

Profile of Under–Five Malnourished Children Admitted in a Tertiary Care Teaching Hospital in Pune, India

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ABSTRACT

Background: Malnutrition is a major public health problem in a developing country like India. Keeping this in mind a study was carried out to find the proportion of under–five children suffering from malnutrition among the under–five hospitalized children and to study co-morbid illnesses and epidemiological factors associated with malnutrition.

Methods: This was a hospital-based cross sectional study carried out in the pediatric ward of a tertiary care teaching hospital in Pune, India. All under–five children suffering from malnutrition were studied over a period of 1 month.

Results: Total number of under five children diagnosed as malnourished were 47 (39.83%). Moderate and severe/very severe malnutrition was statistically significantly higher in a girl child. The proportion of moderate and severe/very severe malnutrition was higher in low birth weight babies, children who were incompletely immunized for age. Faulty infant feeding practice was observed in 28 (59.6%) children. Some of the co-morbid illnesses contributing to morbidity in the malnourished child were acute diarrheal diseases, acute respiratory infection, anemia, and septicemia.

Conclusion: A large proportion of hospitalized children were malnourished. Girl child suffered from moderate to severe forms of malnutrition as compared to male child and this was the only statistically significant association. This may be due to neglect of girl child.

Key words: Hospital, infant, malnutrition, morbidity, preschool

INTRODUCTION

Childhood malnutrition is an underlying cause in an estimated 35% of all deaths among children under five years of age.^[1] The prevalence of underweight children in India is among the highest in the world, and is nearly double that of Sub-Saharan Africa, the report says. The consequences of child undernutrition for morbidity and mortality are enormous – and there is, in addition, an appreciable impact of undernutrition on productivity so that a failure to invest in combating nutrition reduces potential economic growth. In India, with one of the highest percentages of

undernourished children in the world, the situation is dire. Moreover, inequalities in undernutrition between demographic, socioeconomic, and geographic groups increased during the 1990s. More and better investments are needed if India is to reach the nutrition MDGs. Economic growth will not be enough.^[2]

Keeping this in mind this study was carried out with the objective to find the proportion of under-five children suffering from malnutrition amongst the under-five hospitalized children and to study co-morbid illnesses and epidemiological factors associated with malnutrition amongst these children.

METHODS

This was a cross-sectional study carried out in the pediatric ward of a tertiary care teaching hospital in Pune, India. All under-five children admitted in Pediatric ward and suffering from malnutrition were studied over a period of 1 month from 1st May to 31st May 2010. Since this was a short-term project, the period of data collection was limited to a period of one month. Nevertheless the study explores the above mentioned objectives in the current scenario. Ethical approval was taken from the Institutional Ethics Committee before the commencement of study. Informed consent was taken from the parents / legal guardian of the child. Study was conducted with the help of a pre-tested proforma. Each child was examined clinically and the important laboratory findings were noted from the case sheet. Malnutrition was classified according to Indian Academy of Pediatrics (IAP) Classification.^[1] This IAP classification is based on Weight-for-age values. The standard used in this classification for reference population was the 50th centile of Harvard standards. A normal child is >80% of the standard (median). Grade I malnutrition (mild malnutrition) is 71-80% of the standard (median). Grade II malnutrition (moderate malnutrition) is 61-70% of the standard (median). Grade III malnutrition (severe malnutrition) is 51-60% of the standard (median). Grade IV malnutrition (very severe malnutrition) is <50% of the standard (median). A child was considered completely immunized for age if the child received all the doses as per Indian National Immunization Schedule. Low birth weight was defined as weight <2.5 kg.

All the under – five children admitted in pediatric ward over a period of 1 month and suffering from malnutrition were included in the study.

Children of parents/legal guardian not giving informed consent, children admitted in NICU (Neonatal Intensive Care Unit) / PICU (Pediatric Intensive Care Unit), malnutrition secondary to their underlying chronic disease were excluded from the study.

χ^2 test, Fisher exact test were used to study the association between the variables. Odds ratio and 95% confidence interval were calculated.

Mean \pm standard deviation was calculated for age. 'P' value of < 0.05 was considered as statistically significant.

RESULTS

Total under-five admissions in pediatric ward during the one month study period = 118. Total no. of under five diagnosed as malnourished = 47 (39.8%). Majority 28 (59.6%) out of 47 children were males. The mean age was 20.8 months \pm standard deviation of 15.8 months.

Moderate and Severe/very severe malnutrition was observed in 15 (78.9%) out of 19 girls as compared to 12 (42.9%) out of 28 boys and the difference was statistically significant [Table 1].

History of low birth weight was available in 34 children. Moderate and severe/very severe malnutrition was observed in 9 (69.2%) out of 13 children who had history of low birth weight as compared to 11 (52.4%) out of 21 children without history of low birth weight but the difference was not statistically significant [Table 2].

Moderate to severe/very severe malnutrition was seen in 11 (64.7%) out of 17 children who were

Table 1: Association between gender and severity of malnutrition

Gender	Grades of Malnutrition			Total (%)
	Mild (%)	Moderate (%)	Severe to very severe (%)	
Male	16 (57.2)	10 (35.7)	2 (7.1)	28 (100)
Female	4 (21.1)	9 (47.3)	6 (31.6)	19 (100)
Total	20 (42.6)	19 (40.4)	8 (17)	47 (100)

*For analysis, moderate and severe to very severe malnutrition were clubbed together, $\chi^2 = 4.645$, $df = 1$, $P = 0.031$, Fisher exact test, P value = 0.018, Odds Ratio = 5, 95% Confidence Interval = 1.32 to 18.96

not completely immunized for age as compared to 16 (53.3%) out of 30 children who were completely immunized for age but the difference was not statistically significant [Table 3].

Fifteen (31.9%) mothers were illiterate, 17 (36.2%) mothers were educated upto primary school, 13 (27.7%) mothers were educated upto secondary school, 1 (2.1%) mother was educated upto higher secondary school and 1 (2.1%) mother was a graduate out of 47 mothers. Thus, majority of mothers were illiterate or had education only upto secondary school.

The co-morbid illnesses in these 47 malnourished children were as follows:

- Acute diarrheal disease in 20 (42.6%) children.
- Acute respiratory infection in 18 (38.3%) children.
- Dysentery in 3 (6.4%) children.
- Meningitis in 1 (2.1%) child, malaria in 1 (2.1%) child, Hepatitis in 1 (2.1%) child, rickets in 1 (2.1%) child.

Anemia was detected in 26 (55.3%) children, 4 (8.5%) children had failure to thrive, 3 (6.4%) children had sepsis.

Table 2: Association between low birth weight and severity of malnutrition

Low birth Weight	Grades of Malnutrition			Total (%)
	Mild (%)	Moderate (%)	Severe to very severe (%)	
Yes	4 (30.8)	5 (38.4)	4 (30.8)	13 (100)
No	10 (47.6)	8 (38.1)	3 (14.3)	21 (100)
Total	14 (41.2)	13 (38.2)	7 (20.6)	34 (100)

*For analysis, moderate and severe to very severe malnutrition were clubbed together, $\chi^2 = 0.374$, $df = 1$, $P = 0.541$, Fisher exact test, P value = 0.477, Odds Ratio = 0.49, 95% Confidence Interval = 0.11 to 2.097

Table 3: Association between complete immunization and severity of malnutrition

Completely Immunized Child	Grades of Malnutrition			Total (%)
	Mild (%)	Moderate (%)	Severe to very severe (%)	
Yes	14 (46.7)	13 (43.3)	3 (10)	30 (100)
No	6 (35.3)	6 (35.3)	5 (29.4)	17 (100)
Total	20 (42.6)	19 (40.4)	8 (17)	47 (100)

For analysis, moderate and severe to very severe malnutrition were clubbed together, $\chi^2 = 0.203$, $df = 1$, $P = 0.652$ Fisher exact test, P value = 0.546, Odds Ratio = 1.6, 95% Confidence Interval = 0.47 to 5.47

Faulty feeding practices were observed as follows:

- Exclusive breast feeding for less than 6 months in 14 (29.8%) children.
- Delayed complementary feeding (7 months of age onwards) in 14 (29.8%) children.

Thus, the recommended exclusive breast feeding till 6 months of age and initiation of complementary feeding after 6 months was observed only in 19 (40.4%) children.

In 20 cases of malnourished children who also suffered from acute diarrheal disease, unhygienic water storage was observed in 18 (90%), hands were not washed with soap and water prior to food preparation and prior to feeding the child in 6 (30%) out of 20 children. Bottle feeding was observed in 7 (35%) out of 20 children. Serum electrolytes were deranged in 2 (10%) out of 20 cases. All these children were more than 6 months of age and were on complementary feeding.

DISCUSSION

Total number of under five years of age children diagnosed as malnourished were 39.8% out of the total hospitalized children. Thus, malnutrition is still a public health problem in India and needs to be addressed.

In the present study moderate and severe/very severe malnutrition was observed in 15 (78.9%) out of 19 female children and the difference was statistically significant. This may be due to gender bias since female child is often neglected.

Moderate and severe/very severe malnutrition was observed in 9 (69.2%) out of 13 children who were low birth weight as compared to 11 (52.4%) out of 21 children were not low birth weight but the difference was not statistically significant. Children who are born low birth weight are at an increased risk of morbidity and mortality.

In a study done by Ellen Van de Poel *et al.* in Ghana, children who were very small at birth had a higher probability to be stunted than children with normal size.^[3]

In a study carried out by Ngianga-Bakwin Kandala in children under the age of five in the Democratic Republic of Congo (DRC), the authors found that the prevalence of stunting was higher among boys compared to girls (46.1 versus 41.7 percent), linearly associated with

maternal education (higher among children from non educated mother, followed by children from mothers with primary education but lower among children from mothers with secondary or higher education: 49.8, 47.0 versus 35.2 percent).^[4]

In a study carried out by Choudhury KK, it was observed that out of the severely malnourished children, 54.2% were female, and 45.8% were male. Bangladesh typifies many south-eastern countries where female children experience inferior health and uncertain survival, especially after the neonatal period.^[5]

Severe to very severe malnutrition was seen in 5 (29.4%) out of 17 children who were not completely immunized for age as compared to 3 (10%) out of 30 children who were completely immunized for age but the difference was not statistically significant. This reflects the health seeking behavior of the community. One third of the mothers were illiterate and remaining mothers were educated not higher than secondary school. In a study carried out by Bharati S *et al.* it was observed that children with illiterate mothers, from low standard of living households are more prone to become malnourished. It is necessary to improve the rate of literacy, especially of women, to reduce the prevalence of malnutrition and anemia among children.^[6] Faulty infant feeding practice was observed in 28 (59.6%) children. Many mothers are not aware of the benefit of exclusive breast feeding their child for first 6 months of life and the importance of initiation of complementary feeding after 6 months of age. This makes the child more vulnerable to fall in the pit of malnutrition. Also, as seen in the study, in 20 children who also suffered from acute diarrheal disease, unhygienic water storage was observed in 18 (90%) households. Postnatal growth failure is extremely common in the very low birth weight and extremely low birth weight infants.^[7]

The study has limitations that being a short term research project, the sample size was not calculated and all the malnourished children admitted over a period of one month were included in the study. Also being a tertiary care teaching hospital-based study, the proportion of children suffering from severe malnutrition is likely to be higher than seen in community. The power of the study is less due to small sample size; however, confidence interval is calculated for important study variables.

However, the study was meticulously carried out and the findings hold significance in a developing country like India facing the problem of malnutrition.

CONCLUSIONS

In the present study, 47 (39.8%) out of 118 children admitted in the pediatric ward were diagnosed to be suffering from malnutrition. Thus, a large proportion of hospitalized children were malnourished.

The moderate and severe/very severe forms of malnutrition were found statistically significantly higher in girl child which is likely to be a result of gender inequality. Girl child when sick is neglected and brought late to a health care facility when the severity of illness is high. This contributes to increased morbidity and mortality. The proportion of moderate to severe forms of malnutrition was higher amongst low birth weight babies, incomplete immunization for age, lower literacy among mothers. The co-morbid illnesses contributing to morbidity in the malnourished child were acute diarrheal diseases, acute respiratory infection, anemia, septicemia.

Recommendations

Malnutrition is still a public health problem in India and measures need to be taken to prevent neglect of female child. Other measures like decreasing the proportion of low birth weight babies, increasing female literacy, increase health seeking behavior of the community will help in tackling the problem of malnutrition. Mothers need to be educated regarding the benefits of exclusive breast feeding the child for first 6 months of life, the importance of initiation of complementary feeding after 6 months of age and that the complementary feeds need to be hygienically prepared.

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