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OUTCOME OF SEVERE AND MODERATE ACUTE MALNUTRITION IN PATIENTS IN NUTRITIONAL REHABILITATION CENTRE AT A TERTIARY CARE CENTRE OF WESTERN MAHARASHTRA.

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ABSTRACT

Malnutrition, as a major public health and nutrition challenge faced by many developing countries, stands as a consequence of several key social and economic factors such as lack of education, inadequate health care services and ill-informed cultural behaviors. The present study was undertaken to assess socio-epidemiological determinants of acute malnutrition, clinical profile, and outcomes of acute malnutrition patients admitted in NRC of a tertiary referral health center. This is a cross-sectional study conducted in the Nutritional rehabilitation centre of B.J. Government Medical College and Sassoon General Hospital Pune. The study population are 100 children with acute malnutrition admitted in the NRC from January 2014 to June 2015. A detailed socio-demographic history, anthropometry, clinical examination of patients were done. Anthropometry were documented as per the protocol of NRC. WHO growth charts were used for assessment of nutritional status of the children. The data were documented on predesigned proforma. Weight at the time of admission and discharge and daily weights were recorded in NRC proforma, average weight gain per-kg per-day was calculated. Faulty feeding practices -like giving pre-lacteals(28%) ,prolonged breastfeeding more than 2years (50% of above 2years) , early initiation of complementary feeding (50%), bottle feeding(42%), late initiation of complementary feeding (14%)show positive association with acute malnutrition. Mothers in their antenatal and post natal period to be taught about correct feeding practices. In the study late initiation of breast feeding more than 2 years in causing severe malnutrition compared to moderate malnutrition, was found to be statistically significant with p value=0.002. Underlying

KEYWORDS

OUTCOME OF SEVERE AND MODERATE ACUTE MALNUTRITION IN PATIENTS IN NUTRITIONAL REHABILITATION CENTRE AT A TERTIARY CARE CENTRE OF WESTERN MAHARASHTRA.

Abstract: Malnutrition, as a major public health and nutrition challenge faced by many developing countries, stands as a consequence of several key social and economic factors such as lack of education, inadequate health care services and ill-informed cultural behaviors.

The present study was undertaken to assess socio-epidemiological determinants of acute malnutrition, clinical profile, and outcomes of acute malnutrition patients admitted in NRC of a tertiary referral health center. This is a cross-sectional study conducted in the Nutritional rehabilitation centre of B.J. Government Medical College and Sassoon General Hospital Pune. The study population are 100 children with acute malnutrition admitted in the NRC from January 2014 to June 2015. A detailed socio-

demographic history, anthropometry, clinical examination of patients were done. Anthropometry were documented as per the protocol of NRC. WHO growth charts were used for assessment of nutritional status of the children. The data were documented on predesigned proforma. Weight at the time of admission and discharge and daily weights were recorded in NRC proforma, average weight gain per-kg per-day was calculated. Faulty feeding practices –like giving pre-lacteals(28%) ,prolonged breastfeeding more than 2years (50% of above 2years) , early initiation of complementary feeding (50%), bottle feeding(42%), late initiation of complementary feeding (14%)show positive association with acute malnutrition. Mothers in their antenatal and post natal period to be taught about correct feeding practices. In the study late initiation of breast feeding more than 2 years in causing severe malnutrition compared to moderate malnutrition, was found to be statistically significant with p value=0.002. Underlying respiratory system involvement (40 %) was the most commonest comorbid system involved followed by gastro-intestinal (21%) and central nervous system(20%). Outcome indicators were in accordance with National standards (recovery rate more than 75% and death rate less than 5%. This is important as the primary objective of NRC is to reduce fatality rate among children with SAM.

Introduction:

Malnutrition, as a major public health and nutrition challenge faced by many developing countries, stands as a consequence of several key social and economic factors such as lack of education, inadequate health care services and ill-informed cultural behaviors. Children with severe acute malnutrition have nine times higher risk of dying than well nourished.(2) In 2013, globally of the under five old children , 161 million were estimated to be stunted, 51 million were wasted, 17 million were severely wasted and 99 million were underweight.(3) Further about half of all stunted children reside in Asia and over one third in Africa. Similarly children with wasting accounted for approximately two thirds living in Asia and almost one third in Africa.(3) Malnutrition in children is widely prevalent in developing countries including India. More than 33% of deaths in 0-5 years are associated with malnutrition.(3) Nutritional status of children below 5 years in Maharashtra state as per District Level Health Survey -4(2012-13) states that about 34.1% of them were wasted,30% of them were stunted, 38.7%of them were underweight.(5) Nutritional status of children with age 0-23months in Pune as per comprehensive nutritional survey in Marashtra-2012 states that about 4.3% were stunted, 3.7% were wasted,4.3% were underweight (6).

Malnutrition increases mortality, morbidity, impairs physical and mental capabilities of child. Thus, such children require attention with proper nutritional rehabilitation. WHO growth charts are used to assess malnutrition status of the child. NRC patients are managed according to guidelines published in facility based care of severe acute malnutrition by Ministry of Health and Family Welfare, Government of India,2012.(2) As per the guidelines moderate acute

malnutrition do not require admission and can be managed on outpatient department. Ours being a tertiary center with children having underlying comorbidities are required to stay for a longer duration. These children were further managed nutritionally at the NRC. Furthermore, to reduce occurrence and long term consequences of malnutrition, there is an urgent need for recognizing risk factors/determinants of malnutrition and implement interventions to rectify them. The present study was undertaken to assess socio-epidemiological determinants of acute malnutrition, clinical profile, and outcomes of acute malnutrition patients admitted in NRC of a tertiary referral health center.

Methodology:

This is a cross-sectional study conducted in the Nutritional rehabilitation centre of B.J. Government Medical College and Sassoon General Hospital Pune. The study population are children with acute malnutrition admitted in the NRC from January 2014 to June 2015. The Inclusion criteria: All patients with A) SAM,(1)Children > 6 months of age till 60 months of age: weight-for-height less than -3SD and/ or visible severe wasting and/or mid-arm circumference<11.5cm and/or edema of both feet. (2) Infants 1 to 6 months of age: any infant more than 49cm in length with following features - weight-for-height less than -3SD and/ or visible severe wasting and/or edema of both feet. Any infant less than 49 cm in length -visible severe wasting. B) All patients with MAM 1) Children between 6 month to 60 months of age: weight-for-height between -2SD to -3SD and/or mid upper arm circumference 11.5 to 12.5 cm but no edema, child should have good appetite and be alert . 2) Infants between 1 month to 6 months of age: weight-for-height between -2SD to -3SD ,accepting orally well . The Exclusion criteria: 1))Patients with edema primarily due to non nutritional cause on admission. 2) Patients not willing for admission to Nutritional rehabilitation Centre. Consent for participation, counselling and confidentiality was maintained. The sample size of acute malnutrition patients was 100. A detailed socio-demographic history, anthropometry, clinical examination of patients were done. Anthropometry were documented as per the protocol of NRC. WHO growth charts were used for assessment of nutritional status of the children. The data were documented on predesigned proforma. Weight at the time of admission and discharge and daily weights were recorded in NRC proforma, average weight gain per-kg per-day was calculated.

Standard of Care: At Nutrition Rehabilitation Centers (NRCs), children with SAM and MAM receive therapeutic care following protocols based on the guidelines for the management of Acute Malnutrition by Ministry of Health and Family Welfare, Government of India,2012(110, 7). The acute malnutrition patients enrolled were monitored for dehydration, hypothermia, hypoglycemia, feeding difficulties, respiratory distress, sepsis during their hospital stay along with relevant hematological and radiological investigation and outcome noted. Predesigned proforma were used to document all relevant demographic, clinical and laboratory data. Investigations: All relevant investigations like complete haemogram, liver function test , renal function tests,

urine routine, X ray chest, ultrasonography of skull and abdomen, blood culture, urine culture where appropriately required were done.

Children were discharged from the NRC when they met the following discharge criteria: 1)The child is active or alert 2)The child has no signs of bilateral pitting edema, fever, and /or infection.3)The child has completed all age appropriate immunizations.4)The child is being fed 120-130 kcal/kg weight/day; and 5)The primary caregiver knew the care that the child needed to receive at home.6)Completed 14 days stay of NRC.

Adverse outcome included death, no recovery, discharge against medical advise . Statistical analysis were as follows. The data collected were tabulated. Percentages were calculated. Pearson chi-square and Fischers exact test were applied for statistical significance. Outcome were as follows: Recovered -Cases who have completed full antibiotic course ,free from any complications, good appetite, weight gain more than 5gm/kg/day in last 3 days(112, 8), good activity, no pedal pitting edema, immunized completely, completed minimum of 10 days of NRC stay and are fit for discharge. Death - Cases who died during the course of NRC stay. Discharge against medical advise - Cases who require hospital care, weight gain less than 5gm/kg/day in last 3days, pitting pedal edema present, immunization incomplete, and not willing for further stay. Referred /transferred - cases who are transferred to other hospital or any other specialty department in the same hospital for further necessary treatment.

Results: A total of 101 cases of acute malnutrition patients were studied. Out of 101 cases , 39 cases were in the age group between 1month-6month and 62 cases were in the age group between 6month-5years. Out of 101 cases, 55 cases were male children and 46 were female.

Out of 101 cases, 91 cases fall under severe acute malnutrition and 10 cases fall under moderate acute malnutrition. Cases were divided into 2 groups according to their age, GROUP A -above 1month upto 6month, GROUP B-above 6month- 60months. IN GROUP A -23 cases were females,16 cases were male and in GROUP B-23 cases were females, 39 cases were males. IN GROUP A -all cases were without edema and in GROUP B -10 cases were with edema. IN GROUP B -36 cases were having mid arm circumference less than 11.5cm and 24 cases were having between 11.6 to 12.5cm. IN GROUP A -38 cases had severe visible muscle wasting and IN GROUP B-30 cases had severe visible muscle wasting. IN GROUP A -38 cases were SAM, 1 case was MAM and IN GROUP B -53 cases were SAM, 9 cases were MAM. Of 33 completely immunized,9 cases belongs to GROUP A, 24 cases belongs to GROUP B. Of 53 partially immunized,18 cases belong to GROUP A,35 cases belong to GROUP B. Of 14 unimmunized, 12 cases belong to GROUP A, 2 cases belong to GROUP B. Only one case was there for which immunization details not available and it belongs to group-B. IN GROUP A -30 cases completed the duration of 14 days stay, 9 cases did not completed the duration of 14 days stay and IN GROUP B -51 cases completed the duration of 14 days stay,11 cases did not

completed the duration of 14 days stay. In group A , 29 got recovered ,1 died,6 went discharge against medical advise and 3 patients were referred. In group B ,47 got recovered, no death,14 went discharge against medical advise and one patient was referred. In group A, 10 mothers were less than 20 years, 21 were between 20-25 yrs, 6 were above 25 yrs and details of 2 cases not available. In group B, 14 mothers were less than 20 years, 40 were between 20-25 yrs, 7 were above 25 yrs and details of 1 case not available.

Out of 39 Mothers in group A -15 were illiterate, 13 had studied till 7th std, 7 had studied till 8th-12th std , in 2 case this detail was not available and in 2 cases studied above 12th std. Out of 39 Mothers in group B -16 were illiterate, 17 had studied till 7th std,24 had studied till 8th -12th std ,in 1 case this detail was not available and 4 studied above 12thstd. IN GROUP A- out of 39 cases,12 had no BPL CARD ,25 had BPL card and details of 2 cases were not available. IN GROUP B- out of 62 cases,21 had no BPL CARD ,40 had BPL card and details of 1 case was not available. IN GROUP A, number of siblings -28 cases had less than 3 , 9 cases had more than 3 and details of 2 cases not available. IN GROUP B, number of siblings - 54 cases had less than 3 , 7 cases had more than 3 and details of 1 case not available. In group A- overcrowding was present in 16 cases , no overcrowding in 22 cases and details of 1 patient not available. In group B- overcrowding was present in 25 cases , no overcrowding in 36 cases and details of 1 patient not available. IN GROUP A , gestational age at birth of patients were -12 were preterm, 26 were term,no post term and details of 1 patient not available. IN GROUP B , gestational age at birth of patients were -1 were preterm, 59 were term,1 was post term and details of 1 patient not available. In cases who belong to group A -4 cases were less than 1.5kg, 21cases were between 1.5 to 2.5 kg,13 cases were above 2.5 kg and details of 1 patient not available. In cases who belong to group B -3 cases were less than 1.5kg, 10 cases were between 1.5 to 2.5 kg, 48 cases were above 2.5 kg and details of 1 patient not available. In group A, 29 cases were not given Prelacteals, 9 cases had given prelacteals. In group B, 41 cases were not given Prelacteals, 20 cases had given prelacteals. In group A, 1 case details of prelacteals not available . In group B, 1 case details of prelacteals not available. In group A, 22 cases were not given exclusive breast feeding, 17 cases were given exclusive breast feeding .In group B, 28 cases were not given exclusive breast feeding, 33 cases were given exclusive breast feeding. In group B, 24 cases were given complementary feeding within 1year of age, 14 cases more than 1year, were given late initiation of complementary feeding. In group B, 6 cases were not given prolonged breast feeding more than 2yrs, 6 cases given prolonged breast feeding more than 2yrs. In group A, 20 cases were not given bottle feeding, 18 cases were given bottle feeding. In group B, 37 cases were not given bottle feeding, 24 cases were given bottle feeding. IN GROUP A, 14 cases had respiratory co-morbidity, 10 cases had cardio-vascular co-morbidity, 8 cases had gastro-intestinal co-morbidity, 7 cases had nervous system co-morbidity, IN GROUP B, 28 cases had respiratory co-morbidity, 4 cases had cardio-vascular co-morbidity, 14 cases had gastro-intestinal co-morbidity, 14 cases had nervous system co-

morbidity.

In group A, 18 cases had no Anemia, 10 cases had mild Anemia, 8 cases had moderate Anemia, 3 cases had severe Anemia. In group B, 5 cases had no Anemia, 8 cases had mild Anemia, 33 cases had moderate Anemia, 16 cases had severe Anemia. HIV- 1 PATIENT WAS HAVING HIV IN GROUP A, 5 PATIENTS WERE HAVING HIV IN GROUP B, TUBERCULOSIS 2 PATIENTS WERE HAVING PULMONARY TUBERCULOSIS FROM GROUP B. In group A, 24 cases did not required PICU stay, 15 cases required PICU stay.

In group B, 41 cases did not required PICU stay, 21 cases required PICU stay. In group A, 3 cases were having weight loss, 12 cases were having inadequate weight gain, 24 cases were having adequate weight gain. In group B, 4 cases were having weight loss, 28 cases were having inadequate weight gain, 30 cases were having adequate weight gain. IN GROUP A, 22 cases did not have any complications, 4 cases had Hypothermia, 3 cases had Hypoglycemia, 7 cases had Sepsis, 3 cases had Dehydration. IN GROUP B, 27 cases did not have any complications, 6 cases had Hypothermia complications, 1 case had Hypoglycemia, 15 cases had Sepsis, 6 cases had Dehydration, 7 cases had Electrolyte imbalance.

Statistical analysis: A comparative study was done, between SAM and MAM patient groups but since percentage of MAM (9.9%) were fewer compared to SAM (90.1%), risk factors of acute malnutrition did not show statistically significant differences even though their percentage was high, sometimes in only one group. This is a limitation of our study.

In the present study late initiation of breast feeding more than 2 years in causing severe malnutrition compared to moderate malnutrition was found to be statistically significant with p value=0.002. In the present study, number of patients who recovered were more from the group who stayed for complete 14 days compared to those who did not complete 14 days and it was found to be statistically significant with p value=0.000. Chi-square test was applied for statistical analysis.

Discussion:

The problem of SAM is multidimensional and intricate of various socio demographic indicators. Most focus to date has been on the management of acute malnutrition. The study focuses on etiologies of acute malnutrition in the age group 1-6 months and more than 6 months till 60 months. Infants between 1-6 months constituted 38.4 % of acute malnutrition cases at our center. 1-6 month group requires a focus with priority as it is a phase of rapid growth and development. The burden of under nutrition in infants less than 6 months cannot be ignored and should be the significant component of malnutrition treatment programs. The young infant has multiple risks of nutritional deficiency leading to adverse impact on the growth and development. This age group is the centre of focus as they are extremely vulnerable. Moderate acute malnutrition patients account for about 10% of enrolled cases, which are usually not admitted in NRCs as a protocol. In the present study few cases of moderate

acute malnutrition patients were admitted to NRC for nutritional management along with treatment and work-up of underlying illness and with the intention of preventing them to develop severe acute malnutrition.

Anthropometric measurements also point towards that relying on only one measurement will miss cases of acute malnutrition. This indicates that relying only on one indicator may under detect true acute malnutrition and many cases may be undetected which may cause programmatic challenges. About 65% patients are incompletely immunized or unimmunized, which indicates poor contact of children with health care facility. Severe malnutrition was also found in 33% cases who were completely immunized. This may indicate that few cases have got missed at health care facility while these children were moderately malnourished, during their visit for vaccination. Taking correct complete anthropometric measurements to assess for malnutrition is very important at vaccination centers for early detection of acute malnutrition. In a study by HS Aprameya (116, 9) et.al, 84.6% cases were completely immunized and remaining were incompletely immunized. In a study by Syed Tariq A (117, 10) et.al, 13% cases were completely immunized and rest 87% were incompletely immunized. Incomplete immunization or unimmunized children will have poor contact with the health service system, further leading to inadequate health knowledge and awareness leading to acute malnutrition.

80% of children recovered in the study who completed 14 days of NRC stay. One fifth of the patients did not complete 14 days duration stay due to various socio-economic problems of the caretakers. This is one of the biggest programmatic challenges of NRC, facilities should be available for parents to manage both at the family level and patient centered. Informing the local PHC about the admitted acute malnutrition patients can help in decreasing the drop outs and further nutritional rehabilitation. In study by HS Aprameya et.al (116), 10.99% of cases did not complete 14 days stay and is lower compared to our study.

Maternal illiteracy was found in about 33% of acute malnutrition patients. Maternal age group between 20-25 years was found to be most vulnerable group to get babies who later may develop to acute malnutrition patients. 65% of these children belong to families found to be associated with poverty. 81% cases found to be associated with number of siblings less than three. 40% of cases found to be associated overcrowding. Faulty feeding practices -like giving pre-lacteals (28%), prolonged breastfeeding more than 2 years (50% of above 2 years), early initiation of complementary feeding (50%), bottle feeding (42%), late initiation of complementary feeding (14%) show positive association with acute malnutrition. Mothers in their antenatal and post natal period to be taught about correct feeding practices. In the study late initiation of breast feeding more than 2 years in causing severe malnutrition compared to moderate malnutrition, was found to be statistically significant with p value=0.002. Underlying respiratory system involvement (40 %) was the most commonest comorbid system involved followed by gastro-intestinal (21%) and central nervous system (20%).

77% of patients were found to be associated with anaemia. 40% of cases had adequate weight gain. In our study, the patients were kept for minimum of 10 days, maximum of 14 days in NRC. Most of the guidelines including recent ones by WHO suggested a 2 to 8 weeks (18) stay in nutritional rehabilitation centre for catch up growth. So in cases whose weight gain was inadequate, less duration of stay may be the most important reason for failure to gain weight. 21% of cases had sepsis in the study, most common complication which needs to be tackled very early to prevent mortality and morbidity. 37% of cases required PICU care, which strongly suggests need of PICU to be attached to NRC centre's to prevent mortality. The proportion of children who defaulted were 20%, which was significantly above the national and International standard of care (less than 15%) but was not in the unacceptable range (more than 25%). (7) Outcome indicators were in accordance with National standards (recovery rate more than 75% and death rate less than 5%)(7). This is important as the primary objective of NRC is to reduce fatality rate among

children with SAM.

None of the children admitted to NRC were referrals from the community centers for nutritional rehabilitation. They will go to home directly without any contact with health care provider. So it will be difficult for follow up in the community. Thus it is important to convey to the policy makers the need of NRC at tertiary care center and linkages with community NRC.

Preventive interventions may include decreasing preterm and low birth weight deliveries, improving access to immunization, improving nutrition and health knowledge and practices, promoting exclusive breastfeeding for the first six months of life and continued breastfeeding with improved complementary feeding practices for children aged 6–24 months that focus on ensuring access to locally available age-appropriate foods, and improving water supply and sanitation systems and hygiene practices to protect children against communicable diseases.

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Conflict of Interest

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