

# A Prevalence Study of Vitamin A Deficiency Ocular Morbidity among Preschool children in Southern Assam

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## ABSTRACT

**Introduction:** Deficiency of Vitamin A is seen mainly in developing countries specially in preschool children. Aim of the study was to find the prevalence of Vitamin A Deficiency ocular morbidity in preschool children.

**Material and methods:** 1556 children of age 0-5 yrs attending Eye Dept. of Silchar Medical College and Hospital, Assam from 2014-2015 were clinically examined for VAD and treated and followed up.

**Results:** 99(6.36%) children had VAD oculopathy. 5.27% had Conjunctival xerosis, 0.71% had Bitot spots, 0.26% had Night blindness and 0.13% had Corneal opacity. Male children, large family size, Hindus, and children having illiterate mothers outnumbered the others in having VAD oculopathy. Treatment with Vit.A supplements showed promising results.

**Conclusion:** VAD is still a menace in the developing world despite Govt. measures. Community screening, female education and timely treatment can reduce the prevalence of VAD associated ocular morbidity.

**Keywords:** Vitamin A deficiency, xerophthalmia, Bitot's spots, India, Preschool children

## INTRODUCTION

Vitamin A is an essential nutrient required for the normal functioning of the visual system, maintenance of cell function for growth, epithelial integrity, red blood cell production, immunity and reproduction. When dietary intake is chronically low, there is insufficient vitamin A to support vision and cellular processes, leading to impaired tissue function. Low vitamin A intake during nutritionally demanding periods in life, such as infancy, childhood, pregnancy and lactation, greatly raises the risk of vitamin A deficiency disorders (VADD).<sup>1</sup>

VADD includes xerophthalmia and its potentially blinding sequel, impaired mechanisms of host resistance, increased severity of infection, anemia, poor growth and mortality.<sup>1</sup>

Though one of the main causes of xerophthalmia is poor intake of vitamin A rich foods, it is also associated with poverty, ignorance, faulty feeding habits, lack of safe drinking water, proper drainage and excreta disposal among the entire population but young children in particular.<sup>2</sup>

VAD is the most important cause of preventable blindness in young children. Around 2.8 million preschool children are affected with vitamin A deficiency in over 60 countries. 250 000 to 500 000 malnourished children go blind each year, approximately half of whom die within a year of becoming blind.

Though prevalence of clinical vitamin A deficiency is less than 1% in India, biochemical subclinical deficiency is quite high. India remains to be the home of more than a quarter

of the world's preschool children suffering from subclinical VAD and a third of the preschool children with xerophthalmia.<sup>3</sup> VAD is the cause of blindness in 24% of children in blind schools of NE states of India.<sup>4</sup> Aim of the study was to study the Prevalence, Risk factors and Treatment outcome of ocular morbidity caused by Vitamin A deficiency.

## MATERIAL AND METHODS

A cross sectional study was conducted on 1556 children below 5 years of age (Expected Prevalence 30.8%<sup>5</sup>, Infinite population size, Precision of 0.025, CI 95%, sample size came to be 1311), for 1 year in Silchar Medical College and Hospital. Our hospital caters to a population of about 55 lakhs. No division was done among patients according to their geographical residence.

Ocular examination was done under diffused light (torch light) and slit-lamp. No fundus examination was done. Prior permission for the study was taken from the patient's guardians.

Vitamin A deficiency was diagnosed by the presence of Bitot's spot, conjunctival xerosis and Night Blindness. Other causes mimicking symptoms of Vitamin A deficiencies were excluded from the study. Patients were treated with Intramuscular injections or Oral preparation of Vitamin A and lubricating eye drops. Cases were followed up at 1 month and 3 months.

## RESULTS

Vitamin A deficiency was found to be 6.36%, Conjunctival Xerosis 5.27%, Bitot spot 0.71% and Night Blindness 0.26%. VAD was found maximum in the age group of 8-9 years of age (Fig. 1-4) (6.44%) followed by 9-10 years and minimum in the age group of 5-6 years of age (4.64%). Vitamin A deficiency was more prevalent in Males (8.27%) (Table 1). Conjunctival xerosis (7.07%) and Bitot spot (0.84%) was more common in Males while Females predominated in Night Blindness (0.28%) and Corneal scarring (0.14%). Vitamin A deficiency was found more among Hindus (8.07%) (Table 2). Conjunctival xerosis and Night blindness was also more in Hindus but Bitot spot was more in Christians and Corneal scarring among Muslims (Table 3). Children be-

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**How to cite this article:** Ruma Das, Nilanjan Kaushik Thakur, Abhisek Mondal. A prevalence study of vitamin a deficiency ocular morbidity among preschool children in southern assam. International Journal of Contemporary Medical Research 2016;3(3):852-854.

longing to families with >4 members, had a greater prevalence of Vitamin A deficiency (7.41%). Vitamin A deficiency was more prevalent among children coming from families with Illiterate adult females (10.82%) (Table 5)



Figure-1: Bitots spots

Age (in years)	No. of children examined	VAD (%)
0 - 1	302	14 (4.64%)
>1 - 2	310	17 (5.48%)
>2 - 3	288	15 (5.21%)
>3 - 4	326	21 (6.44%)
>4 - 5	330	19 (5.76%)
Total	1556	86 (5.53%)

Table-1: Age distribution

## DISCUSSION

The prevalence of Vitamin a deficiency was found to be 6.36% (99 cases), Conjunctival xerosis 5.27% (82 cases), Bitot spot 0.71% (11 cases), Night blindness 0.26% (04 cas-



Figure-2: Corneal opacity after ulceration caused due to Vitamin A deficiency



Figure-3: Active corneal ulcer due to Vitamin A deficiency

Sex	No. of Cases	Vitamin A deficiency	Conjunctival Xerosis	Bitot Spots	Night Blindness	Corneal Scarring
Male	834 (53.59%)	69 (8.27%)	59 (7.07%)	07 (0.84%)	02 (0.23%)	01 (0.12%)
Female	722 (46.41%)	30 (4.16%)	23 (3.19%)	04 (0.55%)	02 (0.28%)	01 (0.14%)
Total	1556	99 (6.36%)	82 (5.27%)	11 (0.71%)	04 (0.26%)	02 (0.13%)

Table-2: Sex distribution

Religion	No. Of Cases	Vitamin A deficiency	Conjunctival Xerosis	Bitot Spots	Night Blindness	Corneal Scarring
Hindu	545 (35.02%)	8.07%	38 (6.97%)	04 (0.73%)	02 (0.37%)	-
Muslim	927 (59.58%)	5.39%	41 (4.42%)	05 (0.54%)	02 (0.22%)	02 (0.22%)
Christian	31 (1.99%)	6.45%	01 (3.23%)	01 (3.23%)	-	-
Others	53 (3.41%)	5.66%	02 (3.77%)	01 (1.89%)	-	-

Table-3: Religious distribution

Family Member	No. Of Cases	Vitamin A deficiency	Conjunctival Xerosis	Bitot Spots	Night Blindness	Corneal Scarring
≤4	638 (41.01%)	4.86%	26 (4.08%)	04 (0.63%)	01 (0.16%)	--
>4	918 (58.99%)	7.41%	56 (6.10%)	07 (0.76%)	03 (0.33%)	02 (0.22%)

Table-4: Family size

Occupation	No. of Cases	Vitamin A deficiency	Conjunctival Xerosis	Bitot Spots	Night Blindness	Corneal Scarring
Illiterate	425 (27.31%)	10.82%	36 (8.47%)	05 (1.18%)	03 (0.70%)	02 (0.47%)
Literate	1131 (72.69%)	4.69%	46 (4.06%)	06 (0.53%)	01 (0.09%)	-

Table-5: Adult female literacy



**Figure-4:** Anterior Staphyloma post Vitamin A deficiency corneal ulceration

es) and Corneal scarring 0.13% (02 cases). According to the NNMB Technical Report No: 23 (2006), National Nutrition Monitoring Bureau, National Institute Of Nutrition, Indian Council of Medical Research Hyderabad<sup>6</sup>, the overall prevalence of Bitot spots among 1-5 year children was about 0.8%, night blindness was about 0.3% (CI: 0.26 - 0.34) and that of conjunctival xerosis was about 1.8%.

VAD was found maximum in the 3-4 years of age followed by 4-5 years and minimum in the age group of 0-1 year. Jonathan Gorstein et al<sup>7</sup>, also found that Bitots spot (0.61) and night blindness (0.52) was maximum in the 36-47 months age group followed by the 48-59 month age group and minimum in the 6-11 months age group.

Vitamin A deficiency was more in Males (8.27%). Conjunctival xerosis and Bitot spots was also found more in Males while Night Blindness and Corneal scarring in Females. Ngare DK et al<sup>8</sup> in his study also found that Males were more affected than females. Laxmaiah A et al<sup>9</sup> also noted that the prevalence of ocular signs were significantly higher ( $P < 0.001$ ) among boys (2.6%) compared with girls (1.9%) and in older children (3-4 years) compared ( $P < 0.001$ ) with younger (1-2 years), and were also high in children of laborer. Vitamin A deficiency was more prevalent in Hindus (8.07%). Conjunctival Xerosis and Night Blindness was also more among Hindus.

Children belonging to families with illiterate adult females had a greater prevalence of all the four signs of Vitamin A deficiency (10.82%). N. Arlappa et al<sup>10</sup> in his study stated that VAD was more prevalent among Hindus followed by Muslims and in children with illiterate mothers. Pal R et al<sup>11</sup> stated that children born to a literate mother had a prevalence of only 1.35% in relation to a corresponding value of 4.11% in children born to illiterate mothers ( $p < 0.01$ ) (OR 3.15). Prevalence of VAD (7.85%), was more among children whose parents were Farmers and Laborers. Children belonging to larger families ( $>4$  family members) showed a greater incidence rate of Vitamin A deficiency (7.41%).

The NNMB Technical Report No: 23 (2006), National Nutrition Monitoring Bureau, National Institute Of Nutrition, Indian Council of Medical Research Hyderabad<sup>6</sup> stated that the prevalence of Bitot spots was significantly higher among children belonging to households engaged in labour activities, compared to those in other occupations and the proportion of Bitot spots was higher (1%) among the households with larger family size (5-7) as compared to those with a family size of less than 4 (0.6%).

## CONCLUSION

The observation of this study underlines the magnitude and

severity of vitamin A deficiency in an age group ( $<5$  years) that is so vulnerable to different infections and subsequent mortality.

It is important to educate the community about the important morbidity of VAD in children, their aetiology and prevention. Food rich in vitamin A must be supplied regularly in Mid Day Meal. To reduce the prevalence of VAD among preschool children, all should receive Vitamin A prophylaxis as recommended by ICMR.

Community screening, female education and timely treatment can reduce the prevalence of VAD associated ocular morbidity.

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**Source of Support:** Nil; **Conflict of Interest:** None

**Submitted:** 31-01-2016; **Published online:** 24-02-2016