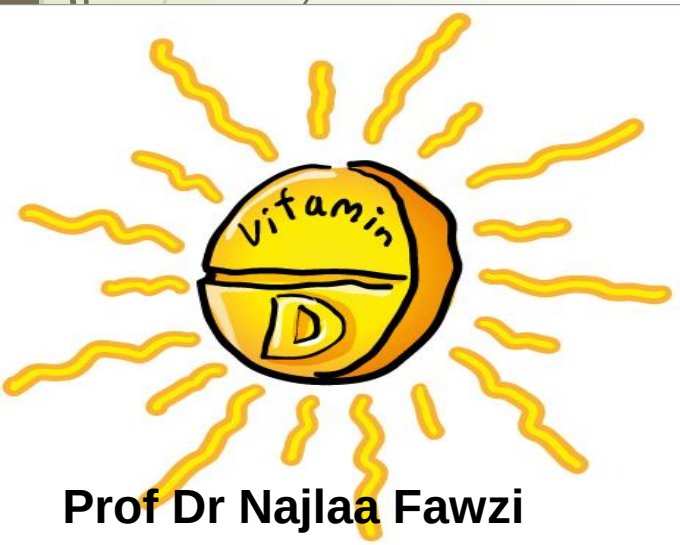
FAT soluble VITAMINS

D

E

A



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Vitamin D

VITAMIN D

Calciferol

- With the help of sunlight, vitamin D is synthesized by the body from a precursor derived from cholesterol.

- Vitamin D is therefore not an essential micronutrient, given the right season and enough time in the sun.

- The active from of vitamin D is actually a hormone that targets organs – most notably the intestines, kidneys, and bones.
  In the intestine, vitamin D is involved in the absorption of calcium and phosphorus.

- In the bone, it assists in the absorption of calcium and phosphorus, helping bones grow denser and stronger as they absorb and deposit these minerals.

Vitamin D is needed at times of rapid growth that is, in infants and young children, adolescents, and pregnant women.

Sources of vitamin D

a-The ultraviolet rays (UVRs) activate the pro vitamin (7-dehydrocholesterol) in the deep layers of the skin , but it can be filtered by air pollution and glass.

b- There are a few foods that are natural sources of vitamin D. These sources are oily fish, egg yolk, animal protein, beef, and mushrooms.

c- Fortified milk.

Bioavailability of vitamin D

There is very little information on the bioavailability of vitamin D. It is assumed that the food matrix has little effect on absorption. Bioavailability also varies among individuals and depends on the level of circulating vitamin-D-binding protein.

Risks related to inadequate or excess intake of vitamin D

- Inadequate exposure to sunlight is the primary risk factor for poor vitamin D status.
- The use of sunscreen, higher levels of melanin in skin (i.e., dark skin), skin coverings (clothes, veils).
- Time of day are factors that decrease exposure to UVB rays.

- **The distance from the equator is also a factor for UVB exposure; people living in latitudes above or below 40 degrees from the equator will be unable to form vitamin D from the skin precursor during the winter months.**

- **kidneys cannot convert vitamin D to its active form. As people age, their kidneys are less able to convert vitamin D to its active form, thus increasing their risk of vitamin D deficiency.**

- **Certain medical problems, including Crohn's disease, cystic fibrosis, and celiac disease, can affect intestine's ability to absorb vitamin D from the food person eat. digestive tract cannot adequately absorb vitamin D.**

- **Obesity :Vitamin D is extracted from the blood by fat cells, altering its release into the circulation.**

People with a body mass index of 30 or greater often have low blood levels of vitamin D.

- **Breast milk is a poor source of vitamin D. Children who are exclusively breastfed and have no or little sun exposure require vitamin D supplements to meet their vitamin D requirements.**

There have been some reports about vitamin D reducing the risk of COVID-19. But there is currently not enough evidence to support taking vitamin D to prevent or treat COVID-19.

Symptoms and Health Risks of Vitamin D Deficiency

Symptoms of bone pain and muscle weakness can mean person have a vitamin D deficiency.

However, for many people, the symptoms are subtle. Yet, even without symptoms, too little vitamin D can pose health risks. Low blood levels of the vitamin have been associated with the following:

- **Increased risk of death from cardiovascular disease**
- **Cognitive impairment in older adults**
- **Severe asthma in children**
- **Cancer**

Rickets is a systemic disease of the growing skeleton characterized by defective calcification of the bones during growth.

The term **osteomalacia** is applied to the same pathological condition when it affects a skeleton that has completed its growth

Research suggests that vitamin D could play a role in the prevention and treatment of a number of different conditions, including type1 and type 2 diabetes, hypertension, glucose intolerance, and multiple sclerosis.

SIGNS
You May Have a
VITAMIN D
DEFICIENCY

Top 10 Home Remedies

To explore more, visit

www.Top10HomeRemedies.com

Less sun => Less Vitamin D => Less Health

Less Sun

Less time outdoors

- Air Conditioning
- TV & internet & video games
- Live in smoggy cities
  or in suburbs with little walking
- Less work outdoors
- Fear skin cancer and wrinkles

Less sun when outdoors

- Sunscreen
- Protective clothing

Additional reasons at:
is.gd/lowvitamind

Henry Lahore 10/2015 VitaminDWiki
details at is.gd/sundisease

Less Health

ALS, Asthma, Autism, Breast Cancer, Cognitive Decline, Congestive Heart Failure, Cystic Fibrosis, Dental, Depression, Diabetes, Falls/fractures, Fibromyalgia, Kidney, Headache, Hypertension, Infection (anti-biotics), Influenza, Lupus, MS, Osteoarthritis, Osteopenia, Osteoporosis, RA, Rickets, Pain-Back, Parkinson's, Psorasis, Prostate Cancer, Pregnancy problems, Raynaud's, Tuberculosis, Ulcer -leg, Weight gain

Strong Proof
that increase in Vit D decreases incidence and/or treats

Allergy, Alzheimer's, Anemia, Bone, Cancers, Celiac, Chronic Fatigue, Chronic Pain, COPD, Fertility, Heart Disease, HIV, IBD, Metabolic Syndrome, MRSA, Myopathy, Sepsis, Thyroid

Associated
with low Vit D for most people with the disease

Acne, Ebola, Hearing, Liver, Rosecea, SAD, Shingles, Shin Splints, Suicide, Vision

Suspected
relationship with low Vitamin D

Ecological factors for Vitamin D deficiency:

- Biological
- Dietary
- Social
- Environmental

1- Biological factors

a- Order of the child: The later the child of an undernourished mother, the higher the probability of developing Vit. D deficiency.

b- Twins

c- Low birth weight

d- High parity will lead to osteomalacia

2-Dietary factors

a-Deficient intake of Vitamin D or calcium

b- Presence of phytic acid and oxalates in diet preventing calcium absorption.

c- Artificially fed babies

3- Social Factors

a-Poverty

b-Ignorance of mothers about proper feeding and rearing of children

c-Cultural factors as wrapping infants and preventing exposure to sunshine, and early marriages of girls who are still in need of dietary calcium.

d-Living in dumpier areas.

4- Environmental factors

a-Amount of sunshine and ultraviolet rays (UVRs). In cloudy and dusty atmosphere the UVRs are absorbed .

b- High prevalence in rural areas due to ignorance, poverty and unhealthful social habits

Tests for Vitamin D Deficiency

The most accurate way to measure how much vitamin D is in your body is the 25-hydroxy vitamin D blood test.

- **A level of 20 Nano grams/milliliter to 50 ng/mL is considered adequate for healthy people.**
- **A level less than 12 ng/mL indicates vitamin D deficiency.**

Treatment for Vitamin D Deficiency

Treatment for vitamin D deficiency involves getting more vitamin D through diet and supplements. Although there is no consent on vitamin D levels required for optimal health ,and it likely differs depending on age and health conditions.

- a concentration of less than 20 Nano-grams per milliliter is generally considered inadequate, requiring treatment.

Guidelines increased the recommended dietary allowance (RDA) of vitamin D to 600 international units (IU) for everyone ages 1-70, and raised it to 800 IU for adults older than age 70 to optimize bone health.

The safe upper limit was also raised to 4,000 IU.

Physicians may prescribe more than 4,000 IU to correct a vitamin D deficiency.

Prevention of vitamin D deficiency

- Health & nutrition education
- Socioeconomic development
- Prevention and control of air pollution.
- Enrichment of milk or baby formula with vitamin D.
- Vitamin D supplements for the high-risk groups.


VITAMIN
E

Vitamin E (α-Tocopherol)

- The most active form of vitamin E is α-tocopherol, which acts as an antioxidant
- Vitamin E protects cell membranes, proteins, and DNA from oxidation and thereby contributes to cellular health.
- It prevents oxidation of the polyunsaturated fatty acids and lipids in the cells.
- Vitamin E is stored in the liver and is safe even at high intake
- Vitamin E helps maintain healthy skin and eyes, and strengthen the body's natural defense against illness and infection (the immune system).

The primary sources of vitamin E

Vitamin E in the α-tocopherol form is found in edible vegetable oils, especially wheat germ, and sunflower oil. Other good sources of vitamin E are leafy green vegetables (i.e., spinach), nuts (almonds, peanuts) and avocados, sunflower seeds, mango and kiwifruit.

Bioavailability of vitamin E

Vitamin E is a fat-soluble nutrient. As such, absorption of this vitamin is enhanced in the presence of fat in a meal

Recommended Amounts

The Recommended Dietary Allowance (RDA) for vitamin E for males and females ages 14 years and older is 15 mg daily (or 22 international units, IU), including women who are pregnant. Lactating women need slightly more at 19 mg (28 IU) daily.

MYFOODDATA

Top 10 Foods Highest in Vitamin E

15mg of Vitamin E = 100% of the Daily Value (%DV)

1 Sunflower Seeds

49% DV (7.4mg) vitamin E
per 1oz handful

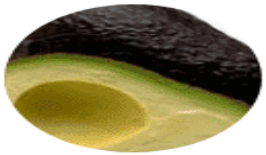
174% DV (26.1mg)
per 100 grams

2 Almonds

49% DV (7.3mg) vitamin E
per 1oz handful

171% DV (25.6mg)
per 100 grams

3 Avocados



28% DV (4.2mg) vitamin E
per avocado

14% DV (2.1mg)
per 100 grams

4 Spinach

25% DV (3.7mg) vitamin E
per cup cooked

14% DV (2.1mg)
per 100 grams

5 Butternut Squash

18% DV (2.6mg) vitamin E
per cup cooked

9% DV (1.3mg)
per 100 grams

6 Kiwifruit

18% DV (2.6mg) vitamin E
per cup

10% DV (1.5mg)
per 100 grams

7 Broccoli

15% DV (2.3mg) vitamin E
per cup cooked

10% DV (1.5mg)
per 100 grams

8 Trout

13% DV (2mg) vitamin E
per fillet

19% DV (2.8mg)
per 100 grams

9 Olive Oil

13% DV (1.9mg) vitamin E
per tablespoon

96% DV (14.4mg)
per 100 grams

10 Shrimp

12% DV (1.9mg) vitamin E
per 3oz (about 12 large shrimp)

15% DV (2.2mg)
per 100 grams

Signs of vitamin E Deficiency

Because vitamin E is found in a variety of foods and supplements, a deficiency is rare. People who have digestive disorders or do not absorb fat properly (e.g., pancreatitis, cystic fibrosis, celiac disease) can develop a vitamin E deficiency.

The following are common signs of a deficiency:

- ✓ **Retinopathy (damage to the retina of the eyes that can impair vision).**
- ✓ **Peripheral neuropathy (damage to the peripheral nerves, usually in the hands or feet, causing weakness or pain).**
- ✓ **Ataxia (loss of control of body movements)**
- ✓ **Decreased immune function**

Risks related to inadequate or excess intake of vitamin E

Individuals whose diets consist mostly of starchy staples – with inconsistent intake of edible oils or other vegetable sources of vitamin E – are at a higher risk of inadequate vitamin E intake.

Studies from Bangladesh link low vitamin E blood levels to an increased risk of miscarriage.

In other studies vitamin E supplementation has been successfully used for the treatment of non-alcoholic fatty liver disease, a condition widespread in overweight and obese people.

Excessive intake of vitamin E from food is very rare.


Vitamin A

Preformed vit A is available only in Foods of animal origin, rich sources of vit A

carotene – the pro vitamin A , which is a pigment in yellow and green plants that the body converts to vit A .

Vitamin A

Requirements: Retinol requirements are influenced by factors related to its

two basic forms in food sources

and its storage in the body, illness and GIT or hepatic defect

The established RDA standard for adults is 800 ug for women and 100 ug for men.

The units are currently measured in *retinol equivalents* (REs) , one RE is equal to 6µg of retinol and 6 ug of carotene.

FOOD SOURCES OF VITAMIN A

Bread, cereal ,rice, pasta: this food group is not an important source of vit A.

Vegetables	Quantity	Vitamin A (ug RE)
Carrots [raw]	1/2 cup	2379
Green beans	1/2 cup	102
Green peas	1/2cup	144
Spinach	1/2 cup	2187
Fruits		
Apricot [dried]	4 halves	490
Apricot [fresh]	3med	867
Banana	1med	69
Orange juice	1/2 cup	75
Water melon	1wedge	753
Meat, poultry, fish, eggs		
Egg, whole	1large	78

Milk, dairy products		
Cheddar cheese	28g	90
Milk, whole	1cup	101

الجدول للاطلاع فقط

CAUSES OF VITAMIN A DEFICIENCY

The major cause is diets which include few animal sources of pre-formed vitamin A.

In addition to dietary problems, there are other causes of vitamin A deficiency.

Iron deficiency can affect vitamin A uptake.

Secondary vit A deficiency occurs due to

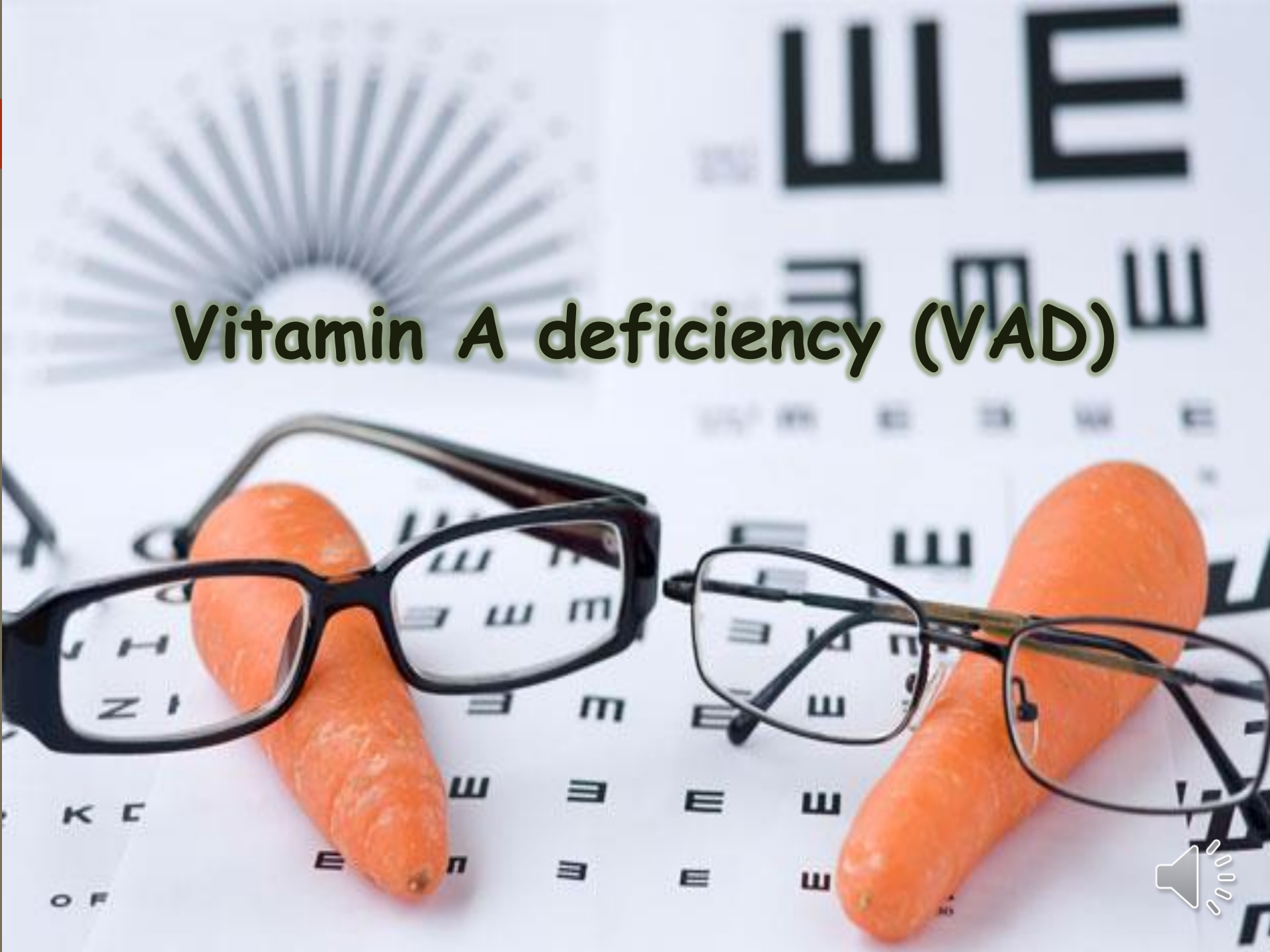
1- poor absorption due to lack of bile or defective absorbing surface

2- inadequate conversion of carotene because of liver disease(liver cirrhosis) or intestinal diseases.

Certain groups of people are more likely than others to have trouble getting enough vitamin A:

- Premature infants, who often have low levels of vitamin A in their first year.
- Infants, young children, pregnant women, and breastfeeding women in developing countries.
- People with cystic fibrosis.

Vitamin A deficiency (VAD)

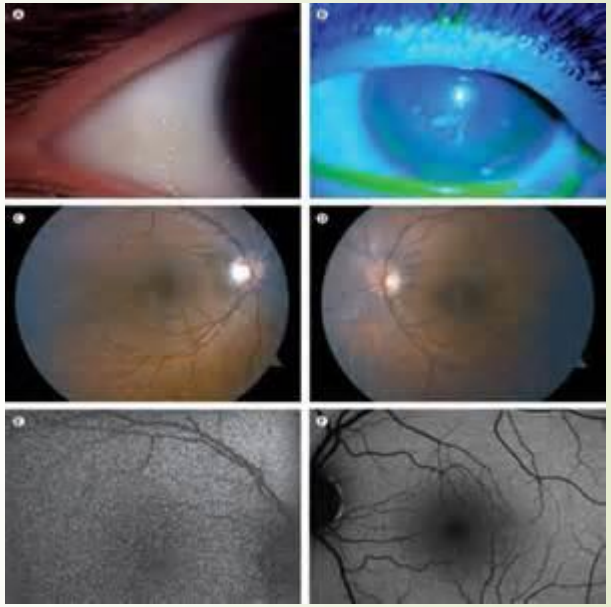


Vitamin A deficiency (VAD)

Deficiency of vitamin A is associated with significant morbidity and mortality from common childhood infections and is the world's leading preventable cause of childhood blindness, and increases the risk of disease and death from severe infections. In pregnant women VAD causes night blindness and may increase the risk of maternal mortality.

An estimated 250 million preschool children are vitamin A deficient and it is likely that in vitamin A deficient areas a substantial proportion of pregnant women is vitamin A deficient.

Severe vitamin A deficiency is associated with Xerophthalmia and ulceration of the cornea, a condition that can lead to total blindness.



Vitamin A is also involved in the function of the immune system and in maintaining epithelial surfaces.

A vitamin A deficient child faces a 25% greater risk of dying from a range of childhood ailments such as measles, malaria or diarrhoea

In fact, vitamin A supplementation was shown to reduce child mortality rates by 23% in areas with significant levels of vitamin A deficiency.

Vitamin A deficiency can be defined clinically or subclinical.

- **Xerophthalmia** is the clinical spectrum of ocular manifestations of vitamin A deficiency; these range from the milder stages of night blindness and Bitot spots to the potentially blinding stages of corneal xerosis, ulceration and necrosis (keratomalacia).

- The various stages of Xerophthalmia are regarded both as disorders and clinical indicators of vitamin A deficiency.

- **Night blindness** is one of the clinical signs of vitamin A deficiency, and is common during pregnancy in developing countries.

Retinol is the main circulating form of vitamin A in blood and plasma. Serum retinol levels reflect liver vitamin A stores when they are severely depleted or extremely high; however, between these extremes, plasma or serum retinol is homeostatically controlled and hence may not correlate well with vitamin A intake.

Therefore, serum retinol is best used for the assessment of subclinical vitamin A deficiency in a population (not in an individual).

Blood concentrations of retinol in plasma or serum are used to assess subclinical vitamin A deficiency.

- **A plasma or serum retinol concentration <0.70 µmol/L indicates subclinical vitamin A deficiency in children and adults**
- **a concentration of <0.35 µmol/L indicates severe vitamin A deficiency.**

Cut-off values for public health significance

Indicator	Prevalence cut-off values for public health significance
Serum or plasma retinol <0.70 µmol/L in preschool-age children	< 2%:No public health problem 2-9%:Mild public health problem 10-19%:Moderate public health problem ≥ 20%:Severe public health problem
Night blindness (XN) in pregnant women	≥ 5%:Moderate public health problem

vitamin A deficiency as a public health problem

Requiring intervention when at least one of two specifications is met:

1) The prevalence of low serum retinol is within the range specified and another biological indicator (including night blindness, breast milk retinol, relative dose response, modified dose response, or conjunctival impression cytology),also indicates widespread deficiency; and/or

2) The prevalence of low serum retinol indicates widespread deficiency and at least four demographic and ecologic risk factors are met, including:

1-infant mortality rate higher than 75/1000 live births and under-5-year mortality rate of higher than 100/1000 live births.

2-full immunization coverage in less than 50% of children at 12-23 months of age.

3- less than 50% prevalence of breastfeeding in6-month-old infants.

4-median dietary intake lower than 50% of recommended safe level of intake among75% of children 1-6 years of age.

5-two-week period prevalence of Diarrhea 20% or higher.

6-measles case fatality rate 1% or higher.

7-no formal schooling for 50% or more of women 15-44 years of age.

8-less than 50% of households with a safe water source.

Assessment of serum retinol permits both the monitoring of trends of vitamin A deficiency as well as the evaluation of the impact of interventions.

Adequate vitamin A intake increases the chances of survival, reduces severity of childhood illnesses, and thereby eases the strain on health systems and hospitals

Improving the vitamin A status of pregnant women may reduce their risk of dying during pregnancy and childbirth, improves their resistance to infection, and helps reduce anemia.

PREVENTION

To successfully fighting VAD, short-term interventions and proper infant feeding must be backed up by long-term sustainable solutions.

The collection of nutritional “well-being weapons” includes a combination of breastfeeding and vitamin A supplementation, coupled with long-term solutions, such as promotion of vitamin A-rich diets and food fortification.

Strategies to Control VAD

- **Promote vitamin A-rich foods (fruits, vegetables, red palm oil).**
- **Give infants and women low-dose iron supplements according to WHO protocols.**
- **Improve food security.**
- **Encouraging of breast feeding and feed children properly.**
- **Prevent disease such diarrheal diseases and treat disease early.**
- **Measles immunization**
- **Fortify foods.**
- **Environmental sanitation and personal hygiene.**

Since breast milk is a natural source of vitamin A, promoting breastfeeding is the best way to protect babies from VAD.

For deficient children, the periodic supply of high-dose vitamin A in swift, simple, low-cost, high-benefit interventions

Food fortification takes over where supplementation leaves off.6m -6y
Food fortification, for example sugar in Guatemala, maintains vitamin A status, especially for high-risk groups and needy families. Changing feeding habits of people and mothers nutritional education

Vitamin A Supplements

Infants< 6-12 months of age only if not breastfed (breast fed children in this group should be protected by post partum supplementation of their mothers.)	50,000 IU orally
Infants 6-12 months of age	100,000 IU orally, every 4-6 months
Children> 12 months of age	200,000 IU orally, every 4-6 months
Mothers (post-partum, lactating)	200,000 IU orally within 8 wks of delivery

Q -1 : Man his total energy requirements is 2450 Cal/day . He is 75 years old.
How many Cal /day he can obtain from protein

Q-2: list the risk factors for Marasmus

Q-3: Who are the people may be at need for Vitamin supplements.