PREVALENCE AND PREDETERMINANTS OF MALNUTRITION IN CHILDREN UNDER 3 YEARS OF AGE IN THE TWO RURAL COMMUNITIES OF PESHAWAR

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ABSTRACT

OBJECTIVE: To determine the prevalence of malnourishment, socio-economic and maternal factors leading to malnourishment in children of less than 3 years of age in the two rural communities of Peshawar.

METHODOLOGY: This descriptive, cross sectional study was conducted in two rural areas of Peshawar from June to July 2012. The respondents were selected using a multistage sampling technique in order to get true representation of the population. A pre-tested structured questionnaire was used to conduct face-to-face interviews with mothers and weight of the < 3 years old children was recorded.

RESULTS: Out of 200 children, 121 (60.5%) were males and 79 (39.5%) were females. Malnutrition was observed in 70 (35%) children, majority (n=50; 71.4%) of which were in the age group 0-2 years. Out of 70 malnourished children, 17(24.3%) were in grade I category, 23 (32.8%) in grade II category while 30 (42.8%) children were in grade III malnutrition. Socioeconomic factors leading to malnutrition were large family size (n=61; 87.1%), poor socioeconomic status (n=47/70; 67.1%) and illiteracy of the mother (n=42; 60%). Maternal factors leading to malnutrition were younger age group (n=29; 41.42%) multi-parity of the mother (n=39; 55.7%) and maternal anemia (n=51; 72.8%).

CONCLUSION: The prevalence of malnutrition in the two rural areas of Peshawar is 35% in children under three years of age. Both socioeconomic and maternal factors were responsible for its high prevalence. A multidisciplinary approach is required to combat malnutrition in these communities of Peshawar.

KEY WORDS: malnutrition, Harvard classification, socio-economic, maternal factors

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INTRODUCTION

Population of Pakistan has grown from 34 million (at the time of independence) to an estimated 180 million by 2012.[1] Maternal and childhood morbidity and mortality remains a major challenge to policy makers and stakeholders,[2] because of lack of health services, inadequate food supply, lack of education and poverty are not addressed. Rather, the focus of the policymakers is on treatment of the menifestations of the malnutrition.

Malnutrition is well-known for its role in childhood disease worldwide and is one of the globally recognized modifiable threats to child survival especially in developing countries.[2] Data suggests that globally there are approximately 165 million malnourished children under the age of 5 years. It is also recognized that approximately 35% of global deaths under five years is attributed to the malnutrition[3] and multiple micronutrient deficiencies which commonly coexist in children who have deficient calorie intake characterized by unvaried diets.[4]

Malnutrition consequently affects the future health and socioeconomic development and productive potential of the society. Over the past 20 years there has been little reduction in the prevalence of malnutrition in the population despite more food availability and an overall increase in caloric intake per capitaworldwide.[2] This may be related to the complex nature of malnutrition – including issues related to poverty, household food security and socio-cultural factors[5]– that determine patterns of an individual from infancy. Unhygienic living conditions, along with unsatisfactory breast feeding, poor weaning practices takes its toll on under five children.[6]

Every year, 800,000 children die in Pakistan and 35 per cent of these deaths occur due to malnutrition. The risk of death is nine times higher for a child suffering from malnutrition compared to a child with a balanced diet.[7] National nutrition survey of Pakistan 2011 shows that across Pakistan, 43.7% children are

stunted, 15.1% are wasted and 31.1% are underweight.[2]

There is now a growing realization that malnutrition is not only a problem of food supplies but can also be a function of more complex social and behavioral determinants affecting child feeding and rearing.[8] Malnutrition in children is directly related to the socio economic status of their parents and inversely related to the educational level of their parents.[9] The objective of our study was to determine the prevalence of malnutrition, the socio-economic, and maternal factors that affect the nutritional status of three year old children in the two rural communities of Peshawar with no on- going nutritional program.

METHODOLOGY

Study setting: This descriptive cross sectional study was conducted from June to July 2012, at Sarband and Pishtakhara, two rural areas of Peshawar. These were selected on the basis of no ongoing nutrition programs.

Sampling:

Demographically, there are approximately 2500 house-holds in Sarband and 650 households in Pishtakhara. A multistage sampling technique was used to collect a sample of 200 children in order to get the true representation of the population. The sample size was calculated using the following statistical formula.

$$s = \frac{Z^2 * (p) * (1-p)}{c^2}$$

Both the areas were divided into 10 clusters (each cluster carried 250 houses in Sarband and 65 houses in Pishtakhara). From the each cluster of 15 households from Sarband and 5 households from Pishtakhara, were selected randomly. Then from each household one child between ages of 0-3 years was selected using simple random sampling technique.

Children who were not the permanant residents of the area, were not included in the study population. Data was collected using trained enumerators using structured pre-tested questionnaires with open and close-ended questions.

Factors studied: The factors studied included:

Socioeconomic factors (large family size i.e. number of people living in the house sharing same kitchen, monthly income of the head of the house hold and education status of the mother),

Maternal factors (age of the mother in years confirm by national Identity card, number of children, number of children a women had) and

Maternal anemia was assessed by taking 5cc of oxalated blood and analyzed in the laboratory using Sahlis hemoglobin meter and Hemoglobin less than 11mg was labeled as anaemic.

Anthropometric measurements: All the children were weighed using a standard digital weighing scale and were classified on the basis of their weight for age, using the 50th percentile of the Harvard standard[10] which is classified as follows:

Grade I if weight is 71—80% of 50th percentile

Grade II if weight is 61—70% of 50th percentile

Grade III if weight is 51—60% of 50th percentile

Grade IV if weight is less than 50% of 50th percentile

RESULTS

Male gender contributed 121 (60.5%) and female gender contributed 79 (39.5%) of the overall sample of 200. The distribution of the children by age and nutritional status is elaborated in Table 1. Most of the sample was contributed by infants (40%) followed by 23.5% in age group >2-3 years (36.5%) and >1-2 years (23.5%). While looking into the nutritional status of the whole sample, normal nutritional status was observed in 65% of the samples while under-nourished were 35%.

Off the 70 malnourished we observed that most the children were found in the age group 0-1 years (n=31/70; 44.3%) while 27.1% (n=19/70) were in the age group >1-2 years and 28.6% (n=20/70) were in the age group > 2-3 years (Table II). The distribution of different grades of malnutrition showed that most of the children were having grade III malnutrition (n=30/70; 42.9%), 23 (32.8%) were in grade II and 17 (24.3%) were in grade I malnutrition.

While distributing the malnourished children with regards to gender, out of 70 malnourished children, 42 (60%) were female and 28 (40%) were male.

The factors leading to malnutrition were socioeconomic factors and maternal factors.

The socioeconomic factors:

Large family size, educational status of the mother and socioeconomic status of the family were the main factors studied. Out of 70 cases of malnutrition, poor socioeconomic status (monthly income up to Rs 10,000) was observed in 67.1% (n=47/70) of the families, large family size (>7 family members) was observed in 87.1% (n=61/70) of the families, illiteracy was observed in 60% (n=42/70) of the mothers of malnourished children, primary education was observed in 24.3% (n=17/70) of the mothers, matriculation or higher education was observed in 15.7% (n=11/70) of the mothers of malnourished children.

The size of the family in our study showed high association with the occurrence of malnutrition as evident from that increasing size of the family is one

of a strong factor which can lead to malnutrition. Most of the patients with malnutrition belong to the family size > 9 (n=52/70; 74.3%). Out of 32 malnourished children belonging to family size of >14 members, 7 (21.9%) were in grade I malnutrition, 10 (31.3%) were in grade II malnutrition and 15 (46. 8%) were in grade III malnutrition (Table III).

Most of the children with malnutrition (n=32/70; 45.7%) were observed in families with monthly income level of <5000 rupees and only 20% (n=14.70) belonged to families with monthly income >15000 rupees. Out of 32 malnourished children belonging to families with monthly income level <5000 rupees, 8 (25%) were in grade I malnutrition, 9 (28.1%) were in grade II malnutrition and 15 (46. 9%) were in grade III malnutrition (Table IV).

TABLE I: DISTRIBUTION OF SAMPLE BY AGE & NUTRITIONAL STATUS (N=200)

Age (years)	Total	Normal	Malnourished
0-1	80 (40%)	49 (61.25%)	31 (38.6%)
>1-2	47 (23.5%)	28 (59.6%)	19 (40.4%)
>2-3	73 (36.5%)	53 (72.6%)	20 (28.6%)
TOTAL	200 (100%)	130 (65%)	70 (35%)

TABLE II: GRADES OF MALNUTRITION WITH RESPECT TO AGE GROUPS (N=70)

Age (years)	Grades of malnutrition according to the Harvard classification			Total Malnourished
	I	II	III	
0-1	8 (25.8%)	9 (29%)	14 (45.16%)	31 (44.3%)
>1-2	4 (21%)	8 (42.1%)	7 (36.8%)	19 (27.1%)
>2-3	5 (25%)	6 (30%)	9 (45%)	20 (28.6%)
TOTAL	17 (24.3%)	23 (32.8%)	30 (42.9%)	70 (100%)

TABLE III: FAMILY SIZE AND GRADES OF MALNOURISHED CHILDREN (N=70)

Family Size	Grades of malnutrition according to the Harvard classification			Total Malnourished
	I	II	III	
Up to 6 members	4 (23.5%)	3(13%)	2 (6.7%)	9 (12.9%)
7-9 members	2 (11.7%)	3 (13%)	4 (13.3%)	9 (12.9%)
10-14 members	4 (23.6%)	7 (30.5%)	9 (30%)	20(28.5%)
> 14 members	7 (41.2%)	10 (43.5%)	15 (50%)	32 (45.7%)
TOTAL	17	23	30	70

TABLE IV: MONTHLY INCOME AND GRADES OF MALNOURISHED CHILDREN (N=70)

Monthly Income (Pak Rupees)	Grades of malnutrition according to the Harvard classification			Total Malnourished
	I	II	III	
>15000	5 (29.4%)	6 (26.1%)	3 (10%)	14 (20%)
>10000-15000	1 (5.8%)	4 (17.4%)	4 (13.3%)	9 (12.9%)
5000-10000	3 (17.6%)	4 (17.4%)	8 (26.7%)	15 (21.4%)
<5000	8 (47.2%)	9 (39.1%)	15 (50%)	32 (45.7%)
TOTAL	17	23	30	70

Maternal Factors: Maternal factors leading to malnutrition found in our survey were young age of the mother, multi-parity (four or more children) and maternal anemia (hemoglobin level less than 10gm/dl).

Young age of the mother was observed in 29 (41.42%) of the mother, Multi-parity of the mothers was observed in 39 (55.7%) of the mothers with malnourished children while maternal anemia was observed in 51 (72.8%) of mother of malnourished children.

DISCUSSION

The results of the present study indicate that prevalence of malnutrition is 35%, which is consistent with the national Nutrition survey 2011.[2] Underlying reasons for this could be because complementary foods, which should be added to ongoing breastfeeding at 6 months of age, are often introduced in ways that provide insufficient nutrition. Often the foods chosen are not provided in adequate quantities, or introduced too early leading to displacement of breast feeding.[11] Even appropriate quantity of food may at times be lacking in essential micronutrients required by the child.[12]

Malnutrition predisposes the young to recurrent, frequent infections that further deteriorates the nutritional status not only through decreased energy intake, but also through gastrointestinal losses of nutrients.[13] The impact of these recurrent infections depends on the child's nutritional status at the onset of infection and the child's diet during convalescence.[13] As illness decreases appetite in all children; however, due

to cultural beliefs and practices, nutrient-rich foods may also be withheld during times of illness, resulting in further deterioration of nutritional status.[4] Conversely, malnutrition reduces the ability to fight infections and results in increased severity of infections.

As found in our study maternal education has a significantly lowering effect on childhood malnutrition. This may be due to the fact that education leads to job opportunities for the female and the necessary income needed to purchase food. A higher level of maternal education could also lower childhood malnutrition in other ways such as increased awareness about healthy behavior, sanitation practices and a more equitable sharing of household resources in favor of the children.[13-15]

Wealth is responsible for the socio-economic inequality in malnutrition as poorer children are more likely to be malnourished, mainly because of their poverty. [9] Additionally, poorer children are more likely to live in areas with disadvantageous characteristics that further predispose them to malnutrition by exposing them to infectious and unsanitary conditions as seen in our study.

Multiparity and the presence of two or more under-five children in the household affects the child growth negatively by placing a heavy burden on the mother's reproductive health and access to nutritional resources and by increasing competition for the scarce resources within the household.[16] Children of younger mothers are more prone to malnutrition because of physiological immaturity and social and psychological stress that come with child bearing at a young age.[17] Furthermore, anaemic mother who are underweight or stunted are at risk of delivering premature or low birth weight infants, who are themselves at risk of poor growth and development in childhood and adolescence.[16]

An earlier study from Madhya Pradesh has shown that toddlers from large families had better nutritional status than those from medium-sized or small families. It could be that in large or joint families there is a greater likelihood of adult women being available to care for the young children[18] and do active feeding if they see that a child is not taking proper feed. This is in contrast to our study as high proportion of the malnourished children in our study belonged to large family size. The finding that female children had worse nutritional status than males is consistent with findings from Bangladesh,[7] Philippines[16] and Mexico.[19] Possible reasons for this divergence are that males may be seen as an important source of labor for the family farm. They are expected to provide economic and social security for their parents when they are old or incapacitated and in times of distress therefore they receive better care than female children.[20,21] Also there might be cultural reasons, as in our culture females are a neglected, vulnerable and underprivileged population. They are the last of the family member to eat and due to food restriction are denied of nutritious food. Also, intra-family distribution of food is poor because older family members receiving the largest share.[22]

CONCLUSION

The prevalence of malnutrition in the two rural areas of Peshawar is 35% in children under three years of age. It was observed that socio-economic factors like low monthly income status, large family size and education of the mother were highly prevalent among those families that had malnourished children. Maternal factors such as young age, multi-parity and anemia plays an important role in the nutritional status of children from birth to three years of age. Generalization of the data should be done with caution as there is a need for further community based research to identify the basic causes of malnutrition. We need to address the basic causes of malnutrition by providing education and equal opportunities for economic development of this vulnerable population.

REFERENCES

1. Pakistan Census Organization. Available from URL: http://www.census.gov.pk/index.php (Cited on Jan 02, 2013).
2. Planning Commission, Government of Pakistan, Pakistan Institute of Development Economics. National Nutrition Survey 2001. Islamabad: Planning Commission, Government of Pakistan.
3. UNICEF 2013 report. Improving Child Nutrition: The achievable imperative for global progress. Available from URL: http://www.unicef.org/publications/index_68661.html (Cited on October 30, 2013).
4. Neumann CG, Gewa C, Bwibo NO. Child nutrition in developing countries. Pediatr Ann 2004; 33: 658-74.
5. Muller O, Krawinkel M. Malnutrition and health in developing countries. Can Med Assoc J 2005; 173: 279-86.
6. De Onis M, Frongillo EA, Blossner M. Is malnutrition declining? An analysis of changes in levels of child malnutrition since 1980. Bull World Health Organ 2000; 78: 1222-33.
7. Daily Dawn Islamabad. August 22, 2013. Launching ceremony of a report titled 'the Lancet Series on Maternal and Child Nutrition in Pakistan' on Wednesday August 21, 2013, report was prepared by a nongovernment organisation, "Save the Children" in collaboration with the Agha Khan University (AKU).
8. Chaudhury RL. Determinants of dietary intake and dietary adequacy for pre-school children in Bangladesh. Food Nutr Bull 1984; 6(4): 24-33.
9. Mujib SA, Kazmi T, Khan S, Shad MA, Bashir M, Khan B. Relationship of non-organic factors with malnutrition among children under three years of age. J Coll Physicians Surg Pak 2006; 16(5): 355-8.
10. Kliegman RM, Behrman RE, Jenson HB, Stanton BF. (Edit). Nelson textbook of Paediatrics, 18th edition. Sanders, Philiadilphil, 2012. 225-7.
11. WHO. Complementary feeding: Report of the global consultation convened jointly by the department of child and adolescent health and development and the department of nutrition for health and development, Geneva, 10-13 December

2001 and Summary of guiding principles for complementary feeding of the breast-fed child. Geneva: WHO; 2002; Available from URL: http://www.who.int/child-adolescent- health/publications/NUTRITION/Report_CF.htm\ (Cited on Jan 02, 2013).

12. Nestel P, Briend A, de Benoist B, Decker E, Ferguson E, Fontaine O, et al. Complementary food supplements to achieve micronutrient adequacy for infants and young children. J Pediatr Gastroenterol Nutr. 2003; 36: 316-28.
13. Bhutta ZA. Effect of infections and environmental factors on growth and nutritional status in developing countries. J Pediatr Gastroenterol Nutr 2006; 43(Suppl 3): S13-S21.
14. Smith LC, Haddad L. Explaining child malnutrition in developing countries: A cross country analysis. International Food Policy Research Institute, Food Consumption and Nutrition Division discussion paper nr. 60; 2000.
15. Vella V, Tomkins A, Borghesi A, Migliori GB, Adriko BC, Crevatin E. Determinants of child nutrition in north-west Uganda. Bulletin of the World Health Organization 1992; 70: 637-647.
16. Heaton T, Forste R, Hoffmann J, Flake D. Cross-national variation in family influences on child health. Social Sci Med 2005; 60: 97-108.
17. Brakohiapa LA, Yartey J, Bille A, Harrison E, Quansah E, Armar MA, et al. Does prolonged breastfeeding adversely affect a child's nutritional status? Lancet. 1988; 332: 416-8.
18. Steketee RW, 2003. Pregnancy, nutrition and parasitic diseases. J Nutr 133 (Suppl 2): 1661S-1667S.
19. Dewey KG. Nutrition survey in Tabasco, Mexico: nutritional status of preschool children. Am J Clin Nutr 1983; 37: 1010-19.
20. Aguillon DB, Caedo MM, Arnold JC, Engel RW. The relationship of family characteristics to the nutritional status of pre-school children. Food Nutr Bull 1982; 4(4): 5-12.
21. Popkin BM. Time allocation of the mother and child nutrition. Ecol Food Nutr 1980; 9: 1-14.
22. Grewal T. Gopaldas T. Gadre VJ. Etiology of malnutrition in rural Indian preschool children (Madhya Pradesh). J Trop Pediatr Environ Child Health 1973; 19(3): 265-70.

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Following authors have made substantial contributions to the manuscript as under:

RG: Conception and design, acquisition of data, drafting the manuscript, final approval of the version to be published

ZK: analysis and interpretation of data, critical revision, final approval of the version to be published

CONFLICT OF INTEREST

Author declares no conflict of interest

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