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CLINICAL PROFILE OF SEVERELY MALNOURISHED CHILDREN ADMITTED TO PEDIATRIC WARD OF MEDICAL COLLEGE PUNE, MAHARASHTRA

Paediatrics

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ABSTRACT

Background: Severe acute malnutrition (SAM) is ubiquitous in India and cause of death for million numbers of children every year. Children with SAM have nine times higher risk of dying than well-nourished children. Therefore, an assessment of clinical profile of malnourished children can able to impart idea about responsible factors in SAM and facilitate its management.

Objective: To evaluate the clinical profile of severely malnourished children admitted in pediatric ward of a Medical College.

Materials and Method: A hospital based cross sectional observational study, carried out in the pediatric ward of B.J. Medical College, Pune from June 2008 to June 2009. Ethical clearance obtained from institutional ethical committee before commence the study. The study group comprised of 75 children aged 6 months to 6 years with Severe Malnutrition. To evaluate clinical profile of malnourished children history including present complaints, past history, birth history, family history and immunization status, dietary habit, socioeconomic status recorded. Data analyzed with SPSS (Statistical package of social sciences) version 20.0 and presented in terms of frequency and percentages.

Results: The majority of cases (48%) was having both nutritional and non-nutritional causes as an underlying etiology for malnutrition. 60% cases had significant past history in the form of chronic illness, and 21.2% cases had significant family history as a contributing factor to malnutrition. Majority children suffer from chronic recurrent illnesses e.g. fever, respiratory symptoms and acute gastroenteritis and require hospitalizations. Even children had poor immunization coverage, faulty feeding practices.

Conclusion: This study concluded that past medical history, family history, birth history, immunization, antenatal care, immunization schedule and socioeconomic status all are responsible factors in predilection of malnutrition.

KEYWORDS

Malnutrition, clinical profile, children

INTRODUCTION

Within 21st century regardless all awareness about ominous impact of malnutrition on health and availability of health and nutrition interventions, malnutrition persists to be one of the foremost root of morbidity and mortality worldwide, particularly in developing countries like India. Severe acute malnutrition (SAM) is ubiquitous and one of the foremost public health problem in India. Children with SAM have nine times higher risk of dying than well-nourished children. Malnutrition is predisposed for half of all deaths in children under 5 years and widespread in Asia and Africa [1]. Malnutrition had reported in up to 33% of children in developing countries. Severe acute malnutrition is defined as a weight-for-height measurement of 70% or less below the median, or three SD or more below the mean National Centre for Health Statistics reference values, the presence of bilateral pitting edema of nutritional origin, or a mid-upper-arm circumference of less than 110 mm in children age 1-5 years. [2]

Children with malnutrition have higher incidence and severity of infections due to deterioration of immune function, limited production and/or diminished functional capacity of all cellular components of the immune system [3]. Nutritional Rehabilitation Centers (NRC) has been available in India to facilitate therapeutic care for SAM children. Here these children have inpatient management by trained personnel and counseling to the mothers given. They discharged once they meet the discharge criteria and advised regular [4].

Inevitable for proper management of malnutrition complete clinical profile is very essential including present and past history, family history, birth history, immunization, antenatal care, socioeconomic status etc. Clinical profile of malnourished children will able to help in reducing morbidity and the mortality and help in further management. Therefore, this study was conducted to evaluate the clinical profile of malnourished children.

MATERIALS AND METHOD

A hospital based cross sectional observational study was carried out in the pediatric ward of a tertiary care institution of Pune over a period of one year. Ethical clearance was obtained from the institutional ethical committee before starting the study. The study group comprised of 75 children aged 6 months to 6 years with admitted SAM (or Grade III and Grade IV PEM according to the IAP classification [5].

Althoughtotal admissions in that age group during study period was 1172 but only severely malnourished children (Grade III and Grade IV PEM) between the age group of 6 months to 6 years admitted to the pediatric ward was included in the study. Moreover, children with severe malnutrition and age less than 6 month or more than six years or those failures to gainconsent were also excluded, thus total sample size was 75.

To evaluate clinical profile of malnourished children, clinical history including present complaints, past history, birth history, family history and immunization status, antenatal care, socioeconomic status documented. Dietary history recorded by 24-hour recall method [6]. The dietary protein and caloric values were calculated according to ICMR standards [7].

Grades of PEM recorded based on weight for age according to the IAP classification for malnutrition grading proposed by IAP in 1972. Agarwal growth chart used to calculate weight for age with 50th percentile as an expected weight [8]. The calculated intake was compared with RDA for that age [5, 9] and the expected dietary requirement for calories and proteins for a patient was calculated as follows:

- Expected Calories (according to Holiday and Segar formula)

For 10 kg expected weight	100 Kcal / kg
For 10 -20 kg expected weight	1000 Kcal + 50 Kcal / kg
For >20 kg expected weight	1500 Kcal + 20 Kcal / kg

- Expected proteins = 2gm /kg

An anthropometric measurement in the form of height and weight has taken from standard techniques [10]. Height of children less than one year of age measured in supine position using infant meter and in older children were measured using steadiometer. The body weight of each child measured using electronic weighing scale and compared using Agarwal growth charts. Other anthropometric measurements including head circumference, chest circumference and mid arm circumference were measured using non-stretchable tape. Weight for age was calculated using 50th percentile as expected weight. Patients categorized into grade III and grade IV PEM using IAP classification [5].

Development assessed according to gross motor, fine motor, language

and social milestones [11]. Socioeconomic status was assessed by using modified Kuppuswamny scale [12]. Patient then subjected to a thorough general and systemic examination and the necessary investigations relevant to the case performed. Low birth weight (LBW) was defined as birth weight <2.5 kg irrespective of gestation [13]. Complete immunization was considered when the child received BCG, three dosages of DPT and OPV and measles according to National Immunization Schedule appropriate for the patient's age. A tentative underlying cause for malnutrition was defined as purely nutritional, purely non- nutritional or both as per pre-defined criteria.

The data were entered into Microsoft excel spreadsheet and descriptive statistical analyses was done by SPSS (Statistical Package of Social Sciences). Data presented in terms of frequency and percentages. Chi-square test used for statistical significance.

RESULTS

Demographic distribution of study population showed, the cases ranged between the age of 6 months to 6 years; among them 24% were infants (6 months – 1 year), 24% were toddlers (1-3 yrs) and 52% were pre-school (3 yrs- 6 yrs) children. Male (50.6%) and female (49.3%) were equally distributed in the study group. According to the religion, 90.6% children belonged to the Hindu community while 6.6% were Muslims, and 1.3% Christians **(Table 1).**

In the present study, 45 cases (60%) had significant past history in the form of chronic illness and 40% had no significant past history. The predominant symptom at the time of admission to the hospital was fever (58.6% cases) followed by cough, loose motions, vomiting, respiratory distress, failure to thrive, decrease appetite, and convulsions, respectively **(Table 2).** Antenatal care registration was done only in 52% cases and 70.6% children were delivered by the trained medical personnel, whereas untrained personnel delivered 25.3% children at home. In this study, majority of the cases (90.6%) were full term and only 4% cases were pre-term. According to birth weight, normal birthweight (>2.5 kg) was seen in 56% cases whereas 29.3% were LBW and in 14.6% cases, birth weight was not known. Only 12% cases required NICU care at birth**(Table 3).**

In this study, significant family history as a contributing factor to malnutrition was seen in 21.2% cases. The majority beingfrom HIV infected parents, and out of 16 cases of positive family history; 5 cases belonged to grade 3 PEM and 11 cases to grade 4 PEM and 13 out of 16 babies were HIV positive. In the 13 HIV positive children, 7 were having tuberculosis as co-infection and 3 of them had close contact with sputum positive family member. Other significant history included rash in mother during antenatal period and history of unexplained child deaths in the family**.**

In this study, majority of the children (40%) was second in the birth order, followed by 33.3% being first in birth order, 18.6% being third in birth order and 8% being fourth in birth order. According to this study, most of the patients (77.3%) had both the parents alive whereas 14.6% had single parents. 2.6% had grandparents/ uncle for caring them and 4 patients were abandoned by their parents; hence, were cared at an orphanage. According to this study, 33.3% cases were having some form of developmental delay; mainly, in the gross motor milestones. Out of 25 cases with developmental delay, the cause in 6 cases was cerebral palsy**(Table 3).**

In this study, nearly 69.3% cases were incompletely immunized for their age and complete immunization for age seen in only 30% cases. Among the individual vaccines in the national immunization schedule, OPV had 84% coverage followed by BCG (76%) and measles (33%) vaccines. Only 10.6% cases had an adequate dietary intake and out of the rest 89.4% who had inadequate dietary intake, 49.2% were calorie deficient and 50.7% were both calorie and protein deficient. Grade III PEM was present in 60% cases and grade IV PEM in 40% cases. In this study, most of the patients belonged to the lower socio-economic status (82.6%) according to modified Kuppuswamy scale.

In the present study, almost all patients (98.6%) had pallor except for onecase, which was a case of polycythemia. Out of the 74 cases of pallor, 22 (29.7%) had mild pallor (Hb: 10 -11 gm/dl), 44 (59.4%) had moderate pallor (Hb 7-10 gm/dl), while 8 cases (10.8%) showed severe pallor (Hb<7 gm/dl). Out of 75 cases, 24 cases (32%) showed the presence of edema. Frank kwashiorkar was noted in two cases and five cases had severe anemia causing CCF and edema. Skin manifestations noted in 65.3% cases and hair changes in 42.6% cases whereas 57 cases (76%) showed clinical features of Vitamin deficiency and Vitamin A and B were the most common deficiencies noted.

Current study showed that the majority of cases (48%) were having both nutritional and non-nutritional causes as an underlying etiology for severe malnutrition. Purely nutritional cause was noted in 41.3% cases. Purely non-nutritional cause where nutritional intake was adequate was noted in 8 cases (10.6%)**.**

DISCUSSION

In this hospital based study, 24% were infants (<1 year), 24% toddlers (1-3yrs) and 52% were pre-school (3 - 6 yrs) children. Males (50.6%) and females (49.3%) were equally distributed in the study group. In a study conducted by **Meena S et al,** children were ranged within age group of 1 month to 60 month with the mean age of 33.25 month and out of 200 children, 84 (42%) were boys and 116 (58%) were girls [14]. According to **NFHS 3**, 82% of the Indian population belongs to Hindu community and 13% from the Muslim population. Similarly, in this study, the majority (90.6%) of children belonged to the Hindu community [15].

According to this study, predominant symptom for admission in SAM children was fever (58.6% cases) followed by cough, loose motions, vomiting, respiratory distress, failure to thrive, decrease appetite, and convulsions. On the other hand, **Ganesh J et al** found that viral infections (21.4%) were the commonest disease for which children were hospitalized followed by acute watery diarrhea and lower respiratory tract infections [16].

In this study, antenatal care was received by only by mothers of only 52% cases and 25.3% children delivered by untrained personals.WHO recommends minimum four ANC visits, ideally at 16, 24–28, 32 and 36 weeks and recommends health promotion including nutrition counseling. It has been shown that women attending regular ANC exhibit better knowledge, attitudes and antenatal practices that significantly influences fetal, infant and maternal health outcomes. [17]

Accordance with this study, family history plays a significant contributing factor to malnutrition and the majority beingfrom HIV infected parents. Similarly, a study conducted by **Dundigalla C et al found** that majority of the children acquired HIV infection through mother to child transmissionand malnutrition is highly prevalent among HIV- infected children in India [18]. In this study, majority of the children (40%) were second in birth order while only33.3% were first in the birth order. It shows that the birth order and family size impinge on the grade of nutrition. Similarly, **Meena S et al** also found family size and number of siblings as the factors significantly associated with malnutrition [14].

According to this study, 33.3% cases were having some form of developmental delay mainly in the gross motor milestones. Similar observations in motor and mental delay were seen in a study conducted by **Udani PM et al** [19]. In our study, 69.3% cases were incompletely immunized for their age and complete immunization for age seen in only 30% cases. Similar results were found in a study conducted by **Triq S A et al where** 62.3% children had incomplete immunization and complete immunization was found only in 13% cases [20].

In our study, only 10.6% cases had an adequate dietary intake and grade III and IV PEM was found in 60% and 40% case, respectively according to IAP classification. In this study, most of the patients belonged to lower socio economic status (82.6%). Similar results were found by **Triq SA et al** where 83.6% cases were from lower socioeconomic status [20]. A study conducted by **Garkal KD et al,** showed that the degree of malnutrition significantly associated with decline in socioeconomic status and low IQ level in school children [21].

In the present study, 32% cases had edema, skin and hair changes noted in 65.3% and 42.6% cases, respectively. According to the present study, 98.6% cases had pallor/anemia. In a study, **Meena S et al** showed that 93.2% children had anemia, while 36% cases had hair and skin changes and edema was found only in 3% cases [14]. In our study, majority of the cases (48%) had mixed nutritional and non-nutritional causes as an underlying etiology for SAM while purely nutritional cause in 41.3% cases and purely non-nutritional cause in 8 (10.6%) cases.

CONCLUSION

The clinical profile of hospitalized severely malnourished children of Pune city revealed that the first 2 years of life is most vulnerable period for malnutrition and affects both sexes equally. Majority children suffer from chronic recurrent illnesses e.g. fever, respiratory symptoms and acute gastroenteritis and require hospitalizations. Even children had poor immunization coverage, faulty feeding practices and caretaker was lacking from basic nutrition education. Thus, past medical history, family history, birth history, immunization, anti natal care, immunization schedule and socioeconomic status all are responsible factors in predilection of malnutrition.

Table 1: Demographic distribution of study participants

Variables	No. of cases	Percentage (%)
Age in years		
6 months to <1 Yr	18	24
1 yr to < 2 yrs	18	24
2 yrs to < 3 yrs	6	08
3 yrs to < 4 yrs	15	20
4 yrs to < 5 yrs	7	9.33
5 yrs to 6 yrs	11	14.67
GENDER DISTRIBUTION		
Male	38	50.67
Female	37	49.33
RELIGION DISTRIBUTION		
Hindu	68	90.67
Muslim	5	6.67
Christian	1	1.33
Others	1	1.33

Table 2: Past-history and Symptoms of SAM children

Variable	No. of cases	Percentage (%)
Past History		
Significant	45	60
Not Significant	30	40
Symtoms		
Fever	44	58.6
Cough	32	42.6
Respiratory distress	23	30.6
Vomiting	26	34.6
Loose motions	30	40
Convulsion/alt.sensorium	11	14.6
Failure to thrive/wt loss	22	29.3
Refusal to feed/decrease appetite	18	24
Pain in abdomen	2	25.3
Pica	1	
Night blindness	1	
Delayed milestones	4	
Swelling of legs	4	
Pallor	3	
Jaundice	1	
Decreased - vision/hearing/speech	1	
Locked jaw	1	
Gum bleeding	1	

Table3: Antenatal and postnatal history of SAM children

Variable	No. of cases	Percentage (%)
ANC Registration		
Yes	39	52
No	36	48
Delivery attended by Trained medical personnel		
Yes	**53**	**70.67**
No.	**19**	**25.33**
Not known	**3**	**4.00**
Gestation		
Full term	68	90.6
Pre term	3	04
Not Known	4	5.4
Birth Weight in Kg		
<1	1	9.33
1 -	6	8.00
1.5 -	5	6.67
2 -	10	13.33
>=2.5	42	56
Not Known	11	14.66
NICU Admission		
Yes	9	
No	66	
Birth order		
1	25	33.33
2	30	40.00
3	14	18,67
4+	6	8.00
Care taker		
Both parents	58	
Single parent	11	
Grandparents/ uncle	2	
Institution	4	
Developmental History		
Normal	50	
Abnormal	25	

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