Research Article

Study of clinical profile of vitamin-a deficiency in malnourished children visiting a medical college hospital

Anandakumar T S[1], Kumar G V[2], Viswanathakumar H M[3]

[1]Dr Anandakumar T S, Professor of Pediatrics, [2]Dr Kumar G V, Associate Professor of Pediatrics, [3]Dr Viswanathakumar H M, Professor & H O D of Pediatrics. All authors affiliated with Sri Siddhartha Medical College and Hospital, Agalakote, Tumkur, Karnataka, India.

Address for Correspondence: Dr. Kumar G V, Associate Professor of Pediatrics, Sri Siddhartha Medical College and Hospital, Tumkur, Karnataka, India, e-mail: kumargowripura@gmail.com

……..

Abstract

Introduction: Vitamin A deficiency (VAD) disorders exist as a public health nutrition problem among preschool-aged children in 118 developing countries worldwide, with the South-East Asian Region harboring the maximum number of cases. **Materials and methods:** The present study was conducted on 100 children with protein energy malnutrition. Clinical assessment was done by noting the symptoms and ophthalmic signs of vitamin A deficiency in both eyes and classified according to W.H.O. classification. **Results:** Majority of the children were below 6 years of age (82%). Pre-school children were affected the most (84.7%). In this study 76% of the children had one or other infections. 52% had infections like respiratory infections (20%), diarrhea (19%), measles (10%) and urinary tract infections (3%). Children with acute infections were found to have severe form of Vitamin A deficiency more often (28.8%). Out of 100 children 17% were grade –I, 23% were grade-II, 32% were grade-III and 28% were grade IV malnourished according to IAP classification. Conjunctival xerosis was the most common sign (45.83%) of all Vitamin A deficiency cases followed by Bitot spots were seen in 30.55% of cases. **Conclusion:** Supplementation of the vitamin A rich food to the at risk mothers and children, proper weaning practices, eliminations of infections by immunization, implementation of various nutritional programs and regular deworming will go a long way in prevention of Vitamin A deficiency in children.

Key words: Vitamin- A deficiency, Conjunctival xerosis, Bitot spots.

……..

Introduction

Vitamin A deficiency (VAD) disorders exist as a public health nutrition problem among preschool-aged children in about 118 developing countries, with maximum number of cases seen in South-East Asian countries [1]. Vitamin A is a fat soluble vitamin which is required for normal vision, and normal function of epithelial tissues and for various metabolic functions. Vitamin A is stored in the liver and will be available for use when required. Night blindness is the earliest symptom of VAD and severe deficiencies lead to ocular changes and blindness in small children. Vitamin A deficiency is a preventable, widely distributed deficiency disorder which can lead to blindness. Vitamin A maintains the integrity of the epithelial tissue of the gastro-intestinal tract, skin, respiratory tract and eyes [2]. Vitamin A deficiency is widely prevalent in low income countries leading to a wide range of clinical manifestations which in turn leads to higher mortality in affected populations. At present in India overt VAD is not a major public health problem but, sub-clinical VAD is still a concern. Many studies have shown that as many as 62 % of our pre-school children may have sub-clinical Vitamin A deficiency [3, 4].

Estimates confirmed 31% to 57% preschool children to be the victims of subclinical VAD. India, being a very vast country, represents a variety of sociocultural and economic settings. This shows varied prevalence rates of VAD in the region. Despite various nutritional programs by the government at all levels to prevent VAD in India, the prevalence of subclinical VAD still exists as one of the highest in the world. High prevalence of malnutrition has resulted in great loss of

Manuscript received: 27th March 2016
Reviewed: 9th April 2016
Author Corrected; 20th April 2016
Accepted for Publication: 1st May 2016

productivity in India. [5]. According to the World Health Report of 2002, the global prevalence of vitamin A deficiency in children aged 0 - 4 years was about 21% and the prevalence of night blindness in pregnant women 5%, both being highest in Asia and Africa [6,7]. Vitamin A is essential for maintaining normal vision, gene expression, reproduction, embryonic development, growth and immune function [8]. Xerophthalmia a clinical term for abnormalities that can range from night blindness in its mildest form to permanent blindness in its most severe form [9]. The systemic consequences of vitamin A deficiency like increased rate of infection-related morbidity and mortality occur earlier than the ocular signs [10]. In places where vitamin A deficiency is prevalent, supplementing vitamin A has reduced both mortality and morbidity due to various causes by around 30% [11]. The Vitamin A supplementation reduces the morbidity and mortality due to are diarrheal diseases, respiratory disease and measles [12, 13].

Materials and Methods

The present study was conducted in the department of pediatrics Sri Siddhartha medical college Tumkur, Karnataka, India. In this study 100 children with protein energy malnutrition (PEM) were selected to study the clinical pattern of Vitamin A deficiency.

Children with injuries to the eyes and other diseases of the eyes other than Vitamin A deficiency were excluded from the study. Clinical assessment was done by noting the symptoms and ophthalmic signs of vitamin A deficiency in both eyes and classified according to W.H.O. classification [14].

Results

Out of 100 PEM children, 55 were male children and 45 were female children. Fifty six children were below 3 years of age, 26 children were between 3 to 6 years of age and 18 children were between 6 to 12 years. Majority of the children were below 6 years of age (82%). In this study the ratio between male to female is 1.2:1. Seventy two children had clinical evidence of Vitamin A deficiency. Pre-school children were affected the most (84.7%). Vitamin A deficiency was noted in male children slightly more than in females with ratio of 1.18:1.0. Majority of the children were from low socio-economic status and were from rural and urban slum areas.

In this study 76% of the children had one or other infections. 52% had infections like respiratory infections (20%), diarrhea (19%), measles (10%) and urinary tract infections (3%). Tuberculosis was present in 24% of the children of which 11% had abdominal tuberculosis, 10% had pulmonary tuberculosis and 3% had central nervous system tuberculosis. There was no clinical evidence of any infection in 24% of children. Children with acute infections were found to have severe form of Vitamin A deficiency more often (28.8%).

Out of 100 children 17% were grade –I, 23% were grade-II, 32% were grade-III and 28% were grade IV malnourished according to IAP classification. Conjunctival xerosis was the most common sign (45.83%) of all Vitamin A deficiency cases. Bitot spots were seen in 30.55% of the Vitamin A deficiency children. Majority of children (63.88%) with Vitamin A deficiency had grade III and grade IV malnutrition. Corneal scar was seen in one case. Night blindness was not noted in any children with Vitamin A deficiency. (Table-1)

Table 1: Distribution of Vitamin A deficiency with respect to PEM.

PEM Grade	No	X1A	X1B	X2	X3A	X3B	XS	Total	No signs
I	17	05	06	00	00	00	00	11	06
II	23	10	04	00	00	01	00	15	08
III	32	09	07	05	00	01	01	23	09
IV	28	09	05	03	00	06	00	23	05
Total	**100**	**33**	**22**	**08**	**00**	**08**	**01**	**72**	**28**

Pallor, edema, skin changes, hair changes and psychomotor changes were the commonest associated signs and symptoms seen in Vitamin A deficiency children. In this study it was found that the children with pallor and edema had maximum incidence of Vitamin A deficiency followed by skin changes. (Table-2).

Table 2: Distribution of Vitamin A deficiency with respect to clinical features.

Sl No.	Clinical features	Percentage (%)	Percentage with Vitamin A deficiency
1	Pallor	76	92
2	Edema	62	66.6
3	Psychomotor changes	61	55.1
4	Skin changes	51	58.82
5	Hair changes	50	26
6	B- Complex deficiency	36	52.7
7	Phrynoderma	30	72
8	Ear discharge	16	00
9	Oral thrush	10	00
10	Rickets	02	00
11	Cancrum oris	01	00

Discussion

During last four decades there is considerable decrease in clinical VAD. Keratomalacia has declined to a rareity, with sharp decline in the prevelance of Bitot spots [15]. Recent surveys indicate that the prevalence of Bitot spots of 0.5 per cent and more (conventional cut-off to define public health problem) is limited to population groups which are socio-economically backward, poverty stricken and have poor health infrastructure. Also, clinical VAD is seen only in certain seasons when green leafy vegetables are in short supply [16]. India has the highest prevalence of clinical and subclinical VAD among South Asian countries; 62% of preschool children were reported to be deficient in vitamin A. Estimates confirmed 31% to 57% preschool children to be the victims of subclinical VAD [17].

Maximum incidence of VAD is observed in the preschool age group. Increased demand for growth, poor liver storage, poor intake, infectious diseases and heigher incidence of PEM are contributory factors. In this study 72 children had clinical evidence of vitamin A deficiency. In this study 92% of the children with vitamin A deficiency were associated with severe anemia and 52.7% of children had vitamin B-complex deficiency. A study by Vanisha S Nambiar, et al showed that vitamin A deficiency was associated with anemia and vitamin B- complex deficiency [18] Vitamin A deficiency in our study was seen in all grades of protein energy malnutrition, but more in grade III and grade IV protein energy malnutrition (46%). Study by Satish D. Ashtekar et al showed that there was almost equal distribution of children with signs of Vitamin A deficiency in all grades of malnutrition [19].

Conclusion

Vitamin A deficiency continues to be a major nutritional disorder in India and many other developing countries especially in pre-school age groups. There is a direct association of PEM and vitamin A deficiency. Infections and infestations continue to be major contributory factors. Supplementation of the vitamin A rich food to the at risk mothers and children, proper weaning practices, eliminations of infections by immunization, implementation of various nutritional programs and regular deworming will go a long way in prevention of Vitamin A deficiency in children.

Source of Support: Nil, **Conflict of Interest:** None
Permission of IRB: Yes

References

1. West KP Jr. Extent of vitamin A deficiency among preschool children and women of reproductive age. J Nutr. 2002 Sep;132(9 Suppl):2857S-2866S.

2. Health Dialogue, Vitamin A Boosts Immunity p:6 Dr. Bruno de Benoist describes the link between Vitamin A and infection, issue No.18 Sept 1999.89-95

3. National Nutrition Monitoring Bureau. Diet and nutritional status of population and prevalence of hypertension among adults in rural areas. National Institute of Nutrition, Indian Council of Medical Research. Hyderabad; 2006. Technical Report No: 24.

4. National Nutrition Monitoring Bureau. Prevalence of Vitamin A deficiency among pre-school children in rural areas. National Institute of Nutrition, Indian

Council of Medical Research. Hyderabad; 2006. Technical Report No: 23.

5. Horton S. Opportunities for investments in nutrition in low-income Asia. Asian Dev Rev 1999; 17:246-73.

6. World Health Organization.World Health Report. Reducing Risk, Promoting Healthy Life. Geneva:WHO,2002: 54-55.

7. Rice AL, West KP jun., Black RE. Vitamin A deficiency. In: Ezzati M, Lopez AD, Rodgers A, Murray CJL, eds. Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors. Vol. 1. Geneva: World Health Organization, 2004.

8. Food and Nutrition Board, Institute of Medicine. Dietary Reference Intakes for Vitamin A,Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Washington, DC: National Academy Press, 2001.

9. Whitcher JP, Srinivasan M, Upadhyay MP. Corneal blindness: a global perspective. Bull World Health Organ. 2001;79(3):214-21. Epub 2003 Jul 7.

10. Sommer A, Davidson FR; Annecy Accords. Assessment and control of vitamin A deficiency: the Annecy Accords. J Nutr. 2002 Sep;132 (9 Suppl): 2845S-2850S.

11. Glasziou PP, Mackerras DE. Vitamin A supplementation in infectious diseases: a meta-analysis. BMJ. 1993 Feb 6;306(6874):366-70.

12. Hussey GD, Klein M. A randomized, controlled trial of vitamin A in children with severe measles. N Engl J Med. 1990 Jul 19;323(3):160-4.

13. Sommer A, West KP jun. Vitamin A Deficiency: Health, Survival, and Vision. New York: Oxford University Press, 1996.

14. Control of vitamin A deficiency and xerophthalmia Report of a Joint WHO/USA ID/Helen Keller International/IVACG Meeting Geneva, World Health Organization, 1982 (WHO Technical Report Series, No 672).

15. Kapil U. Ethical issues in vitamin A supplementation in India. 7. Indian J Prac Doctor. http://www. indmedica.com/ jounals.php/12? Journalid = 3 & issueid=132 & articleid=1745 & action=article, accessed on December 2, 2012.

16. Kapil U, Sachdev H. National consultation on benefits and safety of administration of vitamin A to pre-school children and pregnant and lactating women. Indian Pediatr. 2001 Jan;38(1):37-42.

17. Akhtar S, Ahmed A, Randhawa MA, Atukorala S, Arlappa N, Ismail T, Ali Z. Prevalence of vitamin A deficiency in South Asia: causes, outcomes, and possible remedies. J Health Popul Nutr. 2013 Dec; 31(4):413-23.

18. Nambiar VS. Vitamin A deficiency and anemia: alarming public health problems among the tribal Rathwa adolescents of Chhota Udaipur, Gujarat, western India: a crosssectional study. Int J Med Sci Public Health 2015; 4:1504-1512.

19. Satish D. Ashtekar, Suresh K. Kumbhar, Dawary Bhagavan, Renuka S. Ashtekar: Study of vitamin A deficiency among primary school going children under two PHCs of Sangli District in Maharashtra. International J. of Healthcare and Biomedical Research, Volume: 2, Issue: 4, July 2014, Pages 151-157.

……

How to cite this article?

Anandakumar T S, Kumar G V, Viswanathakumar H M. Study of clinical profile of vitamin-a deficiency in malnourished children visiting a medical college hospital. Int J Pediatr Res 2016;3(5):289-292.doi:10.17511/ijpr.2016.i05.03

……