National Guidelines for the Facility-based Management of Children with Severe Acute Malnutrition in Bangladesh

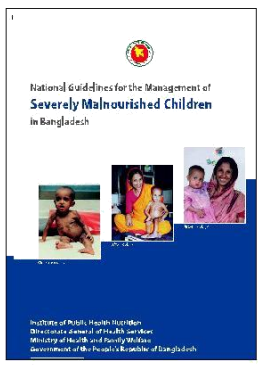
On admission

After 3 days

After 14 days

Institute of Public Health Nutrition
Directorate General of Health Services
Ministry of Health and Family Welfare
Government of the People's Republic of Bangladesh

July 2017



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July 2017

بسم الله الرحمن الرحيم

Message

Bangladesh has surprised the world with MDG achievements and is committed to lead by example again in the case of Sustainable Development Goal (SDG). Bangladesh is on the track in achieving the SDG by 2030. Nutrition is the heart of SDG and we will not achieve SDG, unless malnutrition is not addressed properly. It hinders the child survival as malnutrition is the underlying cause of about 50% under five childhood mortality. Managing severe malnutrition can reduce 55% of case fatality rate at health facility.

This is my pleasure to let you know that, the Institute Public Health Nutrition revised "National Guidelines for the Facility-based Management of Children with Severe Acute Malnutrition in Bangladesh". The Guideline is intended for Doctors, Medical Students, Nutritionists, Senior Nurses and other senior health professionals responsible for the therapeutic care of severely malnourished children in health facilities.

I congratulate Institute of Public Health Nutrition for their valuable contributions towards the revision of "National Guidelines for the Facility-based Management of Children with Severe Acute Malnutrition in Bangladesh" and my sincere gratitude to all others who were involved in this process.

Joy Bangla
Joy Bangabandhu
Bangladesh Live Forever.

Mr. Mohammed Nasim (MP)
Minister
Ministry of Health and Family Welfare
Government of People's Republic of Bangladesh

Message

Bangladesh has made significant achievements in the Millennium Development Goals (MDG); 4 and 5 in child mortality and maternal mortality. However malnutrition, especially in children, still remains a challenge that poses a threat to the country's development efforts.

It is a great satisfaction for me to be acquainted that, Institute of Public Health Nutrition has revised this "National Guidelines for the Facility-based Management of Children with Severe Acute Malnutrition in Bangladesh". This National Guideline is a key step towards the management of severe acute malnutrition.

I would like to thank everyone who worked hard directly for development and revision of the Guideline successfully and I call upon all stakeholders and partners in Bangladesh to lend their support to implement this guideline.

Joy Bangla
Joy Bangabandhu
Bangladesh Live Forever.

Mr. Zahid Maleque
State Minister
Ministry of Health and Family Welfare
Government of People's Republic of Bangladesh

Message

Ministry of Health and Family Welfare (MoHFW) is committed to provide quality health services at facilities and near to doorsteps as well. Many complicated malnourished children die at home without care. This case fatality can be reduced through early nutrition management to severe acutely malnourished children before complications arise.

It is a great contentment to know that the, Institute of Public Health Nutrition revised "The National Guidelines for the Facility Based Management of Severely Malnourished Children". In previous years severe malnutrition has traditionally been managed at inpatient facilities. In public health context, clinical management of acute malnutrition is important as prevention of malnutrition. I hope the "National Guidelines for the Management of Severely Malnourished Children" will be useful for the treatment of severe acute Malnutrition by the health service providers of Government institutions and NGOs.

I am thankful to Institute of Public Health Nutrition (IPHN) and other partners for their valuable contribution for revising the Guideline. I also appreciate the contribution and involvement of other stakeholders and development partners for their continuous support to Institute of Public Health Nutrition.

Mr. Sirajul Haque Khan
Secretary (Health Services Division)
Ministry of Health and Family Welfare
Government of People's Republic of Bangladesh

Message

The maternal and child malnutrition rate in Bangladesh is still remaining high though some remarkable progress was made in this field in recent years. Institute of Public Health Nutrition (IPHN) is trying hard to achieve the target and once we achieve those targets then it will be an enormous achievement for our country in the field of Nutrition.

I am very glad to recognize the revision of "National Guidelines for the Facility-based Management of Children with Severe Acute Malnutrition in Bangladesh" by the Institute of Public Health Nutrition (IPHN). For building a healthy nation, nutrition is an essential part. Institute of Public Health Nutrition (IPHN) focuses on maternal and child nutrition services as well as adolescent nutrition.

I express my gratitude to Institute of Public Health Nutrition (IPHN) and all members of Technical Expert Group, Institutions/agencies including WHO, UNICEF, icddrb and Save the Children and others for their inputs to this National guideline. Hope this guideline will help us to take necessary steps to meet SDG commitment, "Leaving no one behind".

Ms. Roxana Quader
Additional Secretary (PH & WH), Health Services Division
Ministry of Health and Family Welfare
Government of People's Republic of Bangladesh

Message

Malnutrition severely hinders individual, social and national development. Severe acute malnutrition represents a medical emergency and must be treated immediately. In Bangladesh, approximately half a million children are suffering from severe acute malnutrition. We have now entered to the era of Sustainable Development goals and achieving the targets found in goal 2 and other nutrition sensitive goals is impossible without profound progress on undernutrition.

Mainstreaming the implementation of nutrition interventions into health and family planning services will ensure more coordination in the treatment of severe acute malnutrition in the health facility. Treatment of severe acute malnutrition has also been incorporated in Essential Service Package (ESP) which is associated with Universal Health Coverage Initiative through which Government of Bangladesh (GoB) committed to ensure the right to health.

I congratulate Institute of Public Health Nutrition (IPHN), MoHFW and our development partners for their support to revise the "National Guidelines for the Facility-based Management of Children with Severe Acute Malnutrition in Bangladesh". I am hopeful that, capacities of UHC and district hospitals will be strengthened to adequately manage severe acute malnourished cases following this guideline.

Prof Dr. Abul Kalam Azad
Director General of Health Services
Ministry of Health and Family Welfare
Government of People's Republic of Bangladesh

Acknowledgement

Undernutrition is a leading cause of lifelong harm to productivity. In order to function at an optimum level, the human body needs appropriate and adequate nutrition. Undernutrition leads to poor health through reducing immunity and increasing susceptibility to infection. In contrast, well-nourished people are a key resource for national development.

Bangladesh still has a high prevalence of chronic malnutrition: in absolute numbers this relates to approximately 6 million children stunted. There are about 2.4 million children less than 5 years of age who are suffering from wasting. About 450,000 children suffer from severe acute malnutrition – a condition that has a 12 times higher risk of death compared to healthier children (Lancet, 2013).

'National Guidelines for the Facility-based Management of Children with Severe Acute Malnutrition in Bangladesh' has been revised in the context of 4th Health Nutrition and Population Sector Program (HNPSP) and National Plan of action on Nutrition (NPAN). This guideline focuses on the integration of the management of acute malnutrition into ongoing routine health services for children 0-59 months which is also usable in emergency programming. I believe it will strengthen institutional capacity at facility.

Institute of Public Health Nutrition is thankful to the Directorate General of Health Services, Ministry of Health and Family Welfare and we gratefully convey our acknowledgement to the contributions, SAM technical working group and other important stakeholders. We acknowledge the support and cooperation received from all development partners, particularly WHO, UNICEF, ICDDR, B and Save the Children, other members of different departments of Ministry of Health and Family Welfare, academics, scientists, clinicians, public health experts and nutritionists.

Dr. A B M Muzharul Islam
Director, Institute of Public Health Nutrition (IPHN), and
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Government of People's Republic of Bangladesh

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Abbreviations

CMV	Combined mineral vitamin mix
GRS	Growth Reference Standard
ICDDR, B	International Centre for Diarrhoeal Disease Research, Bangladesh
IM	Intramuscular
IMCI	Integrated Management of Childhood Illnesses
IPHN	Institute of Public Health Nutrition
IV	Intravenous
MUAC	Mid-upper arm circumference
NG	Naso-gastric
ORS	Oral rehydration salts
ReSoMal	Rehydration Solution for Malnutrition
SAM	Severe Acute Malnutrition
SD	Standard deviation
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WHM	Weight-for-height median
WHZ	Weight-for-height z-score

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References

1 Introduction

1.1 Severe acute malnutrition in Bangladesh

Severe acute malnutrition (SAM) is an important cause of death in children. SAM affects nearly 20 million pre-school age children, mostly from African and South East Asian region. Malnutrition contributes 8 million deaths in children under five years of age worldwide (WHO 2013). Overall risk of death among children with SAM is 9 times more that of well-nourished children (2)

Level of stunting among Bangladeshi children <5years declined from 51% in 2004 to 36% and underweight from 41% in 2007 to 33% (BDHS 2014). But the decrease in wasting rate is not as expected, which is only from 17% to 14.3 % over last decade. Approximately 3.1 % (BDHS 2014) of under-5 children suffering from SAM only by weight-for-length or height z-score (WHZ) <-3 criterion and estimated to be a total of ~ 450,000. Because, there are no national information on prevalence of SAM using mid upper arm circumference (MUAC) and presence of bipedal oedema in under-5 children, thus the actual number of children suffering from SAM could be much higher than the current estimate.

Children suffering from SAM can be successfully treated by using WHO guidelines that have been shown to be feasible and sustainable even in small district hospitals with limited resources. Where the WHO guidelines have been implemented as recommended, substantial reductions in case fatality rates have been achieved. WHO guidelines are a structured approach to care and involve 10 steps in two phases and taken into account the profound physiological changes that exist in severe malnutrition.

1.2 Management of severe acute malnutrition: combining facility-based and community-based care

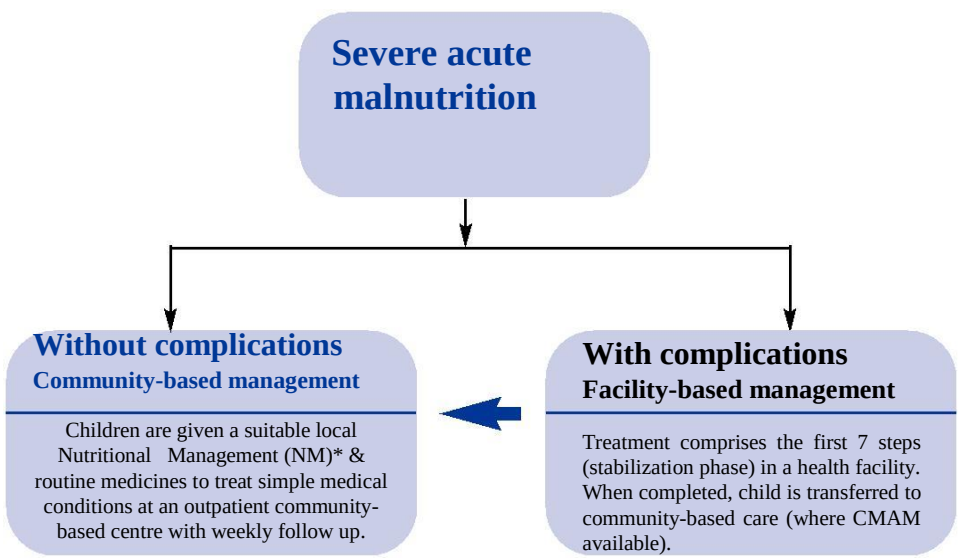
In Bangladesh, SAM in children has traditionally been managed at the facility level through inpatient therapeutic care. A small proportion of cases receive this treatment because active case finding in the community is rare or absent, many families cannot afford the economic and opportunity costs associated with facility-based inpatient care, and health facilities cannot reasonably handle such a high case load.

Facility-based inpatient care is essential when SAM has progressed to a stage where children have medical complications that are life-threatening.

stages when complications are absent, the technical aspects of treatment are very simple. There is universal consensus that severe acute malnutrition without complications does not require inpatient treatment and can be effectively managed at the community level. Therefore, to maximize coverage and access to therapeutic care for children with severe acute malnutrition, an approach that combines the following components is most appropriate:

- Acute Malnutrition and classifications
  MUAC <125mm and/or bipedal oedema
  SAM= MUAC <115mm and/or bipedal oedema
  MAM= MUAC 115mm- <125mm

- **Management at the facility level** for children with SAM with complications.
- **Management at the community level** for children with SAM without complications and children who have been discharged from facility-based inpatient care.



The advantages of a combined facility-based and community-based approach are many:

- **Active case seeking in the community for severe acute malnutrition** through rapid screening methods such as mid-upper arm circumference (MUAC).
- Active case-finding in the community identifies children with severe acute malnutrition early in the progression of the condition, before medical complications occur. If cases can be identified at an early stage, only 10-15 % of SAM children will require facility-based inpatient treatment.
- Rational use of facility-based inpatient care allows health facilities to focus resources on the specialized care of children with SAM with complications.

Access to community-based care for children without complications benefits children by reducing exposure to hospital-acquired infections and benefits families by reducing the time that caregivers spend away from home and other siblings, and by reducing opportunity costs.

- Maximum coverage and access is possible making services accessible to the highest possible proportion of children with severe acute malnutrition. By improving access to treatment, it also ensures that children continue treatment until they have recovered and thus reduces default cases. Until community-based care is in place, all children with SAM should be treated through facility-based care in a health facility.

1.3 About the National Guidelines

The National Guidelines for Facility-based Management of Children with SAM in Bangladesh are intended for doctors, senior nurses and other senior health professionals responsible for inpatient therapeutic care of children with severe acute malnutrition in health facilities. They are based on the global guidelines of the World Health Organization (WHO), which have been adapted, where necessary, to the context of Bangladesh.

The guidelines are designed for circumstances where community-based management of SAM is not available and therefore include the complete protocol for management of SAM , including:

- Assessment of SAM and admission criteria
- General principles for management (the '10 Steps')
- Treatment of associated conditions
- How to address failure to respond to treatment
- Guidelines for discharge before recovery is complete
- Emergency treatment of shock, anemia, severe pneumonia, heart failure etc.

* Nutritional Management (NM) is a therapeutic food equivalent to F100 which is recommended by the World Health Organization (WHO) for the management of SAM in recovery phase

2 Assessment of severe acute malnutrition and admission criteria

2.1 Assessment of severe acute malnutrition

SAM is identified by the presence of severe wasting and/or bi-pedal oedema.

A child aged 6-59 months is classified as severe acute malnourished if s/he has one or more of the following:

- Mid-upper arm circumference <115 mm
- Weight-for-length z-score (WLZ)* < -3
  or Weight-for-length z-score (WHZ) <-3
- Bipedal oedema**

* WLZ is used for children less than 2 years of age
**Bipedal oedema may occur in kwashiorkor, marasmic kwashiorkor

Bangladesh has adopted the new World Health Organization (WHO) Growth Reference Standards (GRS), which should be used for determining the WLZ/WHZ (Annex 1).

There are uncertainties regarding the classification of children aged <6 months as SAM [5]. Until better information becomes available, a child aged <6 months should be classified as SAM if s/he has one or more of the following:

- WLZ <-3
- Bipedal oedema
- Visible wasting*

* If length is <45 cm then calculation of WLZ is not possible

Oedema in all children is graded using the classification below:

Grade of oedema	Definition
Grade +	Mild: both feet/ankles
Grade ++	Moderate: both feet, plus lower legs, hands or lower arms
Grade +++	Severe: generalized oedema including feet, legs, hands, arms and face.

2.2 Admission to facility-based (inpatient) or community-based (outpatient) care

In areas where only facility-based inpatient care is available, all children with one or more of the above criteria should be admitted to inpatient care.

In areas where both facility-based and community-based cares are available:

- SAM without medical complications should be treated through community-based care
- SAM with medical complications should be admitted to facility-based inpatient therapeutic care until medical complications are controlled.

Presence of any of the following conditions with SAM requires facility-based inpatient treatment:

Sign	Criteria for inpatient treatment
Oedema	* Grade ++ and Grade +++
Oedema with wasting	Any grade of oedema with MUAC<115 mm and/or WLZ or WHZ<-3)
Appetite/anorexia	Poor appetite or unable to eat
Vomiting	Persistent vomiting (≥3 per hour)
Temperature	Fever (>39ºC or 102.2ºF axillary) or hypothermia (<35ºC or 95ºF axillary)
Respiratory rate	Rapid breathing according to IMCI guidelines for age:≥60 /min for children <2 months ≥50 /min for children 2-12 months ≥40 /min for children 12-59 months
Anaemia	Severely pale (severe palmer pallor) with or without difficulty breathing
Infection	Extensive infection requiring parenteral treatment
Alertness	Very weak, apathetic, unconscious, fitting/convulsions
Hydration status and dehydrating diarrhoea	Dehydration based primarily on a recent history of diarrhoea, vomiting, fever or sweating, not passing urine for last 12 hours and on recent appearance of clinical signs of dehydration as reported by the caregiver
Other criteria	Infants <6 months with severe acute malnutrition
	Caregiver requests inpatient care

3 General principles of management

There are ten essential steps for management:

Step 1: Treat/prevent hypoglycaemia
Step 2: Treat/prevent hypothermia
Step 3: Treat/prevent dehydration
Step 4: Correct electrolyte imbalance
Step 5: Treat/prevent infection
Step 6: Correct micronutrient deficiencies
Step 7: Start feeding cautiously including breast feeding

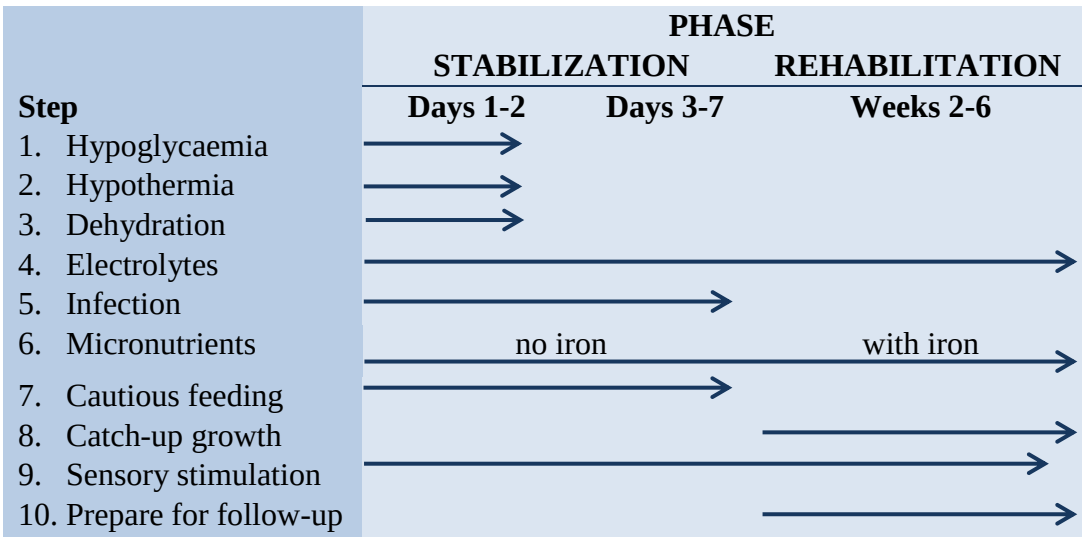
Step 8: Achieve catch-up growth
Step 9: Provide sensory stimulation and emotional support
Step 10: Prepare for discharge and follow-up after recovery

In areas where community-based care is established, facility-based inpatient care for children with severe acute malnutrition with complications includes the first seven steps only. These steps should take four to seven days to complete and then the child is referred to community-based care to continue management of severe acute malnutrition.

The ten steps are accomplished in two phases, as shown by the typical time-frame for the management of a child with severe acute malnutrition in Table 1:

- **Stabilisation phase** when life-threatening problems are identified and treated, specific deficiencies are corrected, metabolic abnormalities are reversed and feeding is begun.
- **Rehabilitation phase** when intensive feeding is started to recover lost weight; emotional and physical stimulation is increased; breastfeeding is re-initiated and/or encouraged; the mother or caregiver is trained to continue care at home, and preparations are made for discharge of the child.

Table 1: Time-frame for the management of a child with severe acute malnutrition



There is an intervening transitional phase of treatment for 2-3 days when dietary treatment changes from low calorie-low protein (F-75) to high calorie-high protein diet (F-100).

Step 1. Treat/prevent hypoglycaemia

a) Diagnosis

Hypoglycaemia and hypothermia usually occur together and are signs of infection. Hypoglycaemia may also occur if the malnourished child has not been fed for 4-6 hours. Consider for hypoglycaemia whenever hypothermia is found (axillary <35ºC or <95ºF), or there is lethargy, limpness, convulsion and loss of consciousness.

- Assume all children with severe acute malnutrition as hypoglycaemic and treat accordingly.
- If blood glucose can be measured immediately and quickly (e.g. with dextrostix), take finger/heal prick blood and check blood sugar level. Hypoglycaemia is considered if blood sugar level is <3 mmol/L or 54 mg/dL.

b) Treatment:

If the child is conscious give:

- 50 ml bolus of 10% glucose or sucrose solution (5 g or 1 rounded teaspoon of sugar in 50 ml or 3.5 tablespoons water), orally or by nasogastric (NG) tube.
- Then feed starter diet F-75 (as in Step 7) every 30 minutes for two hours (giving one fourth volume of the total recommended two hours' feed)
- Keep the child warm
- Antibiotics (as in Step 5)
- Two-hourly feeds, day and night (as in Step 7).

If the child is unconscious or convulsing give:

- 10% glucose (5 ml/kg) IV followed by 50 ml of 10% glucose or sucrose by NG tube. Then give starter F-75 as above
- If convulsion persists after completion of IV glucose, give per rectal diazepam (0.5mg/kg body weight)
- Keep the child warm
- Antibiotics (as in Step 5)
- Two-hourly feeds, day and night (as in Step 7).

c) Monitor:

- Blood glucose: repeat dextrostix after two hours. Once treated, most children stabilise within 30 min. If blood glucose falls to <3 mmol/L give a further 50 ml bolus of 10% glucose or sucrose solution, and continue feeding every 30 minutes for two hours (giving one fourth volume of the total recommended two hours' feed)
- Axillary temperature: if this falls to <36.0 ºC or 96.8ºF, repeat dextrostix
- If level of consciousness remains static; the treatment of hypoglycaemia should be repeated
- If condition does not improve consider other causes and/or refer to a higher facility if possible.

d) Prevention:

Frequent feeding is important in preventing both hypoglycaemia and hypothermia.

- Feed two-hourly
- Ensure feeds throughout the day and night.

Step 2. Treat/prevent hypothermia

a) Diagnosis:

If the axillary temperature is <35 ºC or 95ºF.

b) Treatment:

- Re-warm the child: either clothe the child (including head), cover with a warmed blanket and increase the ambient temperature with available but safe heat source(s), or put the child on the mother's bare chest (skin to skin/ Kangaroo Mother Care (KMC)) and cover them
- Feed as in step 7

c) Monitor:

- Ensure that the child is covered at all times, especially at night
- Feel for warmth
- Temperature: during re-warming take axillary temperature two hourly until it rises to >37.0 ºC or 98.6 ºF
- Blood glucose level: check for hypoglycaemia whenever hypothermia is found

Annex 10 provides an example of a chart for recording temperature, pulse and respiratory rates.

d) Prevention:

- Keep child covered and away from cold air.
- Avoid regular bathing, keep child dry, change wet nappies, clothes and bedding
- Avoid exposure (e.g. bathing, prolonged medical examinations)
- Let child sleep with mother/caregiver at night for warmth
- Feed two-hourly, start straightaway (see Step 7)
- Always give feeds throughout the day and night during the stabilization phase, especially for the first 24-48 hours.

Step 3. Treat/prevent dehydration

a) Diagnosis

It is difficult to estimate dehydration status in a child with severe acute malnutrition using clinical signs alone, because the clinical signs of dehydration may already present in children with severe acute malnutrition (e.g. slow skin pinch, sunken eyes, dry mouth) or are also signs of septic shock (e.g. cold hands and feet and diminished urine flow). Dehydration may be overestimated in a marasmic/wasted child and underestimated in a kwashiorkor/oedematous child. Therefore, assume that children with watery diarrhoea may have dehydration.

b) Treatment:

The standard oral rehydration salts (ORS) solution (90 mmol sodium/L) and the newly modified WHO-ORS (75 mmol sodium/L) contains too much sodium and too little potassium for children with severe acute malnutrition. Instead give special **Re**hydration **So**lution for **Mal**nutrition (ReSoMal) (For recipe see Annex 2).

The newly modified WHO-ORS (75 mmol sodium/L) contains ↑sodium &↓potassium for SAM children. Preferably give special Rehydration Solution for Malnutrition (ReSoMal)

Ingredient	Amount
Water (boiled & cooled)	850 ml
WHO-ORS (new formulation)	One 500 ml-packet
Sugar	20 g
Electrolyte/mineral mix solution	16.6 ml (if available)

Give all children with watery diarrhoea:

- Every 30 min for first two hours, ReSoMal 5 ml/kg orally or by naso-gastric tube, then
- Alternate hours for 4-10 hours, ReSoMal 5-10 ml/kg/h (the exact amount to be given should be determined by how much the child wants, and stool loss and vomiting). F-75 is given in alternate hours during this period until the child is rehydrated.
- After rehydration, continue feeding F-75 (see step 7)

If diarrhoea is severe then new WHO-ORS (75 mmol sodium/L) may be used because the loss of sodium in the stool is high and symptomatic hyponatraemia can occur with ReSoMal [6].

Low blood volume can coexist with oedema. Do not use the IV fluid for rehydration except in cases of shock and then do so with care, infusing slowly to avoid flooding the circulation and overloading the heart (see Section 7)

c) Monitor:

Monitor progress of rehydration:

Observe half-hourly for 2 hours, then hourly for the next 4-10 hours:

- Pulse rate
- Respiratory rate
- Urine frequency
- Stool/vomit frequency

During treatment, rapid respiration and pulse rates should slow down and the child should begin to pass urine. Return of tears, moist mouth, eyes and fontanelle appearing less sunken, improved skin turgor, and urination are also signs that rehydration is proceeding. However, many children with severe acute malnutrition will not show these changes even when fully rehydrated.

Continuing rapid breathing and rapid pulse during rehydration may suggest coexisting infection as well as overhydration.

Fluids should be stopped immediately if there are any signs of overhydration, especially signs of heart failure. If the following signs occur, stop fluids immediately and reassess after one hour:

- Increasing pulse rate (increase of 25 beats/min or more)
- Increasing respiratory rate (increase of 5 breaths/min or more)
- Puffy eyelids or increasing oedema

Stop ReSoMal as soon as the child has 3 or more of the following signs of improved hydration status:

- Child no longer thirsty
- Passing urine
- Slowing of respiratory and pulse rates from previous high rates
- Skin pinch less slow
- Tears

d) Prevention:

To prevent dehydration when a child has continuing watery diarrhoea:

- Keep feeding with starter F-75 (as in Step 7)
- Replace approximate volume of stool losses with ReSoMal (after each water stool give 5-10ml/kg). Note that it is common for malnourished children to pass many small unformed stools: these should not be confused with profuse watery stools and do not require fluid replacement.
- If child is breastfed, encourage to continue breastfeeding with increased frequency.

Step 4. Correct electrolyte imbalance

All children with SAM have excess body sodium even though plasma sodium may be low. Giving high sodium loads in food and fluids is dangerous. Deficiencies of potassium and magnesium are also present and may take at least two weeks to correct. Oedema is partly due to these imbalances.

Treatment

Until stabilization, give:

- Extra potassium* 4mmol/kg/d for 1 week
- Extra 50% magnesium Sulphate * 0.1ml/kg/day for 1 week
- When rehydrating, give low sodium rehydration fluid (e.g. ReSoMal)
- Prepare food without salt
- Do NOT treat oedema with a diuretic

*The extra potassium and magnesium can be prepared in a liquid form and added directly to feeds during preparation. Annex 2 provides a recipe for a combined electrolyte - mineral solution. Adding 20 ml of this solution to 1 litre of feed will supply the extra potassium and magnesium required. The solution can also be added to make ReSoMal.

* When F 75 & F 100 are Produced rightly adding appropriate electrolyte mineral mix then extra potassium and extra magnesium sulphate are not needed.

Step 5. Treat/prevent infection

a) Diagnosis

In severe acute malnutrition the usual signs of infection, such as fever, are often absent, and infections are often hidden. Therefore routinely treat all children with severe acute malnutrition on admission with broad-spectrum antibiotics.

b) Treatment

- Bacterial infections are common
- Signs of infection are often absent
  - Routinely give broad spectrum antibiotic(s) &
  - Measles vaccine if child is > 6 months & not immunised

- **Choice of antibiotics:**

(i) If the child appears to have no sign of infection/complications give

- Amoxicillin oral 15 mg/kg 8-hrly for 5 days

(ii) If the child is severely ill (apathetic, lethargic or looking sick) or has complications (shock; hypoglycaemia; hypothermia; dermatosis; with raw or broken skin; respiratory tract or urinary tract infection; lethargic/sickly appearance) give:

- Ampicillin IM/IV 50 mg/kg 6-hourly for 2 days. Then amoxicillin oral 15mg/kg 8-hourly for 5 days AND

Gentamicin IM / IV 7.5 mg/kg once daily for 7 days. If the child is not passing urine, gentamicin may accumulate in the body and cause deafness. Do not give second dose until the child passed urine.

If the child fails to improve clinically by 48 hours or deteriorates after 24 hours, or if the child presents with septic shock or meningitis, antibiotics with a broader spectrum may be needed (e.g. ceftriaxone 75-100 mg/kg/d IV/IM once daily along with gentamicin).

If malaria is suspected, anti-malarial should be given

- If HIV exposed or infected, provide Co-trimoxazole prophylaxis (Trimethoprim 5 mg/kg/d)
- If Pneumocystis jirovecii pneumonia is present, then treat with Co-trimoxazole (Trimethoprim 20 mg/kg/d) in 4 divided doses for 2 weeks

Step 6. Correct micronutrient deficiencies

All children with severe acute malnutrition have vitamin and mineral deficiencies. As giving iron in acute phase can make infections worse, although anaemia is common, do **NOT** give iron initially but wait until the infection is controlled, child has a good appetite and starts gaining weight (usually by the second week),

Treatment

Give:

- Vitamin A orally on Day 1 unless there is definite evidence that a dose has been given in the last month (for age >12 months, give 200,000 IU; for age 6-12 months, give 100,000 IU; for age 0-5 months, give 50,000 IU)

Give daily for at least 2 weeks:

- Multivitamin supplement (without iron)
- Folic acid 1 mg/d (give 5 mg on Day 1)
- Zinc 2 mg/kg/d
- Copper 0.3 mg/kg/d (if available)
- Elemental iron 3 mg/kg/d but only when starts gaining weight (start in rehabilitation phase).

Annex 2 provides a recipe for a combined electrolyte-mineral solution. Adding 20 ml of this solution to 1 litre of feed or ReSoMal will supply the zinc and copper needed, as well as electrolytes (potassium and magnesium).

Give the following vitamins and minerals as below:

	Combined electrolyte/ mineral solution available	if combined electrolyte - mineral solution nor CMV available
Vitamin A on day 1	√	√
Daily for at least 2 wk:		
Multivitamin	√	√
Folic acid 1 mg/d (give 5 mg on Day 1)	√	√
Zinc 2 mg/kg/d	-	√
Copper 0.3 mg/kg/d	-	√
Elemental iron 3 mg/ kg/d when gaining weight (for about three months)	√	√
Potassium* 4mmol/kg/d for 1 week	-	√
50% Magnesium Sulphate * 0.1ml/kg/day IM for 7 days	-	√

Step 7. Start feeding cautiously

In the **stabilisation phase** a cautious approach is required because of the child's fragile physiological state and reduced capacity to handle large feeds. Feeding should be started as soon as possible after admission and should be designed to provide just sufficient energy and protein to maintain basic physiological processes. The guidelines in this section apply to children aged 6-59 months. For infants aged <6 months see Annex 9.

The essential features of feeding during the stabilisation phase are:

- Small, frequent feeds of low osmolarity and low lactose
- Oral or nasogastric (NG) feeds (never parenteral preparations)
- Energy intake of ~100 kcal/kg/d
- Protein intake of 1-1.5 g protein/kg/d
- Total fluid intake through feeds should not be more than 130 ml/kg/d (100 ml/kg/d if the child has severe (+++) oedema, which means oedema of the legs, hands and face)
- If the child is breastfed, encourage to continue breastfeeding but give the prescribed amounts of starter formula (F-75) to make sure the child's needs are met. If feasible re-lactation should be tried in <24 months older children

The suggested starter formula and feeding schedules (see below) are designed to meet these targets. Milk-based formulas such as starter formula F-75 containing 75 kcal/100 ml and 0.9 g protein/100 ml are satisfactory for most children (see Annex 4 for recipes). Feed from a cup. Very weak children may be fed by spoon, dropper or syringe. A recommended schedule in which volume is gradually increased, and feeding frequency gradually decreased is:

Days	Frequency	Vol/kg/feed	Vol/kg/d
1-2	2-hourly	11 ml	130 ml
3-5	3-hourly	16 ml	130 ml
6+	4-hourly	22 ml	130 ml

For children with severe oedema follow the chart for severe oedema. If intake <80 kcal/kg/d, start NG tube feeding and also, if child is breastfed, then BF should be continued and if not then re-lactation should be done using breastmilk supplementer below 24 months of age

Criteria for increasing volume and decreasing frequency of F-75 feeds:

- If vomiting, frequent loose stool (≥5 per day), or poor appetite, continue 2-hourly feeds.
- If little or no vomiting, less frequent loose stool (< 5 per day), and finishing most feeds, changes to 3-hourly feeds.
- After a day on 3-hourly feeds - if no vomiting, less diarrhoea and finishing most feeds, change to 4-hourly feeds.

Monitor and note:

- Amounts offered and left over
- Frequency of vomiting
- Frequency of watery stool
- Daily body weight

During the stabilisation phase, diarrhoea should gradually diminish and oedematous children should lose weight. If diarrhoea continues despite cautious refeeding, or worsens substantially, see section 4.4 (continuing

diarrhoea).

Step 8: Achieve catch-up growth

In the **rehabilitation phase** a vigorous approach to feeding is required to achieve very high intakes and rapid weight gain of >10 g/kg/d. Readiness to enter the rehabilitation phase is signaled by a return of appetite, usually about one week after admission, and a loss of most/all of the oedema. A gradual transition is recommended to avoid the risk of heart failure which can occur if children suddenly consume huge amounts. The guidelines in this section apply to children aged 6-59 months. For infants aged <6 months see Annex 9.

The recommended milk-based F-100 contains 100 kcal and 2.9 g protein/100 ml (see Annex 5 for recipes). During the later phase of rehabilitation khichuri, halwa, or other suitable family food can be used. Recipes for khichuri and halwa are provided in Annex 8. There should be gradual replacement of F-100 with khichuri/halwa containing the equivalent amount of kilocalories.

The motivation of caregivers is crucial to success. Sufficient time must be spent with the child to enable him or her to finish each feed. The child must be encouraged to eat actively while sitting comfortably on the mother or caregiver's lap. Children must never be left to eat alone.

To change from starter to catch-up formula:

- Replace starter formula F-75 with the same amount of catch-up formula F-100 every 4 hours for 48 hours (transitional phase) then,
- Increase each successive feed by 10 ml until some feed remains uneaten. The point when some remains unconsumed after most feeds is likely to occur when intakes reach about 30 ml/kg/feed (200 ml/kg/d).

Monitor for signs of heart failure during the transition phase:

- Respiratory rate
- Pulse rate

If respirations increase by 5 or more breaths/min and pulse by 25 or more beats/min for two successive 4-hourly readings, reduce the volume per feed: give 4-hourly F-100 at 16 ml/kg/feed for 24 hours (100 ml/kg/d); then 19 ml/kg/feed for 24 hours (115 ml/kg/d); then 22 ml/kg/feed for 48 hours (130/kg/d); then increase each feed by 10 ml as above.

After the transition phase give:

- Frequent feeds (at least 4-hourly) of unlimited amounts of catch-up formula F-100
- This will lead to energy and protein intakes of 150-220 kcal/kg/d and 4-6 g protein/kg/d, respectively.
- If the child is breastfed, encourage continued breastfeeding. Note, however, that breast milk alone does not have sufficient energy and protein to support rapid catch-up growth of children with severe acute malnutrition.

See Annex 7 for range of volumes for free feeding with F-100.

Monitor progress after the transition by assessing the rate of weight gain:

- Weigh child each morning before feeding. Plot weight on a graph paper (Annex 11 provides example).

If weight gain is:

- Poor (<5 g/kg/d), child requires full reassessment
- Moderate (5-10 g/kg/d); check whether intake targets are being met, or if infection has been overlooked
- Good (>10 g/kg/d), continue to praise staff and mothers)

Note: during the first few days of rehabilitation, children with oedema may not gain weight, despite an adequate intake because oedema fluid is being lost. Thus, progress in these children is seen as decreased oedema rather than rapid weight gain. If the child is neither gaining weight nor showing decreased oedema, or there is increasing oedema, the child is failing to respond then reassess the child, look for any pitfall in the management and take appropriate measures.

Formula for calculating weight gain:

$$\text{Weight gain in g/kg/day} = \frac{(W2 - W1) \times 1000}{(W1 \times \text{number of days from W1 to W2})}$$

where: W1 = initial or lowest weight in kg;
W2 = weight in kg on the day of calculation

Or, if weight gain is calculated daily, then the average of the daily weight gain (g/kg/day) can be used.

Step 9. Provide sensory stimulation and emotional support

Severe malnutrition affects mental and behavioural development, which can be reversed by appropriate treatment including sensory stimulation and emotional support.

Provide:

- Tender loving care (smiling, laughing, patting, touching, etc.)
- A cheerful, stimulating environment
- Structured play therapy 15-30 min/d. The play sessions should make use of toys made of locally available low cost materials (see Annex 12)
- Physical activity as soon as the child is well enough
- Parental/caregiver involvement when possible (e.g. comforting, feeding, bathing, play) so that the special care is continued at home

Step 10. Prepare for discharge and follow-up after recovery

A child who has achieved WLZ or WHZ $\geq$ -2 can be considered to have recovered sufficiently to be discharged from hospital, but follow-up is essential. During rehabilitation, the parents must be taught (e.g. preparation of khichuri & halwa as in annex 8) how to prevent malnutrition from recurring, and prior to discharge a plan should be made with the parents for follow-up. Where applicable and possible, the caregivers or other guardians of the child should be included in these discussions.

Criteria for discharge:

In areas where there is no community-based outpatient care, discharge may be given if the following criteria are present:

Criteria for discharge from inpatient care in areas where there is no community-based outpatient care	
Child	• WHZ $\geq$ 2 • Odema has resolved • No more infections and medical complication • Immunization is completed or planned

Mother	• Knows how to:
	  ○ Prepare homemade balanced diet & to feed the child
	  ○ Give home treatment for diarrhoea
	  ○ Recognise the danger signs for seeking medical assistance
	• Advice for follow up

Teaching parents to care for the child and prevent malnutrition recurring:

Ensure that the parent understands the causes of malnutrition and how to prevent its recurrence:

- Correct breastfeeding and feeding practices (frequent feeding with energy and nutrient dense foods)
- How to treat, or seek treatment for, diarrhoea and other infections
- When to take the child for immunizations
- Ensure that the child receives a vitamin A supplement (children aged 6-59 months) and antihelminthic drug (children aged 24-59 months) every 6 months
- How to give structured play therapy to child.

- **Follow Up:**
  - Follow up visit at 1 wk after discharge in treated health facility or nearby public (CC, UH&FWC, IMCI-Nutrition corner, EPI centre etc) or NGO facilities for follow up
  - 1wk, 2wk, 1 month, 3 months and then every 3months thereafter until WHZ becomes >1
  - Enroll in CMAM programme.
  - Attend monthly GMP sessions at health centres (CC, UH&FWC, IMCI-Nutrition corner, EPI Centre etc) or NGO facilities upto 5yrs of child age
  - Enroll in Safety net programme

See Annex 13 for an example of a Discharge Card

4 Treatment of associated conditions

4.1 Vitamin A deficiency

Children with vitamin A deficiency are likely to be photophobic and have closed eyes. It is important to examine the eyes very gently to prevent damage and rupture. All children should have their eyes examined carefully and gently.

If the child shows **any eye signs** of deficiency, give orally:

- Vitamin A on days 1, 2 and 14:

  Children 0-6 months: 50,000 IU
  Children 6-12 months: 100,000 IU
  Children ≥12 months: 200,000 IU

- If first dose has been given in the referring centre, treat on days 1 and 14 only

If there is **corneal clouding or ulceration**, give additional eye care to prevent extrusion of the lens:

- Instil chloramphenicol eye drops (1%) 2-3 hourly as required for 7-10 days and or tetracycline eye ointment in the affected eye at night
- Instil atropine eye drops (1%), 1 drop three times daily for 3-5 days
- Cover with eye pads soaked in saline solution and bandage

4.2 Dermatosis

Signs:

- Hypo-or hyper pigmentation
- Desquamation
- Ulceration (spreading over limbs, thighs, genitalia, groin, and behind the ears)
- Exudative lesions (resembling severe burns) often with secondary infection, including Candida

Zinc deficiency is usual in affected children and the skin quickly improves with zinc supplementation (1-2 mg/kg/day for 2 wks).

In addition, weeping skin lesions are commonly seen in and around the buttocks of children with kwashiorkor:

- Keep the perineum dry.
- Apply a gauze soaked in 1% potassium permanganate solution over affected areas and keep for 10 minutes twice daily.
- Candidiasis should be treated with anti-fungal cream (eg. clotrimazole) twice daily for 2 weeks. Oral candidiasis should be treated with oral nystatin (100,000 IU four times daily).

4.3 Helminthiasis

Treatment of helminth infections should be delayed until the rehabilitation phase of treatment. Give a single dose of any one of the following antihelminthics:

- 200 mg albendazole for children aged 12-23 months, 400 mg albendazole for children aged ≥24 months

or

- 100 mg mebendazole twice daily for 3 days for children ≥24 months (not recomended below 24 months)

or

- 10 mg/kg pyrantel pamoate (any age)-: single dose.

4.4 Continuing diarrhoea and dysentery

Diarrhoea is a common feature of malnutrition but it should subside during the first week of treatment with cautious feeding. In the rehabilitation phase, loose, poorly formed stools are no cause for concern provided weight gain is satisfactory.

Mucosal damage and **giardiasis** are common causes of continuing diarrhoea. Where possible examine the stools by microscopy. Treat giardiasis with metronidazole (7.5 mg/kg 8-hourly for 7 days).

If stool contains visible blood, treat the child with an oral antimicrobial that is effective against most local strains of Shigella (ciprofloxicillin 10 mg/kg/12 hourly for 3 days or pivmecillinum 15 mg/kg/6 hourly for 5 days).

Lactose intolerance Only rarely is diarrhoea due to lactose intolerance. Treat only if continuing diarrhoea is preventing general improvement. Starter F-75 is a low-lactose feed. In exceptional cases:

- Substitute animal milk with yoghurt or a lactose-free infant formula (eg rice suji, see appendix 14)
- Reintroduce milk feeds gradually in the rehabilitation phase

Osmotic diarrhoea may be suspected if diarrhoea worsens substantially in young children with diarrhoea who are given F-75 prepared with milk powder, which has slightly higher osmolality. In these cases:

- Use low osmolar cereal-based F-75 (see Annex 4), or yoghurt or rice suji , then
- Introduce F-100 gradually.

4.5 Tuberculosis

If tuberculosis (TB) is strongly suspected (contacts with adult TB patient, poor growth despite good intake, unremitting chronic cough (> 2 weeks), chest infection not responding to conventional antibiotics):

- Perform Mantoux test (false negatives are frequent in severe malnutrition. Induration more than 5 mm after 48 hours is considered positive)
- Chest X-ray if possible

If test is positive or there is a strong suspicion of TB, treat according to National TB Control Guidelines of Bangladesh.

4.6 Other infections and conditions

Treat other associated conditions and infections according to national guidelines.

5 Failure to respond to treatment

Failure to respond is indicated by high mortality and low weight gain during the rehabilitation phase.

5.1 High mortality

Case fatality rates (CFR) are categorized as follows:

Unacceptable	>20%
Poor	11-20%
Moderate	5-10%
Good	<5%

If mortality is >5%, determine whether the majority of deaths occur:

- Within 24 hours: consider untreated or delayed treatment of hypoglycaemia, hypothermia, septicaemia, severe anaemia or incorrect rehydration fluid or volume or overuse of IV fluids.
- Within 72 hours: check whether the volume of feed is too high or the wrong formulation is used; check whether potassium and correct antibiotics were given.
- At night: consider hypothermia from insufficient covers, no night feeds.
- When changing to catch-up F-100: consider too rapid a transition
- After 7 days: consider hospital-acquired sepsis.

5.2 Low weight gain during the rehabilitation phase

Low weight gain is categorized as follows:

Poor:	<5 g/kg/d
Moderate:	5-10 g/kg/d
Good:	>10 g/kg/d

If weight gain is <5 g/kg/d determine:

- Whether this is for all cases (needs major management overhaul of the Nutrition Unit).
- Whether this is for specific cases (reassess child as for a new admission, including screening for infections including TB, urinary tract infection, and ear infection).

Possible causes of poor weight gain are:

a) Inadequate feeding

Check:

- Night feeds are given
- Target energy and protein intakes are achieved: Is calculation of child's food requirement correct? Is actual intake (offered minus leftovers) correctly recorded? Is the quantity of feed recalculated as the child gains weight? Is the child vomiting or ruminating?
- Feeding technique: is the child fed frequently and offered unlimited amounts?
- Quality of care: are staff motivated/gentle/loving?
- All aspects of feed preparation: weighing scales, measurement of ingredients, mixing, taste, hygienic preparation and storage, and adequate stirring for proper mixing of the ingredients.
- If giving family foods, they are suitably modified to provide >100 kcal/100g (if not, re-modify).

b) Specific nutrient deficiencies

Check:

- Adequacy of multivitamin composition and shelf-life

b) Preparation of electrolyte/mineral solution and whether this is correctly prescribed and administered. If in goitrous region, ensure that potassium iodide (KI) is added to the electrolyte/mineral solution (12 mg/2500 ml) or give all children Lugol's iodine (5-10 drops/day for 14 days)

c) If modified family foods are substantially replacing F-100, electrolyte/mineral solution is added to the family food (20 ml/day).

d) Untreated infection

If feeding is adequate and there is no malabsorption, some hidden infection should be suspected. Urinary tract infections, otitis media, TB and giardiasis are easily overlooked. Other infections include dengue, hepatitis B, malaria and HIV infection. Investigate for infection as follows:

- Re-examine carefully (temperature, pulse rate and respiration rate every 3 hours)
- Repeat urinalysis for white blood cells
- Examine stools for intestinal infections and signs of blood.
- If possible, take chest X-ray
- Test blood for dengue, hepatitis B and malaria

Alter the antibiotic schedule (Step 5) only if a specific infection is identified.

d) HIV/AIDS

In children with HIV/AIDS, good recovery from malnutrition is possible though it may take longer and treatment failures may be common. Gut enteropathy tends to be worse in HIV-infected children. An important cause of enteropathy is Cryptosporidium parvum infection. Lactose intolerance occurs in severe HIV-related chronic diarrhoea: children with monosaccharide and disaccharide intolerance may benefit from lactose-free preparations.

e) Psychological problems

Check for abnormal behaviour such as stereotyped movements (rocking), rumination (self-stimulation through regurgitation) and attention seeking. Ensure extra care, love and attention.

6 Discharge before complete recovery (if required)

A child may be considered to have recovered and be ready for discharge when she/he reaches 80% WHZ $\geq$ 2. For some children, earlier discharge may be considered if effective alternative supervision is available. Domiciliary care or home-based treatment should be considered only if the following criteria are met.

The child:

- Is aged >12 months
- Has lost oedema
- Has completed antibiotic treatment
- Has good appetite and good weight gain
- Has taken potassium, magnesium, mineral and vitamin supplement for 2 weeks (or continuing supplementation at home is possible)

The mother/caregiver

- Is not employed outside the home
- Is specifically trained to give appropriate feeding (type, amount and frequency)
- Has the financial resources to feed the child
- Lives within easy reach of the hospital for urgent readmission if the child becomes ill
- Can be visited weekly
- Is trained to give structured play therapy
- Is motivated to follow the advice given

Local health workers are

- trained to support home care
- specifically trained to examine the child clinically at home, to decide when to refer him/her back to hospital, to weigh the child, and give appropriate advice
- motivated

When children are being rehabilitated at home, it is essential to give frequent meals with a high energy and protein content. These meals should provide at least 150 kcal/kg/d and adequate protein intake (at least 4 g/kg/d). This means feeding the child at least 5 times per day with foods that contain approximately 100 kcal and 2-3 g protein per 100 g. A practical approach would be using simple modifications of the usual home foods (e.g. preparing Khichuri with home foods). Vitamins, iron and electrolyte-mineral supplements can be continued at home.

7 Emergency treatment of shock and very severe anaemia

7.1 **Shock in children** with severe acute malnutrition

Severe dehydration and septic shock are difficult to differentiate on clinical signs alone. Signs of septic shock may include:

- Signs of dehydration, but without a history of watery diarrhoea
- Hypothermia or hypoglycaemia
- Children with dehydration will respond to IV fluids, while those with septic shock and no dehydration may not respond.

Diagnosis of shock is based on the following criteria:

- Lethargic or unconscious and
- has cold hands

  plus either
- Slow capillary refill (longer than 3 sec)

  * or
- Weak or fast pulse (160/min or more for children 2-12 months of age, 140/min or more for children 1-5 years)

* Capillary refill is determined by pressing nail of the thumb or big toe for 2 seconds. Count the seconds from release until return of the pink color. If it takes longer than 3 sec, capillary refill is slow.

The amount of fluid given is determined by the child's response. Overhydration must be avoided.

To start treatment:

- Give oxygen
- Give sterile 10% glucose (5 ml/kg) by IV
- Give IV fluid at 20 ml/kg over 1 hour. Use Ringer's lactate with 5% dextrose; or half-strength normal saline with 5% dextrose, or cholera saline, or half-strength Darrow's solution with 5% Dextrose .
- Measure and record pulse and respiration rates every 30 minutes
- Give antibiotics (see Step 5).
- Keep the child warm.

If the shock is due to Acute watery diarrhoea use cholera saline (20 ml/kg/hr for first 2 hours).

If there are signs of improvement (pulse and respiration rates fall):

- Repeat IV 15 ml/kg over 1 hour; then
- Switch to oral or NG rehydration with ReSoMal, 10 ml/kg/h in alternate hours with starter F-75 for up to 10 hours, then
- Continue feeding with starter F-75

If the child fails to improve (pulse and respiration rates remains high) Assume that, whether the child has septic shock :

- Give maintenance IV fluids (3 ml/kg/h) while waiting for blood,
- When blood is available transfuse fresh whole blood at 10 ml/kg slowly over 3 hours; then
- If sepsis is present, should be treated with antibiotics.

If there are signs of over-hydration during treatment (breathing increases by 5 breaths or more/min and pulse increases by 25 or more beats/min) stop the infusion to prevent the child's condition worsening.

7.2 Severe anaemia in malnourished children

A blood transfusion is required if:

- Haemoglobin is less than 5 g/dL or packed cell value is less than 15%, or
- If there is breathlessness and haemoglobin is between 5 and 7 g/dL.

Give

- Whole blood 10 ml/kg body weight slowly over 3 hours
- Furosemide 1 mg/kg IV at the start of the transfusion

It is particularly important that the volume of 10 ml/kg is not exceeded in children with severe acute malnutrition. If the severely anaemic child has signs of cardiac failure, transfuse packed cells (5-7 ml/kg) rather than whole blood.

Monitor for signs of transfusion reactions. Stop the transfusion if any of the following signs develop during the transfusion for very severe anaemia:

- Fever
- Itchy rash
- Dark red urine
- Confusion
- Shock

Also monitor the respiratory rate and pulse rate every 15 minutes. If either of them rises, transfuse more slowly.

In all cases of anaemia (mild, moderate, and severe anaemia), oral iron (elemental iron 3 mg/kg/day) should be given atleast for three months to replenish iron stores. ***But this should not be started until the child has begun to gain weight.***

7.3 Heart Failure

- Propped up position
- Oxygen
- Stop or slow IV fluid or transfusion
- IV frusemide 1-3 mg/ kg STAT slowly
- Digoxin 5microgm / kg single dose (IV or orally), if needed
- If heart failure is due to severe anemia, transfuse 5 -7 ml/kg of packed blood cells

Annexes

Annex 1

Weight-for-Height Reference Tables

Bangladesh has adopted the new World Health Organization (WHO) Growth Reference Standards (GRS in 2006), which should be used for determining the weight for length (<2 years) or weight for height (≥2 to 5 years).

Recumbent length is measured for children below 2 years (<87 cm), and standing height is measured for children aged ≥ 2 years (≥ 87 cm). Weight-for-length or height z-score can be calculated from the following look up table (adapted from WHO GRS 2006).

Simplified field tables

WHO Child Growth Standards (guideline 45page)

Weight-for-length
Birth to 2 years (z-scores)

Boys' weight (kg)				Length [a]	Girls' weight (kg)			
-3 SD	-2 SD	-1 SD	Median	(cm)	Median	-1 SD	-2 SD	-3 SD
1.9	2.0	2.2	2.4	**45**	2.5	2.3	2.1	1.9
2.0	2.2	2.4	2.6	**46**	2.6	2.4	2.2	2.0
2.1	2.3	2.5	2.8	**47**	2.8	2.6	2.4	2.2
2.3	2.5	2.7	2.9	**48**	3.0	2.7	2.5	2.3
2.4	2.6	2.9	3.1	**49**	3.2	2.9	2.6	2.4
2.6	2.8	3.0	3.3	**50**	3.4	3.1	2.8	2.6
2.7	3.0	3.2	3.5	**51**	3.6	3.3	3.0	2.8
2.9	3.2	3.5	3.8	**52**	3.8	3.5	3.2	2.9
3.1	3.4	3.7	4.0	**53**	4.0	3.7	3.4	3.1
3.3	3.6	3.9	4.3	**54**	4.3	3.9	3.6	3.3
3.6	3.8	4.2	4.5	**55**	4.5	4.2	3.8	3.5
3.8	4.1	4.4	4.8	**56**	4.8	4.4	4.0	3.7
4.0	4.3	4.7	5.1	**57**	5.1	4.6	4.3	3.9
4.3	4.6	5.0	5.4	**58**	5.4	4.9	4.5	4.1
4.5	4.8	5.3	5.7	**59**	5.6	5.1	4.7	4.3
4.7	5.1	5.5	6.0	**60**	5.9	5.4	4.9	4.5
4.9	5.3	5.8	6.3	**61**	6.1	5.6	5.1	4.7
5.1	5.6	6.0	6.5	**62**	6.4	5.8	5.3	4.9
5.3	5.8	6.2	6.8	**63**	6.6	6.0	5.5	5.1
5.5	6.0	6.5	7.0	**64**	6.9	6.3	5.7	5.3
5.7	6.2	6.7	7.3	**65**	7.1	6.5	5.9	5.5
5.9	6.4	6.9	7.5	**66**	7.3	6.7	6.1	5.6
6.1	6.6	7.1	7.7	**67**	7.5	6.9	6.3	5.8
6.3	6.8	7.3	8.0	**68**	7.7	7.1	6.5	6.0
6.5	7.0	7.6	8.2	**69**	8.0	7.3	6.7	6.1
6.6	7.2	7.8	8.4	**70**	8.2	7.5	6.9	6.3
6.8	7.4	8.0	8.6	**71**	8.4	7.7	7.0	6.5
7.0	7.6	8.2	8.9	**72**	8.6	7.8	7.2	6.6
7.2	7.7	8.4	9.1	**73**	8.8	8.0	7.4	6.8
7.3	7.9	8.6	9.3	**74**	9.0	8.2	7.5	6.9
7.5	8.1	8.8	9.5	**75**	9.1	8.4	7.7	7.1
7.6	8.3	8.9	9.7	**76**	9.3	8.5	7.8	7.2
7.8	8.4	9.1	9.9	**77**	9.5	8.7	8.0	7.4
7.9	8.6	9.3	10.1	**78**	9.7	8.9	8.2	7.5
8.1	8.7	9.5	10.3	**79**	9.9	9.1	8.3	7.7
8.2	8.9	9.6	10.4	**80**	10.1	9.2	8.5	7.8
8.4	9.1	9.8	10.6	**81**	10.3	9.4	8.7	8.0
8.5	9.2	10.0	10.8	**82**	10.5	9.6	8.8	8.1
8.7	9.4	10.2	11.0	**83**	10.7	9.8	9.0	8.3
8.9	9.6	10.4	11.3	**84**	11.0	10.1	9.2	8.5
9.1	9.8	10.6	11.5	**85**	11.2	10.3	9.4	8.7
9.3	10.0	10.8	11.7	**86**	11.5	10.5	9.7	8.9

Annex 2

Recipes for ReSoMal and electrolyte-mineral Solution

ReSoMal oral rehydration solution

ReSoMal contains approximately 45 mmol Na, 40 mmol K and 3 mmol Mg/litre. The recipe [7] using the new ORS formulation* is given below:

Ingredient	Amount
Water (boiled and cooled)	850 ml
WHO-ORS (new formulation)	One 500 ml-packet
Sugar	20 g
Electrolyte-mineral solution (see below)	16.5 ml

Electrolyte-mineral solution

Weigh the following ingredients and make up to 2500 ml. Add 20 ml of electrolyte-mineral solution to 1000 ml of milk feed.

	Quantity (g)	Molar content of 20 ml
Potassium Chloride: KCl	224	24 millimol
Tripotassium Citrate: $C_6H_5K_3O_7.H_2O$	81	2 millimol
Magnesium Chloride: $MgCl_2.6H_2O$	76	3 millimol
Zinc Acetate: $Zn(CH_3COO)_2.2H_20$	8.2	300 micromol
Copper Sulphate: $CuSO_4.5H_2O$	1.4	45 micromol
Water: make up to	2500 ml	

Preparation: Dissolve the ingredients in cooled boiled water. Store the solution in sterilized bottles in the fridge to retard deterioration. Discard if it turns cloudy. Make fresh each month.

If the preparation of this electrolyte-mineral solution is not possible and if premixed sachets (see Step 4) are not available, give K, Mg and Zn separately:

Potassium:

- Make a 10% stock solution of potassium chloride (100 g KCl in 1 litre of water):
  - For oral rehydration solution, use 40 ml of stock KCl solution instead of 33 ml electrolyte-mineral solution
  - For milk feeds, add 22.5 ml of stock KCl solution instead of 20 ml of the electrolyte-mineral solution
- If KCl is not available, give syrup K (4 mmol/kg/day)

Magnesium:

- Give 50% magnesium sulphate intramuscularly once (0.3 ml/kg up to a maximum of 2 ml)

Zinc:

2 mg/kg/day

Annex 3

Antibiotics reference table

Summary: **Antibiotics for Children** with severe acute malnutrition

<table>
<tr><th>If:</th><th colspan="2">Give:</th></tr>
<tr><td>No complications</td><td colspan="2">Amoxicillin oral 15 mg/kg 8-hourly for 5 days</td></tr>
<tr><td rowspan="2">Complications
(shock, hypoglycaemia, hypothermia, dermatosis with raw skin/fissures, respiratory tract infections, or lethargic/sickly appearance)</td><td colspan="2">Gentamicin IM/IV 7.5 days mg/kg once daily for 7, Injection Ceftriaxone 75-100 mg/kg/d IM/IV for 5-7 days</td></tr>
<tr><td>Ampicillin IM/IV
50 mg/kg
6-hourly for 2 days</td><td>Amoxycillin
oral 15 mg/kg
8-hourly for 5 days</td></tr>
<tr><td>If a specific infection requires an additional antibiotic.</td><td colspan="2">Specific antibiotics as required</td></tr>
</table>

Doses for specific formulations and bodyweight ranges

Antibiotic	Route/dose/ frequency/ duration	Formulation	Dose according to child's weight 3.0-5.9 kg	6.0-7.9 kg	8.0-9.9 kg
Amoxicillin	Oral: 15 mg/kg every 8 hours for 5 days	Tablet: 250 mg	1/4 tablet	1/2tablet	1/2tablet
		Syrup: 125 mg/5 ml	2.5 ml	5 ml	5 ml
		Syrup: 250 mg/5 ml	1.5 ml	2 ml	2.5 ml
Metronidazole	Oral: 7.5 mg/kg every 8 hours for 7 days	Suspension: 200 mg/ 5 ml	1 ml	1.25 ml	1.5 ml

Antibiotic	Route/dose/ frequency/ duration	Formulation	Dose according to child's weight (use closest weight) 3kg	4 kg	5 kg	6 kg	7 kg	8 kg	9 kg	10kg	11 kg	12 kg
Ceftriaxone Gentamicin	75-100 mg/kg/day IV or IM: 7.5 mg/kg once daily for 7 days	IM / IV IV/IM: vial containing 20 mg (2 ml at 10 mg/ml) undiluted	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50	8.25	9.00
		IV/IM vial containing 80 mg (2 ml at 40 mg/ml) mixed with 6 ml sterile water to give 80 mg/8 ml	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50	8.25	9.00
		IV/IM: vial containing 80 mg (2 ml at 40 mg/ml) undiluted	0.50	0.75	0.90	1.10	1.30	1.50	1.70	1.90	2.00	2.25

Doses for iron syrup for a common formulation

Route/dose/ frequency	Formulation	3.0-5.9 kg	6.0-9.9 kg	10.0-14.9 kg
Oral: 3 mg/kg/daily	Iron syrup: ferrous fumerate 100 mg/5 ml (20 mg elemental iron per ml)	0.5 ml	0.75 ml	1 ml

Dose/amount of iron depends of type of available/ supplied iron salt
Attention: 200 mg Ferrous Fumerate contains 65 mg elemental iron
200mg Ferrous Sulphate contains 60mg elemental iron

Annex 4

Recipes for starter (F-75) and catch-up (F-100) formulas

There are two main groups of F-75 recipes: those which contain cereal flour and require cooking facilities, and those that do not contain cereal flour and do not require cooking. The F-75 recipes containing cereal flour should be used where possible, particularly for children with osmotic diarrhoea, because they have lower osmolarity (approximately 330 mOsmol/L) than those without cereal flour (415 mOsmol/L). Commercial isotonic versions of F-75 (280 mOsmol/l), which contain maltodextrins instead of cereal flour and some of the sugar and which include all the necessary micronutrients, are also available for children with isotonic diarrhoea. F-100 does not contain cereal flour and requires no cooking.

Formula that needs to be stored more than 2 hours should preferably be kept in a refrigerator. It can be stored at room temperature for a maximum of 6 hours.

F-75 recipes if cereal flour and cooking facilities are available

Type of milk	Ingredients	Amount for F-75
Dried whole milk	Dried whole milk	35 g
	Sugar	70 g
	Cereal flour*	35 g
	Vegetable (e.g. Soyabean) oil	20 g (or 20 ml)
	Electrolyte Mineral mix	20 ml
	Water: make up to	1000 ml

Cow's milk (fresh of long life)	Full-cream cow's milk (fresh of long life)	300 ml
	Sugar	70 g
	Cereal flour*	35 g
	Vegetable (e.g. Soyabean) oil	20 g (or 20 ml)
	Electrolyte Mineral mix	20 ml
	Water: make up to	1000 ml

*Cereal flour may be rice, wheat, maize, or whatever cereal is locally available.

Preparation:

If using an electric blender

- Put about 200 ml of boiled, cooled water into a blender. If you are using liquid milk instead of milk powder, omit this step.
- Add the flour, milk or milk power, sugar, oil and electrolyte/mineral solution. Blend.
- Add cooled, boiled water to the 1000 ml mark and blend at high speed.
- Transfer the mixture to a cooking pot and boil gently for 4 minutes, stirring continuously.
- Some water will evaporate during cooking, so transfer the mixture back to the blender after booking, and add enough boiled water to make 1000 ml. Blend again.

If using a hand whisk:

- Mix the flour, milk, or milk powder, sugar, oil and electrolyte/mineral mix in a 1-litre measuring jug.
- Slowly add cooled, boiled water up to 1000 ml.
- Transfer the mixture to a cooking pot and whisk the mixture vigorously.
- Boil gently for 4 minutes, stirring continuously.
- Some water will evaporate during cooking, so transfer the mixture back to the measuring jug after booking, and add enough boiled water to make 1000 ml. Whisk again.

F-75 recipes if cereal flour and/or cooking facilities are unavailable and F-100 recipes

Type of milk	Ingredients	Amount for F-75	Amount for F-100
Dried whole milk	Dried whole milk	35 g	110 g
	Sugar	100 g	50 g
	Vegetable oil	20 g (or 20 ml)	30 g (or 35 ml)
	Electrolyte/mineral mix	20 ml	20 ml
	Water: make up to	1000 ml	1000 ml
Cow's milk (fresh of long life)	Full-cream cow's milk (fresh of long life)	300 ml	880 ml
	Sugar	100 g	75 g
	Vegetable oil	20 g (or 20 ml)	20 g (or 20 ml)
	Electrolyte/mineral mix	20 ml	20 ml
	Water: make up to	1000 ml	1000 ml

Preparation:

If using an electric blender

- Put about 200 ml of boiled, cooled water into a blender. If you are using liquid milk instead of milk powder, omit this step
- Add the milk or milk power, sugar, oil and electrolyte/mineral mix.
- Add cooled, boiled water to the 1000 ml mark and blend at high speed.

If using a hand whisk:

- Mix the milk powder and sugar in a 1-litre measuring jug, and then add the oil and stir well to make a paste. If you use liquid milk, mix the sugar and oil, then add the milk.
- Add the electrolyte/mineral mix, and slowly add boiled, cooled water up to 1000 ml, stirring all the time.
- Whisk vigorously.

Preparation of 3/4th strength Rice Suji

	¾ *Strength Rice Suji*
Rice Powder (g)	**40**
Egg white (g)	**100 (3 eggs, if farm chicken) or 4 (if small size)**
Glucose (g)	**30**
Soya oil (gm)	**25**
Magnesium Carbonate (gm)	**0.5**
Potassium Chloride (g)	**1.0**
Calcium Lactate (g)	**2.0**
Cooked volume (L)	**1.0**
Energy (Kcal /100ml)	**57**
Protein (g/100ml)	**1.9**
Protein energy ratio, %	**13.0**
Fat Energy ratio, %	**40**
Osmolality (mOsm/L)	**296**

Annex 5

F-75 feed volumes for children without severe oedema

F-75 feed volumes for children without severe oedema are given below. For children with severe (+++) oedema, see Annex 6

Weight of child (KG)	Volume of F-75 per feed (ml)[a]			Daily total (130 ml/kg)	80% of daily total [a] (minimum)
	Every 2 hours [b]	Every 3 hours [c]	Every 4 hours (6 feeds)		
2.0	20	30	45	260	210
2.2	25	35	50	286	230
2.4	25	40	55	312	250
2.6	30	45	55	338	265
2.8	30	45	60	364	290
3.0	35	50	65	390	310
3.2	35	55	70	416	335
3.4	35	55	75	442	355
3.6	40	60	80	468	375
3.8	40	60	85	494	395
4.0	45	65	90	520	415
4.2	45	70	90	546	435
4.4	50	70	95	572	460
4.6	50	75	100	598	480
4.8	55	80	105	624	500
5.0	55	80	110	650	520
5.2	55	85	115	676	540
5.4	60	90	120	702	560
5.6	60	90	125	728	580
5.8	65	95	130	754	605
6.0	65	100	130	780	625
6.2	70	100	135	806	645
6.4	70	105	140	832	665
6.6	75	110	145	858	685
6.8	75	110	150	884	705
7.0	75	115	155	910	730
7.2	80	120	160	936	750

7.4	**80**	**120**	**160**	**962**	**770**
7.6	**85**	**125**	**165**	**988**	**790**
7.8	**85**	**130**	**170**	**1014**	**810**
8.0	**90**	**130**	**175**	**1040**	**830**
8.2	**90**	**135**	**180**	**1066**	**855**
8.4	**90**	**140**	**185**	**1092**	**875**
8.6	**95**	**140**	**190**	**1118**	**895**
8.8	**95**	**145**	**195**	**1144**	**915**
9.0	**100**	**145**	**200**	**1170**	**935**
9.2	**100**	**150**	**200**	**1196**	**960**
9.4	**105**	**155**	**205**	**1222**	**980**
9.6	**105**	**155**	**210**	**1248**	**1000**
9.8	**110**	**160**	**215**	**1274**	**1020**
10.0	**110**	**160**	**220**	**1300**	**1040**

[a] Volumes in these columns are rounded to the nearest 5ml.

[b] Feed 2-hourly for at least first two days. Then, when little or no vomiting, modest diarrhoea (<5 watery stools per day), and finishing most feeds, change to 3-hourly feeds.

[c] After 2 to 5 days on 3-hourly feeds; if no vomiting, less diarrhoea, and finishing most feeds, change to 4-hourly fee

Annex 6

F-75 feed volumes for children with severe oedema

F-75 feed volumes for children with severe oedema are given below. For children without severe (+++) oedema, see Annex 5

Weight of child (KG)	Volume of F-75 per feed (ml)[a]			Daily total (100 ml/kg)	80% of daily total [a] (minimum)
	Every 2 hours [b]	Every 3 hours [c]	Every 4 hours (6 feeds)		
3.0	25	40	50	300	240
3.2	25	40	55	320	255
3.4	30	45	60	340	270
3.6	30	45	60	360	290
3.8	30	50	65	380	305
4.0	35	50	65	400	320
4.2	35	55	70	420	335
4.4	35	55	75	440	350
4.6	40	60	75	460	370
4.8	40	60	80	480	385
5.0	40	65	85	500	400
5.2	45	65	85	520	415
5.4	45	70	90	540	430
5.6	45	70	95	560	450
5.8	50	75	95	580	465
6.0	50	75	100	600	480
6.2	50	80	105	620	495
6.4	55	80	105	640	510
6.6	55	85	110	660	530
6.8	55	85	115	680	545
7.0	60	90	115	700	560
7.2	60	90	120	720	575
7.4	60	95	125	740	590
7.6	65	95	125	760	610
7.8	65	100	130	780	625
8.0	65	100	135	800	640

8.2	**70**	**105**	**135**	**820**	**655**
8.4	**70**	**105**	**140**	**840**	**670**
8.6	**70**	**110**	**145**	**860**	**690**
8.8	**75**	**110**	**145**	**880**	**705**
9.0	**75**	**115**	**150**	**900**	**720**
9.2	**75**	**115**	**155**	**920**	**735**
9.4	**80**	**120**	**155**	**940**	**750**
9.6	**80**	**120**	**160**	**960**	**770**
9.8	**80**	**125**	**165**	**980**	**785**
10.0	**85**	**125**	**165**	**1000**	**800**
10.2	**85**	**130**	**170**	**1020**	**815**
10.4	**85**	**130**	**175**	**1040**	**830**
10.6	**90**	**135**	**175**	**1060**	**850**
10.8	**90**	**135**	**180**	**1080**	**865**
11.0	**90**	**140**	**185**	**1100**	**880**
11.2	**95**	**140**	**185**	**1120**	**595**
11.4	**95**	**145**	**190**	**1140**	**910**
11.6	**95**	**145**	**195**	**1160**	**930**
11.8	**100**	**150**	**195**	**1180**	**945**
12.0	**100**	**150**	**200**	**1200**	**960**

[a] Volumes in these columns are rounded to the nearest 5ml.

[b] Feed 2-hourly for at least first two days. Then, when little or no vomiting, modest diarrhoea (<5 watery stools per day), and finishing most feeds, change to 3-hourly feeds.

[c] After 2 to 5 days on 3-hourly feeds; if no vomiting, less diarrhoea, and finishing most feeds, change to 4-hourly feeds

Annex 7

Range of volumes for free feeding with F-100

F-75 feed volumes for children with severe (+++) oedema are given below. For children without severe oedema, see Annex 5.

Weight of child kg	Range of volumes per 4 hourly of F-100 (6 feeds daily)		Range of daily volumes of F-100	
	Minimum (ml)	Maximum (ml)	Minimum (150/ml/kg/day)	Maximum (220 ml/kg/day)
2.0	50	75	300	440
2.2	55	80	330	484
2.4	60	90	360	528
2.6	65	95	390	572
2.8	70	105	420	616
3.0	75	110	450	660
3.2	80	115	480	704
3.4	85	125	510	748
3.6	90	130	540	792
3.8	95	140	570	836
4.0	100	145	600	880
4.2	105	155	630	924
4.4	110	160	660	968
4.6	115	170	690	1012
4.8	120	175	720	1056
5.0	125	185	750	1100
5.2	130	190	780	1144
5.4	135	200	810	1188
5.6	140	205	840	1232
5.8	145	215	870	1276
6.0	150	220	900	1320
6.2	155	230	930	1364
6.4	160	235	960	1408
6.6	165	240	990	1452
6.8	170	250	1020	1496
7.0	175	255	1050	1540
7.2	180	265	1080	1588

7.4	**185**	**270**	**1110**	**1628**
7.6	**190**	**280**	**1140**	**1672**
7.8	**195**	**285**	**1170**	**1716**
8.0	**200**	**295**	**1200**	**1760**
8.2	**205**	**300**	**1230**	**1804**
8.4	**210**	**310**	**1260**	**1848**
8.6	**215**	**315**	**1290**	**1892**
8.8	**220**	**325**	**1320**	**1936**
9.0	**225**	**330**	**1350**	**1980**
9.2	**230**	**335**	**1380**	**2024**
9.4	**235**	**345**	**1410**	**2068**
9.6	**240**	**350**	**1440**	**2112**
9.8	**245**	**360**	**1470**	**2156**
10.0	**250**	**365**	**1500**	**2200**

[a] Volumes in these columns are rounded to the nearest 5 ml

Annex 8

Local diets with appropriate micronutrients can be used during rehabilitation phase with gradual replace of F-100

Culturally acceptable alternatives to F-100 that contain low-cost, culturally appropriate, nutritious, and locally available ingredients include halwa and khichuri. These foods can easily be prepared at home, and so their use in an inpatient therapeutic care centre serves the double purpose of rehabilitating the child and teaching the mother how to prepare and feed them to her child when the child returns home. They can also be fed to other siblings, thereby preventing them from becoming malnourished.

The recipes developed by ICCDR,B [8] are given below.

Halwa

Ingredient	Amount for 1 kg halwa
Wheat flour (atta)	200 g
Lentils (mashur dal)	100 g
Oil (soya)	100 ml
Molasses (brown sugar or gur)	125 g
Water (to make a thick paste)	600 ml
Total energy/kg	2,404 kcal
Total protein/kg	50.5 g

Soak the lentils in water for 30 minutes and then mash. Roast the wheat flour on a hot pan for a few minutes, and then mix with the mashed lentils, oil and water. Melt the molasses and add to the mixture to make a thick paste. Halwa takes about 15 minute to cook and can be kept at room temperature for 6-8 hours.

Khichuri

Ingredient	Amount for 1 kg khichuri
Rice	120 g
Lentils (mashur dal)	60 g
Oil (soya)	70 ml
Potato	100 g
Pumpkin	100 g
Leafy vegetable (shak)	80 g
Onion (2 medium size)	50 g
Spices (ginger, garlic, turmeric and coriander powder)	50 g
Water	1000 ml
Total energy/kg	1,442 kcal
Total protein/kg	29.6 g

Put the rice, lentils, oil, onion, spices and water in a pot and boil. Cut the potatoes and pumpkin into pieces and add to the pot after 20 minutes. Five minutes before the rice is cooked, add the cleaned and chopped leafy vegetable. The pot should be kept covered throughout cooking. Khichuri takes about 50 minutes to cook and can be kept at room temperature fo

Annex 9

Management of severe acute malnutrition in infants aged <6 months

Management of SAM infants under 6 months of age is an area of continued research & debate. Feeding young infants with severe acute malnutrition is labour intensive and requires different skills. It can however be managed under the following phases:

- Stabilization phase
- Rehabilitation phase

Management of SAM in infants aged < 6 month

A. Ten essential steps for management

Management of 1 to 6 steps are as 6 – 59 months SAM children

Step 7 :

- Start breastfeeding
- If the infant is too weak to suckle, mother should be encouraged to express breast milk
- If necessary continue breast feeding by re-lactation using a breastfeeding supplementer (picture from P-113 SAM Training module), until exclusive breastfeeding is re-established.
- If breast milk is insufficient, give F-75 prepared without cereal

Step 8. Achieve catch-up growth

- **Exclusive** breast feeding, if adequate milk production has been re-established
- If breast feeding is not possible, the child can be given diluted F-100 (F-100 diluted by one-third extra safe water i.e. 330 ml)
- Prior to discharge, non-breastfed infants should be advised to share wet nursing or suitable alternatives.

Step 9. Provide sensory stimulation

More emphasis should be given on play and communication, as mentioned in the National Guidelines

Step 10. Discharge and follow up

- Discharge when gaining weight for 5 days on breast feeding alone, or

- Mother should be taught about positioning & attachment for breastfeeding, re-lactation
- When infant has shifted completely to adequate artificial feeding (wet nursing or suitable alternatives) and has had weight for length Z score ≥ -2
- Follow up is like the older children

B. Treatment of emergency conditions like shock, severe anaemia, heart failure should be treated as in older children.

Note: When sepsis is suspected, should be treated with Inj. Ampicillin plus gentamicin for 7 day

Annex 10

Monitoring records

Monitor respiratory rate, pulse rate and temperature 2-4 hourly until after transition to F-100 and patient is stable. Then monitoring may be less frequent (e.g., twice daily).

Danger Signs: Watch for increasing pulse and respirations, fast or difficult breathing, sudden increase or decrease in temperature, axillary temperature <35° C, and other changes in condition.

Monthly Statistics Report - Management of Severe Acute Malnutrition (Version 2.0)

Name of health Facility	250 Beded Hospital,Moulvibazar	Reporting Month	May-15
District	Moulvibazar	Report prepared by	(Incharge Sister)
Upazilla		Type of Program	In Patient Care / Out Patient Care

Case Management

Age Group (Months)	**Total Beginning of the month (A)**	**Admissions (B)**						**Exits**						**Total End of the month (G)** G=A+C-F
		WHZ (B1)	MUAC (B2)	Oedema (B3)	Readmission (B4)	Transfer in from another Nutrition unit (B5)	**Total admissions (C)** C=B1 + B2+B3+ B4+B5	Cured (D1)	Death (D2)	Defaulter (D3)	Non Responder (D4)	Transfer to Out patient (E)	**Total Discharges-Exits (F)** F=D1+D2+D3+D4+E	
<6	0	2	0	0	0		2	2	0	0	0	0	2	0
6 to 59	0	1	4	1	0	0	6	2	0	2	0	0	4	2
TOTAL	**0**	**3**	**4**	**1**	**0**	**0**	**8**	**4**	**0**	**2**	**0**	**0**	**6**	**2**
					Total Admissions	**Male**	4	**67%**	**0%**	**33%**	**0%**			
Supplies						**Female**	4							

Item	Unit	Opening stock at beginning of the month	New stock received during the month	Total amount utilized during the month	Losses	Balance at end of month	Demand for the next 3 months
F-100/ equivalent	Sachets	**200**	0	200	0	0	0
F-75/ equivalent	Sachets	**160**	0	80	0	80	0
Nutrition Treatment						0	0

Screening

Age	Total Number screened (MUAC/WHZ/Oedema)	Total children with SAM	Total Number with Moderate Acute Malnutrition	Total number well Nourished
0 - 59 months	389	8	20	361

* Please send the report to the Director, Institute of Public Health Nutrition, Dhaka by 5th of the month. Email: **iphnreport@gmail.com**

Guidance

Notes

New Admission: Pateint directly enrolled to the nutrition unit to start treatment; (B1,B2, B3,B4, B5)

Re-admission: Includes patients who relapse + patients that have defaulted from the nutritional therapeutic treatment and is admitted in the unit within a period of less than 2 months. After 2 months, the patient is considered a new admission

Transfer in from another therapeutic unit: Patient that has started the nutritional treatment in a different site and is referred to your program to continue treatment. This can be transfers from in-patient to Out Patient Program OR from Out Patient Program to in patient.

Cured: Patient that has reached the discharge criteria as per national guidelines

Death: Patient that has died while enrolled in the program. For Out patient Program the death has to be confirmed by a home visit.

Defaulter: Patient that is absent for 2 consecutive weighing (2 days in in-patient and 2 weeks in out patient)

Non-Responder: Patient that has not reached the discharge criteria after 3 months (90days) in Out Patient Program

Transfers out: Patient that has started nutrition treatment in your unit and is is refered to another health facility to continue nutrition treatment

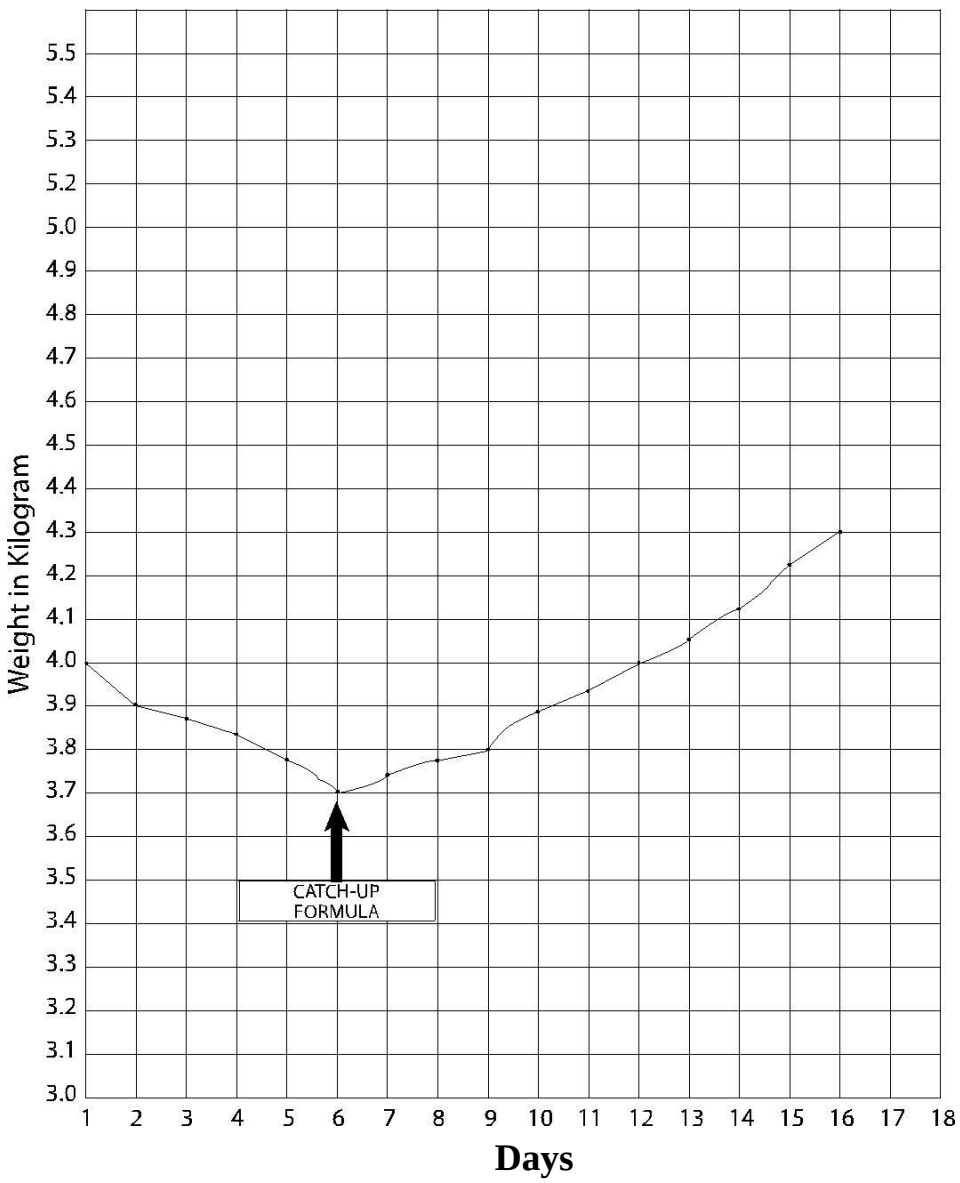
Total End of the month: Total beginning of the month + Total admissions - Total discharges

Annex

11

Weight record chart

Name: Saiful aged 14 months, male, 4 kg and 65 cm on admission, oedema ++



Annex 12

Structured play activities

Children with severe acute malnutrition have delayed mental and behavioural development which, if not treated, can become the most serious long-term result of malnutrition. Play therapy is intended to develop language and motor skills aided by simple toys. It should take place in a loving, relaxed and stimulating environment and can continue after discharge.

The aim should be to play with each child, individually, for 15-30 minutes each day, in addition to informal group play. Each play session should include language and motor activities, and activities with toys.

Language activities

At each play session:

- Teach local songs and games using the fingers and toes
- Encourage the child to laugh
- Describe what (s)he is doing, and repeat what (s)he says
- Teach action words with activities e.g. 'bang bang' as (s)he beats a drum, 'bye bye' as (s)he waves etc.
- Teach words at every opportunity, examples are in italics in the text below

Motor activities

- Encourage the child to perform the next motor milestone. For example:
- Bounce the child up and down and hold him/her under the arms so that the feet support the child's weight
- Prop the child up, roll toys out of reach, encourage the child to crawl after them
- Hold hand and help the child to walk
- When starting to walk alone, give a 'push-along' and later a ‘pull-along' toy

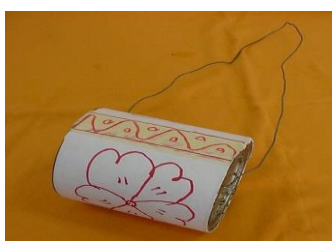
Activities with toys

Simple toys can easily be made from readily available materials. These toys can be used for a variety of different motor activities, e.g:

'In and Out' toy with blocks

- Let the child explore blocks and container. Put blocks into container and shake it, then teach child to take them out, one at a time, saying 'out' and 'give me'
- Teach the child to take out blocks by turning container upside down
- Teach the child to hold a block in each hand and bang them together
- Let the child put blocks in and out of container saying 'in' and 'out'

Homemade Toys



- Cover blocks with container saying 'where are they, they are under the cover'. Let the child find them. Then hide them under two and then three covers (e.g. pieces of cloth)
- Turn the container upside down and teach the child to put blocks on top of the container
- Teach the child to stack blocks: first stack two then gradually increase the number. Knock them down saying, 'up up' then 'down'. Make a game of it
- Line up blocks horizontally: first line up two then more; teach the child to push them along making train or car noises. Teach older children words such as stop and go, fast and slow and next to.
- After this teach to sort blocks by colour, first two then more, and teach high and low building. Make up games

Books

- Sit the child on your lap. Teach the child to turn the pages of the book and to point to the pictures. Then teach the child to point to the pictures that you name. Talk about the pictures. Show the child pictures of simple familiar objects and of people and animals. Teach older children to name the pictures and to talk about them.

Doll

- Encourage the child to hold and cuddle the doll. Teach the word 'baby'. Sing songs whilst rocking the child
- Teach the child to identify his/her own body parts and those of the doll when you name them. Teach older children to name their own body parts
- Put the doll in a box as a bed and give sheets, teach the words 'bed and sleep' and describe the games you play

Danger Signs (under 5 years) :

- **<2 months**
  - Not feeding well or
  - convulsion or
  - fast breathing or
  - severe chest in growing or
  - grunting or
  - fever or
  - Low body temp or
  - movement when stimulated or
  - no movement at all

- **2 months-5yrs**
  - Not able to drink or
  - Breastfeed or
  - Lethargic or
  - Unconscious or
  - Vomits everything or
  - Convulsions

A model discharge card

Come for Scheduled Follow Up visits:

Next Planned Follow-Up:		Record of Visits			
Date	Place	Date	Ht/Length	Weight	% wt-for -ht

Vitamin A--Bring Child for a dose Every Six Months

Next Dose Vit A		Record of Doses Received	
Date	Place	Date	Place

Immunization Given

Tick or Record Date given:

---------- ---------- ---------- ----------
BCG Penta 1 Penta 2 Penta 3

--------- ---------- ---------- ----------
OPV 0 OPV 1 OPV 2 OPV 3

---------- ---------- --------- ---------
IPV PCV MR Measles

Next Immunization

Date	Dose (s) needed

Annex 13

DISCHARGE CARD

For Child Recovering from Severe Malnutrition
Hospital Name

Child's name: _____ M F Date of birth _____
Address: _____

	Date	Weight (Kg)	Ht/length (cm)	% weight-for-ht
Admission				
Discharge				

Instructions for Feeding at Home

What to feed? (Include recipe if needed) _____

How many and how often _____

Medications and Supplements

Give _____ drops _____ (multivitamin preparation) with food once daily.

Give 1 tablet folic acid once daily for _____ days

Give _____ Iron twice daily for 1 month.

Other: _____

Recommendations for Feeding During Sickness and Health

A good daily diet should be adequate in quantity and include an energy-rich food (for example, thick cereal with added all), meat, fish, eggs, or pluses; and fruits and vegetables.

Up to 6 Months of Age

- Breastfeed as often as the child wants, day and night, at least 8 times in 24 hours.
- Breastfeed when the child shows signs of hunger beginning to fuss, sucking largers of moving the lips.
- Do not give other foods or fluids.
- Only in the child

Appears hungry after breastfeeding or is not gaining weight adequately.
and non complementary foods (listed under 6 months up to 12 months).
Give these food 1 or 2 times per day after breastfeeding.

6 Months up to 12 months

- Breastfeed as often as the child wants,
- Give adequate serving of

_____
_____
_____

- 3 times per day if breastfed;
- 5 times per day if not breastfed;
- Add nutritious snacks

- small chewable items to eat with fingers. Let the child try to food salt, but provide help

12 Months up to 2 years

- Breastfeed as often as the child wants,
- Give adequate serving of

_____
_____
_____
_____

of family foods 5 times per day

- Continue to actively help the child to eat

2 years and Older

- Give family foods at 3 meals each day. Also twice daily, give nutritious food between meals, such as:

_____
_____
_____
_____
_____

- Offer a variety of foods. If a new food is refused, offer 'tastes' several times show that you like the food

Up to 4 months of age

Play : Provide ways for your child to see, hear, feul and move

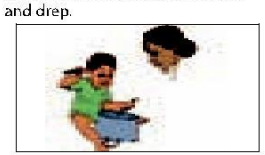
Communicate : Look into your child's eyes and smile at him or her. When you are breastfeeding is a good link.

4 months up to 8 months

Play : Have large colourful things for your child to reach for and now things to see

Communicate : Talk to your child and get a conversation going with sounds or gestures

Play : Give your child clean, safe household things to handle, hang and drep.



Communicate : Respond to your child's sounds and interest. Tell your child the names of things and people.

Play : Give your child things to stack up, and to put into containers and take out.

Communicate : Ask your child simple questions, respond your child's attempts to talk. Play games like 'bye'

Play : Help your child count, name, and compare things. Make simple toys for your child.

Communicate : Encourage your child to talk and answer your child's questions. Teach your child songs and games

These recommendations are consistent with current WHO infant feeding policy.

The decision when precisely to begin complementary feeding should be made in consultation with a health worker, based on the individual infant's specific growth and development needs.

Feeding Recommendations for a child who has PERSISTENT DIARRHOEA

- If still breastfeeding, give more frequent, longer breastfeeds, day and night
- If taking other milk;
  - replace with increased breastfeeding OR
  - replace with fermented milk products, such as yoghurt OR
  - replace half the milk with nutrient rich semisolid food
- For other foods, follow feeding recommendations for the child's age.

Annex 14

Composition of Rice Suji: a lactose-free diet for persistent diarrhoea due to lactose intolerance

	¾ **Strength Rice suji**
Rice powder (g)	40
White of eggs (g)	100 (3 eggs , if farm chicken or 4 if native chicken)
Glucose (g)	30
Soya oil (g)	25
Magnesium Carbonate (g)	0.5
Potassium chloride (g)	1.0
Calcium lactate (g)	2.0
Cooked volume (L)	1.0
Energy (kcal/100 mL)	57
Protein (g/100 mL)	1.9
Protein energy ratio, %	13.0
Fat energy ratio, % Osmolality (mOsm/L)	40 296

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