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Paediatrics

A FOLLOW UP STUDY OF PATIENTS WITH SEVERE ACUTE MALNUTRITION

Dr. Archana N. Shah	Associate Professor, Smt. NHL Medical College, Ahmedabad.
Dr. Jaini S. Kothari	Assistant Professor, AMCMET Medical College , Ahmedabad.
Dr. Dharaben P. Desai*	Resident Doctor, Smt. NHL Medical College, Ahmedabad. *Corresponding Author
Dr. Rajal B. Prajapati	Ex Professor, Smt. NHL Medical College, Ahmedabad.

ABSTRACT Malnutrition is a general term which refers to undernutrition WHO (1973) defines PEM as a "range of pathological conditions arising from coincident lack, in varying proportions of protein and calories, occurring most frequently in infants and young children and commonly associated with infections".Childhood undernutrition encompasses underweight, stunting, wasting, severe acute malnutrition (SAM) and micronutrient deficiency disorders. Undernourished children have significantly higher risk of mortality and morbidity.

Severe Acute Malnutrition

In children between the ages of 6 and 60 months, severe acute malnutrition (SAM) is defined as any one of the following:

- Weight-for-height <-3 Z score
- Visible wasting with MUAC < 11.5 cm
- Edema – Bilateral pitting pedal edema

Severe acute malnutrition is both a medical and social disorder. Nutrition, Immunization, Medical care, Family health, Education and Stimulation(NIMFES) are essential for management of PEM even after discharge from hospital. For growth monitoring, immunization, prevention of infection and relapse regular follow up in health care center is required.

AIMS & OBJECTIVES: To study, Criterias of admission,Clinical profile,The discharging criterias and on follow up to see the weight gain pattern, improvement in development and status of haemoglobin.

MATERIAL & METHODS: This was a prospective study conducted over 2 years .Total 50 patients are taken diagnosed as SAM with age between 6 month to 5 years and discharged according to IMNCI guideline. Written and informed consent obtained from their parents.After discharge, Follow up visit at 1,2,3,4 weeks , then 8 weeks and 12 weeks were done. Data was analyzed statistically and conclusion derived.

RESULTS: The prevalence of SAM is 4.08% in present study with 56% of patients are female and 44% are male. 88% of the patients are having W/H < -3SD and 76% are having MUAC < 11.5 cm whereas edema is present in 6% patients . 96% of patients are having Marasmic type of malnutrition. 36% patients are exclusive breast fed for 6 months while 64% has mismanaged feeding practices. Most common presenting complaint is fever and weight loss and failure to gain weight are least common complain. Wasting and pallor are most common signs. 12 patients where admitted for SAM per se .Whereas 38 patients with pneumonia/ diarrhoea/ TB / UTI SAM being co morbid condition. Out of 44 patients, 15 patients showed good weight gain, 19 patients showed moderate weight gain and 10 patients showed poor weight gain on nutritional therapy at discharge. Improvement in wasting has seen on follow up with improvement in motor milestone and Hb

CONCLUSION: SAM is predominately seen in age group of 1 to 2 year. There is no gender bias. W/H <-3SD is more sensitive than MUAC < 11.5cm for diagnosis of SAM. Marasmus is the usual and common presentation of SAM. Immediate complications are seen hypothermia, hypoglycemia, shock and electrolyte imbalance in form of hypokalemia. Anaemia is universal finding in patients with SAM. All patients could be revive successfully. Most of the patients are discharged on the basis of early discharging criteria. Majority of patients show good to moderate weight gain on nutritional therapy at the time of discharge. All care takers of the patients were sensitized for immunization, home care and follow up.Half of the patients come for follow up as per the advice.Number of follow up visits decrease when patients showed satisfactory weight gain according to their parents. Maximum improvement of hemoglobin is seen in patients of severe anemia followed by moderate and mild anemia which is statistically significant. Motor development is more affected than the other domains of development. 3 months follow up showed statistically significant improvement in all domains of child development.

KEYWORDS :

Optimum Nutrition is essential for child survival & Quality of survival. The word nutrition is derived from **Nutricus**[3] which means to suckle at breast.

Malnutrition is a general term. It most often refers to undernutrition resulting from inadequate consumption, poor absorption or excessive loss of nutrients but the term also encompasses over nutrition, resulting from excessive intake of specific nutrients. WHO (1973) defines **PEM**[6] as a "range of pathological conditions arising from coincident lack, in varying proportions of protein and calories, occurring most frequently in infants and young children and commonly associated with infections".

Childhood undernutrition encompasses underweight, stunting, wasting, severe acute malnutrition (SAM) and micronutrient deficiency disorders. Undernourished children have significantly higher risk of mortality and morbidity.

Severe Acute Malnutrition (SAM)[1,2,3]

In children between the ages of 6 and 60 months, severe acute malnutrition (SAM) is defined as any one of the following:

- Weight-for-height <-3 Z score
- Visible wasting with MUAC < 11.5 cm
- Bilateral pitting pedal edema

Severe acute malnutrition is both a medical and social disorder. The medical problem is due to social problem at home. Lack of exclusive breast feeding, late introduction of complementary feeds, feeding diluted feeds containing less nutrients, repeated enteral infections, respiratory tract infections, ignorance, poverty etc. are the risk factors for severe acute malnutrition. Lack of birth spacing, lack of maternal nutrition during lactation, high birth rate, low birth weight, pre-lacteal feeds, early and late weaning are other additional factors for severe acute malnutrition.

The greatest risk of undernutrition[3] occurs in the first 1000 days, from

conception to 24 months of age, and this early damage to growth and developmental can have adverse consequence on health, intellectual ability, school achievement, work productivity, and earnings. Government and allied agencies are therefore advised to focus interventions on this critical window of opportunity.

In India, Kerala had highest percentage of children with normal nutrition status while Gujarat stood on 6th position.

Management of PEM: (1)Hospitalization (2)Resuscitation (3) Restoration (4) Rehabilitation (5) Prevention. Nutrition, Immunization, Medical care, Family health, Education and Stimulation (NIMFES) are essential for management of PEM even after discharge from hospital. For growth monitoring, immunization, prevention of infection and relapse regular follow up in health care center is required.

AIMS AND OBJECTIVES

To study the Criterias of admission,clinical profile, discharging criterias and on follow up to see the weight gain pattern, improvement in development and status of haemoglobin.

MATERIALS AND METHODS

This was a prospective study conducted over 2 years from October 2017 to July 2019 at a tertiary care center.
Setting- Hospital based study.
Total number of Patients :50

INCLUSION CRITERIA:

Patients between 6 month and 5 years of age diagnosed SAM by atleast one of the following criteria:

- Wt for Lt/Ht less than -3SD
- Visible severe wasting
- Edema of both feet
- MUAC less than 11.5 cm.

EXCLUSION CRITERIA:

- Patient with history of any chronic organic diseases like CHD , Endocrinal Problems, cerebral palsy etc.
- Patient with edema due to other causes like CHF, chronic liver diseases, chronic kidney diseases etc.

Discharge Criteria:

- weight gain of 20% above the lowest weight
- recovered/ cured when reaches 90% or above – one z score weight for length and no edema
- Absence of infection
- Eating at least 120-130cal/kg/day and receiving adequate micronutrients
- Consistent weight gain of atleast 5 g/kg/day for 3 consecutive days on exclusive oral feeding
- Completed immunization appropriate for age
- Caretakers sensitized to home care
- Written and informed consent obtained from their parents/ guardians to use the case details.
- After discharge, Follow up visit at 1,2,3,4 weeks , then 8 weeks and 12 weeks were done.
- On follow up, complain of patients noted.

Antropometric parameters and development assessment were done using in detail in each following visit.

Dietary advise and reinforcement for diet was done.
Statistical Test : chi square test[4] , t-test[4] were used.

Method used for Anthropometry:

Weight:
Measured by using an electronic weighing machine with digital reading to precision of 10gm with minimal clothing.

Height/Length:
Length was measured using Infantometer and height by Stadiometer with accuracy of 0.5 cm.

Mid-upper arm circumference (MUAC):
MUAC was measured on mid point of left arm. The measuring tape was held gently without pressing the soft tissue. The tape was flexible, non stretchable and unaffected by temperature with accuracy nearest 0.1cm .

MUAC	Interpretation
< 11.5 cm	SAM
11.5 – 12.5 cm	Severe PEM
13.5 – 12.5 cm	Moderate PEM
> 13.5 cm	Normal

For development assessment DASII score was used.

Diet assessment was done by previous 3days diet recall before illness. Then calories and protein calculated from different chart of food article.

On follow up, who was completed =>4 follow up visits considered as successful completion of follow up visit.

Data was analyzed statistically and conclusion derived.

OBSERVATIONS

From October 2017 to July 2019(2 years),
Total Admission in Paediatric ward : 2360
Total Patients of age group between 6 months to 5 year : 1680
Total Patients of SAM : 68 (4.04%)
Patients studied : 50

Of the 50 patients , 22% of the patients were in the age group 6 month to 1 year, 50% were in the age group 1 year to 2 year and 23% were more than 2 year of age. 56% of patients were female and 44% were male .

Table 1 Indicators For Sam

Parameter	Number of Patients
W/H <-3 SD	44(88%)
MUAC < 11.5 cm	38(76%)
B/L Pitting Pedal Edema	03(6%)

(n=50)

Criteria for admission according to IMNCI (1) W/H <-3 SD , (2)MUAC < 11.5 cm and (3)MUAC < 11.5 cm. In present study we observed 88% of the patients were having W/H < -3SD and 76% were having MUAC < 11.5 cm whereas edema was present in 6% patients only.

Table 2 Sam - Feeding Practices

Feeding Pattern	No of patients
Exclusive Breast feeding upto 6 months	13(36%)
Mismanaged feeding	23(64%)

(n=36)

EBF practice showed maximum impact on nutrition status of child up to 2 year of age. Out of total 36 patients who were <2 year of age, only 36% patients were exclusive breast fed for 6 months while 64% had mismanaged feeding practices in form of diluted milk, skimmed milk , sugar water with use of plastic bottle.

Table 3 sam - presenting symptoms

Predominant Symptom & Sign	Number Of patients
Fever	39(78%)
Cough and Cold	28(56%)
PICA	20(40%)
Frequency of Stool	16(32%)
Vomiting	12(24%)
Difficulty in Breathing	08(16%)
Weight loss	07(14%)
Pallor	42(84%)
Signs of micronutrient deficiency	18(36%)
Dehydration	16(32%)

(n=50)

The most common presenting complaint was fever (78%) followed by cough and cold (56%) and frequency of stool (32%). Other complaints on presentation were vomiting, respiratory distress, ear discharge, swelling of the body, not gaining weight, poor feeding and convulsion. Weight loss and failure to gain weight were seen 7% and 2% only respectively. Pallor was most common sign noted in 84% of patients followed by signs of micronutrient deficiency. 32% of patients had acute diarrhoeal disease where considered having some dehydration

Table 4 Infections In Sam

Infections	Number of Patients
Pneumonia	17(34%)
Diarrhoeal disease	16(32%)
TB	3(6%)
UTI	2(4%)

(n=50)

12 patients where admitted for SAM per se whereas out of 38 patients ,17 with pneumonia, 16 with diarrhoea, 3with TB and 2 with UTI SAM being comorbid condition.

Table 5 Discharging Criteria In Sam

Discharge Criteria	No. of Patients
Weight gain of 20% above lowest weight	6
Reaches 90% or above one z score weight for length and no edema	0
Absence of infection	44
>5gm/kg/day weight gain on oral feeding (early discharge)	38
Eating atleast 120-130 kcal/kg/day and receiving micronutrients	35
Completed immunization	44
Caretakers sensitized to home care	44

(n=44)

Amongst 50 patients with SAM,44 were successfully discharged,6 patients had taken discharged against medical advice. In present study had no mortality rate. Out of 44 discharged patients, 38 patients showed weight gain >5gm/kg/day so we were able to discharge early. All 44 patients fulfilled discharging criteria of absence of infection, completion of immunization, sensitization of caretaker for home care.

Table 6 Outcome In Follow Up Patients

Outcome	Total patients (n=50)
Successful completion of Follow up visit	27(54%)
Partial Follow up	7(14%)
No Follow up	15(30%)
Relapse	1(2%)
Death	0

(n=35)

Out of 50 patients, 35 patients came for F/up and out of 35 patients 27 patients has completed f/up visit and 1 patient had relapse.

Table 7 Weight Gain In Follow Up Patients

Wasting grade	Mean Weight (Kg) on admission	Mean Weight(Kg) on Discharge	Mean Weight (Kg) on follow up	Weight Gain (gm/day)
I	6.69	7.08	7.83	13gm/day
II	6.65	7.02	7.6	10gm/day
III	6.81	7.32	9.2	27gm/day
IV	9.6	9.8	10.8	13gm/day

(n=35)

Out of 4 wasting grade, maximum weight gain was seen in grade III followed by grade IV, I, II.

Table 8.1 Anthropometric Index During Admission And 3month Follow Up

Index	WLZ(mean)
On Admission	-2.91
On Follow up	-1.88

(n=35)

patients were severely wasted (< - 3SD= -2.91) on admission, improved to moderately wasted (<- 3SD to <- 2SD) on discharge with mildly wasted (>- 2SD= -1.88) after 3 month .

Table 8.2

	Number of patients on Admission	Number of patients on discharge	Number of patients on follow up
W/H=< -3SD	44	32	4

(n=44)

No. of severely wasted children delined from 44/50 to 32/50 on discharge. After 3 months Follow up, out 35 patients of follow up only 4 patients had not crossed <-3SD.

Table 9 Development In F'up Patients

Domain		Mean DQ on admission	Mean DQ on Follow up	Difference of DQ	p value
Motor	Gross	93.22	96.85	3.16	0.00719
	Fine	95.9	98	2.1	0.0080
Personal Social		96.62	98.74	2.12	0.0180
Language		96.5	98.37	1.87	0.0185

(n=35)

most affected milestone was motor milestone . Improvement in all milestone was seen on follow up with maximum improvement in motor milestone which is statistically significant(p value<0.05).

Table 10 Anemia In Follow Up Patients

Grade of Anaemia	Mean Hb on admission	Mean Hb on F/up	Difference of Hb	p value
Mild (11-9 gm)	10.11	10.37	0.26	0.1647
Moderate (9-7 gm)	7.97	9.68	1.71	0.002
Severe (<7 gm)	5.08	9.23	4.15	0.0001

(n=35)

In follow up patients, Mean Hb 10.1 for mild anemia increase to 10.4 on follow up where in moderate anemia, from 7.97 to 9.68 and in severe anemia 5.08 to 9.23 which is statistically significant for moderate and severe anemia(p value<0.05).

DISCUSSION

The prevalence of SAM is 4.08% in present study in which 22% are in the age group 6 month to 1 year, 50 are in age group 1 year to 2 year and 23% are more than 2 year of age. 56% of patients are female and 44% are male. On comparing sanjeev[8] et al study in which SAM is predomintly seen in female patients. That study was conducted in urban slum whereas the present study is conducted in tertiary care institute which caters to urban, urban slum and surrounding villages.

In present study , 88% of the patients are having W/H < -3SD and 76% are having MUAC < 11.5 cm whereas edema is present in 6% patients only.All patients fulfilling MUAC<11.5 cm also has W/H<-3SD(p value < 0.05). 96% of patients are having Marasmic type of malnutrition. Rest 4% are having MarasmicKwashiokor.Patient with marasmickwashiokor did not show classical features of kwashiorkor and also has severe anemia.

EBF practice showed maximum impact on nutrition status of child up to 2 year of age. Out of total 36 patients who are <2 year of age, only 36% patients are exclusive breast fed for 6 months while 64% has mismanaged feeding practices in form of diluted milk, skimmed milk , sugar water with use of plastic bottle.

The most common presenting complaint is fever followed by cough and cold and frequency of stool . Weight loss and failure to gain weight are seen 7% and 2% only respectively. Wasting and pallor are most common signs noted followed by signs of micronutrient deficiencies ,hair changes,irritability and skin changes. 32% of patients has acute diarrhoeal disease where considered having some dehydration. 3 patients were presented with shock with hypothermia, 1 patient is presented with hypoglycemia (RBS was 35mg/dl and other had RBS >54mg/dl) and 1 with lethargy. 12% patients show electrolyte imbalance in form of Hypokalemia.

12 patients where admitted for SAM per se .Whereas out of 38 patients, 17 with pneumonia, 16 with diarrhoea, 3with TB and 2 with UTI SAM being co morbid condition. 78% of the patients are discharged within 7 days of admission.. Minimum hospital stay is 3 days and maximum hospital stay 13 days. In Shaibu[5] et al study, the mean duration of stay was 8.2 days. Out of 44 patients, 15 patients showed good weight gain, 19 patients showed moderate weight gain and 10 patients showed poor weight gain on nutritional therapy at discharge.

Amongst 50 patients with SAM, 44 are successfully discharged from which 38 patients show weight gain >5gm/kg/day so we are able to discharge early. All 44 patients fulfilled discharging criteria.

Out of 50 patients, 35 patients come for Follow up and 27 patients has completed follow up visit and 1 patient has relapse. Out of 4 wasting grade , maximum weight gain is seen in grade III followed by grade IV , I, II. Patients are severely wasted on admission, improved to moderately wasted on discharge with mildly wasted after 3 month which is comparable to H.ASHRAH[7] et al study. Most affected milestone is motor milestone . Improvement in all milestone has seen on follow up with maximum improvement in motor milestone which is statistically significant(p value<0.05). follow up patients, Improvement in mean Hb is statistically significant for moderate and severe anemia(p value<0.05).

CONCLUSION

SAM is predominately seen in age group of 1 to 2 year. There is no gender bias. W/H <-3SD is more sensitive than MUAC < 11.5cm for diagnosis of SAM. Marasmus is the usual and common presentation of SAM. Classical finding of kwashiorkor are not appreciated. Breastfeeding is accepted as most natural way of feeding but concept of complementary feeding is not well understood and accepted by general population. Lack of Exclusive Breast Feeding for first six months of life and late ,inadequate and faulty initiation of complementary feeds are significant risk factors for SAM. Patients with SAM show a significant developmental impairments especially in gross motor and behavioural scales due to deficiency of nutrients. Medical advice is seeked only when child is sick. Sepsis is the initial presentation in significant number of patients. Immediate complications are seen hypothermia, hypoglycemia, shock and electrolyte imbalance in form of hypokalemia. Anaemia is universal finding in patients with SAM. Iron deficiency is the most common cause of anaemia . Few patients have megaloblastic anemia also.

All patients could be revive successfully. There is no mortality seen.This reflects efficient tertiary level care .Most of the patients are discharged on the basis of early discharging criteria i.e. weight gain > 5 g/kg/day for 3 consecutive days. Majority of patients show good to moderate weight gain on nutritional therapy at the time of discharge. All care takers of the patients were sensitized for immunization, home care and follow up.Half of the patients come for follow up as per the advice.Number of follow up visits decrease when patients showed satisfactory weight gain according to their parents.

On follow up, 25% patients cross W/H <-3SD on discharge. The majority of remaining recover by 3 months. only few does not cross W/H<-3SD suggesting requirement of longer follow up. This is in accordance to F-IMNCI guideline.Maximum improvement of hemoglobin is seen in patients of severe anemia followed by moderate and mild anemia which is stastically significant.Motor development is more affected than the other domains of development. 3 months follow up showed statistically significant improvement in all domains of child development.

REFERENCES

1. Kliegman RM, Behrman RE, Jenson HB, Stanton BM. Nelson textbook of paediatrics.
2. F-IMNCI facility based participants manual
3. Nutrition and child development, K. E Elizabeth,
4. Park K. Park's textbook of preventive and social medicine.
5. Shaibu Mohammed Osman,2 Anthony Amponsem, Treatment Outcome of Severe Acute Malnutrition Cases at the Tamale Teaching Hospital, Journal of Nutrition and Metabolism, Volume 2015 (2015), Article ID 641784.
6. World Health Organization, and Unicef. "WHO child growth standards and the identification of severe acute malnutrition in infants and children: a Joint Statement by the World Health Organization and the United Nations Children's Fund." Geneva: World Health Organization (2009).
7. Hasan Ashraf, Nur H. Alam , Mohammod J. Chisti, Sayeda R. Mahmud, Md I. Hossain, Tahmeed Ahmed, M.A. Salam, and N.Gyr. International Centre For Diarrhoeal Disease Research (ICDDR), Clinical Sciences Division , Bangladesh University of Basel, Switzerland
8. Sanjeev Davey, Anuradha Davey, S. Vivek Adhish, Rajni Bagga, Factors influencing status of undernutrition among children (0-5 years) in a rural area of Delhi: a cross-sectional study, Int J Community Med Public Health. 2014; 1(1): 12-17.