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

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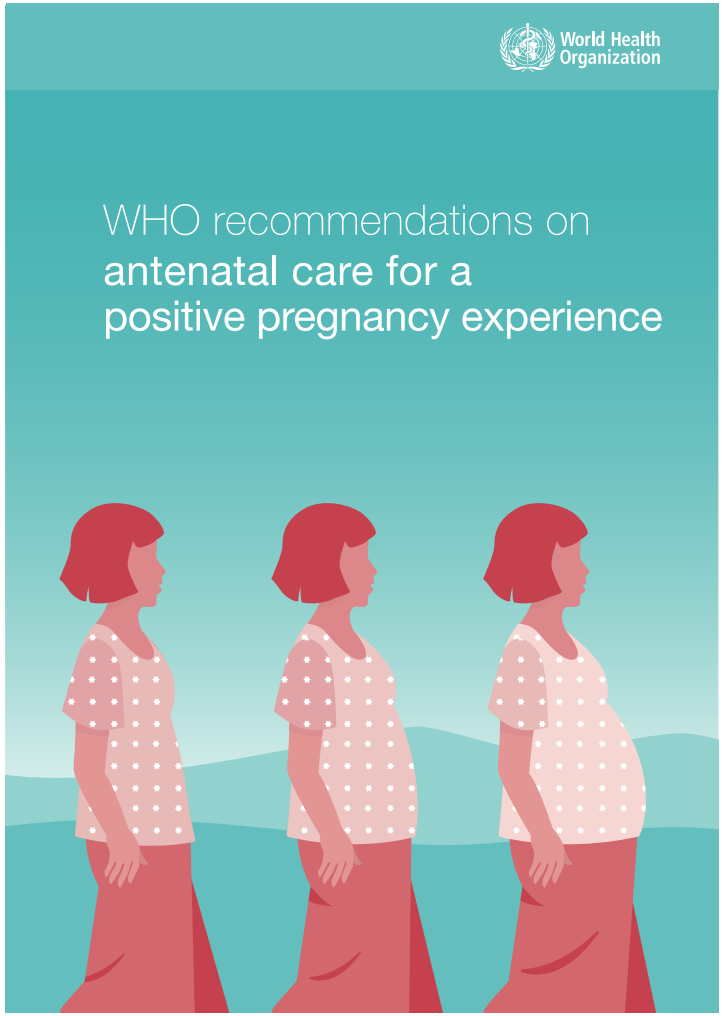
Background

- 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



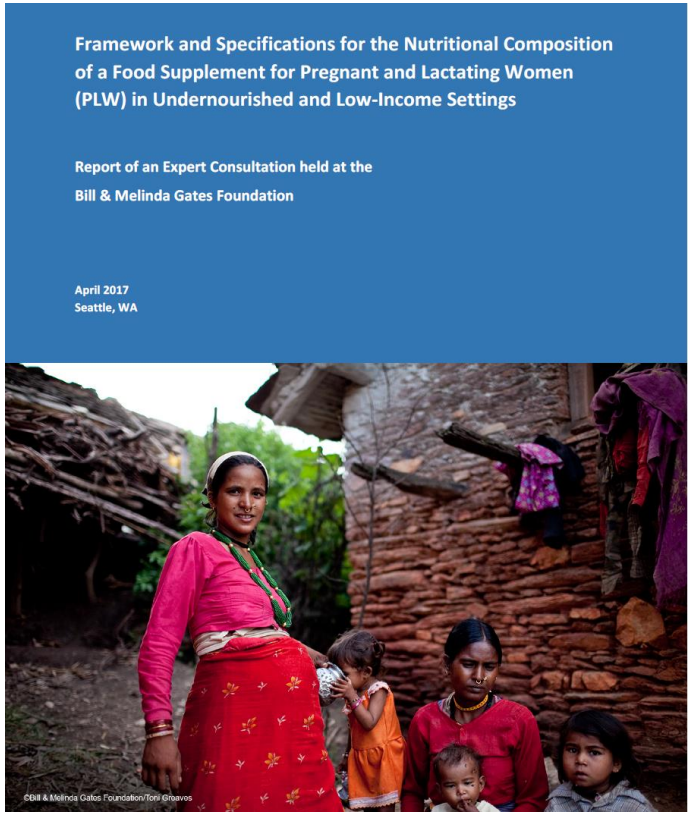
BEP Supplementation : Product design & testing (Gates Foundation Expert Consultation Report)

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

Phase 1: Eleven BEP Supplements Tested

Product Name and Type	Product: sweet /savoury	Product manufacturer
1) Plumpy'Mum – lipid based paste	Sweet	Nutriset
2) Mango bar	Sweet	Nutriset
3) Vanilla filled sticks	Sweet	Nutriset
4) Vanilla biscuits	Sweet	Nutriset
5) Vanilla drink	Sweet	Nutriset
6) Cocoa drink	Sweet	Nutriset
7) Plumpy'Mum - Tomato and Onion	Savoury	Nutriset
8) Masala bar	Savoury	Nutriset
9) Curry biscuit	Savoury	Nutriset
10) Seasoned pillow snack	Savoury	Mars
11) Unseasoned pillow snack	Savoury	Mars


plumpy mum
गर्भवती र स्तनपान
गर्दैगरेको महिलाहरुको लागि
Pregnant and lactating women


Sweet filled sticks
vanilla
गर्भवती र स्तनपान
गर्दैगरेको महिलाहरुको लागि
Pregnant and lactating women


Sweet biscuits
Savoury biscuits


Sweet bar
mango
गर्भवती र स्तनपान गर्दैगरेको महिलाहरुको लागि
Pregnant and lactating women


Seasoned Pillows - Nepal
FOR RESEARCH PURPOSES ONLY
Study Code: NGWU001
Sample Code: N6K6W
Batch No: November 2017
Production Date: 15 November 2017
Storage Conditions:
Clean, Cool & Dry Environment
Less than 25° C / 55% Relative Humidity
Allergen Statement:
May Contain Traces of Soy and/or Gluten
Ingredients:
Whole Yellow Pea Flour, Vegetable Fat (Palm Oil), Sunflower Oil, Seasoning (Tomato Powder, Onion Powder, Garlic Powder, Spice (Chilli), Paprika Extract, Salt), Sugar, Soy Lecithin, Vitamins (A, D3, Folic Acid, Thiamine, Niacin, B12, B6, B2, C), Minerals (Iron, Zinc)
Contains Added Flavor
(Natural and Natural Identical Flavoring Substance)
Unseasoned Pillows - Nepal
FOR RESEARCH PURPOSES ONLY
Study Code: NGWU002
Sample Code: Q2M1A
Batch No: October 2017
Production Date: 10 October 2017
Storage Conditions:
Clean, Cool & Dry Environment
Less than 25° C / 55% Relative Humidity
Allergen Statement:
May Contain Traces of Soy and/or Gluten
Ingredients:
Whole Yellow Pea Flour, Vegetable Fat (Palm Oil), Sunflower Oil, Sugar, Soy Lecithin, Vitamins (A, D3, Folic Acid, Thiamine, Niacin, B12, B6, B2, C), Minerals (Iron, Zinc)
Contains Added Flavor
(Natural and Natural Identical Flavoring Substance)

Results Phase 1: ‘Top 5 products’ across all metrics

	Sweet Plumpy’Mum	Seasoned Pillows	Vanilla Biscuit	Vanilla Drink	Savoury Plumpy’Mum
Individual Hedonic Test Overall appreciation ranking (Avg score on 7-point scale)	2 (6.32)	1 (6.35)	4 (5.98)	5 (5.85)	3 (6.15)
Individual Product Ranking Exercise ‘Top 3’ Ranking (points)	1 (51)	2 (43)	5 (28)	3 (37)	4 (34)
Focus Group Exercise Group ‘Top 3’ Ranking (points)	1 (14)	3 (4)	3 (4)	2 (8)	5 (0)

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)

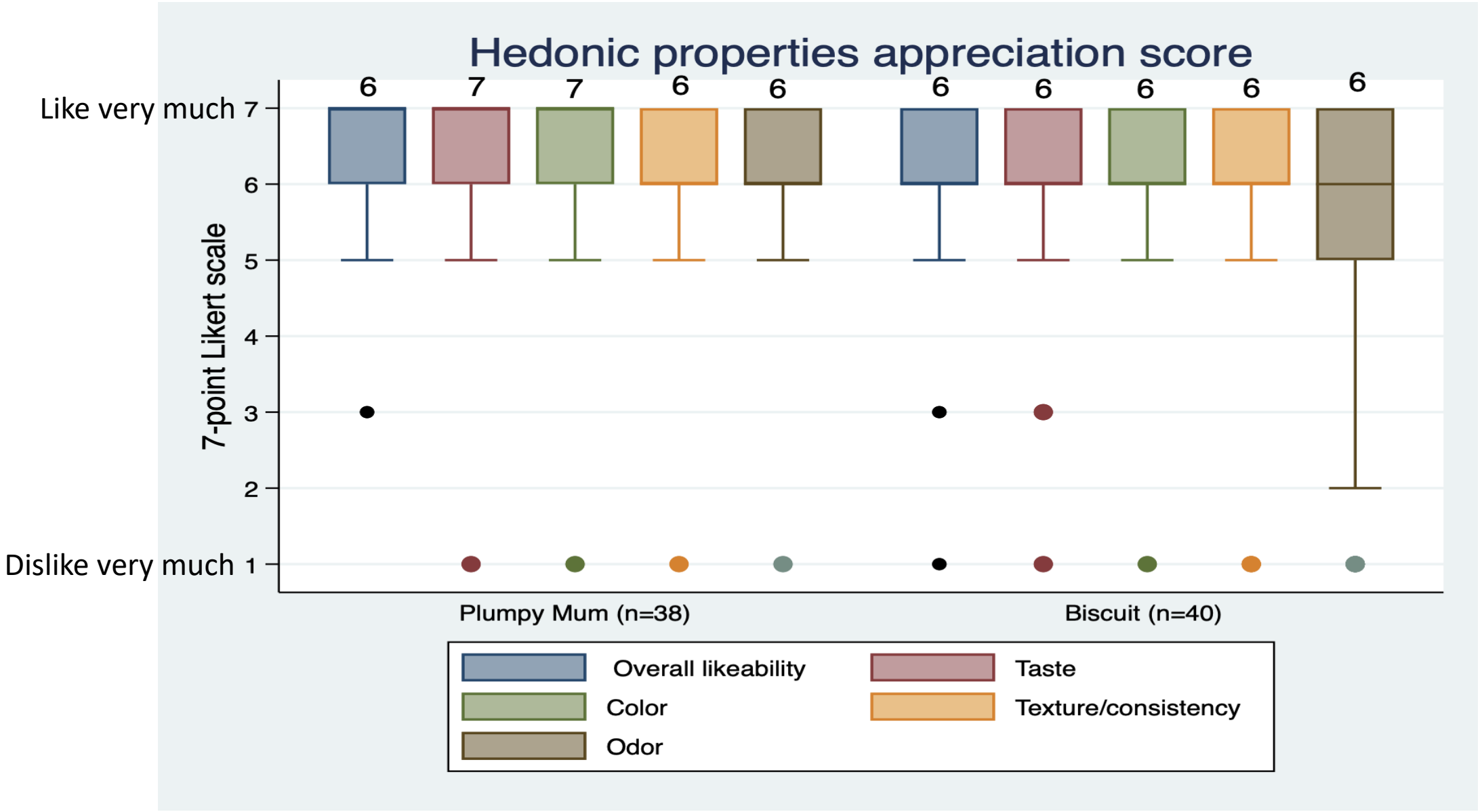
- Two products tested in Phase 2: Sweet Plumpy'Mum and Vanilla Biscuit
- Two product groups: Each with 40 married pregnant women 15-40 years of age (2nd to early 3rd trimester)
- Weekly home visits for supplement distribution and compliance measurement

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)


Hedonic properties appreciation score
Like very much
Dislike very much
7-point Likert scale
7
6
5
4
3
2
1
6
7
7
6
6
6
6
6
6
6
Plumpy Mum (n=38)
Biscuit (n=40)
Overall likeability
Taste
Color
Texture/consistency
Odor

Phase 2: Overall compliance over 8 weeks by supplement group

	Plumpy'Mum	Vanilla biscuit
Overall compliance over 8 weeks using various definitions:	median (Q1-Q3), *mean*	median (Q1-Q3), *mean*
<u>Sachet-count method</u>	N=26	N=34
Adjusted overall compliance (%) over 8 weeks among those met in person	100 (94.8-100) *95.5*	100 (96.4-100) *93.9*

Phase 2: Overall compliance over 8 weeks by supplement group

	Plumpy'Mum	Vanilla biscuit
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Sachet-count method	N=26	N=34
Adjusted overall compliance (%) over 8 weeks among those met in person	100 (94.8-100) *95.5*	100 (96.4-100) *93.9*
Non-sachet count method	N=30	N=37
Overall compliance of ***full*** portion only over 8 weeks among those met in person or over the phone	91.1 (85.7-98.2) *87.6*	96.4 (87.5-98.2) *88.4*
Overall compliance of ***any*** portion only over 8 weeks among those met in person or over the phone	98.2 (87.5-100) *92.9*	100 (94.6-100) *93.0*

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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• Saskia DePee, PhD	World Food Program
• Juliet Bedford, PhD	Anthrologica
• Katie Moore, MSc	Anthrologica
• Leslie Jones, MPH	Anthrologica

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Thank you