Original Research Article

Study to assess conditions associated with xerophthalmia and compliance of VADD control programme among children in rural area of Salem

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Abstract

Background: As a vitamin, A deficiency progresses, the epithelial tissues of the eye become severely altered. Xerophthalmia is a very characteristic lesion of Vitamin A deficiency. The plasma retinol level is not an accurate indicator of vitamin A status unless the deficiency is severe and the liver stores are depleted. These eye lesions are primarily diseases of the young and are a major cause of blindness in developing countries. **Aim of The Study:** To assess conditions associated with Xerophthalmia and compliance of VADD control programme among children inthe rural area of Salem. **Methodology:** This Retrospective study was done in children aged 1-5 years attending Anganwadi and schools in the rural area of Salem. Totally 500 children were included in the study. Data was collected regarding socio-economic status, diet, illness (diarrhea, worm infestation, the recent history of measles, recurrent respiratory infections), immunization status (including measles) vitamin A intake and anthropometry. Children were then examined for any signs of VAD which was graded according to WHO classification. **Results:** We examined 500 children for signs of VAD among them Boys between 4-5 years are more affected than girls. Xerophthalmia is more prevalent in children belonging to poor SES, with inadequate consumption of vitamin A rich foods. VAD was also found to be associated with Anaemia, history of measles and PEM. Out of 500 children, 75% had received a dose of vitamin A indicating satisfactory compliance with vitamin A supplementation program. **Conclusion:** In the present study Xerophthalmia was found to be less prevalent when compared to the W.H.O defined critical level. There was only satisfactory compliance with vitamin A supplementation program. Hence there is a need to detect VAD at an early stage by including trained personnel in rural health programmes. Vitamin A deficiency was significantly associated with anemia, PEM, previous history of measles in children.

Key Word: Xerophthalmia, Corneal Damage, Bitot Spots, Vitamin –A Deficiency [VAD]

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INTRODUCTION

Vitamins are essential organic compounds that are required in very small amounts. Vitamin A is an essential micronutrient as it cannot be generated de-novo by humans. It is obtained from plants and animal sources in the form of provitamins which are then converted to the active form in the body. Vitamin A is required throughout the life cycle, beginning with embryogenesis.[1] Vitamin A, in its active form retinoic acid, regulates many genes that are involved in cell division, cell death, and cell differentiation. Vitamin A is required for normal vision,

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growth, reproduction, hematopoiesis, and immune competence. It is also required for normal respiratory and gastrointestinal functions.[2] The role in immune function and host defense is particularly important in developing countries, where vitamin A supplementation or therapy reduces the morbidity and mortality rates of various diseases, such as measles. The importance of Vitamin A in maintaining the integrity of epithelial tissues and functioning of the retina for vision has been wellestablished.[3] The most obvious symptoms of vitamin A deficiency are associated with the requirement of this vitamin for the maintenance of epithelial functions. The combination of defective epithelial barriers to infection, low immune response, and lowerresponse to inflammatory stress, all due to insufficient vitamin A, can cause poor growth and serious health problems inchildren.[4] The most characteristic and specific signs of vitamin A deficiency are eye lesions. Lesions due to vitamin A deficiency develop insidiously and rarely occur before 2 yr. of age. An early symptom is a delayed adaptation to the dark, later when vitamin A deficiency is more advanced, it leads to night blindness. Photophobia is a common symptom.[5] As vitamin A deficiency progresses, the epithelial tissues of the eye become severely altered. Xerophthalmia is a very characteristic lesion of Vitamin A deficiency. The plasma retinol level is not an accurate indicator of vitamin A status unless the deficiency is severe and the liver stores are depleted. These eye lesions are primarily diseases of the young and are a major cause of blindness in developingcountries.[6] Other clinical signs of vitamin A deficiency may include poor overall growth, diarrhea, susceptibility to infections, anemia, apathy, mental retardation, and increased intracranial pressure.[7] Xerophthalmia is the most readily recognized and the most widely employed criterion (World Health Organisation, 1982) for recognizing VAD clinically. Xerophthalmia includes all ocular manifestations of VAD, from night blindness to corneal scarring and resultant blindness. In developing countries, it is estimated that 50,000 preschool children become blind every year owing to VAD, and many of them will eventually die because of increased susceptibility to infections.[8] In one study a 34% reduction in child mortality in Indonesia was seen by giving 200,000 IU of vitamin A concentrate at 6 months interval. Improved Vitamin A nutriture would be expected to prevent approximately 1-2 million deaths annually among children 1-4 years of age. The last decade has seen global progress in VADD control by expanding the distribution of medicinal supplements, fortification of foods and dietary diversification through horticulture and educational programs.[9,10]

METHODOLOGY

This Retrospective study was done in children aged 1-5 years attending Anganwadi and schools in the rural area of Salem from 2018 October to 2018 December. Totally 500 children were included in the study. Data was collected regarding socio-economic status, diet, illness (diarrhea, worm infestation, the recent history of measles, recurrent respiratory infections), immunization status (including measles) Method of a collection of data: Children, 1 to 5 years of age were enrolled in this study. Socio-economic status was assessed on the basis of modified Kuppuswamy Classification 2007. Data regarding diet, previous illnesses (with special reference to Measles), history of Vitamin A supplementation and immunization was recorded in a proforma. Clinical examination of the child was carried out by 2 doctors including 1 pediatrician and 1 ophthalmologist. Inclusion Criteria: Children aged 1-5 years. Exclusion Criteria: Children aged less than1 year and more the 5 years. PEM was assessed according to IAP classification. Children were then examined for any signs of VAD which was graded according to WHO classification.

STATISTICAL ANALYSIS

The package EPI-INFO version 3.5.3 was used for the analysis of the data and Microsoft Excel was used for data entry as well as to generate graphs, tables etc**.** Results were expressed as the mean ± standard deviation for continuous variables and as number and proportion (%) for categorical data. Since all data are known to be normally distributed, the parametric tests were used for statistical analyses. Chi-square .test was applied to test the association between two categorical factors. All the tests of significance were applied at 5% level of significance.

RESULTS

Table 1: Gender wise classification

Gender	Number of Respondents	Percentage
Male	260	52%
Female	240	48%
Total	**500**	**100%**

Table: 1 shows Out of 500 children male were 260 (52%) and female were 240(48%). Male was more in our study when compared to female children

Table 2: Vitamina Supplementation status of the Population

Vitamin a received	Number of Children	Percentage
Yes	375	75%
No	125	25%
Total	500	100%

Table 3: prevalence of xerophthalmia in the population

Vitamin a deficiency	Number of Children	Percentage
Not present	485	97%
Present	15(x1a)	3%
Total	500	100%

Table 3: shows. In our study out of 500 children, 485(97%) had no features of Xerophthalmia and in 15(3%) of the children, the Xerophthalmia were present.

Table 4: Sex Distribution And Vad

Gender	Vitamin a deficiency				Total
	Absent	Percentage	Present	Percentage	
Male	251	96%	9	4%	260
Female	234	97.5%	6	2.5%	240
Total	485	97%	15	3%	500

Table 4: shows in 500 children vitamin –Adeficiency was absent in 251 (96%) male children and present in 9 (4%) children. In female children 234 had no signs of vitamin–Adeficiency (97.5%) and 6 (2.5%) had vitamin –Adeficiency.

Table 5: Age Distribution And Vad

Age	vitamin a deficiency				Total
	Absent	Percentage	Present	Percentage	
1-2 years	122	99%	1	1%	123
2-3years	221	98.6%	3	1.4%	224
3-4 years	72	96%	3	4%	75
4-5years	70	89.7 %	8	10.3%	78
Total	485		15		500

Table: 5 shows In the 1-2 age group, out of 123 children, 1(1%) had Xerophthalmia. Out of 224 children in the 2-3 years age group, 3 (1.4%) had ocular manifestations of VAD. In the 3-4 years age group, there were a total of 75 children in that 3(4%) having Xerophthalmia. The maximum percentage of Vitamin A deficient children were in the 4-5 years age group, with 8(10.3%) out of 78 children had Xerophthalmia.

Table 6: frequency of vitamin a intake and vad

Frequency of vitamin a intake	vitamin a deficiency				Total
	Absent	Percentage	Present	Percentage	
Daily	233	99%	2	1%	235
Weekly	239	97%	6	3%	245
Month	13	65%	7	35%	20
	485	97%	15	3%	500

Table 6: shows Out of a total of 235 children who consumed Vitamin Aon daily basis, 2 children (1%) had manifestations of VAD. In the group with a weekly intake of Vitamin A rich foods, out of a total of 245 children, 6 (3%) had features of Xerophthalmia. Out of 500 children, 20 children consumed Vitamin A rich foods on a monthly basis. 7(35%) of them had Xerophthalmia.

Table 7: Associated Conditions In Vitamin –A Deficiency Population

other findings	number of children	percentage
anemia	10	66.6%
pem	5	33.3%
recurrent rti	2	13.3%
diarrhea	1	6.6%
history of measles	5	33.3%

Table 7: Shows the number of children who had measles in the last 6 months was 5(33.3%) in vitamin –A deficiency group. Out of 15children, with xerophthalmia2 children (13.3%) had a recurrent episode of RTI. Anemia was detected clinically in 66.6% of children with xerophthalmia 5(33.3%) out of 15 children with xerophthalmia were malnourished. Cases of Developmental Delay were also encountered infrequently. Measles vaccine was not given in 5 cases out of 15(33.3%)

DISCUSSION

Vitamin A deficiency disorders (VADD) exists 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.VADD early in life include all active clinical stages of xerophthalmia including corneal xerophthalmia and its potentially blinding sequelae, impaired mechanisms of host resistance, increased severity of infection, anemia, poor growth and mortality[11]. VADD has long been identified as a serious and preventable nutritional disease. It also contributes significantly, even at sub-clinical levels, to morbidity and mortality from common childhood infection.[12] Studies suggest that ill health and risk of death from some infection are also increased even in children who are not clinicallyinvolved. In our study out of 500 children, 485(97%) had no features of Xerophthalmia and in 15(3%) of the children, the Xerophthalmia were present. Out of 500 children,the malewas 260 (52%) and female were 240(48%). Male was more in our study when compared to female children. In the 1-2 age group, out of 123 children, 1(1%) had Xerophthalmia. Out of 224 children in the 2-3 years age group, 3 (1.4%) had ocular manifestations of VAD. In the 3-4 years age group, there were a total of 75 children in that 3(4%) having Xerophthalmia. The maximum percentage of Vitamin A deficient children were in the 4-5 years age group, with 8 (10.3%) out of 78 children had Xerophthalmia. 375 children (75%) were received vitamin –a supplementation was as 125(25%) were not received vitamin –a supplement. 500 children vitamin –A deficiency was absent in 251 (96%) male children and present in 9 (4%) children. In female children 234 had no signs of vitamin –A deficiency (97.5%) and 6 (2.5%) had vitamin –A deficiency.In our study Out of a total of 235 children who consumed Vitamin-A on a daily basis, 2 children (1%) had manifestations of VAD. In the group with a weekly intake of Vitamin A rich foods, out of a total of 245 children, 6 (3%) had features of Xerophthalmia. Out of 500 children, 20 children consumed Vitamin A rich foods on a monthly basis. 7(35%) of them had Xerophthalmia.[14]

The number of children who had measles in the last 6 months was 5(33.3%) in vitamin –a deficiency group. Out of 15 children, with xerophthalmia 2 children (13.3%) had a recurrent episode of RTI.Anemia was detected clinically in 66.6% of children with xerophthalmia 5(33.3%) out of 15 children with xerophthalmiawere malnourished. Cases of Developmental Delay were also encountered infrequently. Measles vaccine was not given in 5 cases out of 15(33.3%)[15] The government of India, in 1970, initiated National Prophylaxis Program against Nutritional Blindness to combat and prevent VAD.[16] The program involves supplementation with a massive dose of vitamin A as a direct strategy and nutrition education as an indirect long term strategy to combat VAD. After more than three decades of operation, the program, however, suffers from poor compliance.[17] Lack of awareness in the community about the program is one of the possible factors for poor compliance.[18]

CONCLUSION

Totally 15 children were diagnosed as Xerophthalmia in our study who has not received any form of vitamin supplement. The study reveals that the maximum percentage of Vitamin A deficient children were in the 4-5 years age group. All 15 children who had VAD have conjunctival xerosis (XlA) In our study none of the respondents have bitot Spot. VitaminA deficiency was significantly associated with Anaemia, PEM, and previous history of measles in children. Majority of the children received Vitamin A and measles vaccination. There was a decreased prevalence of VAD in those children who received measles immunization and appropriate dose of Vitamin A supplementation.

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