Original Research Paper

Medical Science

TO FIND THE VARIOUS COMORBIDITIES ASSOCIATED WITH SEVERE ACUTE MALNUTRITION AMONG HOSPITALIZED CHILDREN OF EITHER GENDER FROM 6–59 MONTHS OF AGE

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KEYWORDS :

INTRODUCTION:

Severe acute malnutrition (SAM) is one of the major public health issues, affecting an estimated 8.1 million under-five children in India **(1).** Nearly 0.6 million deaths and 24.6 million disability adjusted life years are attributed to this condition. Diarrhea and pneumonia account for approximately half the under-five deaths in India and malnutrition is believed to contribute to 61% of diarrheal deaths and 53% pneumonia deaths **(2).** India is at the epicenter of this crisis despite the country's recent economic progress **(3)**..Severe acute malnutrition is defined as: (i) Weight/height or Weight/length < -3 Z score, using WHO Growth Charts; or (ii) presence of visible severe wasting; or (iii) presence of bipedal edema of nutritional origin; or (iv) mid-upper arm circumference (MUAC) <115 mm **(4).**

Childhood undernutrition is an underlying cause in the estimated 45% of all deaths among under 5 children. According to the National Family Health Survey 4, carried out in 2015-2016, 36% of Indian children under the age of five are underweight, 38% are stunted and 21% are wasted (5,6). Although the prevalence of stunting and underweight among children under-five years of age worldwide has decreased since 1990, overall progress is insufficient and millions of children remain at risk. Proper nutrition contributes significantly to declines in under-five mortality rates. Improving nutritional status is essential for achieving the Millennium Development Goals (MDGs) **(7).**

MATERIAL AND METHODS:

The present study, a observational study, was conducted in the Post Graduate Department of Pediatrics, SMGS Hospital, Government Medical College, Jammu on children of either gender from 6–59 months of age admitted in hospital from 1 November 2013 to 31 October 2014 to describe various morbidities associated with severe acute malnutrition .A total of 120 children were selected. Out of these 57 children had weight for weight/height above -2 SD/Z score of WHO growth standards. These were taken as controls. Rest 63 children with inclusive criteria were selected.

Case definition of severe acute malnutrition as oultlined by WHO was used (any one of the following):
• weight for height/length or weight/length <-3 SD/Z,
• visible severe wasting(of nutritional origin),
• presence of bipedal edema and /or mid upper arm circumference <11.5 cm

INCLUSION CRITERIA

Children age 6 months to 59 months both male and female with WHO case definition on admission were included in the study.

EXCLUSION CRITERIA

children with acute secondary problems like cerebral palsy, meningitis, infiltrative disorders, congenital malformations, chronic systemic disease were excluded.

Methods A thorough history including following risk factors was taken:
• **Socioeconomic factors**
• **Feeding practices**)
• **Immunization**
• **Detailed anthropometric measurements:** including height/length, weight, mid upper arm circumference by uniform measuring tools was done and then plotted on standard WHO growth charts. Length was measured by infantometer, height by stadiometer, to the nearest mm. Weight using a standard electronic weighing scale kept on firm horizontal surface which weighs up to the difference of 1 gm. MUAC was measured by flexible measuring tape wrapped around the mid-upper arm (between the shoulder and elbow) to measure its circumference, measured to the nearest 0.1cm..With the left arm bent, string was used to find the midpoint of the arm between the shoulder and the tip of the elbow. MUAC was then measured on the left upper arm while the arm was hanging down the side of the body and relaxed.
• Detailed general physical and systemic examination was done.
• All children were subjected to appropriate investigations like complete blood counts, blood sugar , serum electrolytes, serum protein, urine routine , blood and urine culture , stool routine ,PBF for malaria parasite , chest x ray, gastric aspirate for AFB , HIV serology in cases of high index of suspicion .
• A questionnaire was used to interview the caregivers of the study population and all information was collected.

STATISTICAL ANALYSIS

The data was analyzed with the help of statistical program SPSS VERSION 17.0. CHI SQUARE test was applied to compare the proportions and p value <0.05 was considered as statistical significant. The odd's ratio (OR) > 1 is positively correlated with malnutrition and or <1 negatively correlated. Qualitative variables were represented as percentages.

RESULTS AND OBSERVATIONS:

TABLE -1 Variables found to be significant risk factors for severe acute malnutrition

Risk factors	Cases (%)	Odd's ratio	95% CI	p- value
Mother illiterate	77.77	28.55	10.59-87.13	<0.01
Father illiterate	58.25	21.65	7.87-68.33	<0.01
Father's occupation (labourer/unemployed)	68.25	21.64	7.87-68.33	<0.01

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Large Family >5 siblings	93.65	65.08	20.57-253.7	<0.01
Drug addiction	12.69	8.03	0.30-4.05	0.02
Household income ≤Rs 200/day	52.38	3.48	1.79-8.46	<0.01
Birth order >3	35.09	2.61	1.25-5.56	<0.01
Medical factors				
Low birth weight	76.19	31.91	11.34-105	<0.01
Lack of exclusive breast feeding	82.53	38.25	13.76-120.7	<0.01
Deprivation of colostrums	60.32	3.25	1.54-7.04	<0.01
Received prelacteal feeds	74.60	9.96	4.59-23.23.01	<0.01
Breast feed period<9 months	49.20	2.08	0.99-4.46	0.05
Put to breast after first hour	79.36	16.26	6.79-41.93	<0.01
Inadequate complementary feeding	69.84	23.28	8.43-75.08	<0.01
Improper dilution	55.88	2.72	0.72-10.47	<0.01
Incomplete vaccination	60.31	3.01	1.45-6.46	<0.01

*Significant p value less than 0.05

TABLE 2 Various morbidities observed with severe acute malnutrition

Associated morbidities observed*	Cases (n=63)	
	No.	%
Persistent diarrhea	14	22.22
Recurrent RTI	13	20.63
Sepsis	11	17.46
Recurrent Otitis media	5	12.69
Skin infection	10	7.96
Measles	9	14.28
Whooping cough	4	6.35

*More than one morbidities were seen in all children

- Out of all the 63 cases most common comorbiditty seen was persistent diarrhea (22.22%), and recurrent RTI (20.63%), followed by sepsis (17.46%), and measles (14.28%) recurrent otitis media (12.69%). And the least common was, and skin infections (7.96%), whooping cough (6.35%) was the least common.associated comorbidity.

BAR CHART SHOWING VARIOUS ASSOCIATED MORBIDITIES
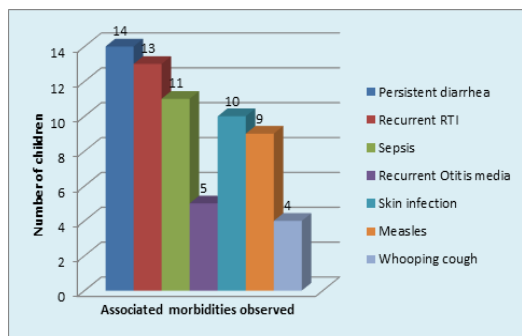
DISCUSSION:

A total of 120 children were taken up for study. Out of these 57 children had weight for height/length above - 2 SD/Z score of WHO growth standards. These were taken as controls. Rest 63 children fulfilling the inclusive criteria were included in the study.(10) Sex-wise distribution of the cases in our series showed slight male preponderance (68.25%). (8,9,10).. %). Variables found to be significant risk factors for severe acute malnutrition include mother illiterate in 77.77% cases, father illiterate 58.25% , father labourer or unemployed in 68.255 caeses, large family > 5 siblings 93.65%, household income < Rs 200/day in 52.385 cases, birth order >3 35.09%, low birth weight 76.19%, lack of breastfeeding 82.53%, deprivation of colostrums 60.32%, received prelacteal feeds 74.6%, breastfeeding < 9 months 49.2%,put to breast after 1 hour in 79.84%, improper dilution 55.88%, incomplete vaccination in 60.38% cases, drug addiction in 12.69% cases.Out of the total cases of SAM cases, marasmi-kwashiorkar was the most common type of PEM seen in 49.21% of cases, followed by marasmus in 34.92% and kwashiorkar in 15.87% of cases.

Children with severe malnutrition are more prone to infections than others due to the immunosuppressive effect of malnutrition and the loss of the protective mucosal barrier in the gastrointestinal tract. Moreover, studies have shown that severely malnourished children are more prone to gut barrier dysfunction, *Escherichia coli* bacteraemia and higher mortality from invasive bacterial infection. Among the medical risk factors recurrent diarrhea, recurrent respiratory tract infections, sepsis, skin infections, measles were the most commonly associated comorbidities in the order of prevelance. Out of all the 63 cases most common comorbiditty seen was persistent diarrhea (22.22%), and recurrent RTI (20.63%), followed by sepsis (17.46%), and measles (14.28%) recurrent otitis media (12.69%). And the least common was, and skin infections (7.96%), whooping cough (6.35%) was the least common.associated comorbidity.

This was similar to the previous studies by **Irena et al. (2011)** and **Kumar et al. (2014)**.(11) Though previous reports have described malnutrition as an important risk factor for pneumonia than for diarrhea, however, diarrhea was the major co-morbid condition found in our study (22.22%), followed by recurrent RTI (20.63%). Studies by **Laghari et al (2013)** found some higher percentage of cases with diarrhea in 61% and RTI in 51% of cases. Measles also has severe consequences on the nutritional status. Previous studies by **Bhaskaram et al. (1999)** showed 3-4% of children with past history of measles, **Kumar et al. (2014)** found 3.8% cases, but we found it in higher number of cases (9%). In a Colombian study by **Bernal et al. (2008)** sepsis was found to be in 9% of cases. Similarly in our study, sepsis was seen in 11% of cases.

CONCLUSION

We infer that significant morbidities are associated with severe acute malnutrion ,hence preventive measures against the significant risk factors would go a long way in reducing the morbidity and mortality of severe acute malnutrition.

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