Consensus Statement of the Indian Academy of Pediatrics on Integrated Management of Severe Acute Malnutrition

INDIAN ACADEMY OF PEDIATRICS

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Justification: Severe acute malnutrition (SAM) is a major public health issue. It afflicts an estimated 8.1 million under-five children in India causing nearly 0.6 million deaths. The improved understanding of pathophysiology of SAM as well as new internationally accepted growth charts and newer modalities of integrated intervention have necessitated a relook at IAP recommendations.

Process: A National Consultative Meeting on Integrated Management of Severe Acute Malnutrition was held in Mumbai on 16th and 17th October, 2010. It was attended by the invited experts in the field. Extensive discussions were held as per the program. The participants were then divided into six groups for detailed discussions. The groups deliberated on various issues pertaining to the task assigned and presented recommendations of the groups in a plenary session. The participants made a list of recommendations after extensive discussions. A Writing Committee was formed and was entrusted with the task of drawing a Consensus Statement on the basis of these Recommendations. After multiple deliberations, the following Consensus Statement was adopted.

Objectives: To critically evaluate the current global evidence to formulate a consensus among stakeholders regarding diagnosis and management of SAM.

Recommendations: An integrated management of malnutrition is likely to yield more dividends. Thus, management of SAM should constitute an important component of Integrated Management of Neonatal and Childhood Illnesses (IMNCI) program. Determination of SAM on the basis of *Z*-scores using WHO Growth charts is considered statistically more appropriate than cut-offs based on percentage weight deficit of the median. Considering the fact that many children with SAM can be successfully managed on outpatient basis and even in the community, it is no more considered necessary to advise admission of all children with SAM to a healthcare facility. Management of SAM should not be a stand-alone program. It should integrate with community management therapeutic programs and linkages with child treatment center, district hospitals and tertiary level centers offering inpatient management for SAM and include judicious use of ready-to-use-therapeutic Food (RUTF). All sections of healthcare providers need to be trained in the integrated management of SAM.

Key words: *Child, Malnutrition, Management, Ready-to-Use-Therapeutic Food.*

MISSION OF THE INDIAN ACADEMY OF PEDIATRICS (IAP)

IAP is in cognizance of the acute necessity of undertaking immediate remedial measures for an estimated 8 million children below 5 years of age who are suffering from Severe acute malnutrition (SAM). IAP is committed to provide academic as well as programmatic support to a concerted national effort in this direction. It commits the service of over 300 branches and 18,000 pediatricians for a systematic and structured effort to address this issue.

INTRODUCTION

Severe acute malnutrition is a major public health issue. It afflicts an estimated 8.1 million under-five children in India [1]. Nearly 0.6 million deaths and 24.6 million DALYs (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). Thus, strong scientific evidence exists on synergism between under nutrition and child mortality due to common childhood morbidities including diarrhea, acute respiratory infections, malaria and measles. In SAM, the case fatality rates related to these morbidities are excessively high.

The understanding of pathophysiology of SAM (including edematous malnutrition) has improved. New internationally accepted growth charts have become available, in which data from Indian children has also been included. Determination of SAM on the basis of *Z*-scores using WHO Growth charts is considered statistically more appropriate than cut-offs based on percentage weight-deficit of the median. Dietary interventions using WHO F-75 and F-100 formulae (or analogues) in the management of inpatient care of SAM have improved outcomes including reduced mortality, early recovery and higher weight gain. It is possible to implement this intervention in

hospitals and healthcare facilities. Community-based programs have shown success in the management of SAM in emergency and non-emergency situations. Considering the fact that many children with SAM can be successfully managed on outpatient basis and even in the community, it is no more considered necessary to advise admission of all children with SAM in a healthcare facility. This becomes pertinent in view of the economic and social burden that hospitalization entails on families that are already battling poverty. Further, our country does not have sufficient hospital beds for offering inpatient care to all children with SAM. An integrated management of malnutrition is likely to yield more dividends. Thus management of SAM should constitute an important component of Integrated Management of Neonatal and Childhood Illnesses (IMNCI) Program. Management of SAM should not be a stand alone program. It should integrate with community management therapeutic programs, and linkages with child treatment center, district hospitals and tertiary level centers offering inpatient management for SAM.

PROCESS

A National Consultative Meeting on Integrated Management of Severe Acute Malnutrition was held in Mumbai on 16th and 17th October, 2010. It was attended by invited experts in the field (*Appendix* 1). The participants made a list of recommendations after extensive discussions. A Writing Committee was formed and was entrusted with the task of drawing a Consensus Statement on the basis of these recommendations.

DIAGNOSIS OF SAM

In children between the ages of 6 and 59 months, Severe acute malnutrition (SAM) is defined as:

(*i*) Weight/height or Weight/length < -3 *Z* score, using the 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.

For infants below 6 months, Criteria (*i*) or (*ii*) or (*iii*) above should be used till data on MUAC below 6 months becomes available. IAP guidelines of 2006 have stated MUAC <110 mm as one of the criterion. Research in India is required to arrive at critical MUAC that will screen and produce similar results when we use weight for height <-3 Z score, using WHO new growth charts, as the criterion. As infants and children from India were also included while formulating WHO growth charts, a MUAC below 115 mm, as being used for other countries, should be adopted till we have more Indian data.

ACTIVE DETECTION OF CHILDREN WITH SAM

Early detection of children with SAM will ensure that these children will be identified before they develop medical complications. This would mean management of many of them before their prognosis worsens and it would also reduce the need for hospitalized care [4,5]. Health professionals and healthcare providers should detect children with SAM at every opportunity provided by health contacts, be it for a medical complaint or for health promotional measures (*e.g.* growth monitoring or immunization). This can be undertaken at every health facility (primary health center and sub-center, health posts, hospitals, day-care centers, etc) and even in the community and *anganwadis* by healthcare workers.

MUAC is a simple measure for the detection of SAM. Screening of children in the community for SAM can be done using MUAC tape. Good quality, non-stretchable, long lasting MUAC tapes should be available at every healthcare facility.

APPETITE TEST

Appetite test is an important criterion to differentiate a complicated from an uncomplicated case of SAM and therefore decide if a patient should be sent for in-patient or out-patient management. Children with SAM who have poor appetite are at immediate risk of death and they will not take sufficient amounts of the diet at home to prevent deterioration and death.

This test has not been standardized or published in diverse Indian settings with different types of therapeutic foods. In the African settings, it is usually conducted in a quiet area with ready to use therapeutic food (RUTF). In African setting, a child, not consuming the minimum recommended amount of RUTF (***Table I***), is labeled as failed 'Appetite Test' and is referred for in-patient care. It may be possible to extrapolate these guidelines to the therapeutic food being used in the Indian setting.

- The appetite test should be carried out at each visit for patients not hospitalized, particularly those who do not gain weight steadily.

TABLE I : CRITERIA FOR PASSING APPETITE TEST

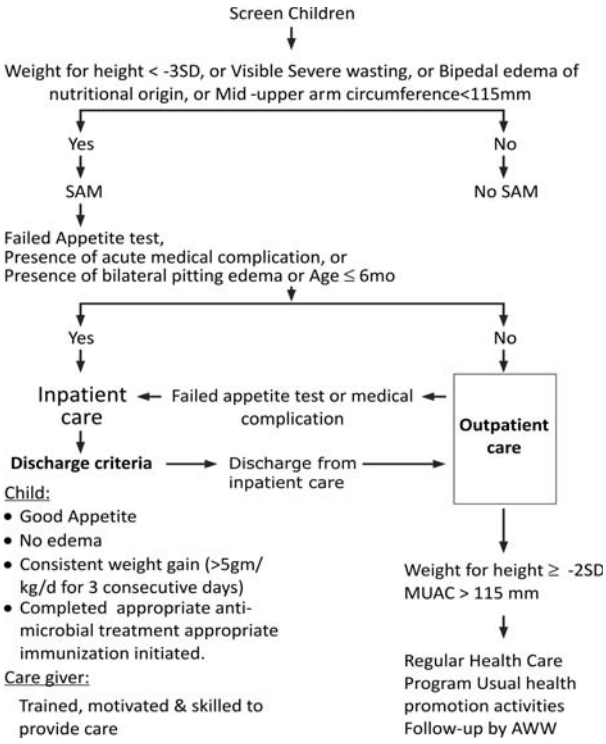
Body weight (kg)	*Minimum amount of RUTF to be consumed for passing the Appetite Test (mL or grams)*
>4	15
4 –6.9	25
7 –9.9	35
10 –14.9	50

- Failure of an appetite test at any time is an indication for full evaluation and probable transfer for in-patient assessment and treatment.
- If the appetite is "good" during the appetite test and the rate of weight gain at home is poor then a home visit would be required because this may indicate a social problem at household level or extensive sharing of the medical nutrition therapy. A simple "trial of feeding" at residential care may be needed to differentiate a difficulty with the home environment from a metabolic problem with the patient

TRIAGE FOR INPATIENT CARE

Triage is undertaken in the community or in any facility that the child is brought initially to find out if children identified to have SAM need facility care like child treatment center or district or tertiary hospital. Indications for inpatient care include the following: (*i*) Presence of a medical complication; (*ii*) Reduced appetite (as judged on the basis of a failed appetite test); (*iii*) Presence of bilateral pitting edema; and (*iv*) Age ≤ 6 months.

A detailed identification and management plan for children with SAM is provided in ***Fig.* 1.**



(Adapted from WHO Growth Standards and identification of Severe Acute Malnutrition in infants and children. A joint statement of WHO and UNICEF. 2009) [3].

FIG. 1 *Identification and management of children with severe acute malnutrition (SAM).*

OUTPATIENT CARE

Children with SAM who do not have any criterion for inpatient care can be managed under an outpatient therapeutic program (OTP) center closest to the child's home. There is a need to establish such a program as a part of Integrated Child Development Scheme (ICDS)/ RCH-II/ IMNCI-ANM, NRHM-ASHA.

- There is a need to provide "therapeutic food" broadly adhering to the WHO and UNICEF specifications; this Medical Nutrition Therapy [6] is based on sound scientific principles with a balanced composition of type 1 and type 2 nutrients for consumption by children suffering with SAM who are being managed in the community or at home [7]. One form of "therapeutic food" is ready to use therapeutic food (RUTF), which is a high-energy food, available in a ready-to-use form with long shelf-life and requiring no preparation at the point of use. This specific composition has been tested and proved effective in functional recovery of SAM children, primarily in the African settings [8]. Controlled trials and experience with RUTF in India is limited and further, there is no robust comparative data documenting the benefits of this formulation over locally produced analogous medical nutrition therapy or augmented home food.
- A rough guide about the amount of therapeutic food to be consumed is summarized in ***Table* II** below. Breast feeding should be continued while the child is on therapeutic food. Other foods may be given if child has good appetite and has no diarrhea.

  The amount is to be given in 2-3 hourly feeds along with plenty of water.
- There is a need to generate Indian data in this regard so that an effective and safe therapeutic food that is acceptable to children and meets WHO/UNICEF specification can be made available under the program. It must be emphasized to the families and to the society at large, that the therapeutic food is to be used only in children with SAM as a part of therapy. It is not meant to be a supplementary food for other

TABLE II : AMOUNT OF THERAPEUTIC FOOD TO BE CONSUMED

Weight	*Amount of RUTF per day*
3 – 4.9 kg	105 – 130 g/day
5 – 6.9 kg	200 – 260 g/day
7 – 9.9 kg	260 – 400 g/day
10 – 14.9 kg	400 – 460 g/day

RUTF: ready to use therapeutic food

children or a part of regular diet. In order to ensure that the same is readily available and can reach the target population, appropriate notification(s) for use of such therapeutic food and for its procurement through institutional mechanisms and its distribution through appropriate channels e.g. nutrition rehabilitations centers, Anganwadis, etc. would be ideal and desirable. To ensure that it is not misused, the Government may consider implementing appropriate restrictions such as restricting its availability only under the program for children with SAM and prohibiting its widespread availability.

- Outpatient management is not recommended for children aged six months or less with SAM.
- The caretaker/ mother should also be counseled about breast feeding, supplementary care hygiene, optimal food intake, immunization and other appropriate health promotional activities.
- Outcome of treatment can be defined as follows:

(a) Non-responder/ Primary Failure (*i*) Failure to gain any weight for 21 days, or (ii) Weight loss since admission to program for 14 days.

(b) Secondary Failure or Relapse (*i*) Failure of Appetite test at any visit or (ii) Weight loss of 5% body weight at any visit. Non-responders and children who develop a danger sign at any time during first 4 weeks should be referred to a hospital.

(c) Defaulters: Not traceable for at least 2 visits.

- Children can be discharged from the program if *any of* the following criteria are satisfied: (*a*) Children admitted to SAM program on the basis of weight for height criteria should be discharged from the program (end therapeutic feeding) when weight for height becomes greater than or equal to -2 *Z* score of WHO reference and there is no edema. (*b*) Children admitted on the basis of MUAC criteria or presence of bilateral edema should be discharged (end therapeutic feeding) when MUAC becomes greater than or equal to 125 mm and there is no edema.

Thereafter, the child can be referred for usual health care program and growth promotion activities can be ensured by *anganwadi* workers (AWW), health care workers and health care providers.

INPATIENT CARE

The principles of management are as outlined in the earlier IAP recommendation (9). The following measures should be undertaken for children requiring inpatient care:

- Admission in a warm area separate from other children with infection
- Prevent, look for and manage: Hypoglycemia, Hypothermia, Dehydration, Electrolyte disturbances, Infection and sepsis, Micronutrient-Deficiency; using IAP Guidelines 2006 (9).

A. Children above 6 months of age

- Early initiation of appropriate feeding is an important step in the management of SAM. Therapeutic feeding conforming to F-75 composition can be used as an initial starting formula in the acute phase, followed by F-100 composition in the rehabilitation phase.

B. Infants less than 6 months

- *Prospect of continuing or re-initiating breastfeeding:* Breastfeeding should be encouraged in children (aged less than 6 months) and having SAM. Supplemental suckling technique can be used to support and enhance breastfeeding. These children should be monitored by determining weight gain and amount of supplemental feeding taken. The supplemental feeding can be slowly withdrawn as the breast milk output increases and baby shows weight gain. A baby showing consistent weight gain on exclusive breastfeeding can be discharged from the inpatient facility. The baby's growth can then be monitored on outpatient basis.
- *No prospect of continuing or re-initiating breastfeeding:* These babies should be treated with F-75 composition therapeutic food in the acute phase and response monitored in a manner described above.
- It is necessary to monitor the child and check for failure to respond to therapy. Failure to respond to therapy should prompt a review of the case, assessment of actual intake and checking for untreated infection and psychological problems.
- Continuation of breastfeeding should be encouraged.
- Sensory stimulation in the form of tender loving care, cheerful stimulating environment, structured play therapy, initiation of physical activity as soon as the child is well and maternal involvement in comforting, feeding and play are important aspects of overall management.

SUPPLEMENTARY SUCKLING TECHNIQUE

- The supplementation is given using tube feedings: the same size as 8NGT (5NGT can be used and is better for the infant, but the milk should be strained to remove any small particles that block the tube. The

appropriate amount of supplemental suckling milk is put in a cup. The mother or assistant holds it.

- The end of the tube is put in the cup.
- The tip of the tube is put on the breast at the nipple and the infant is offered the breast in the normal way so that the infant attaches properly.
- At first, cup should be placed about 5 cm to 10 cm below the level of the nipples so the SS-milk can be taken with little effort by a weak infant. It must NEVER be placed above the level of nipple, or else it will flow quickly into the infant's mouth by siphon with a major risk of inhalation. As the infant becomes stronger the cup should be lowered progressively to about 30 cm below the breast. It may take a day or two for the infants to get used to the tube and the taste of the mixture of milks, but it is important to persevere.

Children with SAM above 6 months of age can be discharged from the health facility once the child and the caretaker satisfy all the following criteria.

DISCHARGE

Discharge should be done when the child has:

- a good appetite (eating at least 120-130 Cal/kg/d) along with micronutrients;
- lost edema;
- shown consistent weight (>5g/kg/d) on three consecutive days;
- completed anti-microbial treatment; and
- appropriate immunization has been initiated,

Mother or Care-taker:

- Has been trained to prepare and provide appropriate feeding
- Has financial resources to feed the child
- Has been motivated to follow the advice given

Children with SAM below 6 months of age can be discharged from the health facility once the baby shows consistent weight gain on oral feeds and has no medical complications. Babies on breast feeding should be showing this weight gain based on exclusive breast feeding.

Training and involvement of the mother/ caretaker is an important aspect of inpatient care. After discharge the child should be referred for further care to the appropriate OTP center and continue the integrated management.

ORGANIZATIONAL ISSUES

- Inpatient and outpatient treatment should be one Integrated Program.
- The program should be integrated with other existing health programs intended to provide health promotion activities
- After the initial feasibility testing, the program may be initiated in a few high-risk districts of the country. After assessing the effectiveness of the programmatic interventions, the program can be scaled up to involve all the districts in the country in a phase-wise manner
- The effectiveness of the overall program needs to be monitored in terms of number of beneficiaries and, improvement in mortality, among others
- The various segments of the program (facility based inpatient care and outpatient care/ community-level management) need to be linked; so that children can be followedup and continued care is assured. This would also help in monitoring and judging effectiveness of the program
- It is necessary to encourage indigenous commercial production of "therapeutic foods" with strict quality control.

TRAINING

- All sections of the healthcare providers need to be trained in the Integrated management of SAM
- Pediatricians should be motivated and trained for taking a leadership role at national/state/district level as this is a child rights issue
- Health professionals and medical teachers should be enrolled as trainers for the program after holding structured training workshops
- Assessment of the effectiveness of training should be an essential component of the training program
- The Universities should be encouraged to accord a prominent position to the detection and Integrated Management of SAM in the pediatric curriculum.

RESEARCH PRIORITIES

- Research priorities should address gaps in knowledge related to SAM.
- Programmatic Research for assessing the cost-effectiveness of various interventions used in the program

PUBLIC AND MEDIA PARTICIPATION

The presence of children with SAM is a reality. The program to tackle SAM can only be successful through media participation and creation of public awareness.

ROLE OF INDIAN ACADEMY OF PEDIATRICS

IAP can play an important role in:

- Providing technical advice to the government regarding appropriate interventions and in formulating management guidelines and training modules
- Assisting the program through conduct of training programs
- Creating public awareness and ensuring media participation
- Recommend the Medical Council of India and the Universities to include management of SAM in the medical curriculum for the subjects of Pediatrics and Preventive and Social Medicine

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Appendix 1:

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B. List of Participants who could not attend but participated in finalization of the Recommendations: Rohit Agarwal, Mumbai; C P Bansal, Gwalior; HPS Sachdev, New Delhi; Uday Bodhankar, Nagpur; Shashi Vani, Nagpur; Umesh Kapil, New Delhi; and Sailesh Gupta, Mumbai.

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