Acceptability and utilization of fortified balanced energy protein supplements among pregnant women in rural Nepal


7th Annual Scientific Symposium on Agriculture-Nutrition: Pathways to Resilience
Dec 11, 2019
Background

- Low birth weight (LBW) and small-for-gestational age (SGA), highly prevalent in South Asian communities, are major risk factors for newborn death.
- Estimated 32 million babies are born too small.
- About 26% of neonatal deaths are attributable to infants born SGA.
- Maternal undernutrition is a key contributor to poor fetal growth, LBW, childhood stunting, and short- and long-term infant morbidity and mortality.
What are balanced energy protein (BEP) supplements?

• Protein provides < 25% of total energy content

• WHO recommended BEP supplementation for populations or settings with a high prevalence of undernourished pregnant women

• BEP supplements shown to reduce the risk of stillbirths and SGA neonates and promote gestational weight gain
Gap/Need:

- No specified products, different types of formulations, lack of guidance on the best supplement for use,
- Programmatic experience with blended fortified foods for supplementation but sharing/substitution and quality of protein may be an issue

Solution:

- Design a few prototype “ready-to-use” nutritious BEP supplements fortified with the required micronutrients
- Research needed to test for acceptability, use and impact of new BPE supplements during pregnancy and post-partum
- Exciting opportunity to operationalize the WHO recommendation with a “ready-to-use” BEP product
BEP Supplementation Trial in Nepal: Maternal and Infant Nutrition Trial (MINT)

Three Phases Aims:

**Phase 1**: identify the most acceptable among eleven candidate supplements for use in pregnancy and lactation in the South Asian context

**Phase 2**: assess 8-week acceptability and consumption compliance of two short-listed supplement options

**Phase 3**: Large, community-based RCT to test the efficacy of a BEP supplement for daily use during pregnancy and the first 6 months after delivery on the outcomes of pregnancy and growth of infants during the first 6 months of life
Study site

- Sarlahi District representative of large portion of the Terai districts
- Sarlahi nutritional status (2012-2017): >28,000 pregnancies in first trimester
  - Avg BMI of women in first trimester of pregnancy was 19.1 and 37% below BMI 18.5 (underweight)
  - Avg weight was 43.4kg (30% below 40kg)
  - Avg height was 150.3 cm (25% are 120cm or shorter)
  - 29.4% LBW, mean birthweight 2710g
  - 46.8% SGA
Study methodology (Phase 1)

- Sample size: 40 married pregnant women 15-40 years of age
- Over 2-days, tasted small portions of each of eleven candidate BEP supplements

Mixed Methods Approach

**QUALITATIVE**
5 Focus group discussions

**QUANTITATIVE**
Hedonic Testing (7-point Likert scale)
Product ranking on hedonic properties

TRIANGULATION
### Phase 1: Eleven BEP Supplements Tested

<table>
<thead>
<tr>
<th>Product Name and Type</th>
<th>Product: sweet /savoury</th>
<th>Product manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Plumpy’Mum – lipid based paste</td>
<td>Sweet</td>
<td>Nutriset</td>
</tr>
<tr>
<td>2) Mango bar</td>
<td>Sweet</td>
<td>Nutriset</td>
</tr>
<tr>
<td>3) Vanilla filled sticks</td>
<td>Sweet</td>
<td>Nutriset</td>
</tr>
<tr>
<td>4) Vanilla biscuits</td>
<td>Sweet</td>
<td>Nutriset</td>
</tr>
<tr>
<td>5) Vanilla drink</td>
<td>Sweet</td>
<td>Nutriset</td>
</tr>
<tr>
<td>6) Cocoa drink</td>
<td>Sweet</td>
<td>Nutriset</td>
</tr>
<tr>
<td>7) Plumpy’Mum - Tomato and Onion</td>
<td>Savoury</td>
<td>Nutriset</td>
</tr>
<tr>
<td>8) Masala bar</td>
<td>Savoury</td>
<td>Nutriset</td>
</tr>
<tr>
<td>9) Curry biscuit</td>
<td>Savoury</td>
<td>Nutriset</td>
</tr>
<tr>
<td>10) Seasoned pillow snack</td>
<td>Savoury</td>
<td>Mars</td>
</tr>
<tr>
<td>11) Unseasoned pillow snack</td>
<td>Savoury</td>
<td>Mars</td>
</tr>
</tbody>
</table>
## Results Phase 1: ‘Top 5 products’ across all metrics

<table>
<thead>
<tr>
<th></th>
<th>Sweet Plumpy’Mum</th>
<th>Seasoned Pillows</th>
<th>Vanilla Biscuit</th>
<th>Vanilla Drink</th>
<th>Savoury Plumpy’Mum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual Hedonic Test</strong></td>
<td></td>
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<tr>
<td>Overall appreciation</td>
<td>2 (6.32)</td>
<td>1 (6.35)</td>
<td>4 (5.98)</td>
<td>5 (5.85)</td>
<td>3 (6.15)</td>
</tr>
<tr>
<td>ranking</td>
<td></td>
<td></td>
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<tr>
<td>(Avg score on 7-point scale)</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Individual Product Ranking Exercise</strong></td>
<td>1 (51)</td>
<td>2 (43)</td>
<td>5 (28)</td>
<td>3 (37)</td>
<td>4 (34)</td>
</tr>
<tr>
<td>‘Top 3’ Ranking (points)</td>
<td></td>
<td></td>
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<td><strong>Focus Group Exercise</strong></td>
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<tr>
<td>Group ‘Top 3’ Ranking</td>
<td>1 (14)</td>
<td>3 (4)</td>
<td>3 (4)</td>
<td>2 (8)</td>
<td>5 (0)</td>
</tr>
<tr>
<td>(points)</td>
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Phase 1: Qualitative findings summary

• Association with familiar foods was positive
  • Sweet Plumpy’Mum was found to be similar to ‘Suji ko Halwa’ (semolina pudding), Horlicks, Bournvita, Cerelac, ‘Satu’ (roasted flour from pulses/cereals)
  • Seasoned pillows was found to be similar to savory chips and snacks like ‘Nimkii’, ‘Kurkure’, ‘Khatta meetha’
  • Vanilla biscuit was found to be similar to ‘Parle-G’ biscuit

• Use during pregnancy
  • Vanilla biscuit was reported to be easy to eat (while on the move)
  • Positive response for all three products on daily use: enjoyed the taste/flavor and associated health benefit to the expecting mother/baby
  • Some women suggested they would ‘get sick’ eating the same product every day during pregnancy
Study methodology (Phase 2)

• Two products tested in Phase 2: Sweet Plumpy’Mum and Vanilla Biscuit
• Two product groups: Each with 40 married pregnant women 15-40 years of age (2\textsuperscript{nd} to early 3\textsuperscript{rd} trimester)
• Weekly home visits for supplement distribution and compliance measurement

**QUALITATIVE**
In-depth interview with PW (n=16, 8 per group)
Focus group discussions with PW (n=4, 2 per group)
Other in-depth interviews: family members (n=6, 3 per group)
& health workers (n=6)

**QUANTITATIVE**
Hedonic Testing
Compliance assessment (weekly)

TRIANGULATION
Phase 2: Overall compliance over 8 weeks by supplement group

<table>
<thead>
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<th>Overall compliance over 8 weeks using various definitions:</th>
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<th>Vanilla biscuit</th>
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<td>median (Q1-Q3), mean</td>
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<td>N=26</td>
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<td><strong>Adjusted overall compliance (%) over 8 weeks among those met in person</strong></td>
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<td>100 (94.8-100)</td>
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<td><strong>Non-sachet count method</strong></td>
<td>N=30</td>
<td>N=37</td>
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<td>Overall compliance of <em>full</em> portion only over 8 weeks among those met in person or over the phone</td>
<td>91.1 (85.7-98.2) 87.6</td>
<td>96.4 (87.5-98.2) 88.4</td>
</tr>
<tr>
<td>Overall compliance of <em>any</em> portion only over 8 weeks among those met in person or over the phone</td>
<td>98.2 (87.5-100) 92.9</td>
<td>100 (94.6-100) 93.0</td>
</tr>
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Summary of Phase 2: Quantitative

• Sharing of products higher in the Biscuit group (35.7%, mean 1 day) compared to the Plumpy’Mum (27.5%, mean 0.4 days)

• Supplements were most often consumed in the morning

• Biscuits were more frequently consumed over multiple sittings than the Plumpy’Mum (20.2% versus 7.9%)

• 82.5% and 65.1% of the Plumpy’Mum and Biscuit group respectively reported eating their meals and snacks as they ‘normally would’
Summary of phase 2: Qualitative

• Majority of women reported changes in perception of the product over the 8-week period
• Family members also noted perceived changes to women’s physical health, commenting her face ‘is bright’ or that she ‘looks healthier’
• Strong support for the product at the household level
• Health workers were in accord about the importance of ‘supplementary foods’ in pregnancy
• Cited barriers: household economics, family (husband/mother-in-law) opposition and lack of knowledge/education
• Majority of the women were in favour of having the option to change the products on a weekly basis
Investigative team

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- Katie Moore, MSc, Anthrologica
- Leslie Jones, MPH, Anthrologica
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Thank you