

ETIOLOGICAL FACTORS OF MALNUTRITION AMONG INFANTS IN TWO URBAN SLUMS OF PESHAWAR

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ABSTRACT

Malnutrition among children is rampant in Pakistani Society specially in the underprivileged groups. A cross-sectional study was undertaken to assess the etiological factors in vulnerable group of children 6 months to 2 years of age. It was found that still majority of women didn't give colostrums to their babies, while more than 50% of mothers didn't start weaning at right age. Moreover majority of the children were fed commercial weaning formulas. All these factors were found to be significant players in causing malnutrition in this age group.

Malnutrition is common among all sections of the Pakistan population, but is of greatest consequence in young children. In Pakistan, 48% of all children below five year age are undernourished¹. For majority children, growth faltering starts at four to six months. The National Family Health Survey data also highlights the critical period of six months to two years. Data available from various states shows a similar picture². The percentage of malnutrition continues to rise between six months to two years and thereafter plateaus. Around 40 to 50 per cent of children are malnourished by the age of two year³.

What is the solution? How can malnutrition be prevented in this vulnerable child population? Supplementary feeding programs are not the only answer as their services are utilized by children three years and above. Lack of economic resources is not a major constraint in all families. The present pilot study was undertaken with the objective to assess the etiological factors playing a role in causation of protein energy malnutrition (PEM) in children (6-<12 months) in two urban slum communities in Peshawar.

SUBJECTS AND METHODS

A sample size of 114 was calculated keeping in view the prevalence of PEM as 60 per cent, confidence interval 95% and relative precision as 15%. One hundred and fifty five consecutive children (6-<12 months) with their respective mothers belonging to low socio-economic in two urban slum communities of Peshawar attending a "Maternal and Children Clinic" were enrolled for the study. The data for the present study was collected using a pretested semi-structured questionnaire. The mothers were interviewed to collect the required information. Data on age, sex, per capita income and occupational status of the parents was collected.

Nutritional status of child was assessed with the help of anthropometric measurements and nutrient intake. Nutritional of 106 (out of total of 155) children registered for the study was assessed by utilizing weight for age criteria. The NCHS standards for weight for age were utilized for classification of children in various of nutritional status. Classification recommended by American of Pediatrics (AAP) was utilized to classify children in various nutritional categories⁴. The SECA electronic weighing scale was utilized to record the body weight to the nearest 100 g. Weight of the subjects was measured with minimal clothing and bare feet. Weight was taken of all the children. Anthropometric measurements of 70 per cent (n = 109) of the mothers were recorded using standard equipments. For measuring weight, the subject was asked to be bare-footed and with light clothing. Anthropometric rod was used for height measurement. The height of the subject was measured by making the subject stand straight with head position such that Frankfurt plane was horizontal, feet together, knees straight and heels, buttock and shoulder blades straight, arms

hanging loosely on either side with palms facing the thighs. The anthropometric rod was placed between the shoulder blades while measuring height.

The nutritional intake of all the indexed children was calculated by 24 hour dietary recall method⁵. The amount of milk consumed by the child throughout the day (both breast and top milk) in last 24 hours was specifically enquired. The nutrient intake of each child was calculated by using a computer software program based on the Nutritive Value of Pakistani Foods developed at Arid Agricultural University, Rawalpindi, Pakistan⁶. Recommended Dietary Allowances suggested by the Food and Drug Administration (FDA) for 6 months to less than 12 months of age were utilized to assess the adequacy of nutrient intake of the subjects⁷. The dietary intake of 109 mothers randomly selected was assessed using the 24 hour dietary recall method as mentioned above. The intake of energy, protein and iron was calculated.

Detailed information was collected on feeding of colostrums, exclusive breastfeeding, introduction of top milk, introduction of semi-solid foods to the infants, use of commercial weaning foods and other weaning practices being followed by the mothers in feeding the child⁸. The amount of breast-milk being consumed by the child was calculated using a table on "Output of Breast-milk at Different Stages of Lactation"⁹. The frequency and duration of feeds was also taken into consideration while calculating the amount of breast milk being consumed by the subjects.

RESULTS

A total of 155 consecutive children and their mothers attending the "Maternal and Child Health Clinic" from two urban slum communities constituted the study population. It was observed that 55.5% children

NUTRITIONAL STATUS OF CHILDREN (N=106)

Nutritional status	No.	(%)
Normal	79	(74)
Grade I	12	(11)
Grade II	9	(9)
Grade III	2	(2)
Grade IV	4	(4)

TABLE-I

were males. Out of total, 14.2, 7.1, 7.1, 37.4, 20.0 and 14.2% children were in the age group of 6, 7, 8, 9, 10 and 11 months of age, respectively. Forty five per cent of the children belonged to the families with per capita monthly income between Rs. 1000-15000. Only 15.5% belonged to the families with per capita income above Rs. 1500. Ninety seven per cent mothers of the indexed children were housewives.

It was found that 11, 9, 2 and 4% children were in Grades I, II, III and IV category of under nutrition, respectively. Seventy four per cent of the children were in normal nutritional grade (Table 1). The mean weight of the mothers of indexed children was 50.8 ± 6.3 kg and the mean height was 152.2 ± 6.3 cm.

All the 155 children were being breastfed at the time of the survey. Breastfeeding was initiated within 6 hours of birth by 87 (56%) mothers and after 48

AGE OF INTRODUCTION OF SEMI-SOLID/SOLID FOODS (N=147)

Age of starting (mo)	No. (%) of children being fed semi-solids		No. (%) of children being fed solids	
<3	1	(0.7)	1	(0.7)
4-5	56	(38.1)	36	(26.4)
6-7	69	(46.9)	75	(54.7)
8-9	18	(12.2)	22	(16.1)
10-11	3	(2.1)	3	(2.1)

TABLE-2

MEAN CALORIE AND PROTEIN INTAKE AMONG CHILDREN 6-<12 MONTHS

Age (mo)	Energy (Kcal) RDA=843	Protein (g) RDA=14.19
6	625±169	12.27±4.4
7	731±143	14.7±4.2
8	703±187	14.90±3.5
9	610±222	14.19±7.2
10	573±160	11.35±3.8
11	598±146	11.50±3.4

Values are depicted as mean ± SD.

TABLE-3

hours by 35 (22%) mothers. The mean weight of the children who were fed colostrums 5.7 ± 3.6 kg as compared to 4.8 ± 4.07 kg for those who were not fed colostrums. Out of 155 subjects, 31 (20%) children were exclusively breastfed till the age of 5-6 months. Nearly, 41% children were exclusively breastfed for less than two months. The mean weight of children who were exclusively breastfed for two months was 4.5 ± 3.9 kg as compared to $6.0 \pm$ kg for those who were exclusively breastfed for 6 months.

It was observed that 127 (82.0%) children received top milk. Amongst those receiving top milk, about 68% children started receiving it when they were less than 6 months of age. Twenty per cent children started receiving top milk when they were 9-11 month of age. Results revealed that 108 (86.0%) children received diluted top milk. Out of these, 65 (52%) children received top milk diluted with water in the ratio of 1:1 followed by 2:1 by 17 (18.7%) and 4:1 by 12 (9.4%) subjects. The most common mode of feeding top milk to children was katori and spoon in 86 (67.7%) followed by bottle in 36 (28.3%) and glass in 5 (3.9%) children.

Table 2 depicts the age of children at which started consuming semi-solids or

solid food items. It was observed that only 47% children were consuming semi-solids at 6 to 7 months of age. The most common complementary semi-solid food given was khichri followed by kulcha and rice. The energy intake of children receiving semi-solids was 621.2 ± 188 Kcal as compared to $569.5 \pm$ Kcal for those who were not consuming semi-solid food items. Out of 155 children, 137 (88.4%) received solids in their weaning diet (Table 2). Children who were consuming solid foods had higher mean weight by 2.5 kg and higher energy intake by 100 Kcal as compared to children who were not consuming solid foods. The mean calorie and protein intake among infants is depicted in Table 3. The mean calorie intake among infants was 64. Kcal which was only 75% of the RDA. Results of the nutrient among infants further revealed that there was a gradual decline in the calorie intake of the infants after the age of 8 months. The mean protein intake was 13.16 g as compared to the recommended of 14.19 g.

DISCUSSION

In the present study, colostrums was not given by 44% of the mothers indicating the continuation of traditional practices of discarding the colostrums and not feeding it to the child. Earlier studies conducted have reported similar findings (10-12). The dilution of top milk was practiced by 86% of the mothers. Nearly, 28% of the mothers used bottle for feeding the top milk. Similar findings have been reported by other workers¹⁰. It was disheartening to know that only 47% of the mothers initiated giving semi-solids and 55% of the mothers were giving solids by the age of six months. This was possibly an important reason for inadequate intake of nutrients by the children. It was found that 67% of the mothers fed their children three or less than three times a day, which was less than the

recommended frequency of five times per day. Nearly, 37% of the children were being given commercially available weaning foods indicating the possible percolation of weaning practices used by elite urban mothers to the urban slum mothers. No mother reported that the child was being fed with the home made ready to eat weaning premixes.

In the present study, the possible etiological factors found for the causation of PEM amongst young children were essentially non-feeding of colostrums, lack of exclusive breastfeeding, late introduction of semi-solid and solid foods, dilution of top milk, faulty weaning practices including the use of bottle milk by as high as 28% of the mothers. All these etiological factors have been studied and documented in the rural and urban slum communities in earlier studies¹³. However, no active intervention has been initiated to tackle these possible etiological factors which play an important role in combination with infection and infestation which are common in children between 6.18 months of age. The present study again highlights that there is a need of developing nutritional and health education messages and delivering them through existing infrastructure of MCH functionaries like Lady Health Workers (LHW's) and Lady Health Visitors (LHV's) for prevention of under nutrition. The present study also reveals that for community based management of PEM amongst children, the peripheral MCH functionaries should be supported by electronic and mass media to play an important role in dissemination of correct messages on breastfeeding and weaning of young children.

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