What do we know about cost and impact of nutrition interventions?

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Overview

• What are the impacts of the 6 WHO nutrition targets (mortality, economic, both?); what are the modelling issues?
• What do we know about the impact of specific interventions for undernutrition?
• What do we know about the cost of specific interventions for undernutrition?
• What do we know about impact re obesity?
WHA nutrition targets/SDGs

1. Achieve a 40% reduction in the number of children under-5 who are stunted;
2. Achieve a 50% reduction of anaemia in women of reproductive age;
3. Achieve a 30% reduction in low birth weight;
4. Ensure that there is no increase in childhood overweight;
5. Increase the rate of exclusive breastfeeding in the first 6 months up to at least 50%;
6. Reduce and maintain childhood wasting to less than 5%.
## Impact of individual WHA targets: 1

<table>
<thead>
<tr>
<th>Target</th>
<th>Mortality</th>
<th>Monetary</th>
</tr>
</thead>
<tbody>
<tr>
<td>↓  Stunting</td>
<td>√√</td>
<td>√√</td>
</tr>
<tr>
<td>↓  Anemia</td>
<td>√</td>
<td>√√</td>
</tr>
<tr>
<td>↓  Low Birth Weight</td>
<td>√√</td>
<td></td>
</tr>
<tr>
<td>↓  Child overweight</td>
<td></td>
<td>√√</td>
</tr>
<tr>
<td>↑  Exclusive breastfeeding</td>
<td>√√</td>
<td>√√</td>
</tr>
<tr>
<td>↓  Wasting</td>
<td>√√</td>
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</tbody>
</table>

Author’s assessment
Impact of WHA targets: 2

• Some of 6 reduce morbidity and mortality (modelled in LiST) – effect strongest in LICs
• Some of 6 reduce health expenditures – effect strongest in HICs
• Some of 6 increase productivity directly (e.g. anemia in adult women) – LMICs
• Some of 6 benefit cognition, hence future productivity (e.g. anemia; breastfeeding) - all
Mortality vs productivity

• More difficult to model with 2 outcomes, not 1
• Some studies put both into a common metric ($)
• Copenhagen Consensus papers on nutrition were instructed to use $1000 and $5000/DALY
• Similar to WHO guideline that $1 \times$ per capita income is “very cost-effective” (in 2012, all low income countries had GDP < about $1000; all lower middle < about $4500): WB cutoffs)
Mortality vs productivity 2

• Other researchers have evaluated the monetary impact of a death as the discounted present value of future productivity

• Depends on assumptions about future growth rate of the economy, and appropriate discount rate

• Favours richer and fast-growing economies
Lancet 2013 top 10 interventions

- Balanced energy-protein supplements – moms
- Breastfeeding promotion
- Calcium supplements - moms
- Complementary feeding education (food-secure areas) + food (food-insecure areas)
- Management of moderate-acute malnutrition (MAM)
- Multiple micronutrient supplements – moms
- Therapeutic feeding - severe-acute malnutrition (SAM)
- Universal salt iodization
- Vitamin A for prevention
- Zinc for prevention

Bhutta et al, 2013
Modelling economic & mortality outcomes

- Morbidity/mortality outcomes have been modelled (LiST for example takes account of interactions)
- Economic outcomes have not been modelled in the same way as epidemiology: RCTs less suitable since behavior is more important (PROFILES – Excel based)
- There are undoubtedly interactions for economic outcomes—cognitive improvements due to reduction in iodine deficiency, iron deficiency and stunting are not necessarily additive
- So some estimate of interaction is desirable
What do we know about impact of specific interventions?

<table>
<thead>
<tr>
<th>Knowledge fairly good</th>
<th>Knowledge more limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balanced energy supplements moms</td>
<td></td>
</tr>
<tr>
<td>Breastfeeding</td>
<td>Breastfeeding promotion</td>
</tr>
<tr>
<td>Calcium supplements moms</td>
<td>Complementary feeding education</td>
</tr>
<tr>
<td>Multiple micronutrient supplements</td>
<td>Complementary feeding</td>
</tr>
<tr>
<td>Therapeutic feeding SAM</td>
<td>Management of MAM</td>
</tr>
<tr>
<td>Vitamin A for prevention</td>
<td>Zinc for prevention?</td>
</tr>
</tbody>
</table>

Author’s subjective assessment of literature
Impact – what do we know?

• Our knowledge is better for interventions that require less behavior modification (e.g. micronutrients), and sometimes where there is a commodity (micronutrients, RUTF)

• Our knowledge is more limited where behavior modification is needed
What we know better/less well regarding mortality impact?

Number of deaths of children < 5 averted by intervention per yr

- Management SAM: 370,000
- Preventive zinc: 150,000
- Breastfeeding prom.: 130,000
- Appropriate comp. feed: 100,000
- Management MAM: 70,000
- Maternal energy supps: 40,000
- Maternal MMN: 40,000
- Vitamin A supps: 10,000
- Calcium supplements: 10,000

Source: Bhutta et al, 2013 (Lancet series)
Red/blue colouring is author’s assessment
What do we know about cost?

• It is not enough to know about what an intervention costs (there are many ineffective interventions) – we need to know what an effective intervention costs

• Easier to cost interventions whose effect is fairly clear (therapeutic feeding for SAM, vit A)

• Harder to cost those involving behavior change (breastfeeding promotion, complementary feeding education, obesity)
What do we know about cost – 2?

• In some cases we have tried to develop commodities to standardize interventions, e.g. Lipid-Nutrient Supplements (LNS) for complementary feeding; extend use of RUTF/RUSF for MAM; orlistat/gastric surgery for obesity

• This has met with only modest success, so no “magic bullet” for the intervention, hence no easy solution for costing
Surveys of cost/cost-effectiveness literature

  - 27 for individual micronutrients
  - 1 for a nutrition education program
  - 3 for treatment of SAM
  - 2 for a comprehensive package of interventions
Our knowledge of detailed delivery costs:

<table>
<thead>
<tr>
<th>Better</th>
<th>Less good</th>
</tr>
</thead>
<tbody>
<tr>
<td>By region and country</td>
<td>Cost of “last mile”</td>
</tr>
<tr>
<td>In different vertical programs</td>
<td>In integrated services</td>
</tr>
<tr>
<td>For different food vehicles (fortification)</td>
<td>Cost of national level policy development and mass media campaigns</td>
</tr>
<tr>
<td>What is ineffective</td>
<td>How to make programs even more effective</td>
</tr>
</tbody>
</table>

Based on Horton and Levin, forthcoming, 2016
What we know **better/less well** regarding cost - mortality?

Based on Bhutta et al, 2013 (Lancet series)
Assessment better/less well known cost information is author’s
What we know **better/less well** regarding cost - stunting?

Based on ongoing work at World Bank on costing WHA targets.
Assessment better/less well known cost information is author’s.
Obesity in LMICs

• Literature on cost-effectiveness of interventions regarding obesity in LMICs is very thin

• Identified 3 studies in ongoing work for Disease Control Priorities (www.dcp-3.org)

• Our knowledge of what works, what it costs, and how it interacts with policies on undernutrition (double burden) isn’t good
References


Comments, questions?

Photo credit: MEDA Canada, Masava project