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ORIGINAL RESEARCH

Assessment of risk factors and clinical presentation in children with acute malnutrition- A cross sectional study

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ABSTRACT

Background: Malnutrition is a major public health issue plays an important role in the economic burden of society in developing countries. Children with acute malnutrition as a result of inadequate food supply caused by social, economic, and environmental factors **Aim**: The purpose of this study is to investigate the numerous risk factors and clinical presentation in severe acute malnutrition children **Methods:** This cross sectional observational study was conducted in KD Medical College Hospital and Research Centre, Mathura, U.P. A total of fifty children under the age of 5 year were enrolled Patient's clinical profile resulted from a thorough anthropometric examination, analysis of related risk factors, and analysis of comorbidities were recorded. **Results:** Among total cases of acute malnutrition, majority of them (38%) were 13-24 months of age group with slightly female predominance (56%). Most of them (60%) resided in rural area, 42% from lower socio-economic class and 58% were belongs to joint family. Low birth weight (66%), absence of 6 months exclusive breast feeding (70%), delayed or inadequate complimentary feeding (46%) and incomplete immunization (38%) were common predisposing factors. The common clinical presentation were Weakness (63%), Lethargy (54%), Diarrhoea (35%), Skin changes (35%), Fever (33%), Hair changes (32%), muscle wasting (30%), and Oedema (24%) among malnourished children. **Conclusion:** Young maternal age, maternal education levels, socio-economic class, family size, baby's birth order, length of breastfeeding, consumption of formula milk, and immunization of children play a significant impact on severe malnutrition in young children

Keywords: Malnutrition, children, risk factors,clinical profile

INTRODUCTION

All types of malnutrition are epidemic-level public health issues. Under nutrition continues to be the primary cause of children's poor health, early mortality, and morbidity in developing countries [1]. According to predictions from the World Health Organisation (WHO), in 2020, there were 149 million stunted children under five, 45 million wasted children (too thin for height), and 38.9 million overweight children. The study also revealed that about 45% of deaths among children under five are caused by under nutrition, which is common in low- and middle-income countries [2]. Malnutrition in children is also a major public health concern in India [3]. The World Health Organisation (WHO) has proposed this special classification for identifying and treating children who suffer from severe malnutrition. Severe acute malnutrition is indicated by any of the following symptoms. I) a weight less than -3 standard deviations (SD or Z score) of the median height/length WHO growth reference ii) experiencing bipedal nutritional edoema, or iii) having an upper arm circumference of less than 115 mm between the ages of 6 and 59 months [4]. Severe acute malnutrition (SAM) is a specific type of severe malnutrition. In India, an estimated 8.1 million children under five suffer from severe acute malnutrition [5, 6]. Severe acute malnourished children should be treated as "inpatients," ideally in specialised facilities such as Nutrition Rehabilitation Centres that have enough staff and resources to provide medical and nutritional therapy [7]. In a nutrition rehabilitation clinic, severe acute malnutrition with co-morbidities and medical consequences must be treated and monitored. The prevalence of stunting, wasted, severely wasted, underweight, and overweight in children under five is 35.5%, 19.3%, 7.7%, and 32.1%, respectively, based

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on data from the fifth National Family Health Survey (NFHS-5) [8]. Over 19 million children under five were impacted by SAM globally in 2015 [9]. These children will be recognised before they experience health issues if severe acute malnutrition is detected early [10]. In the therapy of severe acute malnutrition inpatient care, dietary interventions utilising WHO F 75 and F 100 formulae have improved results, such as lower mortality, quicker recovery, and increased weight gain.

Aim & Objective

The study's objective and aim is to determine the clinical features and risk factors of severe malnutrition in infants less than six months.

MATERIAL AND METHODS

This cross sectional observational hospital based study was carried out in the department of paediatrics in KD Medical College Hospital and Research Centre, Mathura, U.P.

All children visited inpatient and outpatient department during study period were screened for their nutritional status and those found to have severe acute malnutrition were included in this study after fully satisfying the following criteria:

a) Weight-for-height less than -3 SD and/or

b) Visible severe wasting and/or Mid Upper arm circumference (MUAC) < 11.5 cm and/or

c) Nutritional edema of both feet

Inclusion criteria

- Children with 6 months to 5 years of age group, and both genders
- Children diagnosed as acute malnutrition
- Parents who provided written informed consent

Exclusion criteria

- Children <6 months or>5 years of age group
- Children with chronic renal failure, congenital heart diseases, liver disorders, asthma, mental retardation, or cerebral palsy
- Parents who not provide written informed consent

Patient's socio-demographic data (age, gender, residential area, socio-economic class, family size, birth order etc), comprehensive clinical profile resulted from a thorough anthropometric examination, analysis of related risk factors, and analysis of comorbidities were recorded in all cases.

Data analysis

Data was entered into Microsoft excel 2010 professional spreadsheets and analyzed using SPSS version 22.0. Data analysis was done as per objective; descriptive statistics in form of percentages, charts, tables or graphs. Chi-square test was used for significance. A $p<0.05$ considered as statistically significant

RESULTS

Among 50 cases of acute malnutrition, majority of the cases (38%) were 13-24 months of age group, slightly female predominance (56%). Most of them (60%) resided in rural area, 42% belong to lower socio-economic class and 58% were belongs to joint family [Table: 1].

Table1: Demographic features of acute malnourished children

Demographic variable		Frequency	Percentage
Age group	6-12 months	15	30%
	13-24 months	19	38%
	>2 to 5 years	16	32%
Gender	Male	22	44%
	Female	28	56%
Residence	Rural	30	60%
	Urban	20	40%
Socio-economic class	Lower	21	42%
	Middle	18	36%
	Upper	11	22%
Family status	Joint family	29	58%
	Nuclear family	21	42%

Among risk factors of malnutrition: low birth weight (66%), absence of exclusive breast feeding up to 6 months of age (70%), Delayed introduction of complimentary feeding beyond 6 months with inadequate quantity (46%),incomplete immunization (38%) and mothers unawareness regarding malnutrition (84%) were major risk factors for SAM (table 2).

Table 2: Risk factors associated with the acute malnourished children

Risk factors		Frequency	Percentage
Exclusive Breast Feeding	Yes	15	30%
	No	35	70%
Delayed Complimentary	Yes	23	46%

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Feeding	No	27	54%
Low Birth Weight	Yes	33	66%
	No	17	34%
Birth maturity	Pre-term	21	42%
	Term	29	58%
Immunization status	Unimmunized	7	14%
	Partially immunized	19	38%
	Fully immunized	24	48%
Mother's Awareness About Malnutrition	Yes	8	16%
	No	42	84%

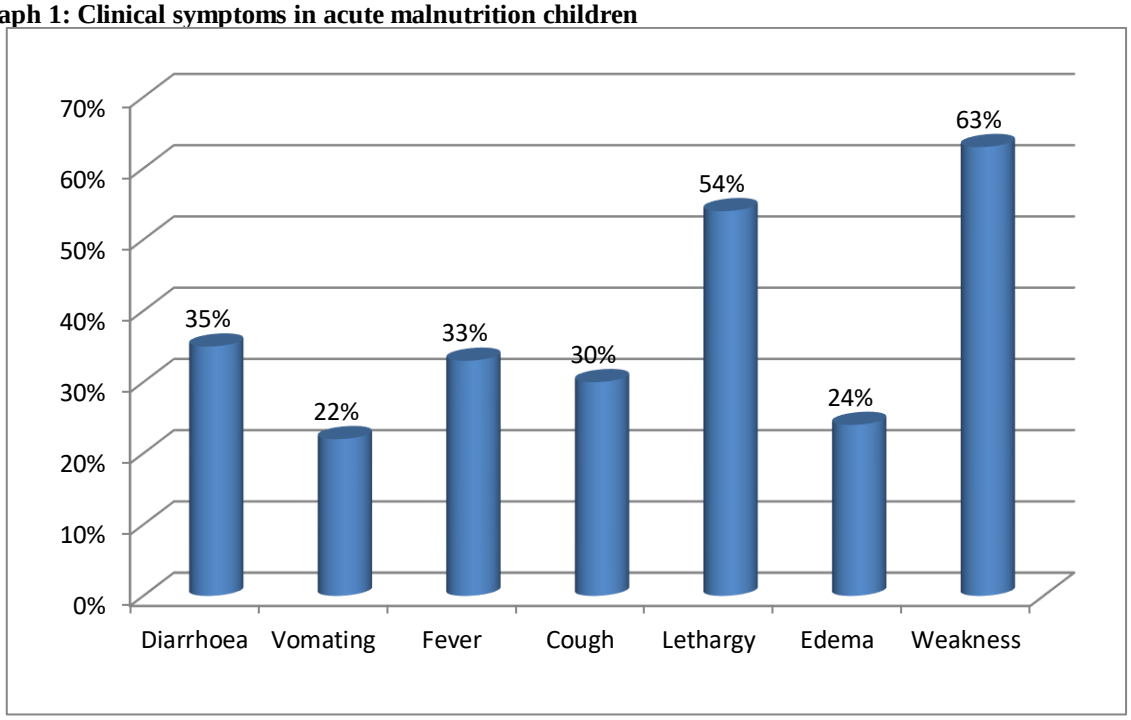
Among the co-morbid conditions precipitating the malnutrition, Anaemia (44%) was the commonest followed by UTI (34%), Hypoglycaemia (30%) and septicaemia (20%). (Table 1). Mantoux test was reactive and chest x-ray was abnormal with positive contact history in 6% of the study population suggesting Tuberculosis

Table 3: Categorization of study population according to co-morbidities

Risk factors		Frequency	Percentage
Anemia	Yes	22	44%
	No	28	56%
Hypoglycemia	Yes	15	30%
	No	35	70%
UTI	Yes	17	34%
	No	33	66%
Tuberculosis	Yes	2	6%
	No	47	94%
Septicemias	Yes	10	20%
	No	40	80%

The common clinical presentation of malnourished children were Weakness (63%), Lethargy (54%), Diarrhoea (35%), Skin changes (35%), Fever (33%), Hair changes (32%), muscle wasting (30%), cough (30%), Oedema (24%), and vomiting (22%) [Graph 1 & 2]

Graph 1: Clinical symptoms in acute malnutrition children



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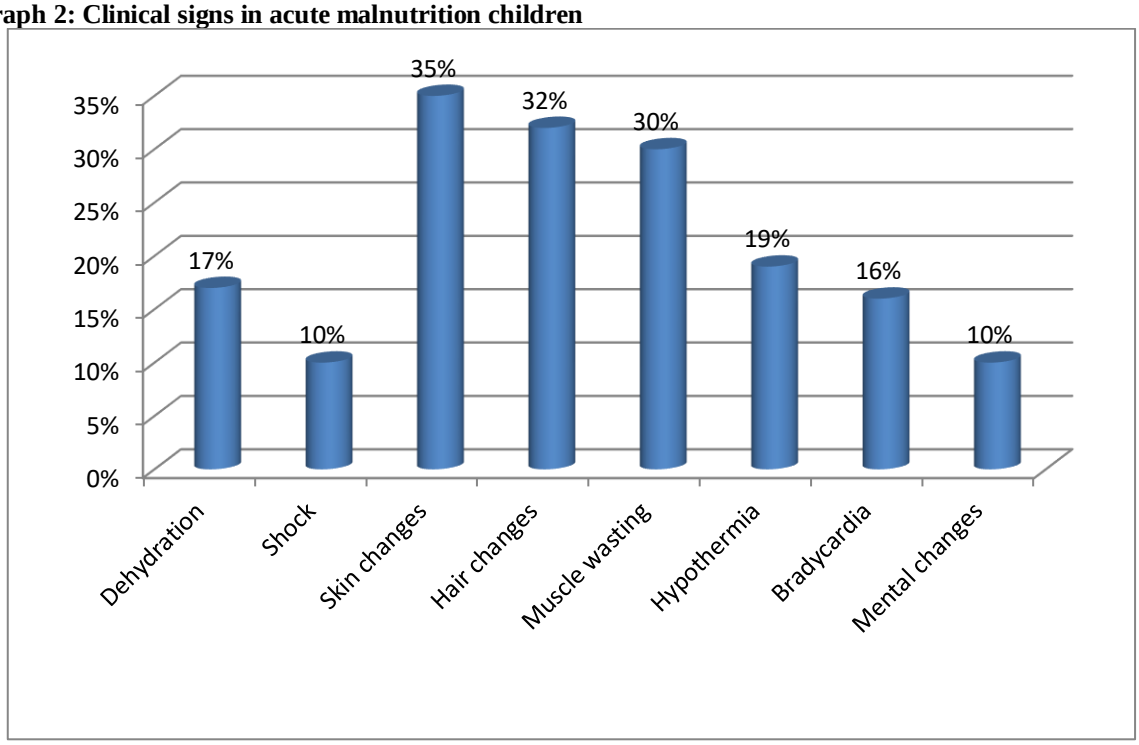
Graph 2: Clinical signs in acute malnutrition children



DISCUSSION

Acute Malnutrition is a preventable and treatable cause of childhood mortality and morbidity by an adequate nutritional assessment and prompt diagnosis. In our study, majority of the children (38%) were within 13-24 months of age, similarly, in the studies done by Choudhary et al [11] and Mamidi, et al [12], majority of patients (96% and 71% respectively) were below 24 months. This could be due to rapid growth occurs and requirement of substrates for energy and building of tissues also increases, thus deficiency of energy, protein and micronutrients often result in malnutrition in the first 2 years of life.

Present study found, females were more than males with a ratio of 1.27:1, concordance with the Singh, et al [13] and Das S, et al [14] reported that extent of malnutrition was significantly higher in girls, discordance to our results, Goyal S, et al [15] and Devi RU, et al [16], described higher incidence of malnutrition in males. They postulated that due to ritual and social norms, parents give more importance and seek medical advice more often for male child.

Current study found most of the malnourished child resided at rural area, lower socio-economic class and belong to joint family, in agreement with the Sharma BL, et al [17] and Sayad TA, et al [18]. This indicates that poor purchasing power, unavailability of food, improper distributions make the children vulnerable to malnutrition in a deprived community.

We have found that absence of exclusive six months breast feeding, Delayed introduction of complimentary feeding, low birth weight incomplete immunization and mothers unawareness regarding malnutrition were the major risk factors of acute malnutrition in children, our results comparable with the Hoq et al [19] and M David, et al [20].

Bottle fed babies are more prone to infections due to poor hygienic condition of both bottle and nipple, and high incidence of bottle feeding lead to malnutrition has been reported by Aneja, et al [21].

Anaemia, lower urinary tract infection, hypoglycemia and septicaemia were the common comorbidities associated with the acute malnutrition of children in this research, consistence with the Kumar R, et al [22].

In our study weakness, Lethargy, Diarrhoea, Skin changes, Fever, Hair changes, muscle wasting, cough, Oedema, and vomiting were the common clinical presentation in malnourished children, our findings equivalent to those of Maria BR et al [23], D Suman et al [24], and M. Munirul Islam et al [25].

Illiteracy and poverty were the major factors contributing to malnutrition in children. Acute malnourished children are staying longer in hospital and have a higher morbidity and mortality.

CONCLUSION

We discovered that acute malnutrition in children under five years of age was significantly influenced by low maternal age, low socioeconomic position of the family, bigger family size, and mother's educational status. Low birth weight, non-exclusive breastfeeding, milk preference, bottle feeding and Immunization status of children were significant predictors. Our findings highlight the necessity of including mother education and information about infant malnutrition, for an intervention to be successful, a variety of risk factors need to be addressed.

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