EFFECTS OF NUTRITION IN UNDER 5 CHILDREN OF LOW PRIVILEGED SOCIETY : AN ANTHROPOMETRIC COMPARISON

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Summary

Nutrition is a Basic human need .It is essential for physiological homeostasis & growth. But unfortunately it remains unmet for vast number of children. These children fail to achieve their full developmental potential. Growth assessment is the best indicator to see the health & nutritional status of children. Growth retardation is a constant feature of undernutrition. An observational study was conducted to see the nutritional status on 100 under 5 children of low privileged society following inclusion & exclusion criteria. Their height, weight, skin fold thickness were measured. Their weight for age (measures of underweight), height for age (measures of stunting) & weight for height (Measures of wasting) were assessed. Z scores of weight for age (underweight), height for age (stunting) & Weight for height (wasting) were also assessed. Among them 32 subjects were moderately & 36 were severely undernourished according to reference of WHO. 32 subjects were within the normal range of growth curve according to WHO/NCHS standard. Severely undernourished children were of younger age group and their heights (in cm) were significantly low comparing to normal children, though there was no significant difference in their weight. Except weight for height (wasting) in moderately undernourished children all measurements were significantly lower (p value<0.001) both in moderate & severe undernourished group in comparison to normal children. Serum total protein, albumin & globulin level of all the children were within normal range. This study concludes that about 2/3 of under 5 children suffer from moderate to severe undernutrition in low privileged people in our society. They are underweight & suffer from wasting & stunting from the early childhood.

Key words

MUN-moderate undernutrition; SUN-severe undernutrition; Z scores.

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Introduction

Undernutrition in children below 5 years is a major health problem in developing countries. Approximately   50% of 10 million death occures each year due to undernutrition. Estimated 149.6million children in developing countries are malnourished when measured in terms of wt for age [1]. In Bangladesh about 45% children are moderate to severely stunted, 48% are moderately underweight.13% is severely underweight, 10% are moderate to severely wasted. Mortality rate is about 69%/thousand live birth [2]. More than half of childhood death is due to undernutrition in Bangladesh. It is one of the major health problem[3].

Poverty, lack of education, poor hygiene, worm infestation, and repeated infection is mostly responsible for it. Moreover rapid population growth, inadequate child caring and weaning practice are also responsible [4]. In undernutrition there is protein, calorie, micronutrients & vitamin deficiency which may lead to repeated infection in these groups of people which leads to the vicious cycle. These reduce the potentiality in poor class of people. There is also growth retardation and physical poor performances in their adult life. So they become a burden for the family as well to the society [5]. Assesement of nutritional status can be done by dietary history, clinical examination including height, weight, rate of growth, measurements of mid arm circumference and skinfold thickness. Z scores also help to assess the   nutritional status [6]. Biochemical changes such as hypoproteinemia, anaemia hypoglycemia, hypovitaminosis & water electrolyte imbalance also occur. Growth assessement is the best indicator to see the health and nutritional status of children [5].

This study was conducted to evaluate the proportion of Moderate and severe undernutrition in 100 children of low privileged society who came to outpatient dept of child health with different complains. All subjects were from poor class of people. Their parent's income was from 5000-8000 taka per month. All of them were the dwellers of slum area in & around Chittagong city.

Materials and methods

It was an observational study, carried out in the Department of Physiology, CMC in collaboration of child health dept of CMCH during the period of July 2004-2005.Approval from ethical review committee of CMC were duly taken.100 children of 6-60 months of low socioeconomic status were randomly selected following inclusion and exclusion criteria from outpatient department of child health, CMCH to see the effects of undernutrition on their growth. Growth status showed 3 groups, normal, moderate and severe undernutrition. Z scores of weight for age (Underweight), height for age (stunting) and weight for height (wasting) were used for their grouping according to reference of World Health Organization (WHO) [4]. Children whose Z scores were between-2to -3SD were grouped as moderately undernourished. Those having Z scores <-3SD were grouped as severely undernourished.Those having Z scores within ±2 SD were grouped as normal group. Among 100 children, 36 were suffering from severe undernutrition, 32 were suffering from moderate undernutrition and 32 were within nomal range for the age & sex. Their Weight were measured by standard weighing machine & infant & toddler beam balance (Wyellux supreme), Length was taken by wooden infantometre and height by vertical meter scale. History and detailed physical examination were recorded in a case record form. Among 100 children only 2 children were presented with the feature of oedema. Written consent was taken from the parents. Data were compiled, analyzed & compared by students᾽ t᾽ test. Mean values of different parameters were compared between groups. Level of significance was expressed as p value & value < 0.05 was considered as significant.

Inclusion criteria

Children age between 6-60 months. Urban Slum dwellers. Parents' income within 5000-8000 taka/month.

Exclusion criteria

Age of the children >60 months and < 6 month.
Income of the parent above 8000 taka/month.
Children with known congenital anomaly, valvular heart disease, low birth weight& prematurity, endocrinopathy, birth trauma, prolong labour, cranial palsy & convulsion. As all these may affect the growth. Intake of drug by mother in pregnancy such as amiodaron, thyroxine, steroid, iodine containing cough syrup. As these may interfere the growth of fetus. Age of the subjects selected were from 6 to 60 months. As nutritional requirements are increased due to rapid growth rate at this age [7]. Moreover infants & preschool children are dependent for nutrition on their parents who sometimes are unable to satisfy their needs at this age due to poverty [8]. WHO classification of undernutrition [9].

	Moderate undernutrition (MUN)	Severe undernutrition(SUN)
Symmetrical oedema	No	Yes[a]
Weight for height (measure of wasting)	SD score[b]-2 to-3 (70%-79% of expected	SD score<-3 <70% of the expected
Height for age (measure for stunting)	SD score[b] -2 to -3 (80% to 89% of the expected)	SD score <-3 (<85% of expected)

a.   This includes Kwashiorkor & Marasmic Kwashiorkor.

b.   SD score (Z score) =

$$SD\ score\ (Z\ score) = \frac{Observed\ wt\text{-}expected\ wt\ (median\ weight)}{1\ SD}$$

*Median (50th percentile of NCHS/WHO standards)

Results

Table I: Age, height and weight of the study subject

Group	Age(month) Mean ±SD (range)	P value	Wt in Kg (Mean ±SD (range)	P value	Ht(in cm) (Mean ±SD) range	P value
Normal (n=32)	33.33±15.65 (6-59)		13.41±2.7 (8-18)		89.45±11.33 (65-107)	
MUN (n=32)	34.90±15.54 (12-59)	>0.10	10.53±2.12 (7-14)	>0.10	81.97±12.65 (64-102)	>0.10
SUN (n=36)	28.63±13.94 (6-59)	>0.10	7.54±1.79 (3-11)	>0.10	77.22±9.12 (61-97)	<0.001*

*Marks signify tests of significance, unpaired "t" test unless specified otherwise.MUN   moderate under nutrition; SUN severe under nutrition.

Table I showing Unpaired" t" test between normal vs. MUN and normal vs. SUN. Result is significant when normal is compared to severe under nutrition (p<0.001)

Table II: Comparison of weight for age (underweight), height for age(stunting) and weight for height(wasting) in study groups.

Group	Wt for age % mean±SD range	P value	Ht for age % mean±SD Range	P value	Wt for Ht % mean±SD range	P value
Normal (n=32)	96.17±4.62 (90.57-109.37)		97.99±3.74 (85.85-105.05)		102.73±7.77 (89.82-123.96)	>0.10
MUN (n=32)	74.54±2.98 (69.23-78.83)	<0.05* (t=2.18)	90.38±3.33 (78.50-97.43)	<0.001*** t=5.62	92.01±8.04 (92.01-119.65)	
SUN (n=36)	58.28±.29 (27.77-72.72)	<0.001*** t=7.16	87.92±5.03 (78.72-104.03)	<0.001*** t=4.92	73.86±10.96 (77.58-83.33)	<0.001***

*Marks signify tests of significance. Unpaired t test done between normal vs. MUN and normal vs. SUN. n is the number.

Table III: Z scores of weight for age (underweight), height for age (stunting),weight for height(wasting) of the study groups.

Group	Z scores Wt for age	P value	Z scores Ht for age	P value	Z scores Wt for Ht	P value
Control (n=32)	-0.36±0.48	<0.001**	-0.40±0.92	<0.01**	-0.26±0.93	<0.05*
MUN (n=32)	-2.52±0.28		-2.56±0.90		-0.86±0.98	
SUN (n=36)	-4.26±0.90	<0.001**	-3.3±1.4	<0.001**	-2.93±1.2	<0.001**

Unpaired "t" test was between normal vs. MUN and normal vs. SUN.*Marks signify tests of significance. n is the number.

Table IV: Serum total protein, albumin & globulin of study groups

Group	Total protein (gm/L) mean±SD (range)	P value	Albumin (gm/L) mean±SD (range)	P value	Globulin (gm/L) mean±SD (range)	P value
Normal (n=32)	73.44±7.1 (59.06-87)	>0.10	48.20±4.45 (39.13-56.52)	>0.10	25.21±5.96 (11.26-34.18)	>0.10
MUN (n=32)	71.81±11.07 (50.31-85.31)	(32.60-55)	47.43±5.05 (7.8-52.39)		25.21±11.40	
SUN (n=36)	68.15±11.25 (45-87.5)	>0.10	45.65±4.49 (28.9-52.17)	>0.10	22.43±10.07 (2.5-41.85)	>0.10

Unpaired "t" test was between normal vs. MUN and normal vs. SUN.*Marks signify tests of significance. n is the number

Discussion

Present study was undertaken to see the effect of undernutrition on growth in under 5 children. Anthropometric measurements of the children were taken by using simple parameters, like height, weight, Z scores of height for age(stunting), weight for age(underweight),weight for height(wasting) ,Children were classified according to the Z scores .Serum total protein, albumin & globulin were also estimated as biochemical parameters of nutritional parameters.

In this study out of total 100 children of under 5years of low privileged society, 32 children were of normal growth & nutrition, 32 children were suffering from moderate undernutrition & 36 children were suffering from severe undernutrition .Age group selected in this study were from 6 to 60months.Nutritional requirements are more in this group of children due to rapid growth in this age. But unfortunately due to poverty, late weaning & imbalanced diet they fail to achieve normal growth. Also it appeared that children of lower age group were suffering more from severe undernutrition though it was not significant(table-Iv).Mean height of severe undernutrition was significantly low comparing to normal children .probably they were suffering from chronic undernutrition(Table-v).Severe undernutrition group were suffering from underweight, wasting & stunting comparing to normal children. Moderate undernutrition group were underweight significantly comparing to normal group. These finding indicates that children in our country are undernourished & stunted from early childhood. This finding is consistent with the finding of child Nutrition survey of Bangladesh 1992.It was observed that 39.8% of all children in our country were suffering from 1st degree malnutrition. WHO survey on nutrition observed that 46% of all children in our country are stunted (2).In present study, we can conclude that (both MUN & SUN) 68% of the children were underweight, wasted & suffering from stunting.

There is some limitation in this study, 100 children are not the representative of all children of the country. All subjects included were urban slum dwellers, collected mostly from outpatient department (only 5 children were from indoor) .So further study for a prolong period on wide scale population may include some new information.

Disclosure

All the authors declared no competing interest.

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