

## Vitamin A deficiency in children: Is it still prevalent in India?

Vitamin A deficiency (VAD) has been recognized as a public-health issue in developing countries and xerophthalmia due to VAD is the leading cause of preventable childhood blindness which presents as night blindness and Bitot's spots (BS) in early stages followed later by keratomalacia [1]. Children are more prone to VAD due to decreased dietary intake and poor absorption leading to depleted vitamin A (VA) stores in the body. Other contributory factors are a high prevalence of infectious diseases such as measles, diarrhea, and respiratory infections; and economic constraints, sociocultural limitations, and lack of education.

Globally, 5.2 million and 190 million preschool-age children have night blindness and low serum retinol concentration ( $<0.70 \mu\text{mol/L}$ ), respectively [1]. Nearly, 44-50% preschool children in South Asian regions were affected by severe VAD and 85% of these children with xerophthalmia reside in India [1]. In a survey conducted by National Nutrition Monitoring Bureau (NNMB) in eight states, the prevalence of BS in rural preschool children of India was 0.8% indicating its public health significance [2]. The prevalence of blood VAD (serum retinol  $<20 \mu\text{g/dl}$ ) was 61% in all NNMB states, ranging from 52% in Maharashtra to 88% in Madhya Pradesh and proportion of severe blood VAD ( $<10 \mu\text{g/dl}$ ) was 21.5% in all the states [2].

Similarly, a high prevalence of clinical VAD (4.50%) in rural children of Meghalaya is reported by Nongrum and Kharkongor in a study published in this issue of the journal, which is probably the first reported study on VA status from the region. The prevalence of VAD was higher 5.9% in school-going children of age 5-15 years and 2.49% ( $<50\%$ ) in preschool (0-5 years) children which is higher than the WHO global cut off of 0.5% for VAD indicating that clinical VAD is a public health problem in this region [3].

High incidence of VAD seen in school going children could be due to food faddism and warm infestations. Authors could have correlated the low incidence of VAD in preschool children with delayed BF and complementary feeding practices. Prevalence in this area is higher than the prevalence estimates in other parts of India such as Kerala, Maharashtra, West Bengal, and Madhya Pradesh except for Aligarh in Uttar Pradesh (9.1%) [4]. Importantly authors found no children with severe forms of clinical VAD such as corneal ulceration and corneal scar contradicting the results of a previous study, which reported a high prevalence of severe clinical VAD [4].

In their study, authors did not measure the serum retinol concentrations, which could have confirmed the biochemical

VAD. Second, night blindness and BS are considered as mild stages of eye disease but both represent moderate-to-severe systemic VAD (serum retinol  $<0.35 \mu\text{mol/L}$ ). Authors had mentioned the prevalence of night blindness in age group of 0-5 years; however, the WHO has recommended that age group of 24-71 mo should only be included for assessment of night blindness as it cannot be reliably identified among children between 12 and 24 months [5]. Therefore, it should have been clarified to make the data more reliable. Another important fact worth mentioning is that authors should have clarified the previous therapy with mega doses of VA (MDVA) in studied children. One recent study has shown the reappearance of BS within 12 months of administration of two MDVA even in children with adequate serum retinol level [6].

Another important aspect of the present study was the assessment of knowledge of nutrition and dietary practices and the social factors that influence VA status in children by interviewing mothers of children with and without VAD. Maternal education and family size were found to be significantly affecting VA status in children. Interestingly, most (87%) of the mothers knew and understood the local term for night blindness "*matiar*" literally means "hen eyes" while being ignorant of the medical term "VAD." They also treat night blindness or "*matiar*" traditionally by consuming beef liver in raw, boiled or roasted form. Over 3000 years ago, ancients not only knew night blindness but they also knew that it can be reversible by consuming specific foods such as animal liver, cod liver oil or butter [7]. Now, we know that they cured the disease without understanding the disease.

In studied population also, the traditional home remedy for VAD was the consumption of beef liver. Diet is a key factor in tackling VAD and knowledge about one's own traditional food may have an impact on dietary consumption as well as VA status of children. In this study, children of mothers having poor knowledge of diet and nutrition are 2.5 times more likely to have VAD. Three viable approaches to control VAD are dietary diversification, supplementation, and fortification, of which dietary diversification has shown advantages over the other two. This approach, if supported with the nutrition education program, may be more effective in developing countries. Likewise, VAD problem may be addressed exploiting food-based strategies as a permanent solution of the problem in developing countries [8].

A systematic review showed that agricultural strategies improve the consumption of vegetable, fruits, and tubers rich in VA precursors (i.e., beta carotene) by women and children and have potential to improve the health and nutrition

of young children and women of reproductive age [9]. However, given the low conversion rates of carotenoids to VA, effect of these strategies is likely to be limited unless the consumption of sufficient quantities and preparation of fat is ensured. Studies on agricultural strategies and home garden interventions in Mozambique, Ethiopia, South Africa, and Bangladesh showed reductions in the prevalence of BS and night blindness. On the other hand, home gardening strategies in India reported no significant effects on VA status [10]. Although authors of the present study have not analyzed the consumption of VA rich food items and their effect on VA status, it can be a viable option to combat VAD in Indian children and further research should be carried out to assess its usefulness in our country.

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