

# Strategy of Government of India to Provide Vitamin-A to Infants

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**Abstract:** Vitamines are organic molecules that are essential to an organism in small quantities for proper metabolic function. Vitamines have different jobs to help keep the body working properly. Some vitamines help you resist infections and keep your nerves healthy, while others may help your body get energy from food. ‘Casimir Funk’ is considered the father of vitamin therapy. Vitamin-A is a group of vital micronutrients widely present in the human diet. Vitamin -A plays a key role in correct functioning of multiple physiological functions. Vitamin -A deficiency (VAD) is a major nutritional concern in poor societies, especially in India. Retinoides is a natural and synthetic forms of vitamin-A. Retinol, Retinal and Retinoic acid are termed as vitamers of Vitamin-A.

Vitamin-A is vital to child health and immune function, hence in settings where Vitamin-A deficiency is a public health problem, Vitamin-A supplementation is recommended in infants as a public health intervention to reduce child mortality and morbidity. Supplementation with vitamin-A is safe, cost-effective and efficient means for eliminating deficiency of this vitamin and improving child survival. The majority of countries where Vitamin-A deficiency (VAD) is known to be serve public health problem have policies supporting the distribution of Vitamin-A.

## I. INTRODUCTION

The term Vitamin was derived from “Vitamine” a compound word coined in 1912 by the biochemist Casimir Funk, while working at Lister institute of preventive medicine. Chemical name of Vitamin-A is Retinol. Vitamin plays important role in the correct functioning of multiple physiological functions. Animal based products are rich source of the retinyl ester form of the vitamin, while vegetables and fruits contain Carotenoids. Vitamin-A is fat soluble vitamin, present only in food of animal origin. It’s provitamin Carotines are found in plants. This occurs in two forms, as Retinol in animal foods and as b-carotene in

plant food. Vitamin-A deficiency (VAD) is major nutritional concern in poor societies, especially in India.

Vitamin-A is globally essential nutrient belonging to the group of fat soluble vitamins that was first described in 1913 in a study of animal fed with ethereal egg or butter extract. Vitamin-A is fat soluble vitamin, recommended daily allowance for children. World Health Organization (WHO) also recommends, supplementations approaches in children between 6 – 59 months.

Vitamin-A is a general term encompassing various fat-soluble substances such as retinol, retinyl palmitate and beta- carotene. It’s various metabolites are essential for vision, cellular differentiation, epithelial barrier function. Vitamin-A is important for normal vision, the immune system, reproduction, growth and development. Vitamin-A also helps your heart, lungs, and other organs work properly. Vitamin-A can be stored in the liver, therefore, it is recommended to give high- dose Vitamin-A once every 4-6 months to prevent Vitamin-A deficiency. For safety, the minimum interval between doses should be one month.

## II. CONCEPT

Vitamin-A is lipophilic molecule, it’s structure was first elucidated by Paul Karrer in 1931 from fish liver oil. The term Vitamin-A is generic term for Retinol and it’s active metabolites, such as the Retinal and Retinoic acid.

Retinyl esters and Carotenoids are also considered Vitamin-A forms. The term Vitamin-A is often used in loosest possible sense to mean a collection of molecule with a similar biological activity based on the parent compound Retinal. They are monocyclic diterpenes

and the family of compound is often called the Retenoides.

The most commercially relevant derivative is Vitamin-A acetate, due to its higher stability and it is produced worldwide on a scale of greater than 7500 tons per year. It is used in supplements for humans and in animals feed to ensure a healthy life.

Vitamin-A (Performed and Provitamin)

1)Retinoides- Natural and Synthetic forms of Vitamin-A.

2)Performed- Three performed compounds that are metabolically active and found in animal products.

a) Retinol- (Alcohol form)

It is present in animal tissues as retinyl ester with long chain fatty acid.

b) Retinal / Retinaldehyde- (Aldehyde form)

It is obtained by oxidation of Retinol. Retinal and Retinol are interconvertible.

c)Retinoic acid- (Acid form)

It is produced by oxidation of Retinal.

3)Provitamin- Carotenoids (Beta carotene)

It can yield two Retinols when metabolized in the body.

Beta carotene found in plants and has two beta ionone rings connected by a polyprenoid chain.

Vitamin-A includes a group of fat soluble that are involved in growth and differentiation of various body cells.

These includes cells of the respiratory epithelium, gastrointestinal tract, retina and immune system. Vitamin-A has been termed as an anti- infectious vitamin because of its role in regulating human immune function. We evaluated all the available evidence on impact of Vitamin-A supplementation in reducing infants and childhood mortality. Preterm infants have low liver stores of Vitamin-A at birth and their plasma concentration of retinol often remain low throughout the first year of life. Preterm infants with Vitamin-A deficiency have a higher risk of eye and

chronic lung diseases. So it is essential Vitamin-A intake to infant need for the first 6 months.

### III.HISTORICAL BACKGROUND

The Vitamines originates from biochemist Casimir Funk, who stated that deficiency disease can be prevented and cured by the addition of certain substances to the diet, which is called Vitamines. Later it was discovered by Elmer McCollum and others that Vitamines were not just one compound, but a collection of compound and McCollum first introduced letters to differentiate between them. In total 13 compounds were identified, starting in 1912 with what is now known as Vitamin B1(Thiamine), culminating in the discovery of vitamin B9(Folic acid) in 1941. Vitamin-A(Retinol) was first discovered in 1916. Paul Karrer described the chemical structure of Vitamin-A in 1932. Harry Holmes and Ruth Corbet isolated and crystallized vitamin-A in 1937.

Methods for synthesis of Vitamin-A came with the work of David Adriaan van Drop and Jozef Ferdinand Arens in 1946 and Otto Isler and colleagues in 1947.

In 1912, Casimir Funk originally coined the term Vitamine. The major period of discovery began in the early nineteenth century and ended at the mid-twentieth century. The puzzle of each vitamin was solved through the work and contributions of epidemiologists, physicians, physiologists and chemists. Although the availability of Vitamin-A through food fortification and medicinal supplements virtually eliminated ocular Vitamin-A

deficiency from developed countries by the second half of the 20th century, Vitamin-A deficiency remains a serious problem in developing countries as indicated by global surveys beginning in the 1960s. Millions of children were shown to be Vitamin-A deficient, with resultant blindness and increased child mortality.

Beginning in the 1960s, interventions trials showed that Vitamin-A deficiency disorders could be prevented in developing countries with periodic Vitamin-A dosing, and in the 1980s and 1990s, large randomized, double-blind, placebo- controlled clinical trials demonstrated the marked efficiency of Vitamin-A supplementation in reducing child mortality.

#### IV.APPLICATIONS

Vitamin-A and Retinoic acid play a central role in the development and differentiation of white blood cells, such as lymphocytes which play critical role in the immune response. Through collaborative efforts with partners the United Nations Children Fund (UNICEF) plays a lead role in supporting countries to reach children aged 6-59 months with two appropriately spaced high doses Vitamin-A supplements each year.

Vitamin-A helps boost immunity and protects children under five from preventable diseases and mortality. Vitamin-A supplementation may be required in infants and children with liver diseases or short bowel syndrome due to the malabsorption of fat soluble vitamins.

Vitamin-A may have benefits for preterm infants in the prevention of chronic lung disease, enterocolitis.

A meta analysis of relatively high dose Vitamin-A supplementation in infants nearly about 1500g concluded

that the incidence of oxygen requirement by 36 weeks corrected age was reduced, and there was trend towards reductions of retinopathy and sepsis.

Role of Government, Various scheme and effective implementation of the scheme for Socio- Economic Welfare of the Society-Under the national programme in India, Six monthly administration of mega doses of Vitamin-A to 6-59

months old children has been implemented to prevent particularly blindness due to Vitamin- A deficiency and to control hypovitaminosis A. Under this strategy, every infant 6-11 months and children 1-5 years is to be administered Vitamin-A every 6 months.

-Presently Vitamin-A supplementation (VAS) is implemented through the existing network of primary health centers and sub- centers. Accordingly, each child was to receive five doses of Vitamin-A before her/his third birthday.

-In view of operational feasibility, the administration of first dose at Vitamin-A was linked to measles immunization.

Research also established that two cents worth of Vitamin-A given to children every six months, could

reduce child mortality in many countries by over one third.

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