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

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“Improving efficiency in health”

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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?
<table>
<thead>
<tr>
<th>Number</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Achieve a 40% reduction in the number of children under-5 who are stunted;</td>
</tr>
<tr>
<td>2</td>
<td>Achieve a 50% reduction of anaemia in women of reproductive age;</td>
</tr>
<tr>
<td>3</td>
<td>Achieve a 30% reduction in low birth weight;</td>
</tr>
<tr>
<td>4</td>
<td>Ensure that there is no increase in childhood overweight;</td>
</tr>
<tr>
<td>5</td>
<td>Increase the rate of exclusive breastfeeding in the first 6 months up to at least 50%;</td>
</tr>
<tr>
<td>6</td>
<td>Reduce and maintain childhood wasting to less than 5%.</td>
</tr>
</tbody>
</table>
### 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>
<td></td>
</tr>
</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 x 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
Preventive zinc
Breastfeeding prom.
Appropriate comp. feed
Management MAM
Maternal energy supps
Maternal MMN
Vitamin A supps
Calcium supplements

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 &quot;last mile&quot;</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