Activity 3-F: Micronutrient Activity Station
Vitamin A deficiency
Instructions

• Please read through this Vitamin A information package and discuss amongst your group.

• You have 15 minutes to review this package.

• Answer the questions related to the specific micronutrient given in their manuals.

• At the end of the 15 minutes please move on to the next station till you have completed all four.
Vitamin A: 
DIETARY SOURCES

Provitamin A Carotenoids  
These come from plant sources such as fruits & vegetables. The most important of these - beta carotene - is found in leafy green vegetables and in bright yellow and orange fruits & vegetables. Absorption from plant sources is lower than animal sources.

Preformed Vitamin A  
This is found in animal sources such as organ meats (liver), red meat and fish.

Breastmilk is a critical source of preformed vitamin A for the infant
The underlying cause of VAD is a diet chronically insufficient in vitamin A. Reasons for an inadequate level of vitamin A include:

1. Inadequate breastfeeding – the first critical source of vitamin A.
2. Diet lacking in vitamin A-rich foods (especially liver and full-fat dairy products).
3. Vegetarian diets with modest amounts of vitamin A-rich fruits and vegetables.

An inadequate diet and infections usually co-exist in vitamin A deficient populations. VAD increases the severity of infections, which in turn adversely affect intake, giving rise to a ‘vicious cycle’ of VAD and infections.
Prevention Strategies to prevent Vitamin A Deficiency

- Improving diet
- Consumption of vitamin A -fortified foods
- Vitamin A supplementation programs
High-Dose Supplementation
Periodic, targeted high doses of vitamin A supplementation (VAS) to populations at risk is a proven, low-cost intervention.

Vitamin A Deficiency (VAD) : Prevention Strategies

- Vitamin A Supplementation Programs
- Fortified Foods
- Dietary Diversification

Consumption of Foods Rich in Vitamin A
Breastfeeding is included in this strategy - it is the first best source of vitamin A for infants.

Vitamin A fortification of staple foods such as oil, flour, milk powder or sugar is a cost-effective strategy.

* VAS = Vitamin A Supplementation
Vitamin A Supplementation

For Children: The WHO recommends periodic VAS in children 6 - 59 months only in populations at risk.

For Mothers: In regions where vitamin A deficiency is a severe public health problem as in East Africa, supplementation in pregnancy is recommended to avoid night blindness in mothers. However, country protocols should be consulted for guidelines on VAS.

Adequate nutrition through a balanced diet is recommended for mothers in the postpartum period, especially during breastfeeding.
Supplementation in MEASLES

Measles & Vitamin A
Measles, a viral infection, infects and damages epithelial tissues of the body. It can reduce vitamin A levels in the body.

Treatment
Studies have shown that vitamin A supplementation given in measles reduces morbidity due to the disease. Thus, the WHO recommends vitamin A to be given to all children with measles in vitamin A deficient areas.

<table>
<thead>
<tr>
<th>AGE</th>
<th>DOSE</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 6 months</td>
<td>50,000 IU</td>
<td>2 doses, 24 hours apart</td>
</tr>
<tr>
<td>6 months - 1 year</td>
<td>100,000 IU</td>
<td>2 doses, 24 hours apart</td>
</tr>
<tr>
<td>greater than 1 year</td>
<td>200,000 IU</td>
<td>2 doses, 24 hours apart</td>
</tr>
</tbody>
</table>
Xerophthalmia literally means ‘dry eyes’. It is the term that is used to describe the ocular (eye) manifestations of vitamin A deficiency. Signs include night blindness and Bitot’s spots.

In case of such symptoms and signs referral to health centre for treatment is necessary.
Iodine Deficiency
Instructions

• Please read through this Iodine information package and discuss amongst your group.
• You have 15 minutes to review this package.
• Answer the questions related to the specific micronutrient given in their manuals.
• At the end of the 15 minutes please move on to the next station till you have completed all four.
Iodine is important for the production of thyroid hormones. Thyroid hormones regulate many reactions within the body and are required for skeletal and central nervous system development in fetuses and infants.

• Seaweed is one of the best food sources of iodine, though depending on the species, iodine content is highly variable.

• Other good sources include fish, shrimp, and other seafood. Foods of marine origin usually have a higher content because iodine in sea-water becomes concentrated in marine life.

• Iodine is also present in vegetables (e.g. green peas, corn, beans) and fruits (e.g. dried prunes, strawberries, bananas).

• Few foods contain iodine naturally - of those that do iodine content is generally low. Iodine content varies depending on:
  o soil content
  o fertilizer use
  o irrigation practices
Strategies to Prevent Iodine Deficiency

- Consumption of iodized salt
- Iodine supplementation
CONTROL of Iodine Deficiency Disorders

There are two key global strategies to control iodine deficiency disorders:

**Salt Iodization**
Families and patients should be recommended to consume iodized salt only. Iodized salt should be kept away from heat to protect its iodine content.

**Supplementation**
Supplementation of vulnerable populations with iodine is an alternative strategy if salt iodization is not feasible.
Prevention Strategies

• WHO and UNICEF recommend iodine supplementation as a temporary strategy, when salt iodization is not possible.

• Iodine supplementation is particularly recommended for pregnant or lactating women, women of child-bearing age and children aged 0-24 months, in iodine-deficient regions.
Zinc Deficiency
Instructions

• Please read through this Zinc information package and discuss amongst your group.
• You have 15 minutes to review this package.
• Answer the questions related to the specific micronutrient given in their manuals.
• At the end of the 15 minutes please move on to the next station till you have completed all four.
Zinc is an important mineral for the body’s immune system, growth and development. Dietary diversification strategies, especially for households with predominant plant-based diets:

- Increase production and use of animal source foods (e.g. beef and poultry).
- Employ household phytate reducing techniques such as soaking cereals and legumes and leavening of grains.
- Encourage breastfeeding and complementary feeding as per WHO recommendations. Breastfeeding is sufficient for meeting an infant’s zinc requirements up to 6 months of age, after which appropriate complementary feeding should be initiated.
Dietary Zinc Sources

Dietary Sources of Zinc
Liver, beef, veal, lamb, pork, chicken, soy products and seeds, especially pumpkin and squash seeds.

Foods Inhibiting Absorption of Zinc
Whole grains, legumes, cereals and nuts are phytate-containing foods which inhibit zinc absorption. Non-heme iron intake can also reduce zinc absorption which is a cause of concern for individuals on iron supplementation.

People on phytate-rich diets might have zinc requirements up to 50% higher than the normal population.
Strategies to Prevent Zinc Deficiency

- Improving diet
- Zinc supplementation
- Zinc fortification
Zinc Therapy in Diarrhea

The World Health Organization and UNICEF recommend zinc supplementation for children under-5 to treat all forms of diarrhea.

- Oral Rehydration Salts (ORS) are given along with zinc. Both are essential and not a substitute for the other.

**Known Benefits**

Research has shown that zinc therapy reduces:

- diarrhea-related admissions to hospital by 23%
- duration of the episode (acute diarrhea by 10 hours and persistent diarrhea by 16 hours)
- diarrhea-related mortality
Vitamin D Deficiency
Instructions

• Please read through this Vitamin D information package and discuss amongst your group.
• You have 15 minutes to review this package.
• Answer the questions related to the specific micronutrient given in their manuals.
• At the end of the 15 minutes please move on to the next station till you have completed all four.
Vitamin D is an important micronutrient required for strong bones (by helping calcium absorption), muscle and nerve function, as well as helping the immune system.

**Endogenous Skin Synthesis**

Exposure of uncovered skin to sunlight leads to vitamin D synthesis in the skin.

**Dietary Sources of Vitamin D**

- Fish liver oils (e.g. cod and halibut)
- Fatty fish (e.g. salmon, tuna, sardine)
- Egg yolks
- Fortified foods (e.g. milk, cheese, cereals, margarine)
Vitamin D is synthesized by the skin when exposed to sunlight. Moreover it is also available in certain foods. Most commonly vitamin D deficiency can be due to:

- Inadequate exposure to sunlight – due to reduced outdoor exposure time, air pollution, skin coverings or sunscreen use
- Diet poor in vitamin D
- High amounts of melanin (skin pigment)
Vitamin D Deficiency: Vulnerable Groups

Pregnant and Lactating Females
Need vitamin D to ensure adequate stores in the baby and sufficient vitamin D in breast milk.

Neonates and Infants
Neonates are born with low vitamin D stores and the breast milk vitamin D content is dependent on the mother’s vitamin D status (which is often not adequate).

Older Adults (> 65 Year of Age)
Skin of older adults does not synthesize vitamin D as efficiently as that of younger people.

Inadequate Sun Exposure
Inadequate exposure to sun leads to inadequate synthesis of vitamin D.
Strategies to Prevent Vitamin D Deficiency

• Adequate exposure to sun
• Vitamin D-rich diet
• Vitamin D supplements
Vitamin D Deficiency Treatment

In many settings, vitamin D deficiency (and rickets in children) is treated with supplementation. However there is no global consensus on doses given to adults and children.