

RISK FACTORS FOR PRIMARY THIRD DEGREE MALNUTRITION IN CHILDREN LESS THAN FIVE YEARS OF AGE

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ABSTRACT

Background: Malnutrition is one of the leading causes of morbidity and mortality in children globally. The objective of this study was to determine the risk factors for primary 3rd degree malnutrition in children less than five years of age.

Material & Methods: This descriptive cross-sectional study was conducted from April, 2010 to June, 2011 at Department of Pediatrics and Neonatology, PGMI/LRH, Peshawar. One hundred and thirty malnourished children under 5 years of age were included to determine the risk factors for malnutrition.

Results: Out of 130 patients, majority 46.2% were in the age range of 2-12 months, majority 63.1% were females and 75.38% were having weight range of 2-5.8 Kg. The commonest risk factors were illiterate mothers (84.6%), unemployed fathers (84.5%), poverty (73.1%), poor environmental living conditions (64.6%), delayed weaning (59.2%), illiterate fathers (56.9%), >2 children under 5 years (48.5%), mixed feeding (45.4%), partial vaccination (43.1%), fresh cow milk (36.9%), >5 children in family (26.2%) and working mothers in (3.1%) cases.

Conclusion: Commonest risk factors for malnutrition in children less than five years age are illiterate mother and father, unemployed father, poverty, poor environmental living conditions, delayed weaning, more than 2 children under 5 years, mixed feeding, partial vaccination, history of using fresh cow milk, more than 5 children in family and working mother.

KEY WORDS: Malnutrition; Child nutrition disorders; Risk factors; Child.

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INTRODUCTION

Malnutrition is defined as a pathological state resulting from absolute or relative deficiency or excess of one or more of the essential nutrients. It may be primary, associated with lack of primary health care and other social /environmental factors and secondary due to the presence of some underlying disease. It is one of the leading causes of morbidity and mortality in children globally.¹⁻³ Its persistence has profound implications for children, society, and the future of the mankind.^{4,5} Currently, over two-thirds of the world's malnourished children live in Asia followed by Africa and Latin America.⁶

Malnutrition continues to be a major public health problem in Pakistan. According to UNICEF report, two out of every five children under-five in

Pakistan are malnourished and three out of every five children under-five years are stunted.⁷ About 30-40% of children in Pakistan have low height for their age (stunting) and 14% have low weight for their height (wasting).^{8,9}

Few local studies have reported the prevalence of risk factors of primary 3rd degree malnutrition in children under 5 years of age.¹⁰⁻¹⁷

Malnutrition is globally the most important risk factor for illness and death, contributing to more than half of deaths in children worldwide; child malnutrition was associated with 54% of deaths in children in developing countries in 2001.¹⁸⁻¹⁹ Protein-energy malnutrition (PEM), first described in the 1920s, is observed most frequently in developing countries but has been described with increasing frequency in hospitalized and chronically ill children in the United States.²⁰

According to WHO, malnutrition has three commonly used comprehensive types named stunting, wasting and underweight measures by height for

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age, weight for height and weight for age indexes respectively.²¹⁻²³

The results of this study would be helpful in designing effective awareness creating programs for prevention of malnutrition in children by addressing the preventable risk factors for malnutrition.

The objective of this study was to determine the risk factors for primary 3rd degree malnutrition in children less than five years of age.

MATERIAL AND METHODS

This descriptive, cross-sectional study was conducted in the admitted patients with malnutrition in the Department of Pediatric, PGMI/LRH Peshawar, from April, 2010 to June, 2011.

A total of 130 children with clinically diagnosed primary 3rd degree malnutrition, were selected for the study as per inclusion and exclusion criteria. Risk factors of malnutrition included: fresh cow milk feeding, mixed feeding, delayed weaning, more than 2 children under the age of 5 years, large family size (>5 children), partial vaccination, no vaccination, working mother, un-employed fathers, twin delivery, literacy status of parents (mothers and fathers), poverty and living in poor environmental conditions. Primary 3rd degree Malnutrition was defined as weight less than 60% of expected for age based on Gomez classification.

Children with clinically diagnosed malnutrition having weight less than 60% of expected, age between 2 months to 5 years of both the sexes were included in the study. Those having secondary malnutrition due to some underlying disease and children having incomplete information regarding weaning, and vaccination status were excluded from the study.

After approval from the hospital ethical committee, the data was collected of all those patients with clinically diagnosed malnutrition who presented through Out-patient department (OPD) or Emergency department admitted in Pediatric B Unit, of Post-graduate Medical Institute, Lady Reading Hospital, Peshawar. An informed written consent was taken from parents or relatives for further evaluation. All patients' weight for age was calculated. The patients with weight below 60% for their age were labeled as "third degree malnourished" according to Gomez's classification. Weight of each child was taken by baby weight scale. Each child was weighed without shoes and clothing. Expected weight for age was then worked-out and percentage of present weight to the expected weight was calculated. In addition, the nutritional history and history of breast feeding was specifically taken. Age of weaning was also inquired. The important risk factors for malnutrition were scrutinized.

All this information and other demographic data like name, age, gender, address, educational and occupational status of parents were also recorded. The qualitative variables like illiteracy, unemployment of father, working mother, fresh cow milk, mixed feeding, vaccination, poverty, poor environmental condition, and delayed weaning, were analyzed for percentages and frequencies. Mean \pm standard deviation was calculated for quantitative variables like age, weight. For gender distribution, male to female ratio was calculated. The data was stored and analyzed by statistical program SPSS version 12.

RESULTS

A total of 130 malnourished children less than five years of age were admitted in the Department of Pediatrics and Neonatology, PGMI/LRH, Peshawar during the study period.

Among these, 48 (36.9%) were males and 82 (63.1%) females, with male to female ratio of 1:1.7. Out of these, 60 (46.2%) were in the age range of 2-12 months, followed by 57 (43.8%) >1-2 years, and 13 (10%) in the age range of >2-5 years. Overall age range was from 3 months to 5 years with mean age of 1.27 ± 1.08 years.

The mean weight of patients was 4.93 ± 1.15 Kg, with range of 2-11 Kg. Majority of malnourished children i.e. 98 (75.38%) were having weight range of 2 to 5.8 Kg, followed by 31 (23.84%) in the weight range of 6 to 10 kilogram. Only one (0.80%) was having weight of 11 Kg. Overall weight range was from 2 to 11 Kg with mean of 4.93 ± 1.15 Kg. In the age group of 2-12 months, there were 26 males and 34 females, in the age group of >1-2 years, there were 18 males and 39 females, and in the age group of >2-5 years, there were 4 males and 9 females. (Table 1)

Most prominent risk factors of malnutrition were illiterate mother 110 (84.6%) cases, unemployed fathers in 110 (84.5%) cases, poverty (family income of Rs. <6000 per month) in 95 (73.1%), poor environmental living conditions in 84 (64.6%) cases, delayed weaning in 77 (59.2%), illiterate father in 74 (56.9%). Among the other risk factors, completion of vaccination was found in 74 (56.9%) cases, more

Table 1: Cross tabulation age-range and gender of malnourished children (n=130).

Age range	Gender		Total
	Male	Female	
2-12 months	26	34	60
>1-2 years	18	39	57
>2-5 years	04	09	13
Total	48	82	130

Table 2: Risk factors for malnutrition in children less than five years of age (n=130).

Risk factors	Number of cases	Percentage
Illiterate mother	110	84.6%
Unemployed father	110	84.6%
Poverty (Family income Rs. <6000 per month)	95	73.1%
Poor environmental conditions	84	64.6%
Delayed weaning	77	59.2%
Illiterate father	74	56.9%
More than 2 children under 5 years	63	48.5%
Mixed feeding	59	45.4%
Partial vaccination history	56	43.1%
History of fresh cow milk	48	36.9%
More than 5 children in family	34	26.2%
Working mother	4	3.1%

than 2 children under 5 years were recorded in 63 (48.5%), mixed feeding was found in 59 (45.4%) cases, partial vaccination history in 56 (43.1%) cases, history of fresh cow milk in 48 (36.9%) cases, more than 5 children in family in 34 (26.2%) cases and working mother in 4 (3.1%) cases. (Table 2)

DISCUSSION

Malnutrition remains a global public health problem affecting development, particularly that of the underprivileged and the poor countries.²⁴ It is a strong risk factor for admission to hospital and death.²⁵ Male children seem to be more exposed to the risk of malnutrition than female children. There is no obvious explanation for gender difference but in Asia, for instance, gender difference has been attributed to boys being given preference over girls.²⁶ Also, older children are more prone to be exposed to anthropometric failure than their counterparts aged less than one. Mainly, older children are mixed breastfed, even not breastfed at times, while younger children may be protected by the mother's immune system at birth.²⁷ The risk could be also due to lack of foods in the households due to poverty or the lack of hygiene by mothers, when cooking.²⁸

In our study, in 130 malnourished children the majority were females with the frequency of 63.1%. Malnutrition in one study⁵ was more common in girls than in boys. This may be due to the cultural, social

and customary practices prevalent in the area where the male gender is considered more important in the family structure and therefore receives better nutrition. This preponderance of malnutrition in females is similar to that observed by others. In a study by Choudhury et al,²⁹ severe malnutrition was 1.4 times more common in girls as compared to boys. No significant gender difference was found in the studies done by Khichi et al³⁰ and Fikree et al.³¹ In another study there was little difference in the prevalence of malnutrition between the boys and girls as 51.5% were males whereas 48% females.²⁴ Similar results are also reported in one local study,¹² where males were at more risk of developing malnutrition than females. In contrast to these the results of a study conducted in Botswana showed that malnutrition was significantly higher among boys than among girls.³²

We have included malnourished children from 2 months to 5 years of age in our study, as this is the most important age range in the development of a child. Mean age in this study was 1.27 years (ranged 3 months to 5 years). In a local study¹⁰ at Department of Pediatrics, SIMS/Services Hospital, Lahore, similar findings have been reported which showed a total of 200 children included in study, from 2 months to 5 years of age. All had 3rd degree malnutrition according to modified Gomez Classification. Another study by Khichi et al³⁰ included children between the ages of two to five years in the Bahawalpur area. The study of Nizamani et al³³ where 65.5% of the children below five years of age were found to be malnourished. Ray et al³⁴ from Kolkata, India reported that 60.29% of children below five years of age were undernourished. Hossain et al³⁵ found 96% of undernourished children between six to sixty months with varying grades of malnutrition in Bangladesh. In another study they included children age ranged between 6 months to 3 years. Mean age was 23.44 months, while median age was 24 months.²⁴ These variations could be due to the study design of the respective studies.

Weight is another risk factor of malnutrition in children. In our study minimum weight was 2 Kg and maximum was 11 Kg with mean weight of 4.93 Kg. A local study showed some higher weight rates in their study, in that study mean weight of the children was 7.74 kg, while median weight was 8 kg. Minimum weight was 4.5 kg.²⁴ Difference in mean weight is due to selection of the children of older age in the referenced study as they have selected their patients from 2 to 5 years old, while we have selected our study population from 2 months to 5 years because of the reason that this age group is very important due to the developmental phase of a child.

The gap observed on stunting prevalence between children from uneducated mothers or those whose mothers had a primary school level education

compared with those from mothers with secondary or high level of education remains high. In fact, education could make a difference by empowering mothers (decision on type of nutrition and/or use of preventive medicine). Similar results have been found in most developing countries. Education could also help the mothers make informed nutritional decisions about cultural norms on certain types of food for children.³⁶

Illiterate mother (84.6%), illiterate father (56.9%), unemployed fathers (84.5%), poverty (family income of Rs. <6000 per month) (73.1%), poor environmental living conditions (64.6%), delayed weaning (59.2%), were the most prominent risk factors of malnutrition noted in our study. Various international and national studies have reported more or less same results.

Many local studies proved that literacy status of parents (mothers and fathers) strongly affects the nutritional state of the children where illiterate parents are a risk for the development of malnutrition in children <3 years of age especially underweight.^{2,8} While in few other studies poverty,¹⁴ living in poor environmental conditions¹⁵ and diarrhea^{16,17} were found to be another risk factors of malnutrition.

In another study²⁴ major groups of children were coming from middle class families, with an average family income between Rs. 5000 to 10000. As family income varied between Rs. 3000 to greater than Rs. 10000, there was no direct correlation of family income with the malnutrition. This clearly showed that lack of maternal education regarding child's feeding and weaning played a major part in causing malnutrition. In these families, 35.5% of the mothers were illiterate, 38% mothers studied only up to the primary, 21.5% up to matric and 5% showed higher education above matric.

A strong and significant synergy was found between parental education and malnutrition in one study. This is similar to other studies where malnutrition is significantly associated with the literacy of parents. Significant association between education of the mother and the general health of the children has been reported from Laos.³⁷

This study revealed an inverse relation between monthly income or socioeconomic status and malnutrition. These results are similar to the study conducted by Ayaya et al³⁸ in Kenya where poverty and social conditions under which the children live have been found as major determinants of malnutrition. This is different from the study by Latif et al⁵ where neither income nor maternal education is related to the child's nutritional status. However, poor socioeconomic status of the family contributes a lot to the development of malnutrition in the developing regions. With very low income, it is a tough task to provide a nutritious diet to the children.¹²

One study⁵ did not show any significant association between either the mother's or the father's education and malnutrition. This is in contrast to other studies where malnutrition was found to be significantly associated with literacy rate of parents. In the study by Pakistan Medical & Research Council, a much lower rate of malnutrition in children was found if any adult female in that household had education of matric or above.³⁹ This difference may be due to the fact that they only looked at education of the mother and not of other adult female members in the household. These findings are similar to that of Fikree et al³¹ where maternal education was not significantly associated with wasting in children. Ali et al¹³ reported significant association between malnutrition in children below three years of age and fathers' low literacy level.

Similarly one study showed no association between malnutrition and monthly household income. This is different from the other studies who found significant association between malnutrition and low socioeconomic status of the family. A significant association was found between malnutrition and anemia in one study population. That study showed that malnutrition and associated anemia are common problems in children of Keamari area.⁵

Maternal education is a significant predictor of child health. Normally children of educated mothers are considered to be less likely to fall victim to malnutrition than those of the uneducated ones. Increasing education brings improved understanding of health and nutrition and more use of health services, including immunization and antenatal care. But it has been found in a study that education alone does not prevent malnutrition in children, whatever the income level of the parents.^{40,41}

Among the other risk factors in our study, we have found completion of vaccination (56.9%), more than 2 children under 5 years (48.5%), mixed feeding (45.4%), partial vaccination history (43.1%), history of fresh cow milk (36.9%), more than 5 children in family (26.2%) and working mother (3.1%) cases. Many studies done at international and national level also have reported same kind of results in their respective studies.

It is estimated that among the downtrodden, hardly 10% of the money is spent on foods obtained from animal sources i.e. egg, milk, curd, meat etc. In the referenced study, the risk of malnutrition is higher for children who were not exclusively breast fed. The same observation has been made by other studies conducted in Pakistan,^{10,11} Kenya³⁸ India,⁴² and Turkey.⁴³ Some other studies confirmed the fact that completes immunization provided protection against malnutrition. Malik et al,¹¹ Rana et al,¹⁰ Bloss et al⁴⁴ also reported similar results and found that up to date immunization is protective against malnutrition.

Majority of mothers in Pakistan and other developing countries do not have clear guidelines regarding weaning. Though food may be available to them, yet the schedule of food administration and child requirement may not be known to them. Nutritional practices vary according to their social and cultural background, tribal and religious taboos. A very small number of malnourished children can actually be attributed to poverty. There is a need to know the perceptions and practices of mothers regarding child feeding and the impact factor of these perceptions on child malnutrition.²⁴

CONCLUSION

Majority of female malnourished children are in the age range of 2 to 12 months, having weight range of 2 to 5.8 Kg. The commonest risk factors for malnutrition are illiterate mother and father, unemployed father, poverty, poor environmental living conditions, delayed weaning. Other risk factors were more than 2 children under 5 years, mixed feeding, partial vaccination, history of fresh cow milk, more than 5 children in family and working mother.

As majority of risk factors for malnutrition are preventable, it is necessary to design effective awareness programs through electronic media for prevention of malnutrition in children less than five years of age.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.
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