

Influence of Vitamin A supplementation program on morbidity pattern of an urban slum in Odisha

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ABSTRACT

Background: Vitamin A deficiency (VAD) continues to be a major public health nutritional problem in India, even though the National Vitamin A Prophylaxis Programme has been in operation for more than three decades.

Aim: To assess the effect of vitamin A supplementation (VAS) after 2 doses among urban slum pre-school children up to 5 years of age.

Material and Methods: It is a descriptive, longitudinal study conducted in the urban slum population catered by the UHTC under KIMS. Study period: July 2008- June 2010. Out of 451 children identified in the age group of 1-5 years, 369 children fulfilled the eligibility criteria and formed the study cohort. A pretested and predesigned questionnaire was used by a team of UHTC to gather information on the socio-demographic characteristics of the population.

Result: Statistical analysis of the data showed a significant improvement in the diarrhea and scabies incidence while acute respiratory infection (ARI) and malaria were unaffected.

Conclusion: The present study reaffirms compelling evidence that vitamin A supplements can prevent death and illness in children aged 6 months to 5 years.

Keywords: vitamin A supplementation, vitamin A deficiency, diarrhea, scabies,

INTRODUCTION

Vitamin A (Vit A) is an important micronutrient for maintaining normal growth, regulating cellular proliferation and differentiation, controlling development, and maintaining visual and reproductive functions. Diet surveys have shown that the intake of Vit A is significantly lower than the recommended daily allowance in young children so much so that prevalence of clinical and subclinical Vit A deficiency in India is one of the highest in the world, being 0.7% and 57% respectively as reported in 2007.¹

According to National Nutrition Monitoring Bureau (NNMB) micronutrient survey in 2002 with regards to time trends and interstate differences in average vit A intake in different states, Odisha showed little change over the years 1975-2005.² However due to the vast diversity in the population strata in Odisha with nearly 20-30% of its population being tribal, proportion of children (per 1000) experiencing day and night-time vision difficulties is around 36-38%.³ Moreover National Family Health Survey (NFHS -3) reported below 30% coverage for children 12-35 months of age

who received Vit A in last 6 months, which is a significant dip in Odisha.⁴ In an attempt to improve the coverage, especially of the first two doses, it was decided to link Vitamin A administration to the ongoing immunization programme.

The current study was carried out in an urban health training centre (UHTC), Bhubaneswar Odisha, to assess if the national program of Vit A supplementation affected the morbidity pattern of the children within its field practice area.

METHODOLOGY

Study Design: Descriptive, longitudinal study.

Study practice area: The urban slum population catered by the UHTC under KIMS i.e., of 7500.

Study period: July 2008- June 2010.

Study population: All children between 1-5 years of age. A house to house survey was done to identify the children between 1-5 years in July 2008 and IEC done regarding Vit A Supplementation (VAS) and urged to come to the UHTC for all ailments. Subsequently those who have received the VAS during the campaign rounds of Dec 2008 and May 2009 were enrolled into the study.

Inclusion criteria: All the children between 1-5 completed years of age and have taken the 2 doses of VAS along with measles around 9 months during the study period (verified from the immunization card or history from the mother).

Exclusion criteria: The children who came to stay after Dec 2008 and not immunized as well as those suffering from any chronic ailment were excluded from the study.

Sampling: Out of 451 children identified in the age group of 1-5years, 369 children fulfilled the eligibility criteria and formed the study cohort, which is a statistically adequate sample for proportional sampling. An informed consent was obtained from the guardian prior to enrollment for the study.

A pretested and predesigned questionnaire was used by a team of UHTC to gather information on the socio-demographic characteristics of the population. The team also had a medical doctor who diagnosed VAD clinically on the basis of symptoms. The VAS was given in the dose of 1,00,000 IU to the children over 12 months of age.

Analysis was done using SPSS version 9 and the results were expressed in percentages, and chi-square test was used to detect the statistical significance.

RESULTS

Table 1: Sociodemographic characteristics of the slum population

Characteristics	Number N=7378, households-1054 Mean average size of family=6.8
Religion(n=1054)	
Hindu	864 (82%)
Muslim	148(14.5%)
others	42 (3.5 %)
Type of family	
Nuclear	956(90.7%)
Joint	98 (9.3 %)
Caste(Hindu households) n=864	
SC	421 (48.7 %)
ST	308(35.6%)
General	135 (15.7 %)
Education of head of household	
Illiterate	121(11.5%)
Primary	768(72.9%)
Secondary	105(9.9%)
Higher secondary	60 (5.7 %)
Occupation	
Unemployed	76(7.2%)
Labourer	689(65.4%)
Unskilled work	227(21.5%)
Skilled work	62 (5.9 %)

In the study population most of the families were Hindus (82%) and nuclear (90.7%). The caste which is relevant only for Hindus, most were scheduled caste (48.7%). 72.9% of the population had received education till primary school and 65.4% earn their livelihood as labourers.

Table 2: Relevant Characteristics of the study cohort Vs the unselected

Characteristics	Number Children (n=369)	No. not selected (n=82)	P value
<i>Religion</i>			
Hindu	301	64	-
Muslim	68	18	
<i>Sex</i>			0.36
Male	196	33	
Female	173	49	
<i>Birth order</i>			0.000
First	188	12	
Second	105	26	
Third & more	76	44	
<i>Education of mother</i>			0.001
Literate	225	23	
Illiterate	144	59	
<i>Diet having Vit A rich food *</i>			0.039
Once a week	204	35	
Twice or more in a week	165	47	
<i>Clinical manifestations</i>			
Night blindness	3	4	
Corneal dryness	-	1	

*Vit A rich food included vegetables like papaya, banana and non-veg foods like egg and sea fish.

A gender difference was observed for selection into the study. The birth order showed highly statistical significance i.e., higher the birth order, more the children were excluded. Education of the mother too was significant with regards to child receiving Vit A dose as more children of illiterate mothers missed the Vit A doses. Vit A deficiency was seen statistically significant in the children who missed their Vit A dose (0.003 at 90% CI).

The results of the table-3 shows statistically significant decline in diarrhea episodes and incidence of scabies after the 2 rounds of Vit A doses. Rest of the morbidity patterns, though decreased, were not statistically significant.

Table 3: Morbidity pattern before Dec 2008 and after May 2009

Morbidity pattern (summation of cases in the registered 1- 5 group)	Before Dec 2008 (summation of no. of episodes in 4 months)	After May 2009 (summation of no. of episodes in 4 months)	P value (at 95% CI)
Acute respiratory Infection(ARI)	280 239 (64% had at least 1 episode)	254 217(58.9% at least 1 episode)	0.65
Diarrhea	125 33% had at least 1 episode (2.2 episodes per child)	75 21% at least 1 episode (1.3 episodes per child)	0.001
Measles (mild infection)	30(8%)	12(3%)	0.12
Malaria	221.4(1.6 episodes per	302(1.8 episodes per child)	1.2
Co-existing malnutrition (mod-severe)	155 (41%)	84 (22.7%)	.001
Scabies	133(36%)	131 (35.4%)	1.45
Episodes of hospitalization for complications of any infection	106 (26%)	After May 2009 (summation of no. of episodes in 4 months)	P value (at 95% CI)

DISCUSSION

Vit A deficiency is common during childhood in many middle and low income countries, even among populations whose diets rely heavily on vegetables and fruits.⁵ The reasons are multiple and include widespread maternal under nutrition, poor dietary quality, and losses during diarrhoea.^{6,7} WHO estimates that 122 countries have a moderate to severe public health problem.⁸

It was seen from this study that VAS coverage was better among children of literate women and the first 2 birth orders as well as for male children. VAS definitely showed improvement in diarrhea and scabies infection. The findings of this study correlates with a study done in Brazil where it was found that the overall incidence of diarrhea episodes was significantly lower in the vit A supplemented group than in the placebo group. With the standard definition of diarrhea (3 liquid or semi-liquid stools in 24 h) the effect of vit A on mean daily prevalence did not reach significance, but as the definition of diarrhea was made more stringent (increasing number of stools per day), a significant benefit became apparent.⁹ In addition to controlling diarrhea, Vitamin A supplementation is also associated with large reductions in mortality, morbidity, and vision problems in a range of settings.^{10,11}

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Statistically significant reduction in the incidence of scabies among the study population is another finding that needs to be highlighted. Although evidence to this effect is very meager in literature, the possible explanation for such reduction may lie with the normal physiologic function of vit A. It is known to strengthen the immune function and hence reduce morbidity of infectious diseases.

The limitations of the study were that the OPD data depends on self reporting hence it could be possible that some self limiting episodes may have been missed. Other confounding factors like overcrowding, malnutrition, lack of personal hygiene were not accounted for. Lack of funds did not permit to carry out biochemical serum retinol estimation prior to the 2 doses to see if actually there is an increase in serum retinol.

CONCLUSION

Our study reaffirms compelling evidence that vitamin A supplements can prevent death and illness in children aged 6 months to 5 years. Supplements are inexpensive and have few side effects. Further trials are needed to determine the most effective dose and frequency of supplementation. Policymakers should continue working to provide supplements for all children at risk of deficiency, particularly those in low and middle income countries. We support the state policy of VAS recommendations every 6 months among underserved populations till the age of 5 years.

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