

FREQUENCY OF VITAMIN A DEFICIENCY IN CHILDREN OF AGE 6 MONTHS TO 72 MONTHS AT THE OUT PATIENT OPHTHALMOLOGY DEPARTMENT OF AGENCY HEADQUARTER HOSPITAL LANDIKOTAL, KHYBER AGENCY

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ABSTRACT

Objective: To determine the frequency of Vitamin A deficiency (VAD) and associated clinical features in children of age group 6 months to 72 months in order to plan comprehensive eye care program.

Material and Methods: It was a non- interventional, cross- sectional study based on 2373 children aged between 6 months to 72 months, attending the Eye OPD from 1st April 2005 to 1st April 2006. Xerophthalmia was diagnosed on the basis of ocular signs and symptoms set by WHO. Dietary intake of Vitamin A was assessed and correlation of vitamin A deficiency with various risk factors was evaluated.

Results: Out of 2373 children, 94 (4 %) children were suffering from VAD. Out of 94 children, 37 (39.4%) had Bitot spots, 27 (28.7 %) had signs of corneal Xerosis/ Ulceration/ Keratomalacia while 24/94 (25.5 %) had a history of night blindness. Thirty one (33%) children belonged to age group 61-72 months. Diarrhoea was the most frequent preceding illness in 33(35 %). Most of the children (80/94; 85%) belonged to poor socio economic class.

Conclusion: Vitamin A deficiency is not uncommon in children attending eye OPD. Most of them had already developed corneal involvement. Majority are under the age of 3 years; belonging to poor families, with poor dietary intake of vitamin A and with history of preceding illnesses like diarrhea etc. Community based studies are needed to assess the real burden of VAD and to plan for the major preventive strategies.

Key words: Vitamin A deficiency, Xerophthalmia, Blindness, Children.

INTRODUCTION

Blindness has profound human and socioeconomic effects in all the communities. The costs of lost productivity, rehabilitation and education of the blind are a significant economic burden, particularly in many developing countries. Blindness is often associated with lower life expectancy. There are 1.5 millions blind children worldwide mainly in Africa and Asia. In developing countries blindness in children is usually caused by Vitamin A Deficiency, measles, conjunctivitis of the newborn and harmful traditional eye medicines. They all lead to scarring of the cornea.

A system for classifying the clinical stages of Xerophthalmia, revised by WHO in 1982, remains

in widespread use today.¹

World Health Organization Classification of Paediatric Xerophthalmia:

| | |
|---|-------|
| Night Blindness | XN |
| Conjunctival Xerosis | X1A |
| Bitot's Spots | X1B |
| Corneal Xerosis | X2 |
| Corneal Ulceration/ Keratomalacia less than 1/3 of surface | (X3A) |
| Corneal ulceration/ Keratomalacia equal or more than 1/3 of surface | (X3B) |
| Xerophthalmic corneal scar | (XS) |
| Xerophthalmic fundus | (XF) |

Night blindness (Xn) the earliest and most common ocular manifestation of VAD results from rod photoreceptor dysfunction, which impairs vision under conditions of low illumination. *Conjunctival xerosis (X1A)* represent early keratinizing metaplasia of the epithelium with losses of mucus secreting goblet cells that are required to maintain a normal bulbar surface. The lesion does not affect vision. Advanced xerosis result in *Bitot spots (X1B)* which are composed of patches of desquamated keratinized epithelium mixed with gram negative saprophytic bacilli and other microbes. Corneal xerophthalmia is a medical emergency. *Xerosis of cornea (X2)* appears as bilateral and lusterless condition that often starts on the inferior surface before spreading across the cornea.² *Corneal ulceration (X3A)* presents as punched out defects often forming on the inferior peripheral surface of the cornea. Ulcer may be shallow or sufficiently deep to perforate descemet membrane. Iris may plug the perforated ulcer which can limit the loss of ocular content. *Keratomalacia* (softening of the cornea) involves full thickness necrosis of the cornea. Treatment of keratomalacia and ulceration involving less than one third of cornea (X3A) usually spares the central visual axis. Ulceration and necrosis involving one third or more of the cornea (X3B) usually result in perforation, loss of ocular content, a shrunken globe and blindness. Supportive treatment may spare the less affected eye and life of the child. *Xerophthalmia corneal scarring (Xs)* is a potentially blinding consequence of healed ulceration and keratomalacia. VAD causes ocular manifestation of xerophthalmia depress growth, disturb hemopoieses, disturb epithelial barrier function impair immunity and increases severity of infection and consequent mortality.³ These and other health consequences of vitamin A deficiency are now collectively known vitamin A deficiency disorders or VAD.⁴ Historically extract of liver were prescribed by the Egyptians, Chinese and later the Greeks and Romans for eye diseases. Corneal destruction was first described by the French physician Gullemean in 1585. Reports of corneal softening (Keratomalacia) were increasingly filed by physicians working all over the world linking the condition to poor starch diets and implicating one or more missing dietary factors.⁵ This study was aimed to determine the frequency of Vitamin A deficiency (VAD) and associated clinical features in children of age group 6 months to 72 months in order to plan comprehensive eye care program.

MATERIAL AND METHODS

It was a non interventional cross sectional study conducted at ophthalmology unit AHQ Landikotal between 1st April 2005 1st April 2006.

All children attending Eye OPD aged between 6 months to 72 months suffering from various eye diseases were included in this study. However children not falling in this age group or those with congenital eye disorder were excluded. Separate proforma was used for every child enrolled in the study. Detailed history was taken regarding night blindness, nutritional status, other comorbidities like diarrhoea, measles and respiratory tract infection. All children were examined in detail using slit lamps, uncooperative children after sedation were examined under operating microscope for Bitot spots, corneal and conjunctival xerosis, keratomalacia and xerophthalmic scar. Cycloplegic refraction and fundus examination with indirect ophthalmoscope was done to exclude refractive error and retinal pathology. Vitamin A is essential dietary nutrient in humans meaning that it is indispensable for life and must be provided by diet. Rich sources of pro vitamin include dark green leafy vegetables, carrots, ripe yellow fruits like mango and papaya. Animal sources include liver, fish liver or egg, milk and cheese. Every child was weighted. All those with Vitamin A deficiency satisfying the clinical classification/staging set by WHO¹ were enrolled in this study. These include Night blindness (XN) Conjunctival xerosis,(X1) Corneal xerophthalmia(X2),Corneal ulceration(X3), Keratomalacia (Softening of cornea) and Corneal scarring (XS). Children with VAD were provided with vitamin A capsules and were offered two follow up visits at 3 days and 4 weeks. Those with corneal ulceration were admitted and were treated with topical antibiotics. Dietary counseling and immunization particularly for measles was done.

RESULTS

2373 children between the age of 6 to 72 months attending Eye OPD, AHQ Landi Kotal between 1st April 2005 to 1st April 2006 were enrolled in this study. 94 (4%) children were suffering from VAD, 51(54%) were female, while 43(46%) were male. Out of 94 children, 37 (39.4%) had Bitot spots, 27 (28.7 %) had signs of corneal Xerosis/ Ulceration/ Keratomalacia while 24/94 (25.5 %) had a history of night blindness. 3 children with corneal xerosis ended up with xerophthalmic scars. Majority of children 31(33%) with VAD belonged to age group 61-72 months followed by 20 (22%) in age group 46-60 months. Diarrhoea was the most frequent preceding illness and was reported in 33(35%) children followed by Measles in 32 (34%) and respiratory tract infection in 13(14%). Major proportion of children 61(65%) had breast feeding ceased at an age of 6-12 months. 45(48%) children had consumed vitamin A rich diet at least once a month followed by 16(17%) consuming Vitamin A enriched diet at least once a week, 12(13%) were

FREQUENCY OF VARIOUS STAGES OF VITAMIN A DEFICIENCY DISORDERS

| Stages of Vitamin A deficiency disorders | Frequency (n=94) | %age |
|--|------------------|------|
| Bitot Spots | 37 | 39.4 |
| Corneal Xerosis | 27 | 28.7 |
| Not cited in hotel | 24 | 25.5 |
| Conjunctival Xerosis | 11 | 11.7 |
| Xerophthalmic Corneal Scars | 3 | 3.2 |

Table 1

having the Vitamin A diet daily. In all age group children with VAD were under weight. 58(62%) children were immunized according to EPI regime, 13(13.79%) had vaccination done randomly 9(10%) had no history of immunization. Majority of children 80(85%) belonged to low socioeconomic groups with families having income less than Rs. 2000 a month.

DISCUSSION

Corneal blindness related to VAD is the leading cause of childhood blindness. VAD causes 50-70% of corneal scars in Asia and Africa.⁶ It increases the severity and mortalities of other infections especially measles and diarrhoea.⁷ An estimated 28 million pre-school children are clinically affected and 251 million are sub clinically deficient. WHO in 1995 placed Pakistan as region with severely sub clinical VAD.⁸ This study revealed that out of 2373 children, 94 (04%) children were suffering from consequences of VAD. Out of these female children were 54% and male children 46%. Mean age of children with VAD was 51 months. B.S Medical College hospital in West Bengal has published similar reports where 35% children attending Eye OPD had VAD.⁹ Khan et al also noted in their study that pre school children were most vulnerable to vitamin A deficiency.² 24 (27%) children had history of night blindness. A study from Nepal revealed similar result (25.80%),¹⁰ such children exhibit low to deficient serum retinol concentration compared to controls with normal night vision.¹¹ Similar findings were also noted in another study from Beijing.¹²

In our study corneal xerosis was seen in 24 children (28.7%). A fully reversible condition, corneal xerosis can rapidly advance to ulceration and keratomalacia without immediate vitamin A and other supportive therapy. Bitot spots were present in 27 (31%). Bitot spots are round to triangular in shape nearly always occurring bilaterally and temporal to the limbus; nasal lesions may appear in advanced deficiency.¹³ Standard treatment with 200,000 IU Vitamin A on 2 consecutive days initiate a clinical response within several days, although a cure may require

weeks to months.¹⁴ Majority of children i.e 31(33%) with VAD belonged to age of 61-72 months. Sommer has also reported corneal xerophthalmia during infancy and higher magnitude of corneal xerophthalmia in hospital and noncorneal VAD in field studies.¹⁵

In a study conducted in NWFP, there was higher proportion of VAD with increasing age and poverty.¹⁶ Diarrhea was the most frequent preceding illness in 35% children. A study from Java also demonstrated that children with Bitot spots and night blindness were having higher association with history of diarrhea and respiratory diseases.¹⁷ Another study in New Delhi also showed that sub clinical VAD increases risk of common infections like Measles, Diarrhea and Pneumonia.¹⁸ Major proportion (65%) of children were not breast fed at the age of 6 to 12 months. A similar study from Bangladesh revealed that night blindness was significantly higher among children who were undernourished and were not breast fed.¹⁹ Majority (48.27%) of the children consumed Vitamin A enriched diet less than once a week. A cross sectional study from Nagpur also showed that children taking dietary vitamin A less than recommended levels were at higher risk of developing xerophthalmia.²⁰ Vitamin A is an essential dietary nutrient in humans meaning that it is indispensable for life and must be provided by diet. Rich sources of pro vitamin include dark green leafy vegetables, carrots, ripe yellow fruits like mango and papaya. Animal sources include liver, fish liver or egg, milk and cheese. The biggest barrier responsible for not consuming Vit A rich food is poverty. Majority of the children (62.1%) were immunized according to EPI. While in study conducted in NWFP showed that xerophthalmia was common in patients who were not immunized for Measles.²¹ This difference questions possible breaches in the cold chain of vaccines. Indonesia controlled the problem of Vit A deficiency by integrating health and agricultural programs.²² They distributed Vitamin A capsules and linked it to national immunization programs, promoted the consumption of green leafy vegetables and eggs and also launched food fortification program. Among the many challenges that developing countries are facing, Vitamin A deficiency is the one that can be overcome. The need is urgent, the solutions are known, effective and affordable.²³

CONCLUSIONS

Vitamin A deficiency is not uncommon in children attending eye OPD. Majority of the children had Bitot spots and signs of corneal Xerosis/ Ulceration/ Keratomalacia. Most of them had already developed corneal involvement.

Majority are under the age of 3 years; belonging to poor families, with poor dietary intake of vitamin A and with history of preceding illnesses like diarrhea etc. Community based studies are needed to assess the real burden of VAD and to plan for the major preventive strategies as Vitamin A Deficiency is preventable.

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