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A STUDY OF CLINICAL PROFILE & OUTCOME IN CHILDREN WITH SAM ADMITTED IN DHIRAJ HOSPITAL.

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ABSTRACT

INTRODUCTION: Undernutrition is widely prevalent and major cause of morbidity and mortality in children under five years of age in India. Mortality among children with undernutrition is nine times more than well-nourished children. Even with the establishment of the Nutritional Rehabilitation Centre (NRC), data on undernutrition has not improved from NFHS -3 to NFHS- 4.
OBJECTIVE: The primary objective of the study was to to evaluate the clinical profile of Severe Acute Malnutrition patients and to evaluate effect of socio-economic status on the outcome of management of children with SAM.
MATERIAL AND METHODS: A observational study was carried out among 61 undernourished children of 6-59 month of the age admitted under Nutritional Rehabilitation Centre of a tertiary care institute from December 2015 to December 2016.Demographic, clinical presentation, anthropometry, laboratory tests, hospital stay & outcome indicators were recorded. Modified Kuppuswamy classification was used to categorise socio-economic status of patients. Patients were followed up after 15 days and 1 month of discharge.
RESULTS: - A total of 61 children with SAM were analyzed. Among them 64.94% were below the age of two years. Proportion of severely wasted, severely stunted and severe underweight children were 91.8%, 88.52%, and 91.97% respectively. 21.31% of the study participants had edema. Most common co morbidity was respiratory tract infection (42.62%). Most common clinical feature was loss of subcutaneous fat prevalent in (65.57%) and sparse hair (47.54%) amongst children enrolled in study. Average weight gain was 13.05 g/kg/day Among 61 patients, 62.29% recovered while,16.40% and 21.31% had inadequate response and failure to response, respectively on discharge. while 65.58% participants came for complete of all 2 follow ups, Among patients who came for complete follow-up 50.58% were recovered, 1.64% had relapse, 6.56% patients inadequate response and 6.56% patients were failed to show response.
CONCLUSION- NRC provides life saving care.Acute gastroenteritis and respiratory tract infection were significantly associated with under nutrition in our study. loss of subcutaneous fat most common clinical presentation. In oue study NRC is affective in management with 62.29% recovery rate and 0% mortality, Maternal education, paternal education, socioeconomic status was not significantly associated in our study.

KEYWORDS : Malnutrition, Anemia, comorbidity, Socio-economic status.

INTRODUCTION

Health of children is dependent on food intake, which provides sufficient energy level to body and its nutrients ,which increase social and physical growth.

According to the United Nations declaration "the child shall enjoy special protection and shall be given opportunities and facilities by law and order and by means to enable him to develop physically and mentally in a healthy and normal manner and in a condition of freedom and dignity." But after so many efforts, undernutrition is primary cause of poor-health and mortality among children in developing countries[1,2].

Various socioeconomic and socio demographic variables such as age, sex, birth order, mother's education, and mother's occupation are the background factors for child's undernutrition. All these factors affect the feeding practices, sanitation, and health seeking behavior, which have direct bearing with the nutrition of the child.

Undernutrition can affect child's development by retarding physical and mental development. Poor nutrition in the first 1000 days of a child's life can also lead to stunted growth, which is irreversible and associated with impaired cognitive ability and reduced school and work performance[3,4,5]

Worldwide, about 55 million under-five children suffer from severe acute malnutrition and estimated 26 million of them had severe malnourishment, most of them live in sub-Saharan Africa and south Asia.

In India ,20% of children under 5 years of age suffer from wasting due to severe acute malnutrition. Worldwide, more than 1/3rd of the children who are wasted live in India. India accounts for more than 3 out of every 10 stunted children in the world. [6,7,8,9]. Socioeconomic status is supposed to be have an impact on prevalence of malnutrition.

As per the NFHS-4 India, 28.5% children under 5 years are wasted,38.4%,35.7% are stunted and undreweight. While in Gujarat 35.9% are wasted,38.7% stunted and 39.3% underweight.[10] which is slightly improved data as compare to NFHS-3.

Nutritional Rehabilitation Center (NRC) are being set up in the health facilities for inpatient management of severly malnourished children, with counselling of mothers for proper feeding and to bring them back on the road to recovery and subsequent follow up is ensured to maintain their nutrition status.

MATERIALS AND METHODS

The present study was conducted in NRC located at Dhiraj Hospital, Vadodara, Gujarat, India. This was a hospital-based observational study done in duration of one year from 31st December 2015 to 31st December 2016. Total 61 children with severe acute malnutrition between age of 6 to 60 months admitted in NRC during the study period were enrolled in the study.

Inclusion criteria:-
All children between age 6 month to 60 months admitted in Dhiraj Hospital with diagnosis of severe acute malnutrition were included.

Exclusion Criteria:-
Participants whose parents were not willing to give consent for the study, children admitted with metabolic disease, hereditary condition/ congenital anomaly were excluded from the study.

Method
Study was started after taking permission Informed consent was obtained form parents of study participants. They were asked detailed history including age, gender, family history, birth history, immunization history, development history, socioeconomic status (modified Kuppuswamy classification)were noted and general and

systemic examination was carried out. Nutritional status of these children was assessed by anthropometric parameters, defined according to WHO criteria. Anthropometric data was plotted over the growth chart.

Physical and Systemic Examination: Thorough head to toe and systemic examination was carried out considering all signs of malnutrition [like loss of fat,dermatosis, sparse hair, Bilateral Pitting Oedema,, etc.]

Anthropometric examination:[11,12,13]:
Weight, Length(upto 2 years, Height(> 2 years to 5 years),Mid-arm circumference (MAC), head circumference were noted.

Growth charts:- The indices of nutritional status like weight for age, height/length for age were plotted and compared with the WHO age and sex specific growth charts.

And than classified according to WHO classification [14,15]

All or any one of all Symmetrical oedema	Yes
Weight for height/length (Severe wasting)	Z score <-3 SD
MUAC (6-60 months)	<11.5 cm

AND/OR

SAM Children with any of the medical complications.[14,15]

Management and Discharge done according to NRC Protocol.

RESULTS
Age distribution of participants (n=61) Total 61 number of patients were enrolled in the study. The proportion of severely wasted, severely stunted and severely underweight children were 91.8%, 88.52%, and 91.97% respectively. Study showed that prevalence of severe acute malnutrition was maximum 63.94% (n=39) in group of children below 24 months of age,mean age in months was 20.33 ± 12.90.

Table 1: Socioeconomic class of study participants according to kuppuswamy classification(n=61)

Socioeconomic class	Number	Percentage (%)
Class 1 (Upper)	02	03.28
Class 2 (Upper Middle)	01	01.64
Class 3 (Lower Middle)	10	16.40
Class 4 (Upper Lower)	22	36.06
Class 5 (Lower)	26	42.62

Out of 61 patients, 78.68% (n=48) belonged from lower socioeconomic status (class 4 and 5), while only 03.28%(n=2) and 01.64% (n=1) belonged from upper and upper middle class respectively.

Table- 2: Clinical profile among study participants (n=61)

Feature	Number	Percentages(%)
Angular stomatitis	19	31.14
Loss of fat (buttock, cheek, thigh, axilla)	40	65.57
Dermatosis	27	44.26
Frontal bossing	12	19.67
Sparse hair	29	47.54
Dental carries	10	16.39
Spongy & bleeding gums	08	13.11
Koilonychias	07	11.47
Tonsillitis	02	03.27
Malar prominence	12	19.6
Flag sign	03	04.91

In list of clinical sign and symptoms of the patient ,many of them had multiple symptoms, in which most common were, angular stomatitis in 19 patient (31.14%), 40 (65.57%) had loss of fat(buttock, thigh, cheek, axilla), 27 (44.26%) patients had dermatosis, Frontal bossing was present in 12 (19.67%) patients, 29 (47.54%) patients had sparse hair,10 (16.39%) had dental carries,08 (13.11%) had spongy and bleeding gums, 07 (11.47%) patients had koilonychias and tonsillitis, malar prominence and flag sign were present in 02 (03.27%), 12 (19.67%), 03 (04.91%) respectively

Table 3: Comorbid condition among study participants (n=61)

Comorbid condition	Number	Percentage(%)
LRTI	16	26.2
URTI	18	29.5
Acute gastro enteritis	26	42.62
Infantile tremor syndrome	03	4.91
Abdominal tuberculosis	01	1.63
Microcephaly	02	3.25
Septicaemia	14	22.95

Most comman comorbid conition among study participants were acute gastro enteritis (n=26,42.62%), URTI (n=18,29.5%), LRTI (n=16, 26.2%), infantile tremor syndrome (n=3,4.91%),abdominal tuberculosis (n=01,1.63%), microcephaly (n=2,3.25%), septicemia (n=14, 22.95%). Other comorbid condition like septicaemia, infantile tremor syndrome, abdominal tuberculosis, microcephaly were also there.

All patients failed appetite test. RT feed were given to all enrolled patients and most of patients (n=34,55.5%) required RT feed for 3 to 5 days while, only 1 patient required RT feed for 10 days. The mean duration required for RT feed was 4.60 ± 2.5 days.

Table 4: Outcome among study participants at discharge (n=61)

Progress	Number	Percentages (%)
Recovered	38	62.29
Inadequate response	10	16.40
Failure to response	13	21.31

Recovery rate at the time of discharge was 62.29% (n = 38) which was less than the given standard of NRC[18](>75%).

Table 5: Condition of study participants at complete follow up (n=61)

Progress	Number	Percentages (%)
Recovered	31	50.82
Relapse	01	01.64
Inadequate response	04	06.56
Failure to response	04	06.56
lost to follow-up	21	34.42

In our study 65.58% (n = 40) participants came for complete of all 2 follow ups, while 34.42% (n = 21) participants were lost to follow-up. Among patients who came for complete follow-up 50.82% (n = 31) were recovered (>15%), 1.64% (n = 01) had relapse, 6.56% (n = 04) patients inadequate response (10-15% weight gain) and 6.56% (n = 04) patients failed to show response(<10%)

DISCUSSION
In present study, average weight gain was 13.05 g/kg/day. As per NRC guideline[16], acceptable, average weight gain should be more than or equal to 8 gm/kg/day. Studies were done by Shah RH et al from Baroda and Ganesh J et al in Tamil nadu showed weight gain of 9.3 and 8.9 gm/kg/day, respectively among the children admitted in NRC which was quite less than our study.. In present study 42.62% (n=26) of SAM children were belonging to lower socioeconomic class. Which is similar to the study Hashmi G et al (2016)[17] Karnataka which had 56.47% children belonged to lower socioeconomic class. While studies like Syed Tariq A et al (2015)[18] Kashmir and Tette et al (2015)[19] Ghana showed 61.6% and 36.8% proportion of lower class participants, respectively.

Diarrhea and respiratory tract infection were frequent comorbidities associated with malnutrition. In our study, maximum number of the patients were admitted with the complain of respiratory tract infection 55.7% (n=34), Diarrhea was found in (42.62 %,n=26) of the SAM patients of the participants. Bharathi S et al (2016)[20] Telangana showed 33.36% of the participants were having respiratory infection and 18.89% of the patients were having diarrhea as comorbidity. Syed Tariq A et al (2015)[18] Kashmir showed that 30% of the Admitted SAM patients at the NRC were suffering from diarrhea and 26.3% of the SAM patients were having Respiratory tract infections

A study was done by Shah RH et al in Baroda and Syed Tariq A et al in Kashmir showed recovery rate of >75%. Other studies Kumar NP et al

(2016)[21] showed 67.3% recovery rate. While Hashmi G et al (2016)[17], Bharathi S et al (2016)[20], Ganesh J et al (2016)[22], Showed 26%, 15% and 24.2% recovery rates, respectively among admitted SAM children at nutritional rehabilitation centre.

In our study 65.58% (n = 40) participants came for complete of all 2 follow ups, while 34.42% (n = 21) participants were lost to follow-up. Among patients who came for complete follow-up 50.58% (n = 31) were recovered, 1.64% (n = 01) had relapse, 6.56% (n = 04) patients inadequate response and 6.56% (n = 04) patients were failed to show response. A study done by Mulla s Et al (2017)[23] Rajasthan showed 40.91% of the follow up rate. A studies Kumar NP et al (2016)[21] Ananthapuramu showed Out of the 153 discharged children who were treated in NRC, only 44 (13.1%) children came for all the three follow-up visits.

Maternal education, paternal education, socioeconomic status was not significantly associated with the recovery of the admitted children at our nutritional rehabilitation center. This might be due to low sample size in patients from higher classes and good literacy. No death of any enrolled patient during study period.

CONCLUSION:-
NRC provides life saving care. Protein energy malnutrition adversely affects the immune system and under nutrition is considered the most common cause of immunodeficiency. Acute gastroenteritis and respiratory tract infection were significantly associated with under nutrition in our study. loss of subcutaneous fat most common clinical presentation.

In oue study NRC is affective in management with 62.29% recovery rate and 0% mortality, however outcome at follow up significantly decrease than outcome at discharge so improvement at community level needed with strengthening counseling at the time of discharge. Maternal education, paternal education, socioeconomic status was not significantly associated in our study

Present study will help to reevaluate NRC based management of under nutrition and making new policy in future.

References:
1. Mishra K, Kumar P, Basu S, Rai K, Aneja S. Risk factors for severe acute malnutrition in children below 5 y of age in India: A case-control study. The Indian Journal of Pediatrics. 2014 Aug 1; 81(8):762-5.
2. Patel B, Gandhi D. WHO classification detecting more severe malnutrition: A comparative study with IAP classification. Indian J Basic Appl Med Res. 2016; 5:628-34.
3. World Health Organization, Country Office for India; National Rural Health Mission (IN). Facility Based Care of Severe Acute Malnutrition: Participant
4. Bhalwarrajvir, editor. Text book of public health and community medicine, Armed Forces Medical College; 2009p.713-811)
5. Vega-Franco L.Conceptual milestones in the history of protein-energy malnutrition. SaludPublica Mex. 1999 Jul-Aug;41(4):328-33.
6. World Bank Report 2009. Available from http://siteresources. worldbank. org/ EXTAR2009/Resources/62239771252950831873/AR09_Complete.pdfAceessed on 25 Feb 2017.
7. Suryakantha AH. National Health programs. A text book of Community Medicine with recent advances, fourth edition, ISBN 978-93-85999-96-3. 2014 p:896-964
8. NUTRITION andthe Post-2015Sustainable Development Goals. Available at https://www.unscn.org/files/Publications/Nutrition__The_New_Post_2015_Sustainable_development_Goals.pdf accessed on 29 June 2017.
9. Malnutrition information pack. Gujarat CSR Authority. Available at: http://gcsra.org/writereaddata/images/pdf/IP-Malnutrition.pdf accessed on 17 June, 2017
10. Gujarat Fact sheet NFHS-4; 2015-16. Ministry of Health and Family Welfare, Government of India. Available at: http://rchiips.org/NFHS/pdf/NFHS4/ India.pdf. Accessed on 30 June 2017
11. Rodríguez L, Cervantes E, Ortiz R. Malnutrition and gastrointestinal and respiratory infections in children: a public health problem. International journal of environmental research and public health. 2011 Apr 18;8(4):1174-205.
12. Yoon, PW; Black, RE; Moulton, LH; Becker, S. The effect of malnutrition on the risk of diarrheal and respiratory mortality in children <2 y of age in Cebu, Philippines. Am. J. Clin. Nutr 1997, 65, 1070–1077
13. Scrimshaw, NS; SanGiovanni, JP. Synergism of nutrition, infection, and immunity: An overview. Am. J. Clin. Nutr 1997, 66, 464S–477S
14. Global Database on Child Growth and Malnutrition. Available from http://www.who.int/nutgrowthdb/about/introduction/en/index5.html Accessed on 01/09/2017 accessed on 20 June 2017
15. Seetharaman N, Chacko TV, Shankar SL, Mathew AC. Measuring malnutrition-The role of Z scores and the composite index of anthropometric failure (CIAF). Indian Journal of Community Medicine. 2007 Jan 1;32(1):35
16. Guidelines for Management of Severe Acute Malnutrition (SAM) Children at Nutrition Rehabilitation Center 2012. Available at https://nrhm.gujarat.gov.in/ images/pdf/nrc _ guidelines.pdf accessed on 18 June 2017
17. Hashmi G, Kumar SS. Evaluation of the effects of nutrition intervention measures on admitted children in nutritional rehabilitation center, Gulbarga, India. International Journal Of Community Medicine And Public Health. 2016 Dec 24;3(9):2550-4.
18. Naik SA, Saleem R. Demographic, clinical profile of severe acute malnutrition and our experience of nutrition rehabilitation centre at children hospital Srinagar Kashmir. International Journal of Contemporary Pediatrics. 2017 Jan 6;2(3):233-7.
19. Tette EM, Sifah EK, Nartey ET. Factors affecting malnutrition in children and the uptake of interventions to prevent the condition. BMC pediatrics. 2015 Nov 19;15(1):189
20. Bharathi S, Anuradha K, Rao JV. An experience at a tertiary level hospital NRC in management of severe acute malnutrition in children aged between 6-59 months adopting World Health Organization recommendations. Research in Health Science. 2016 May 25;1(1):41
21. Kumar NP, Praveena B. An experience of facility-based management of severe acute malnutrition in children aged between 0-59 months adopting the World Health Organization recommendations at Nutrition Rehabilitation Centre, Ananthapuramu. journal of evolution of medical and dental sciences-jemds. 2016 apr 21;5(32):1744-8
22. Kumaravel KS, Ganesh J, Balaji J, Rameshbabu B, Nedunchelian K. Clinical profile of children with Severe Acute Malnutrition attending Nutritional Rehabilitation Centre in Dharmapuri. Pediatric Review: International Journal of Pediatric Research. 2016 Feb 28;3(02).
23. Mulla S, Gupta PK. An experience of facility based management at one of the malnutrition treatment centre in district Baran of Rajasthan, India. International Journal Of Community Medicine And Public Health. 2017 May 22;4(6):2162-6.