Towards the Overdue Elimination of Deficiency Disease Epidemics

By André Briend

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Nutritional deficiency epidemics are all highly predictable. Softwares are now available to flag nutrients missing in a ration, making epidemic prediction easy. Indeed, there is no excuse for being taken by surprise by a deficiency disease epidemic.

The daily menus for refugees and displaced people are remarkably similar throughout the world. They receive a cereal staple food, very often maize, beans and oil, which are the cheapest source of energy, protein and lipids available on the world market.

A diet based on maize, beans and oil has no vitamins A, C, B12, and a very low content of vitamin B2, folic acid, niacin, absorbable zinc and iron. It is not physiologically possible for refugees to live for long periods of time on such a diet and compares unfavourably with the nutrient content of most pet foods (see table 1). Consequently, one of the first things refugees do, if they can, is sell part of their ration to buy foods containing the missing nutrients. If this is not possible, within a few weeks they fall ill with one of the many deficiency diseases reported every year, including pellagra, scurvy and beriberi.

Blended flours as a safety net, or not?

Following repeated, and often large scale, epidemics of deficiency diseases among refugees, the decision was taken in the early 1990s to add blended flours to the list of foods systematically distributed to refugees. Fortified with vitamins, the introduction of blended flours, such as Corn Soy Blend (CSB) and Unimix, has undoubtedly played a role in the prevention of massive deficiency epidemics. Yet, their choice was based mainly on low cost and availability in food aid circuits - they were never designed to prevent nutritional deficiency epidemics. Hence, they are poorly adapted for this purpose and provide only a weak safety net.
Blended flours typically contain (after cooking) 30 mg of vitamin C and 8 mg of niacin per 100g of flour\(^3\). When logistical conditions are difficult or air transport is needed, their low nutrient density makes them an extremely poor option to prevent deficiency disease epidemics. For example, transport of one metric tonne of CSB provides only 300 g of vitamin C and 80 g of niacin, when a smaller quantity of a more nutrient dense product could be used instead. Not surprisingly, deficiency epidemics persist in areas difficult to access for logistical reasons.

The low quantity of vitamins in blended flours also has cost implications. For example, the cost of providing vitamin C using CSB, at about 0.5 _ per kg, is 160 times higher than the cost of the vitamin C in a chemical form\(^4\). Cost differences are similar or even higher for other vitamins. These ratios are quite unfavourable for food aid programmes run on a tight budget, as is usually the case.

The practical implications are staggering. In the spring of 2002, the Lancet reported a scurvy outbreak in Northern Afghanistan\(^5\). Although predicted by many, including high level UN nutritionists, a scurvy outbreak still occurred and people died. Why? Because the international aid community failed to send the equivalent of 0.0001 _ of vitamin C per person per day to the population at risk, despite several months of advance notice. Even if the logistical and technological constraints increase the real cost by a factor of 10 or a 100, this cost remains incredibly low. The lack of timely, adequate response remains difficult to explain. Considering the price of all nutrients involved in recent nutritional deficiency epidemics is incredibly low when purchased in chemical form\(^6\), persistence of these deficiencies epidemics IS unforgivable.

The absurdity of the present situation leads to a key questions. Why do NGOs, who so often pride themselves on their advocacy campaigns, remain silent about the situation? Even NGOs who lobby for control of forgotten diseases in poor countries seem to have forgotten nutritional deficiency diseases.

**Necessary involvement of industrial partners**

Pellagra seen in patient attending MSF-B clinic in Kuito, Bie Province

Some micronutrients, such as niacin, needed to prevent pellagra, have a very unpleasant taste, while others are toxic at high doses. For these reasons, it is necessary to incorporate nutrients in a chemical form into a food with a pleasant taste but also a volume (or a taste) which prevents over consumption. This approach is much more successful than providing multi-vitamin tablets, which are difficult to distribute and always poorly accepted. These constraints imply that the food industry must be involved in deficiency disease prevention because only they have the expertise needed to develop appropriate food carriers with the optimal nutrient weight /cost ratios. Technically, there are no apparent major obstacles preventing the development by the industry of highly fortified foods, with nutrient/weight ratios 50 or even 100 times higher than in CSB, and a favourable nutrient/cost ratio.

*Table 1 Comparison of nutritional composition of a typical refugee ration (without addition of blended*
flour) with that of pet food

<table>
<thead>
<tr>
<th>Food</th>
<th>Vitamin B2</th>
<th>Vitamin B1</th>
<th>Niacin</th>
<th>Folic acid</th>
<th>Vitamin C</th>
<th>Vitamin A</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refugee ration</td>
<td>455</td>
<td>1.44</td>
<td>0.13</td>
<td>9.6</td>
<td>79</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Comprises:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat flour</td>
<td>400</td>
<td>1.28</td>
<td>0.08</td>
<td>8</td>
<td>40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Beans</td>
<td>30</td>
<td>0.16</td>
<td>0.05</td>
<td>1.6</td>
<td>39</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Oil</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sugar</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pet foods</td>
<td>455</td>
<td>1.07</td>
<td>1.62</td>
<td>22.5</td>
<td>52</td>
<td>0</td>
<td>1090</td>
</tr>
<tr>
<td>Human requirements</td>
<td>1.1</td>
<td>1.3</td>
<td>17</td>
<td>200</td>
<td>40</td>
<td>700</td>
<td>14.8</td>
</tr>
</tbody>
</table>

Adapted from Tomkins and Henry, 1992. Note: Vitamin C is not an essential nutrient for most animals, with the exception of guinea pigs and primates.

Consequences of the NGO's medical culture

The need to involve the food industry in the prevention of nutritional deficiency diseases may be a major stumbling block in improving the current refugee situation. Headquarters of NGOs working in relief are usually staffed by health professionals with a medical bias, who are not used to consulting the food industry. Arguably, nutritionists working in NGO or UN agencies could have played a role to promote food based prevention of deficiency diseases, but being suspicious of the food industry has long been part of their professional culture. This may stem from previous dishonest attempts to promote breast milk substitutes by some wellknown companies.

Changing attitudes to prevent epidemics

A relationship between NGOs and the food industry must evolve and a dialogue must start if we want to eliminate the remaining deficiency disease outbreaks. Minerals and vitamins can be incorporated into a vast range of foods and there are many choices available, ranging from vitamin C in candies to the addition of iron to salt. Tasks should be clearly defined for each partner, relating to product development on the industry side and evaluation for the NGOs.

In conclusion, the current situation of continuing deficiency epidemics will change only if NGOs recognise that their attitude must change. A preventive approach should be adopted and the alarm bell rung as soon as it is noted that the level of any key nutrient is low in the ration used to feed refugees. Blended flours have proved unsuccessful in preventing deficiency disease. A dialogue must begin with the food industry to develop and field test alternative solutions.

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Reed BA, Habicht JP. Sales of food aid as sign of distress, not excess. Lancet. 1998; 351: 128-30


Vitamin C bought in bulk costs about 10 euro per kg. If one estimates daily requirements at 100 mg, or 10-4 kg, these requirements represent a cost of 10-3 euro. The prevention of scurvy requires much less vitamin C, about 10 mg per day, at a cost of 0.0001 euro.


Similar calculations to vitamin C, see footnote 4


Taken from Field Exchange 21

www.ennonline.net/fex/21/towards

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