Management of severe acute malnutrition in Cambodian children 6-59 months

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Acute malnutrition - A problem worldwide

Department of Nutrition, Exercise and Sports

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Moderate acute malnutrition (MAM)
Severe acute malnutrition (SAM)

% of population undernourished
- >35%
- 25 - 34%
- 15 - 24%
- 5 - 14%
- <5%
- no data

Hunger Map 2013

(Black et al. 2013; WHO and UNICEF, 2009)
Identifying a child with SAM?

Measure anthropometric measures

- **Body weight.**
- **Body length/height.**
- Calculate weight-for-height z-score (WHZ).

**Severe acute malnutrition (SAM):**

- WHZ: < -3
- MUAC: < 11.5 cm
- Presence of bilateral pitting oedema
- Infants > 6 months but weight <4kg

Clinical signs of SAM.

Assessment of mid-upper-arm circumference (MUAC).

Assessment of bilateral pitting oedema.
How to find children with SAM?

Children arriving at the hospital/health center - measure all children.

Community-based mass screenings in high-risk areas.

Screening in local NGO supporting children from poor households.

Village Help Support Group (VHSG).
Children with SAM with and without complications

Referral to nearest health center/hospital

Assessing at health center/hospital:

- Bilateral pitting oedema.
- MUAC.
- Medical assessment.
- Appetite test if SAM.

Hospital

Inpatient treatment of complications and SAM.

Presence of medical complications and/or no appetite.

Home

Outpatient treatment of SAM.

If RUTF is available.

No presence of medical complications and have an appetite (appetite test).

(WHO, 2013; WHO, 1999; Briend et al. 1999, Manary, 2006; NNP, 2009; WHO et al. 2007)
Inpatient treatment of SAM - WHO

The general principles of the inpatient care (WHO protocol) are:

1) Treat and prevent hypoglycemia.
2) Treat and prevent hypothermia.
3) Treat and prevent dehydration (hypovolemic shock).
4) Correct electrolyte imbalance.
5) Start cautious feeding (F-75).
6) Treat and prevent infection.
7) Identify and treat any other problems, including Vitamin A deficiency, severe anemia, Beriberi and heart failure.
8) Achieve transition to catch-up diet (F-75 and BP-100™).
9) Provide sensory stimulation and emotional support.
10) Prepare for follow up (outpatient) after stabilization and complications have been treated.

These 10 steps are accomplished in two phases:

1. An initial stabilization phase.
2. A longer rehabilitation phase.

(WHO, 2013; WHO, 1999; Briend et al. 1999, Manary, 2006; NNP, 2009; WHO et al. 2007)
Inpatient treatment of SAM

Hospital-based treatment

The steps of inpatient care following identification include:

1) Triage at OPD or at admissions.
   - Check signs of hypoglycemia and hypothermia.
   - Determine if the child is SAM.

2) Admission in the pediatrics/malnutrition ward, including prevention and treatment of hypoglycemia and hypothermia.

3) Systematic treatment with antibiotics.

4) Assessment and treatment of medical complications, including monitoring of danger signs.
   - Severe dehydration – Give ReSoMal.
   - Septic shock.
   - Congestive heart failure.
   - Severe anemia (keep in mind: Hemoglobin disorder).
   - Severe vitamin A deficiency.
   - Dermatosis and/or kwashiorkor (oedema).
   - (HIV and TB status).

(WHO, 2013; WHO, 1999; Briend et al. 1999, Manary, 2006; NNP, 2009; WHO et al. 2007)
Inpatient treatment of SAM (continued #1)

Hospital-based treatment

The steps of inpatient care following identification include:

5) Feeding the child until stabilization and transition.

**Initial phase**
- Start initial phase with feeding immediately after the child has been admitted with F-75.
- F-75 is a milk powder dissolved in water.
- F-75 contains 75 kcal/100 ml usually for 2-7 days.
- F-75 contains no iron.
- Patient should be fed 8 times/day at 2-3h intervals.
- Encourage breastfeeding.

**Rehabilitation phase**
- Gained appetite and release of oedema – F-100 for a few days.
- F-100 contains 100 kcal/100 ml + iron.
- Transition to RUTF.

6) Correct micronutrient deficiencies
- Done through F-75, F-100 or RUTF.
- Vitamin A is given at the discharge from SAM treatment. (outpatient)

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(F-75)

F-75

F-100

Ready-To-use - Therapeutic Food (RUTF)

Initial phase

Rehabilitation phase

(WHO, 2013; WHO, 1999; Briend et al. 1999, Manary, 2006; NNP, 2009; WHO et al. 2007)
Inpatient treatment of SAM (continued #2)

Hospital-based treatment

The steps of inpatient care following identification include:

7) Emotional stimulation and sensorial development.
   - Rehabilitation with the mother.
   - Ensure good environment.
   - Play and physical activities.

8) Monitoring of management progress.
   - Monitoring the progress of the child.
   - **Each feed:**
     - Quantity F-75, F-100 or RUTF.
     - Amount and frequency of vomiting.
     - Frequency of breastfeeding.
   - **Once daily:**
     - Weight/weight gain.
     - Oedema.
     - Frequency and type of stools.
     - Dehydration and cough.
     - Liver size and palmar pallor.

9) Prepare for and ensure follow up after discharge.
   - Gained appetite, minor complications, the child can eat at least 75% the RUTF.

If failing to respond:
- Not regaining appetite after 4 days.
- Failure to start to lose oedema after 4 days.
- Oedema still present at day 10.
- Failure to stabilize by day 10.
- Fail to gain 15% of weight.

Test for HIV and TB.

Ready-To-use - Therapeutic Food (RUTF)

Initial phase

Rehabilitation phase

(WHO, 2013; WHO, 1999; Briend et al. 1999, Manary, 2006; NNP, 2009; WHO et al. 2007)
Outpatient treatment of SAM

Home-based treatment follow up at health centers/hospital

Before going home (hospital/health center):

• First dose of antibiotics + other needed medications.
• Test appetite.
• Counselling on feeding with RUTF.
• Breastfeeding practices.
• Home hygiene practices.
• Review danger signs.
• Check immunization status, if not vaccinated plan vaccination at 1st follow up visit.
• Food ration provided based on child’s weight.

( WHO, 2013; WHO, 1999; Briend et al. 1999, Manary, 2006; NNP, 2009; WHO et al. 2007)
Outpatient treatment of SAM

**Follow-up schedule (health center/hospital):**

- 1<sup>st</sup> follow up visit 7 days (give RUTF for 2 weeks).
- 2<sup>nd</sup> follow up visit 14 days after 1<sup>st</sup> follow-up visit (give RUTF for 2 weeks).
- 3<sup>rd</sup> follow-up visit 14 days after 2<sup>nd</sup> follow-up (give RUTF for 3 weeks).
- Follow-up continues for a minimum of 2 months.
- Medical check-up, appetite test, weight, height, MUAC and oedema assessment, food ration and feeding counseling.

**Home-visit:**

- Absent for 2 continuative follow-up visit.
- Eat less than 75% of RUTF by 2<sup>nd</sup> follow up visit.
- Below admission weight on 2<sup>nd</sup> follow up visit.
- Weight loss for any follow-up visit.
- Static weight for 2 consecutive follow up visits.
- Refused hospital referral.

(WHO, 2013; WHO, 1999; Briend et al. 1999, Manary, 2006; NNP, 2009; WHO et al. 2007)
## Routine drugs in outpatient treatment of SAM

<table>
<thead>
<tr>
<th>Name of Product</th>
<th>When</th>
<th>Age/Weight</th>
<th>Prescription</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vitamin A</strong>*</td>
<td>At discharge</td>
<td>6 months to &lt; 1 year</td>
<td>100 000 IU</td>
<td>Single dose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 1 year</td>
<td>200 000 IU</td>
<td></td>
</tr>
<tr>
<td><strong>Amoxicillin</strong></td>
<td>At admission</td>
<td>All Beneficiaries</td>
<td>25mg/kg/dose</td>
<td>2 times/day for 7 days</td>
</tr>
<tr>
<td><strong>Mebendazole</strong></td>
<td>1st follow-up visit</td>
<td>&lt; 1 year</td>
<td>DO NOT GIVE</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12-23 months</td>
<td>250 mg</td>
<td>Single dose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24-59 months</td>
<td>500 mg</td>
<td></td>
</tr>
<tr>
<td><strong>Measles vaccination</strong></td>
<td>At admission if not received at 9 months</td>
<td>From 9 months</td>
<td>Standard</td>
<td>Give 2nd dose at 18 months</td>
</tr>
</tbody>
</table>

(NNP, 2009)
Outpatient discharge criteria

**Discharged as cured:**
- WHZ > -2 or MUAC > 12.5 cm and no oedema for 2 consecutive follow-up visits with a minimum length of stay in follow-up of 2 months and clinically well.

**Referred:**
- Referred to inpatient care if not responding (lost weight for 2 consecutive follow-up/or static weight for 2 consecutive follow-up) or severe medical complications.

**Defaulted:**
- Absent for 2 consecutive follow-up visits.

**Non-cured:**
- Discharge criteria not reached after 4 months.

**Died:**
- Died during time registered for outpatient treatment of SAM.

(NNP, 2009)
Example of recent activities on SAM treatment in Cambodia
Development of locally produced RUTF

• Low acceptability of commonly used RUTF, BP-100™.

• Adapt RUTF to local taste and preferences using locally available ingredients (mung beans, soya beans, fish, rice, coconut).

• Make Cambodia independent from importing RUTF’s.

• Reduce cost by replacing milk powder with small dried fish powder.

Photo credit: Arnaud Laillou.

Num Trey fish paste wrapped into a crispy wafer.

Wafer and paste production at Vissot (local producer).

(Bourdier, 2009; Ketsana, 2013)
Trials

Acceptability trial

- Test acceptability among children and their caregivers.
- Taste trial of Num Trey paste, Num Trey wafer and BP-100™.
- The National Pediatric Hospital, Phnom Penh, Cambodia.
- Acceptability evaluated on a 5-point hedonic scale using smiley faces for 8 organoleptic qualities and a ranking.

Effectiveness trial

- To test the effectiveness of the locally produced fish-based RUTF (Num Trey) compared with the imported milk-based RUTF (BP-100™) in the treatment of severe acute malnutrition in Cambodian children (6-59 months).
- National Pediatric Hospital, Phnom Penh, Cambodia.
- Eight weeks intervention trial with follow-up every 2nd week.
Outcomes – Effectiveness trial

**Primary outcome**
✓ Weight gain (g/kg/day).

**Secondary outcomes**
✓ Body composition changes during treatment.
✓ Micronutrients status (iron, vitamin A, zinc, fatty acids, complete blood count).
✓ Immunological parameters (C-reactive protein (CRP), Alpha-1 acid glycoprotein (AGP) and leptin).
✓ Perception of the products by the caretaker (acceptability/focus group discussion).
✓ Energy intake.
✓ Changes in Height-for-age z-score, MUAC, weight (kg), muscle area and fat.
✓ Eating patterns (food refusal, household sharing).
✓ Morbidity (diarrhea, vomiting, skin rash, cough, fever).

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**Sample size**
The expected weight gain was >4g/kg/day for both RUTFs.
Sample size: 49 children per group - planned to recruit 60 in each group (total n=120).
Trial design

Home-based single-blinded randomized controlled trial.

Children were individually randomized to 1 of 2 RUTF’s for 8 weeks.

Num Trey RUTF  
BP-100™
Timeline of treatment

Children arrive at the National Pediatric Hospital.

Non-complications:
- Baseline.
- 2nd Week follow-up.
- 4th Week follow-up.
- 6th Week follow-up.
- Endline.

Complications:
- Inpatient treatment of SAM
  Standard treatment (F-75 + F-100)
  Ready for discharge invited into the trial.

Children **NOT** included in the trial.

Home-visits & Focus group discussions.

Thank you for your attention!