Micronutrient Powder Use and Outcomes in Refugee Camps in Nepal (ASIA)
A refugee is a person who owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion, is outside the country of their nationality, and is unable to or, owing to fear, is unwilling to avail him/herself of the protection of that country. 

United Nations High Commissioner for Refugees (UNHCR)

According to the United Nations High Commissioner for Refugees (UNHCR), the number of refugees at the end of 2007 stood at 11.4 million, including 1.7 million people considered to be in a refugee-like situation. Developing countries hosted 82% of the global refugee population and the 50 least-developed countries provided asylum to 19% of the world’s refugees. Children and adolescents represent the majority of people of concern in Africa and Asia. It is well known that micronutrient malnutrition is an important public health concern in populations dependent on food assistance, such as refugees and displaced persons.

Nutritional status in Nepali refugee camps

In Nepal some 100,000 Bhutanese of Nepali ethnicity live in seven refugee camps in southeastern Nepal and are highly dependent on food relief and rations from the World Food Programme (WFP). As a result of a survey in February 2007 by the Center for Disease Control (CDC), that indicated a high prevalence of anemia (43.3%) and chronic malnutrition, i.e. stunting, (26.9%) amongst the children aged 6-59 months in Damak refugee camp, a comprehensive Micronutrient Powder (MNP) program was initiated to supplement the food rations.
Improving lives with Micronutrient Powders

The MNP program started in March 2008 and aimed to reach all 8,500 children aged 6-59 months in the camps, with a 1 g sachet of a specially formulated MNP (see table below), called Vita-Mix-It (VMX), that was designed to be sprinkled every other day on to the child's home-prepared food by their mothers/caregivers. The micronutrients (16 vitamins and minerals) included in the powder and the level added (1 RNI for most micronutrients) was based on the WHO / WFP / UNICEF recommendations and also took into consideration the micronutrients provided by the standard food rations distributed in the camp.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Joint Statement UNICEF/WHO/WFP &lt;5 years</th>
<th>Amount per 1g sachet</th>
<th>Percentage contribution to Joint Statement UNICEF / WHO / WFP &lt;5years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>µg RE 400.0</td>
<td>100.0 1</td>
<td>25</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>µg 5.0</td>
<td>5.0 100</td>
<td></td>
</tr>
<tr>
<td>Vitamin E</td>
<td>µg 5.0</td>
<td>5.0 100</td>
<td></td>
</tr>
<tr>
<td>Vitamin K</td>
<td>µg -</td>
<td>30.0 2</td>
<td>200</td>
</tr>
<tr>
<td>Thiamine</td>
<td>mg 0.5</td>
<td>0.5 100</td>
<td></td>
</tr>
<tr>
<td>Riboflavin</td>
<td>mg 0.5</td>
<td>0.5 100</td>
<td></td>
</tr>
<tr>
<td>Pyridoxine</td>
<td>mg 0.5</td>
<td>0.5 100</td>
<td></td>
</tr>
<tr>
<td>Folic Acid</td>
<td>µg 150.0</td>
<td>150.0 100</td>
<td></td>
</tr>
<tr>
<td>Niacin</td>
<td>mg 6.0</td>
<td>6.0 100</td>
<td></td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>µg 0.9</td>
<td>0.9 100</td>
<td></td>
</tr>
<tr>
<td>Vitamin C</td>
<td>mg 30.0</td>
<td>30.0/60.0 3</td>
<td>100/200</td>
</tr>
<tr>
<td>Zinc</td>
<td>mg 4.1</td>
<td>4.1 100</td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>mg 10.0</td>
<td>10.0 100</td>
<td></td>
</tr>
<tr>
<td>Selenium</td>
<td>µg 17.0</td>
<td>17.0 100</td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td>mg 0.56</td>
<td>0.34 4</td>
<td>100</td>
</tr>
<tr>
<td>Iodine</td>
<td>µg 90.0</td>
<td>30.0 5</td>
<td>33</td>
</tr>
</tbody>
</table>

1 Reduced because fortified foods provided by WFP already contribute a considerable amount.
2 Vitamin K added as intake is usually low where vegetable consumption is low.
3 The original MNP had 30 mg of vitamin C but this has been increased, following the CDC assessment, to 60 mg to enhance iron absorption and mitigate the effect of tannins in the tea consumed.
4 Copper reduced to US RDA as upper intake level for children 1-3 year is 1 mg.

At the start of the program information materials were distributed and demonstrations/education sessions were given by trained nutrition workers to inform the mothers/caregiver on the purposes, benefits and correct use of the VMX.

Assessing the impact of Micronutrient Powders

Six months after the initiation of the MNP distribution program another CDC survey was undertaken that included in its objectives – to estimate the current prevalence and severity of malnutrition and of anemia among the children aged 6-59 months and to evaluate the VMX program awareness, coverage and household implementation.

The assessment was a cross-sectional nutritional survey that included 502 children drawn from a systematic random sample from the camps (these were not the same children investigated 1.5 years earlier). The mothers/caregivers were asked about their knowledge, attitudes, and practices in relation to the VMX program and in addition, anthropometric measurements were taken and the prevalence of anemia was estimated using hemoglobin assessed by finger-prick blood samples.

The results showed that although there was a high (98.2%) general awareness of the program and mothers/caregivers showed an excellent compliance and knowledge of appropriate dosage and use of the MNP, the prevalence of anemia (43.6%) had not improved compared to February 2007 (43.3%). Severe anemia prevalence was 0.4%, moderate 18.1% and mild 25.1%. The 6-11 month age group had the highest prevalence (78.3%) and it was noted that anemia prevalence declined with increasing age.

DEFINITIONS

Stunting / Chronic malnutrition is defined based on height-for-age and is the primary manifestation of malnutrition in early childhood. The World Health Organisation criteria defines severe stunting for children aged 6-59 months as a Z-score of < -3.0; moderate stunting a Z-score of > -3.0 but < -2.0 and not stunted a Z-score of > -2.0.

Anemia is defined as a qualitative or quantitative deficiency of hemoglobin, a protein found inside red blood cells. The World Health Organisation criteria for severe anemia in children aged 6-59 months is a hemoglobin concentration of < 7.0 g/dL; moderate anemia is 7.0 – 9.9 g/dL and mild anemia is 10.0 – 10.9 g/dL.
Actions taken

Following on the CDC survey, a number of actions have been implemented to further address the impact of the use of MNPs in the refugee setting in Nepal and these include:

- Analysis of the micronutrient content of the MNPs that has shown that the levels set in the specifications for the supplement are still met in the end product after 6 months exposure to field conditions.
- Doubling the vitamin C level of the powder (from 30 to 60 mg) to mitigate the negative effect of tea on iron absorption.
- Further investigation of the deterioration in nutritional status and of changes in food consumption pattern (including tea consumption by young children).
- Reconsideration of the survey design to possibly include a comparison group, such as school-age children or women of reproductive age from the same camps who don’t receive MNP.

The results from ongoing better designed evaluations of MNP programs will have to be awaited before firm conclusions can be drawn.

More information

For further information on the MNP Program please contact:

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