutrition in 0-12 month age group with 13-60 month age group (age groups merged to make 2 by 2 table), it was observed that former group had a better nutritional status as compared to later group. The difference was statistically significant ($\chi2$ = 4.046, df =1, p = 0.044). (Table 2)

Table 2 Distribution of Children According to Age and Nutritional Status

Age (in months)	Malnutrition (%)	Normal (%)	Total (%)
0-12 months	127 (59.1)	88 (41.9)	215 (35.8)
13-24 months	68 (67.3)	33 (32.7)	101 (16.8)
25-36 months	68 (64.8)	37 (35.2)	105 (17.5)
37-48 months	74 (69.2)	33 (30.8)	107 (17.9)
49-60 months	49 (68.1)	23 (31.9)	72 (12.0)
Total	386 (64.3)	214 (35.7)	600 (100.0)

(Chi-square = 4.046, df = 1, p value = 0.044)

The percentage of under nutrition was higher among children having other illness (66.5 %), followed by measles (63.2 %), diarrhoea (60.5 %) and acute respiratory infection (56.1 %). However it was statistically not significant when children with illness among malnourished were compared to children with illness who are not malnourished ($\chi2$ = 3.6, df = 3, p = 0.308). (Table 3)

Table 3 Association of Major Illnesses and Nutritional Status

Illness	Nutritional status (%)		Total (%)
	Malnourished (%)	**Normal (%)**	
Diarrhoea	26 (60.5)	17 (39.5)	43 (7.2)
Measles	36 (63.2)	21 (36.8)	57 (9.5)
ARI	46 (56.1)	36 (43.9)	82 (13.7)
Others	278 (66.5)	140 (33.5)	418 (69.6)
Total	386 (64.3)	214 (35.7)	600 (100.0)

(Chi-square = 3.6, df = 3, p value = 0.308)

Nutritional status of children aged 6-60 months was also measured by using Mid Upper Arm Circumference (MUAC). There are total 500 children aged 6-60 months. As per this, 262 (52.4 %) children have MUAC of more than 135 mm whereas only 9 (1.8 %) children have MUAC of less than 115 mm (Table 4). Immunization status was also assessed. Fully immunized children were 85.8 % whereas 6 children had not received a single vaccine. (Figure 1)

Table 4 Distribution According to Mid Upper Arm Circumference (MUAC) of Children Aged 6-60 Months

MUAC	Total (%)	Interpretation
> 135 mm	262 (52.4 %)	Normal
115-135 mm	229 (45.8 %)	Mild to moderate malnutrition
< 115 mm	09 (1.8 %)	Severe malnutrition

Figure 1. Immunization* status of study population

13.2 % 1.0 %

85.8 %

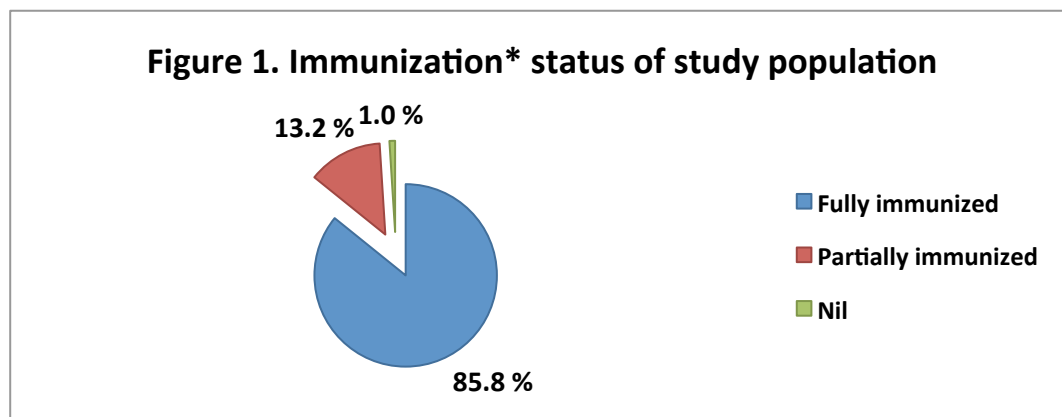- Fully immunized
- Partially immunized
- Nil

Fig 1: Immunization Status of Study Population
* Immunization status was considered as per age of children

DISCUSSION

Protein calorie malnutrition is a widespread nutritional disease in developing countries.[8] Preschool (under five) children are notoriously fraught with the risk of malnutrition and the prevalence of malnutrition varies between 50-80% as mentioned by Gupta *et al.*[9] Almost two-third of the children in our study was suffering from protein energy malnutrition.

The prevalence of underweight, stunting and wasting was 39.3 %, 46.7 % and 17.5 % respectively in this study. Total prevalence of malnutrition to be 64.3 % in this study, which is lower than studies of Sengupta P[10] (74% stunted, 42% wasted and 29.5% underweight) and Amritanshu K[11] (underweight 30 %, stunting 74.2 % and wasting 41.9 %).

In our study association was found statistically significant between age of the child with malnutrition (p<0.05), which is comparable with the study of Singh JP[12] and finding of study conducted by Sengupta P.[10] The percentage of malnutrition was significantly more in 1-5 year age group. Improper weaning, recurrent infections make this age group more vulnerable. In our study there is no statistical significant association found between illness and nutritional status.

We have also assessed nutritional status of children aged 6-60 months using MUAC. As per this, 45.8 % children have mild to moderate malnutrition whereas 1.8 % has severe malnutrition. The advantage of using the MUAC measurement compared to other nutritional indices is that it is simple to use and it is good to identify the high risk children who need urgent treatment, facilitating the better coverage at the screening and/or diagnostic stage, which is a key component of program success.[13] The revision of the MUAC cut off by WHO to identify severe malnutrition is useful in early diagnosis in less severe state of malnutrition whereby it reduces the duration of treatment in therapeutic feeding centres.[7]

In this study we have not explored maternal factors like maternal BMI and antenatal care, socio demographic factors and other environmental factors which also play significant role in childhood under nutrition.

CONCLUSION AND RECOMMENDATION

Majority of under five children were malnourished (64.3 %) and among them 39.3 % children were underweight, 46.7 % children were stunted and 17.5 % were wasted. Here malnutrition was more common in males than females.

Reduction of malnutrition in 0-5 age group can be ensured by availability of supplementary feed. Health workers should focus on health education among parents, especially the mothers on the exact nutritional requirements in terms of quality and quantity of the child at specific age groups.

Public health interventions for severe malnutrition must simultaneously focus on preventive and promotive aspects, and therapeutic interventions in the community. Research organizations and funding agencies need to prioritize the research further and build a valid evidence base to implement community based malnutrition programs.

LIMITATIONS

Study was conducted among children having health complaints attending Out Patient Department so their nutritional status may not be accurately comparable with healthy children of community.

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