International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-39, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

National Vitamin A Prophylaxis Programme: Should be continued, stopped or targeted

Ms. Neha Sharma
MSc. Research Scholar
Department of Foods & Nutrition, Faculty of Family and Community Science
Maharaja Sayajirao University of Baroda

ABSTRACT: Vitamin A is an essential nutrient needed for normal functioning of visual, immune and reproductive system; growth and development & maintenance of cellular epithelial integrity. Clinically, its deficiencies can be seen as xeropthalmia (severe form) night blindness, bitot spot, keratomalacia and other ocular manifestations), keratinization in skin, retarded growth of bones & impaired reproductive system. In public health deficiency is mainly seen clinically in the form of xerophthalmia (severe) or subclinical form especially among young children with others infections, due to increased nutrient requirements for growth. To prevent this deficiency Government of India had started to provide Vitamin A supplementation under the Vitamin A Prophylaxis Programme with a certain dose and schedule. As the time passes, a remarkable change has been observed in the prevalence, incidence, form (clinical to subclinical) of the deficiency disease, which bring many controversies over vitamin A Prophylaxis Programme with regard to its doses, schedule, beneficiaries and marker. This puts a question on the Programme whether it should be revised, continued or stopped.

KEYWORDS: Bitot spot, Contoversies, Night blindness, Prophylaxis Programme, Vitamin A deficiency, Vitamin A supplementation, Xeropthalmia.

BACKGROUND

In India from 1910s to the 1960s there was a huge prevalence of undernutrition, micronutrient deficiencies and childhood mortality (Gopalan C., 1999). In this line, there was a significantly high prevalence of VADs in the form of xeropthalmic blindness especially among young children (0 - 3yrs) i.e. >0.5%, which was enough to call it as severe public health issue (WHO, 2009). In response to this, India has started the National Prophylaxis Programme for Nutritional Blindness [NPPNB] due to Vitamin A Deficiency in 1970 as 100% fully centrally sponsored scheme to prevent xeropthalmic blindness and reduce the prevalance of xerophthalmia and possibly to reduce the under 5 child mortality. But presently, the xeropthalmic night blindness among young children has disappeared and there is reduced prevalence of clinical VAD only in particular geographic areas and socioeconomic groups (Kapil U. & Sachdev H.P.S., 2013). Also, the major causes of child mortality are injuries, diarrhoea, respiratory infections and low birth weight which are not directly related to Vit A deficiency but may be related to subclinical VAD. (SRS, 2019). Additionally, it can't be neglected that diet of Indian children are extremely poor in Vitamin A (only 5% of children 2–4 years consumed vitamin A-rich fruits and vegetables (CNNS, 2019). So, with relation to many evidences including the above two, there are many controversies over vitamin A Prophylaxis Programme whether it should be revised, continued or stopped.

Evolution of Vit A supplementation Programme & its Prevalence

National vitamin A prophylaxis programme was started in 1970 by Ministry of Women & Child Development, GoI as fully central sponsored scheme to prevent xeropthalmic blindness. That time this clinical condition is regarded as both public health issue and a marker for VAD (WHO, 2009). This Programme was a remedial measure over the high prevalence of xeropthalmic blindness and bitot spot during 1940s to 1960s i.e >1.8% in preschoolers (Sareen N. & Kapil U., 2016).

This Programme was first initiated in 11 states and later, after the studies by NIN in 1976, it was extended to all the states and become a universal Programme.

Under this the children of age from 9-36 months were administered by the 5 massive dose of synthetic vitamin A before his 3rd birthday [6-11 months - 1 lakh IU of Vit A and in 12-36 months one dose of 2 lakh IU of Vit A every 6 months]. Then in 2006, the

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-39, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

targeted group was revised as children (9-59 months), as per the recommendation of WHO, UNICEF and Ministry of Women &Child Development.

Presently, the same 9 massive doses have been administered from 6 months to 5 years in a campaign mode, implemented through primary health centres and ICDS under National Health Mission.

Prevention of Nutritional Blindness & VAD

Prevention of VAD and nutritional blindness can be achieved by comprehensive strategy which can simultaneously address the following;

- Nutrition Education through National Programmes (ICDS, CSSM, etc.), Research Institutes, NGOs, Home Science Colleges and private sectors
- Nutrient Supplementation through Prophylaxis programmes
- Horticultural Interventions and Home Gardening of Protein & Vit A rich food
- Fortification of maximum and commonly consumed product with Vit A
- Prevention of Infection
- Biofortification like Golden rice

NATIONAL VITAMIN A PROPHYLAXIS PROGRAMME

Under this programme, preventive dosages are administered to all children aged 9 months to 5 years.

Dose & Regime: Total 9 doses till five years of age. (Table 1)

Age	Dose	Quantity
9 months	100000 I.U.	1ml
1-5 years	200000 I.U.	2ml

Source: nhm.gov.in (National Health Mission), 2024

Statistics of prevention of Nutritional Blindness through VAS - There is a decline from 1.8% in 1975 to 0.2 % in 2012 in the nutritional blindness & prevalence of Bitot's spot among preschoolers as reported in by the NNMB surveys conducted from 1975-2012. Supporting this, other reports conclude the low prevalence of sub clinical VAD (17.6%) and Bitot's spot (0.3%) in preschoolers in contrast to a high prevalence of Bitot's spot (1.5%) (NNMB, 2012) and sub clinical VAD (21.5%) in children aged 5-10 yrs (CNNS, 2019). This decrease is due to the significant improvement in coverage (71.2%) of Vitamin A supplementation in children 9-36 months (NFHS 5, 2019-2021)

Also, the prevalence of blindness in all age group was reported as 0.36% and surprisingly its major causes filed were cataracts, refractive errors and negligible % were contributed by nutritional blindness (National Blindness and Visual Impairment Survey India 2015-2019).

Statistics of prevention in U5MR through VAS - In India there was a gradual decline in U5MR from 191 in 1970 to 29 in 2022, and in IMR from 80 (1991) to 35.2 (2021), where VAS Programme also played its significant role (World Bank Data, 2022) (NFHS 5, 2021). The Massive dose of Vitamin A supplementation Programme was grounded on the claim that it would reduce childhood mortality by 24% and it did the same according to a meta analysis of 17 trials of which 8 in India (Mayo Wilson E., etal, 2011). According to the updated data, VAS brought 12% reduction in overall mortality; where it has no effect on mortality due to meningitis, respiratory disease and measles (Imdad A. etal, 2022).

Current status of Vitamin A Deficiency & Vitamin A supplementation

Clinical VAD have declined drastically during last 15 decades. Presently the xeropthalmic blindness has disappeared and there is very low prevalence of clinical VAD and that also in a particular group. In 2000, ICMR surveyed the 16 districts in all 5 regions and reported only 3 districts out of 16 had a prevalence of bitot spot of >0.5% (cut off to define public health issue) and those 3 districts were either draught prone (Bikaner) or had poor socioeconomic development (Patna and Gaya) (Toteja G. etal, 2002). Currently, it is assumed to be prevalent mainly in tribal population, urban slums, regions of north east and south east India (Arlappa N., 2023)

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-39, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

This declination is due to.

- Significant interventions in the field of child health which improves the status of child health.
- Massive Dose of Vit A supplementation Programme coverage have increased to 60% in 2016.
- Prevalence of undernutrition had reduced gradually from 1975.
- Immunization coverage for vaccination preventing diseases has improved and covered almost 80%.
- Improvement in health infrastructure & health facilities reduces the morbidities & mortality rates.
- Food availability and accessibility has increased.
- ICDS providing supplementary nutrition & other services covered 80% of population(rural)

But, replacing the clinical form, currently India is facing VADs in its subclinical form with its prevalence of 17.6% among children (CNNS, 2019). At this declined clinical VAD and its prevalence only in some pockets of areas and its subclinical deficiency, India is giving the same massive dose of Vitamin A irrespective of nutrition status of children which is not beneficial for non Vitamin A deficient children but can be toxic and may have negative impacts.

Controversies

There are many controversies over Vitamin A Prophylaxis Programme as shown in Fig. 1

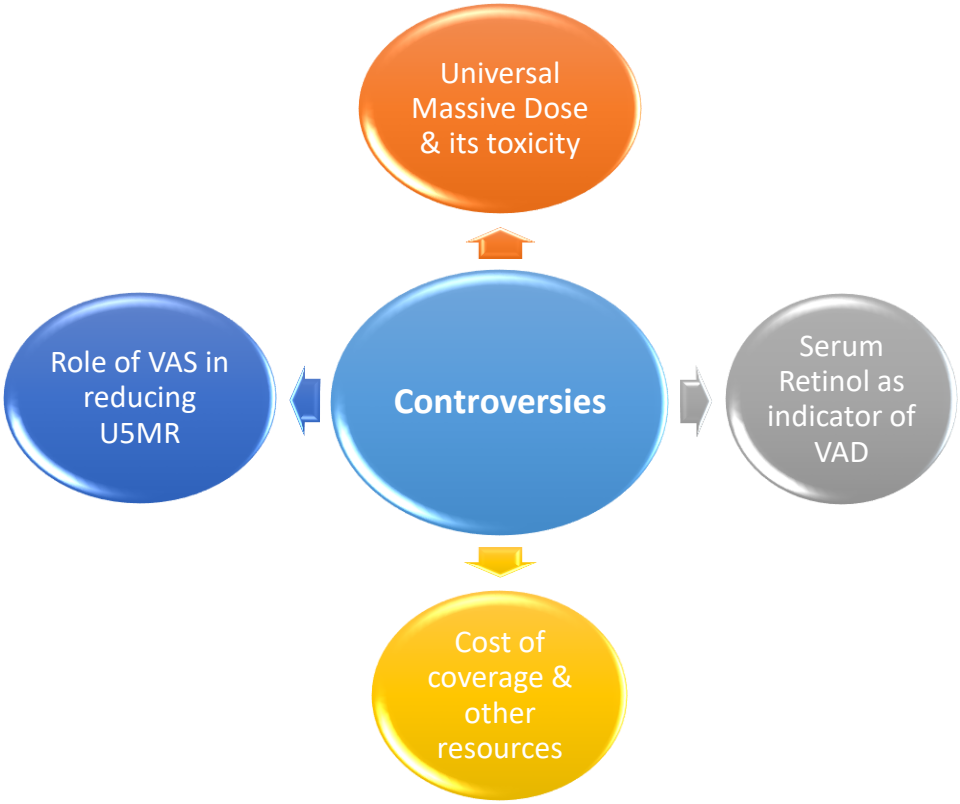

Fig.1: Controversies over Vitamin A Prophylaxis Programme

1. **Controversies over massive dose & declination of clinical VAD**

Vitamin A Prophylaxis Programme have provision of such massive doses to reduce the high prevalence of xeropthalmic blindness (>1.8%) which was then (in 1940 to 1970) prevalent in children of all geographic area & socio-economic groups. Secondly, it was reducing U5MR by 24% that time because of high prevalence of under nutrition and pathetic condition of food and health systems. BUT

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-39, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

Now with the low prevalence of clinical VAD & that too only in draught prone or poor socio-economic areas like tribal areas. At this time when night blindness, for which programme has conducted, is even not used as marker of VAD, giving mega doses irrespective of nutrition status of children is not at all beneficial instead toxic. According to the Expert Committee, Vitamin A supplementation along with fortification in milk and oil would result in hypervitaminosis but presently no such evidence is found to support this rationale except some, where overdoses has been administered within short period of time & are 10 times the RDA (Olson JM. etal, 2021)(Penniston KL& Tanumihardjo SA, 2006). If this is seen technically, TUL (Tolerable Upper Limit) for Vitamin A is 3000 mcg/d (approx 10,000 IU/d), whereas the massive dose of 2 lakhs IU per 6 months provide only 300mcg/d (approx 1100 IU/d), therefore, there is no chance of hypervitaminosis. (RDA, 2020)

2. Controversies over serum Retinol as an indicator

With transit in VADs from clinical to subclinical form, serum Retinol has been advocated and is used as marker of VADs now which is best use to assess subclinical Vit A Deficiency by WHO. (WHO, 2009)

BUT

Serum Retinol is questioned as feasible and valid indicator to asses Vitamin A Deficiency as it requires collection of blood samples of children, sophisticated laboratories and high cost equipments and trained personnel. Also serum retinol not merely depends on vitamin A stores, but decreases with low protein intake and iron deficiency (Oliveira J.M., 2008). Synthesis of Retinol Binding Protein depends on Zn, Fe & Biotin (Christian P. & West P.K., 1998). Thus, it can't give the reliable Vit A deficiency status.

There are many reports showing higher VADs based on Serum Retinol Estimation [SR] which do not provide the true burden of VADs as per other reports while analyzing the previous ones (Suri D.J. etal, 2021)(Aralappa N. etal, 2008,2010)

A report documented 61% of VAD in children in West Bengal estimated by SR but not adjusted to CRP levels which shows subclinical infections. (Kapil U. & Sachdev H.P.S., 2013). Also as SR level is affected by many factors, it overestimates the burden of VAD, which in turn ask for Vit A Prophylaxis Programme.

3. Controversies over its role in reducing U5MR.

REDUCED U5MR DURING 1970s ore 1980s v/s NO ROLE IN REDUCING PRESENT U5MR.

Although VAS has reduced U5MR by 24% in 1970s, with a decrease in U5MR from U5MR from 191 in 1970 to 29 in 2022, and in IMR from 80 (1991) to 35.2 (2021), where VAS Programme also played its significant role (World Bank Data, 2022) (NFHS 5, 2021). Also, a report in Cochrane data base system showed a positive role of VAS in reducing U5MR but the next report of the same finds only 1 significant reduction (54%) in child mortality out of 4 trials. A meta analysis of 17 trials for mortality indicated positive role of vitamin A in reducing mortality (Imdad A. etal, 2022) but when only Indian trials are considered, there was no mortality benefit (Gupta P & Indrayan A., 2002).

4. Controversies over cost of coverage and other resources.

Acc. to recent report of cost analysis of national Vit A prophylaxis programme in various countries, a huge amount has been spent for Under 5 children and that too in India (MOST, USAID Micronutrient Program, 2004). Looking at the current scenario of prevalence (i.e. low) of VAD and the rationale provided by the Expert Committee, a large portion of this expenditure is considered waste as undertaken for questionable benefits of VAS to non deficient children. It is like wasting the huge amount of money to make children more toxic.

CONCLUSION & OPINION

Going through with all the different reviews and evidences mentioned above, we can say that there is a need of targeting Vitamin A supplementation for vulnerable groups like tribal population, urban slums and backward areas; and for others a food based approach should be there, as sustainable & cost effective solution. We can support it by many evidences :-

- Although WHO issued guidelines; provide global evidence based recommendations on the use of VAS in reducing mortality & morbidity. (WHO, 2011) Under this supplementation to 6-59 months children is recommended but in India (as per above evidences of mortality) the mechanism by which Vit A reduce mortality is not clear & understood. Also, there is high prevalence of subclinical Vit A deficiency i.e., 17.5% in (1-4yrs) and 21.5%. in (5-9 yrs) according to CNNS 2016-2018 which is higher than the cut off to define public health issue.

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-39, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

- In addition to this, VAS now becoming uneconomical as most of the children are not benefitted by it instead getting toxic. This money can be used for the generating & strengthening of food based approach for the non deficient & subclinical deficient children.
- With this the situation of COVID increased the micronutrient deficiencies and the U-5 mortality, hunger and undernutrition among various age groups including children, needs VAS rather stopping this programme

Also, it is important for MoHFW to surveillance and appraises the ground realities of vitamin A status among children under 5 and to carry study with more sensitive biomarkers like relative dose response test; before revising or taking any decision regarding existing vitamin A supplementation policy.

So, keeping all the above points in mind, the triple A [Assessment, Analysis and action] Strategy should be adopted and then action should be taken as an targeted approach rather universal approach or stop this programme for VAD children.

Food based approach including local production & consumption of Vitamin A rich food, fortified foods, improving dietary habits and physical activity and including nutrition in food systems for non deficient population & subclinical VAD.

Abbreviation

CNNS – Comprehensive National Nutrition Survey
CRP – C Reactive Protein
GoI – Government of India
ICDS – Integrated Child Development Services
IMR – Infant Mortality Rate
IU – International Unit
MoHFW – Ministry of Health and Family Welfare
NFHS – National Family Health Survey
RDA – Recommended dietary Allowance
SR – Serum Retinol
TUL – Tolerable Upper Limit
U5MR – Under 5 Mortality Rate
VAD – Vitamin A Deficiency
VAS – Vitamin A Supplementation
Vit A – Vitamin A
WHO – World Health Organisation

REFERENCES

1. Arlappa N, Balakrishna N, Laxmaiah A, Nair KM, Brahmam GN., 2010. Prevalence of clinical and sub-clinical vitamin A deficiency among rural preschool children of West Bengal, India. *Indian Pediatr.* ;48:47–9
2. Arlappa N, Laxmaiah A, Balakrishna N, Harikumar K, Brahmam GNV. Clinical and sub-clinical vitamin A deficiency among rural pre-school children of Maharashtra. *Ann Hum Biol.* 2008;35:606–14.
3. Arlappa, N., 2023Vitamin A supplementation policy: A shift from universal to geographical targeted approach in India considered detrimental to health and nutritional status of under 5 years children. *Eur J Clin Nutr* **77**, 1–6 . https://doi.org/10.1038/s41430-022-01122-5
4. Cause of Death Statistics, 2019. Office of the Registrar General, India Ministry of Home Affairs Vital Statistics Division. Sample Registration System Section. West Block-1, R K Puram New Delhi-110066
5. Christian P, West PK. Interaction between zinc and vitamin A. *Am J Clin Nutr.* 1998;68(Suppl 2):4355–415.
6. Comprehensive National Nutrition Survey (CNNS) National Report, 2019. Ministry of Health and Family Welfare (MoHFW), Government of India, UNICEF and Population Council. New Delhi.
7. Gopalan C., 1999. The changing epidemiology of malnutrition in a developing society. The effect of unforseen factors. NFI Bulletin.

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-39, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

8. Gupta P, Indrayan A., 2002. Effect of vitamin A supplementation on childhood morbidity and mortality: critical review of Indian studies. *Indian Pediatr.*;39:1099–118.
9. Imdad A, Mayo-Wilson E, Haykal MR, Regan A, Sidhu J, Smith A, Bhutta ZA., 2022 Vitamin A supplementation for preventing morbidity and mortality in children from six months to five years of age. Cochrane Database System Rev. 3(3):CD008524. doi: 10.1002/14651858.CD008524.pub4. PMID: 35294044; PMCID: PMC8925277.
10. Kapil U, Sachdev H.P., 2013. Massive dose vitamin A programme in India--need for a targeted approach. Indian J Med Res, 138(3):411-7. PMID: 24135191; PMCID: PMC3818610.
11. Mayo-Wilson E, Imdad A, Herzer K, Yakoob MY, Bhutta ZA., 2011. Vitamin A supplements for preventing mortality, illness, and blindness in children aged under 5: systematic review and meta-analysis. BMJ.;343:d5094. doi: 10.1136/bmj.d5094. PMID: 21868478; PMCID: PMC3162042.
12. MOST, USAID Micronutrient Program, 2004. Cost Analysis of the National Vitamin A Supplementation Program in Zambia. Arlington, Virginia, USA
13. National Blindness and Visual Impairment Survey India 2015-2019. National Programme for Control of Blindness & Visual Impairment, Directorate General of Health Services, MoHFW, GoI, New Delhi.
14. National Family Health Survey (NFHS-5), 2019- 21. Government of India Ministry of Health and Family Welfare COMPENDIUM OF FACT SHEETS INDIA AND 14 STATES/UTs (Phase-II)
15. NATIONAL NUTRITION MONITORING BUREAU, 2012 Diet and Nutritional Status of Rural Population, Prevalence of Hypertension & Diabetes among Adults and Infant & Young Child Feeding Practices -Report of Third Repeat Survey. NATIONAL INSTITUTE OF NUTRITION Indian Council of Medical Research Hyderabad - 500 007. INDIA.
16. National Vitamin A Prophylaxis Programme, National Health Portal of India. Ministry of Health & Family Welfare, Department of Family Welfare. GoI, 2024
17. nhm.gov.in (National Health Mission), 2024
18. Oliveira J.M. Michelazzo F. & Stefanello J. & Rondó, P.H.C., 2008. Influence of iron on vitamin A nutritional status. Nutrition reviews. 66. 141-7. 10.1111/j.1753-4887.2008.00018.x.
19. Olson JM, Ameer MA, Goyal A, 2021. Vitamin A Toxicity. [Updated 2021 Aug 14]. In: Stat Pearls Treasure Island (FL): Stat Pearls Publishing
20. Penniston KL, Tanumihardjo SA., 2006. The acute and chronic toxic effects of vitamin A. Am J Clin Nutr.;83:191–201.
21. Sareen N & Kapil U, 2016. Controversies Continue: Universal Supplementation of Megadose of Vitamin A to Young Children in India. Indian Journal of Community Medicine. 41. 89. 10.4103/0970-0218.177515.
22. Suri DJ, Wirth JP, Adu-Afarwuah S, Petry N, Rohner F, Sheftel J, Tanumihardjo SA., 2021. Inflammation Adjustments to Serum Retinol and Retinol-Binding Protein Improve Specificity but Reduce Sensitivity when Estimating Vitamin A Deficiency Compared with the Modified Relative Dose-Response Test in Ghanaian Children. Curr Dev Nutr.;5(8):nzab098. doi: 10.1093/cdn/nzab098. PMID: 34386690; PMCID: PMC8352745.
23. Toteja, G & Singh, Padam & Dhillon, Bhupinder & Saxena, Neeti. (2002). Vitamin A deficiency disorders in 16 districts of India. Indian journal of pediatrics. 69. 603-5. 10.1007/BF02722689.
24. WHO, 2009. Source of data. WHO. Vitamin and Mineral Nutrition Information System (VMNIS). Micronutrients database. (https://www.who.int/data/nutrition/nlis/info/vitamin-a-deficiency)
25. WHO, 2011. Guideline: Vitamin A supplementation in infants and children 6–59 months of age. Geneva, World Health Organization.
26. World Bank Data, 2022. UN Inter-agency Group for Child Mortality Estimation (UNICEF, WHO, World Bank, UN DESA Population Division) https://data.worldbank.org/indicator/SP.DYN.IMRT.IN

Cite this Article: Sharma, N. (2025). National Vitamin A Prophylaxis Programme: Should be continued, stopped or targeted. International Journal of Current Science Research and Review, 8(3), pp. 1341-1346. DOI: https://doi.org/10.47191/ijcsrr/V8-i3-39