



Vitamin A Deficiency among School Going Adolescents in Rural Areas of Bareilly

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Author's contribution

Author AKA designed the study, performed the data acquisition, data analysis, statistical analysis, wrote the protocol, the first draft of the manuscript and manuscript review. Authors HSJ and AS managed the analyses of the study, manuscript editing and review. All authors read and approved the final manuscript.

Original Research Article

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ABSTRACT

Objective: 1. To find out the prevalence of Vitamin A deficiency (VAD) on the basis of presence of bitot's spot and conjunctival xerosis among rural school going adolescents of District Bareilly, Uttar Pradesh, India. 2. To identify the associated factors and to suggest the suitable measures to prevent VAD among them.

Study Design: Cross sectional study.

Place and Duration of Study: Field practices areas Department of Community Medicine RMC&H Bareilly, Uttar Pradesh India, between Jan 2012 to Dec 2012.

Participants: 900 school going adolescents.

Sampling: Multistage sampling method. A structured schedule was used to collect the information.

Statistical Analysis: Data were analyzed with SPSS 17. Significant difference was determined using Chi- square test.

Results: The overall prevalence of VAD was found to be 42.22%. It was higher in 15-19 years of age group adolescents (48.77%) as compare to 10-14 years (41.6%). The prevalence of VAD was slightly higher among boys (p value=0.666). Out of total 398 (42.22%) VAD adolescents 300 adolescents were from socioeconomic class V.

Conclusion: Nutrition education regarding regular intake of foods rich in vitamin A rich is needed to prevent the deficiency.

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1. INTRODUCTION

Vitamin A deficiency (VAD) is one of the most important causes of preventable childhood blindness and is a major contributor to morbidity and mortality from infections, especially in children and pregnant women, affecting the poorest segments of populations, particularly those in low and middle income countries. The primary cause of vitamin A deficiency is lack of an adequate intake of vitamin A, and may be exacerbated by high rates of infection, especially diarrhea and measles. Its consequence is most apparent during stages of life of high nutritional demand (e.g. early childhood, pregnancy and lactation). A variety of interventions are being used to improve the vitamin A status of populations: dietary diversification, vitamin A supplementation and fortification. [1] 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. [2] Though, the risk of severe deficiency decline with age, vitamin A deficiency frequently extends into adolescence and early adulthood. [3]

However, very few studies on VAD have also included school going adolescents (10-19 years) apart from preschool and school children. [4] With this background the study was undertaken amongst school going adolescents aged between 10-19 years in rural areas of Bareilly district, to find out the prevalence of VAD by the presence of bitot's spot and conjunctival xerosis and to identify the associated factors and to suggest the suitable measures to prevent VAD among them.

2. MATERIALS AND METHODS

A cross sectional study was conducted in the rural field practicing area of Department of Community Medicine, Rohilkhand Medical College and Hospital Bareilly, Uttar Pradesh, India. The study period was one year (January 2012 to December 2012). Approval for conduction of study was taken from the Institutional Ethical committee.

Multistage sampling design was used. One block (Bithrichainpur) was randomly selected out of two blocks in first stage. In this selected block out of 8 schools 5 schools were selected by lottery method in second stage. Optimum number of adolescents studying in class 6th to 12th selected randomly as third stage, ensuring the representation of all classes. Sample was selected by proportional allocation from different classes to ensure a minimum sample size of 900.

The information was collected on socio-demographic characteristics, like age, sex, religion, type of family (Nuclear family- Couple with their dependent children, residing under same roof, Joint family- Consists of a number of couples and their children who live together in same household. All the men are related by blood and women of household are their wives) socio economic status (assessed according to Prasad classification) [5], parental education etc. General health examination was carried out and nutritional status was also assessed on the basis of anthropometric examination. [6] Ocular examination was conducted by a bright illuminant torch in natural light as per WHO guidelines. Vitamin A deficiency was diagnosed by the presence of bitot's spot and conjunctival xerosis. [7] Data were analyzed with SPSS 17.

3. RESULTS

Table 1, shows the prevalence of vitamin A deficiency was higher in adolescents in age group 15-19 years (48.77%) as compare to 10-14 years age group (41.63%), it was observed higher among males (43.78%) as compare to females (43.31%) Except for age, there was no significant difference for these groups ($p < 0.05$).

Table 1. Distribution of adolescents according to vitamin A deficiency in relation to socio-demographic characteristics

Socio demographic Characteristics	Absent No. (%)	Present No. (%)	Total No. (%)	Chi-Square Value (p-value)
Age group (years)				
10-14	335(66.7) (58.37)	239 (60.0) (41.63)	574	4.292 (0.038)
15-19	167(33.3) (51.23)	159 (40.0) (48.77)	326	
Gender				
Male	307(61.2) (55.22)	249 (62.6) (44.78)	556	0.186 (0.666)
Female	195(38.9) (56.5)	149 (37.4) (43.3)	344	
Religion				
Hindus	343(68.3) (54.79)	283 (71.1) (45.21)	626	0.810 (0.368)
Muslims	159 (31.7) (58.03)	115 (28.9) (41.97)	274	
Socio-economic class				
II	4(0.80) (50.0)	4 (1.00) (50.0)	8	1.801 (0.615)
III	11(2.2) 45.84	13 (3.3) (54.16)	24	
IV	77(15.3)	81 (20.4) (51.3)	158	
V	410(81.7) (57.8)	300(75.4) (42.3)	710	
Type of family				
Nuclear	175(34.9) (58.7)	123 (30.9) (41.3)	298	1.569 (0.210)
Joint	327(65.1) (54.32)	275 (69.1) (45.68)	602	
Total	502(100) (57.8)	398(100) (42.2)	900	

Table 2, shows among 398 vitamin A deficient adolescents, mothers of 82.16% and fathers of 43.97% were educated less than or equal to primary level. Among these VAD adolescent mothers of 93.47% and fathers of 7.79% were unemployed. Association between vitamin A deficiency and parental education and occupation was found statistically insignificant ($p > 0.05$).

Table 2. Distribution of adolescents according to vitamin A deficiency in relation to parent's education and occupation

Characteristics	Absent No. (%)	Present No. (%)	Total No. (%)	Chi-Square value (p-value)
Mother's education				
Less than or equal to primary school	417(83.1) (56.05)	327 (82.2) (43.95)	744	0.127 (0.721)
Above primary school	85(16.9) (54.5)	71 (17.8) (45.5)	156	
Father's education				
Less than or up to primary school	231(46.0) (56.9)	175 (44) (43.1)	406	0.375 (0.540)
Above primary school	271(54) (54.9)	223(56.0) (45.1)	494	
Mother's occupation				
Unemployed	473(94.2) (56)	372(93.5) (44.0)	845	0.221 (0.638)
Employed	29(5.8) (52.7)	26 (6.5) (47.3)	55	
Father's occupation				
Unemployed	36(7.2) (53.74)	31 (7.8) (46.3)	67	0.123 (0.726)
Employed	466(92.8) (56)	367(92.2) (44.1)	833	
Total	502(100) (55.8)	398(100) (44.2)	900	

4. DISCUSSION

In the present study vitamin A deficiency was found in 44.22% adolescents, among whom 62.56% were males and 37.44% were females. Prevalence in males and females was almost similar 44.7% and 43.31% the association between vitamin A deficiency and sex was not statistically significant ($p= 0.666$). The prevalence of vitamin A deficiency observed by Chandna S et al. [8] was 39% in school going children of age 6-9 years in Haryana, India, they also observed slightly higher prevalence among males (16%) than in female (15%). The prevalence of vitamin A deficiency observed by Woodruff BA et al. [9] 15% in Kenya and 30% in Nepal. In different studies Pathak P et al. [10] Choudhary S et al. [11] and Singh J et al. [12] Khan S et al. [3] found the prevalence of vitamin A deficiency 14.6%, 13.7%, 3% and 6.37% respectively. Chauchan et al. [13] in their study observed the overall prevalence of VAD 2.9%, prevalence of VAD among girls (4.1%) was significantly high than boys (1.9%). The prevalence of vitamin A deficiency in present study observed higher as compare to other studies may be due to the other studies were done in urban areas or cities and the present study conducted in rural adolescents.

In present study prevalence of VAD was higher among adolescents in socio-economic class III (54.16%) was higher but not significant and it was also observed higher in age group 15-19 year (48.77%) as compare to 10-14 years (41.68%). The association between vitamin A deficiency and age group was significant ($p=0.038$). Similar findings were observed by

Khan S et al. [3] they reported higher prevalence of vitamin A deficiency in older age group as compared to younger age group and slightly higher prevalence among males as compared to females, but they observed higher prevalence of vitamin A deficiency among adolescents belonging to lower socio economic class. In present study prevalence of observed VAD was higher among adolescent belonging to Hindu (45.25%) and joint families (45.68%), and it was also observed to be higher among adolescent whose mothers were educated above primary level (45.51%) and were employed (42.27%). Except higher prevalence in joint families other findings of Sachdeva S et al. [14] not match with the findings of present study. The mean intake of vitamin A among adolescents in Uttar Pradesh, India according to NNMB report 2012 [15], in age group 10-12 years (males- 268 µg/d, females- 179 µg/d), in 13-15 years (males- 242 µg/d, females- 157 µg/d) and in age group 16-17 years (males- 290 µg/d, females- 203 µg/d). According the this report a large percentage of adolescents has vitamin A intake below RDA (Recommended Daily Allowance) and mean intake are far below the Estimated Average Requirements (of between 312 and 357 µg/day) for this age group.

5. CONCLUSION

The overall prevalence of vitamin A deficiency was found to be 44.22%. The prevalence of vitamin A deficiency was significantly higher among the older age group of adolescents. Higher percentage of vitamin A deficiency was also found among those belonging to socio-economic class III and joint families. The prevalence of vitamin A deficiency was also higher among the Hindus and among the males.

Nutrition education regarding regular intake of plant foods rich in beta-carotene such as green leafy vegetables, yellow fruits, carrots and animal foods containing retinol like fish liver oil, fish, liver, egg, meat, milk, butter, cheese. Vitamin A in the form of retinol in animal sources is much more efficiently absorbed than pro-vitamin A carotenoids from plant sources but also much less affordable. Use of fortified food like vanaspati, margarine, dried skimmed milk should be strengthened as still the use of these items are limited in this area. Other measures like promotion of breast feeding, supply of safe drinking water, maintaining proper sanitation and hygiene, prevention of diarrhea, measles, acute respiratory infections and access to basic health services should also be adopted.

ETHICAL APPROVAL

Approval for study was passed from the institutional board of study meeting (IEC/IRB No. 26.11.2011).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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