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Research Article

Nutritional Status of Underfive Children in Urban Slum Area of Varanasi

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Abstract
Objectives
1-To study the prevalence of protein energy malnutrition (PEM) in under five children (1-5 years age)
2-To study the role of PEM related deficiency sign in clinical diagnosis of PEM
Study Design: *A cross-sectional study*
Study Settings: *Deptt. Of PSM, I.M.S., B.H.U., Varanasi*
Study Subject: *400 children of under five age group (1-5years) of urban field practice area (Sunderpur community)*
Study Period: *July1999 to July 2000*
Result: *In the present study screening of PEM by weight for age,mid-arm circumference and BMI(SR index) have revealed that prevalence of PEM was by and large same i.e. 63.3,65.3 and 63.5 percent respectively. By 'weight for age' criteria using IAP classification, it was found that 41.5% children were in grade III, 16.5% in grade II, whereas 5.5% were in grade III or severe grade of PEM. Prevalence of PEM related deficiency signs revealed that loss of subcutaneous fat and muscle wasting was present in 23.3% children, Among the hair changes lack of lusture (23.0%),thin hairs(19.3%), dyspigmentation (15.8%) were the commonly observed finding and psychomotor changes in form of irritability(14.8), was the commonest observation. When these deficiency signs were matched with PEM status (PEM children with deficiency signs), it emerged that all the 93 children who had loss of S.C. fat and muscle wasting, presented with PEM. Very high percent of children with psychomotor changes and hair changes, were observed to be associated with PEM.*
Keywords: *Mid arm circumference, Singh & Rao index, Nutritional deficiency sign.*

Introduction

No other disease compares in importance with PEM in the field of childhood nutrition or public health in general. Protein energy malnutrition is an important public health problem in India. With over 60 million children being victim to it, as per the available prevalence rates of the disease. This form of malnutrition is highly prevalent in young children of developing countries. Very few children may survive the most severe form of PEM unless they receive proper medical attention, even then the mortality would be unacceptably high. The disease in its less severe forms constitutes a serious handicap and may have permanent effect on the growth and development

of the child if it continues over a long period or if it is present at a very early age.

The period of childhood, specially the under five (1-5 year) age group which constitutes around 12% of our total population, forms the vulnerable group of community, They are too weak to assert their need. Studies on their nutritional status are essential for an understanding of unique individuality of each child, and meaningful interpretation of deviation from normal nutrition. Further the result so obtained from the baseline data is a practical approach to provide health care to this group.

Material and Methods

The total population of the area is about 5,000. Thus the estimated number of under fives in this area was estimated to be around 600. In view of the cross-sectional study design chosen, an attempt was made to enumerate all the under five children in the study area. No sampling was done, as the intention was to cover the entire study universe. However, In spite of best efforts the coverage of under five children in the study was 400 out of 600 (67.0%). This sample size estimate is based on the assumption that approximate extent of the problem is around 50% with permissible error in the estimate equal to 10%.

Data on age, weight, height, and midarm-circumference was collected on a pretested questionnaire. For age ascertainment, growth card was used. The above mentioned measurements were used to screen out cases of protein energy malnutrition, with the criteria as given below:

(a) Weight for age criterion: For standard reference weights at different ages of NCHS standards (50^{th} percentile value) were used. For grading the nutritional status classification advocated by Indian Academic of Pediatrics (1999)[1]was used

(b) Body Mass Index (SR Index): (Weight / height^2) x 100, In this index weight is in kg, height in cm and 100 as constant. Children with index value of equal or less than 0.15 (critical level) were considered as PEM cases (ICMR, 1970; IJPH, 1994)[2,3]

(c) Mid-Upper Arm Circumference (MAC): It was used for grading of nutritional status (Jelliffe and Jelliffe 1969, Shakir and Morley, 1974)[4,5]

(d) Clinical Assessment: Child was examined from head to toe in good illumination for presence or absence of physical signs known to be associated with nutritional deficiency conditions. To minimize subjective and objective errors in clinical examination standard screening schedule covering all areas of the body as suggested by Jelliffe (1966)[6] was used and recorded on a pre-designed and pretested proforma

Results

Prevalence of PEM based on screening done by different Anthropometric measurements

Criteria Applied	Total PEM Cases (All grades)	
	No.	%
Weight for age	253	63.3
Mid upper arm circumference {MAC)	261	65.3
S.R. Index	254	63.5

Table-1 shows, the prevalence of PEM based on screening done by different Anthropometric Measurements. Screening for PEM by "Weight for Age" [using NCHS Standards and IAP Classification] and by "Mid Upper Arm Circumference "(MAC) and "S.R. Index" have revealed that the prevalence of PEM in the study children as detected by these 3 methods was by and large same (63.3. 65.3. and 63.5 percent respectively).

Prevalence of various "Grades of PEM" by weight for age [N=400]

Grade of PEM	No.	%
I Mild	165	41.3
II Moderate	66	16.5
III Severe	22	5.5
Total PEM cases	253	63.3

Table-2 shows, the prevalence of various grades of PEM by "Weight for Age". In order to examine severity of the disease, the grades of PEM were computed. By 'weight for age' criteria using IAP classification, it can be seen that only 5.5% children were grade- III or severe

grade of PEM, 16.5% % children were grade- II or moderate grade of PEM, whereas 41.3% of PEM children were of grade I (mild grade).

Table-3 Prevalence of PEM related "Clinical Deficiency Signs"

Deficiency Signs Detected	Prevalence of Deficiency signs in All Children (N=400)		Prevalence of Deficiency signs in PEM cases (by Wt for Age) (N=253)	
	No.	%	No.	%
Hair changes				
Lack of lusture	92	23.0	76	30.0
Dyspigmentation	63	15.8	47	18.6
Easy pluckability	21	5.3	19	7.5
Thinness	77	19.3	62	24.5
Sparseness	61	15.3	50	19.8
Other changes				
Loss of S.C. fat	93	23.3	93	36.8
Muscle wasting	93	23.3	93	36.8
Pot belly	23	5.8	19	7.5
Psychomotor changes				
Irritability	59	14.8	53	20.9
Listlessness	19	4.8	19	7.5
Lack of interest in surroundings	22	5.5	22	8.7
Tendon jerks diminished	03	0.8	03	1.2

Table-3 shows, the prevalence of PEM related "Clinical Deficiency Signs" . The deficiency signs of PEM studied as per standard guidelines of Jelliffe and Jelliffe (1966) revealed that [a] loss of subcutaneous fat and muscle wasting was present in 23.3% children, [b] among the hair changes lack of lusture (23.0%). thin hairs (19.3%) dyspigmentation (15.8%) were the commonly observed findings, and [c] psychomotor changes in the form of irritable child (14 8%) was the commonest observation in this group. When these deficiency signs were matched with PEM status (PEM children with deficiency sign), it emerged that- [a] all the 93 children who had loss of S.C. fat and muscle wasting, presented with PEM (by weight for age), [b] very high percent of children with psychomotor changes and hair changes, were observed to be associated with PEM. It may also be pointed out that signs of Kwashiorkor like oedema moon face, dermatosis were conspicuous by their absence.

Discussion

Since MAC and SR Index are age independent indicators and also do not require any western or Indian standards, as also have shown to screen PEM cases with high degree of sensitivity and specificity, have revealed almost same prevalence of PEM as by "Weight for age" using NCHS values. This also supports the argument that even for Indian Children's we should use only NCHS standards and not any other local standard of low values. There are many studies available reporting PEM prevalence in preschool children according to various anthropometric indices. Mohanan et al (1994)[3] in his study in rural area of Manglore reported 60.7%, 50.9%, 64.4% prevalence of PEM according to weight for age, mid-arm circumference and S.R. index respectively. In another study conducted by Shukla etal (1976)[7] in the same area of Varanasi reported 27.3%, 67.3%, 64.4% of prevalence of PEM according to weight for age, mid-arm circumference and S.R. index. However, these studies are not strictly comparable because of many reasons like [1] different standards used by different workers e.g. Shukla (1976)[7] in his study in Varanasi have used ICMR standards with very low expected weight values as compared to NCHS expected weight values, [2] criteria for normality varies in different classifications e.g. IAP classification uses >80% of the expected weight for a normal child, whereas, Gomez classification uses, >90% of the

expected weight for a normal child, [3] age groups studied by various authors have also shown variations, and [4] the instruments used like weighing scales were also not the same viz. some using spring balances, lever balances, and even bathroom scales.

In order to examine severity of the disease, the grades of PEM were computed. This observation highlights the 'Iceberg phenomenon' of diseases, which is very well illustrated by PEM. But it is mild (41.3%) and moderate PEM (16.5%) cases which needs secondary preventive strategy, so that by nutritional, feeding, feeding hygiene and other interventions, these children could improve and enter in the area of normality as soon as possible. Studies conducted by Sen (1994)[8] and by Ray etal (2000)[9] in slum area of Kolkata and West Bengal respectively also showing almost same prevalence of different grades of PEM by weight for age criteria. However, these studies reporting grades of PEM are also not strictly comparable for the reasons cited above, as also the basic difference of using various classifications with varying cut off points used for grading PEM.

The role of presence of PEM related deficiency signs should not be under-played in the clinical diagnosis of PEM. Even if may hesitate to refer them as cardinal or pathognomonic sign, their high association with PEM (diagnosed by 'weight for age') suggest that their presence should atleast raise a very high index of suspicion.Shukla (1976) in his study in urban slum area, of Varanasi also reported [a] loss of S.C. fat and muscle wasting in 21% and 22.1% children respectively, [b] majority of children showed various hair changes ranging from 1.2% to 43.2%, [c] psychomotor changes- in the form of irritability was observed in 32.3% of children.

Conclusion & Recommendations

While the prevalence of mild state of PEM is in itself high, this should be considered as a gross underestimation of the real extent of the problem of PEM. Prevalence of PEM as judged by the presence of signs like hair changes, loss of subcutaneous fat and muscle wasting, appeared to be maximum in children with moderate and severe forms of manifestation screened out. Marasmic-Kwashiorkar and Kwashiorkar were not found in the study children. Screening of PEM by various anthropometric criterias showed that weight for age, BMI (SR index), and MAC gave similar results in terms of prevalence of PEM (63.3,63.5 and 65.3percent respectively). Based on the results of the study and review of literature following recommendations are made out It is suggested that there is a need for standardization in techniques, criterias, and standards to be used so that the area specific data so obtained may be comparable with each other. A longitudinal study of under five children extending through school age period, will be very useful in computing growth velocities of children and also in identifying the precise age periods when malnutrition sets in. The results of such a study should help to fill up the gaps in our present understanding. In the present study Body Mass Index (BMI) and Mid-upper Arm Circumference (MAC) have yielded almost similar results in terms of prevalence of PEM. However, the screening validity of these two age independent indicators needs to be established, by using weight for age as gold standard. Child care programme in the area should be developed as part of the total family care programme, using family folders, growth charts, maternal health card and other problem specific documents like tuberculosis card etc.IEC programme on child health with people participation through Mahila Mandal and Health Committee of the area. In order to promote the child health in the area, coordination with the Urban ICDS Centre should also be attempted specially in the area of supplementary feeding programme. Proper record keeping, periodic staff meeting and discussion with the other agencies like ICDS should be given due importance, so that periodic programme review can be made and hindrances can be sorted out.

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