



Infection profile in children with severe acute malnutrition –a study from tertiary care centre of Rajasthan

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ABSTRACT	<p>Subtitle / objective: - To study the clinical and infection profile in children with severe acute malnutrition admitting in tertiary care hospital.</p> <p>Design:-Prospective observational study</p> <p>Subject: - Infant and children (6 month to 5 year) having severe acute malnutrition admitted in hospital during period of 12 months.</p> <p>Methods: - A total of 375 cases of acute severe malnutrition were enrolled in the study and a detailed history and physical examination finding were recorded in pretested proforma at the time of admission and relevant investigation was done in all patients.</p> <p>Result:- Most common presenting symptom was fever (70.7%), followed by vomiting (52%), loose motion (46.7%), cough (46.7%) and loss of appetite or weight loss (30.7%). Most common co morbidity associated with PEM was gastrointestinal (60%) followed by respiratory tract infection (52%). Other associated co-infections were tuberculosis (9.3%), measles (4%) and HIV (4%).</p> <p>CONCLUSION: - Gastrointestinal and respiratory infections are the most common cause of hospitalisation and morbidity in acute severe malnutrition</p>
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KEYWORDS	Acute severe malnutrition, Infection, Co-morbidity
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INTRODUCTION:-
Malnutrition is rampant in paediatric age group. It is responsible for high morbidity, mortality and serious long term sequelae. Infections occurring with malnutrition are major cause of morbidity in all age groups and are responsible for majority of all death under 5 yr of age in developing countries [9]. Mucosal barrier immunity is impaired in the malnourished host due to the altered architecture and composition of the mucosal tissues which or reduced IgA secretion [3]. Secretory IgA is an important component which protects the respiratory and gastrointestinal tracts against infection with pathogenic organisms. Thus malnutrition and infection can be mutually aggravating and produces more serious consequence for the patient

METHOD:-
We conducted prospective observational study of patients with acute severe malnutrition admitted in hospital unit of the tertiary care hospital in western Rajasthan, SRG hospital and medical college, Jhalawar, Rajasthan. A total of 375 patients enrolled in study between 6 month to 5 year of age during the period of 12 months.

Criteria for admission were (age group 6 month to 5 years):

1. Weight for height/ length -3 SD (WHO/NCHS median height).
2. Bilateral pedal oedema
3. Grossly visible severe wasting.
4. Mid upper arm circumference <11.5 cm

A detailed history and physical examination finding will be recorded at the time of admission by using standard methodology and anthropometric measurement expressed in standard deviation from the median of the reference population standards (NCHS). After admission, investigations like Haemoglobin,

total and differential leucocytes count, ESR, urine and stool examination, MT, HIV ELISA , chest X-Ray, electrolytes and other investigations were done as and when required.

RESULTS
Out of all admitted patients, 360 (96 %) were below 2 yr of age. Male patient constituted 74.6 % of the total with a ratio of M: F = 2.9:1. The mean age of admitted patients was 14.92 ± 7.48 months among them 275 (83.3 %) were living in rural area.

Fever was the most common presenting complaint in 265 (70.7 %) patients, followed by vomiting in 195 (52 %), loose motion in 175 (46.7%), cough in 175 (46.7 %) and loss of appetite or weight loss in 115 (30.7%) patients. Other complaints were abdominal distension in 25 (6.7%), rash in 15 (4%) and convulsion and ear discharge in 10 (2.7%) patients each. **Table 1**

Most common co-morbidity associated with malnutrition were gastrointestinal tract disturbances in 225 (60%), followed by respiratory tract infection in 195 (52%), urinary tract infection in 15 (4.0%), otitis media in 10 (2.7%). **Table 2**

Most common observed vitamin Deficiency was vitamin B in 150 (40%), followed by vitamin A in 105 (28 %), vitamin D in 25 (6.7 %) and vitamin C in 5 (1.3%) patient.

Angular stomatitis and conjunctival xerosis were most common deficiency sign.

Discussion:-
Protein energy malnutrition is associated with number of infection, vitamins and micronutrients deficiency. Inadequate

intake, infection and poor nutritional status are intimately linked. The cumulative effect of reduced energy and nutrients intake caused frequent infection in these children.

In developing countries a major factor in PEM is the effect of frequent infection during 1st year of life. Diarrhoea, respiratory and other infectious diseases are frequent in most children in rural and low income group. Commonest cause of mortality in malnutrition is chronic diarrhoea and respiratory infections.

Malnutrition can interfere with antibody formation and it also reduces the ability to phagocytosis, chemotaxis and complement function of body. Thus malnutrition and infection can be mutually aggravating and produces more serious consequence for the patient.

In our study, we observed that most common presenting symptom was fever followed by vomiting, loose motion, cough and loss of appetite or weight loss .Other common presenting symptom were oedema, abdominal distension and ear discharge. Bernal et al⁴ (2008) and Bagga et al² (2003) in their study also reported diarrhoea and fever as common presenting symptom. Ashraf et al¹ (2001) also reported that diarrhoea (25.8%) and fever/vomiting (30.9%) were the common presenting symptom in malnourished children.

Most common co morbidity associated with PEM was gastrointestinal (followed by respiratory tract infection UTI and otitis media. Other associated co-infection were tuberculosis, measles, HIV. Sharma¹⁰ (2004) reported in his study that the incidence of malnutrition interlinked with infections was 4%. Diarrhoea and dysentery constitute majority of infections (about 50%) and second most common infection was recurrent upper and lower respiratory infection. Bernal et al⁴ (2008) reported that most common associated illness at admission was diarrhoea (68.4%), among these 31.5% were dehydrated. Diarrhoea and dysentery constitute majority of infection (50%) and second most common infection was respiratory tract infection.

Vijakaram and Bhaskaran¹³ (1990) in their study found a significant association between PEM and Tuberculosis. Thrustans et al¹² (2008) reported that overall prevalence of HIV in severely malnourished patients is 21.6%. Malnutrition adversely affects the immune status of children and makes them more vulnerable to infections. Diminished immune functions render undernourished patients more susceptible to infections.

In our study, Vitamin B deficiency was most common followed by Vitamin A, Vitamin D and Vitamin C and most common deficiency sign were cheliosis, angular stomatitis and conjunctival xerosis. Chainani et al⁵ (1994) in their study compared different vitamin deficiency between malnourished and normally nourished children and observed prevalence of vitamin A deficiency in (15.7% v/s 1.8%), vitamin B in (7.6% v/s 0.4%), vitamin D in (11.9% v/s 2%) and vitamin C in (1.1% v/s 0 %) children. Mitra et al⁸ (2006) also reported vitamin A deficiency in 8.7% and vitamin B in 32.5% of malnourished patients. Madhu et al¹² (2000), Choudhary et al⁷ (2000) and Chandna and Sehgal⁶ (1994) also reported that angular stomatitis, xerosis of conjunctiva, cheliosis and glossitis were the most common vitamin deficiency sign.

Bernal et al⁴ (2008) conducted a study on treatment of severe malnutrition in children by implementing the WHO Guidelines and observed that most common sign of infection at admission was fever (26.3%), and most common associated illness at admission was diarrhoea (68.4%) with a significantly higher frequency in children with mild and moderate malnutrition ($P = 0.003$).

Conclusion:-

So we concluded that infection in severe malnutrition is common cause of morbidity and mortality. Infections also adversely affect the nutrition in these child. So it is very important to anticipate and aggressively treat infection in severely malnourished child so that mortality can be prevented.

Contributors- none
Funding-none
Competing interest-none

Table-1
Distribution according to Presenting Complaints

S. No.	Complaints	Number of patient n (%)
1.	Fever	265 (70.7)
2.	Vomiting	190 (50.7)
3.	Loose motion	175 (46.7)
4.	Cough	175 (46.7)
5.	Loss of appetite (Weight loss)	115 (30.7)
6.	Oedema	55 (14.7)
7.	Abdominal Distension	25 (6.7)
8.	Rash	15 (4.0)
9.	Convulsion	10 (2.7)
10.	Bleeding	10 (2.7)
11.	Ear discharge	10 (2.7)

Table 1 depicts presenting complain in Severe acute malnutrition

Table-2
Distribution according to disease pattern

S. No.	Morbidity	No. of patient n (%)
1.	Acute diarrhoea vomiting	140 (37.3)
2.	Bronchopneumonia	115 (30.7)
3.	Upper respiratory tract infection	80 (21.3)
4.	Acute vomiting	50 (13.3)
5.	Tuberculosis	35 (9.3)
6.	Acute diarrhoea	35 (9.3)
7.	Dysentery	35 (6.7)
8.	Measles	15 (4)
9.	HIV	15 (4)
10.	Urinary tract infection	15 (4)
11.	Otitis media	10 (2.7)
12.	Septicaemia	05 (1.3)
13.	Malaria	05 (1.3)

Table 2 depicts co morbidity associated with malnutrition

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