



Original Article

## Knowledge of the Importance of Vitamin A and awareness of its deficiency among Mothers of children under five at the Immunisation Clinic in Eastern India: A Cross-Sectional Study

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### ABSTRACT

**Introduction:** Vitamin A deficiency (VAD) is one of the major public health concerns, especially in Africa and South-East Asia, including India. Growth, vision, immune system performance, and infection resistance all depend on vitamin A underscore its importance in life of growing children. A mother's lack of knowledge about nutrition raises her child's risk of VAD. Keeping with this aim, we planned to assess knowledge of the importance of vitamin A and its deficiency and determinants in Patna, India.

**Materials and Methods:** A community-based cross-sectional study was conducted in the field practice area of the Department of Community Medicine following approval from the Institutional Ethics Committee, IGIMS, Patna. A total of 255 participants were recruited using sequential sampling. Data were collected using a pre-tested semi-structured questionnaire.

**Results:** Among participants, 301 (96.8%) had heard about Vitamin A, and 196 (63.0%) correctly recognized it as a fat-soluble vitamin. However, only 32 (10.3%) knew the correct age (9 months) for the first dose, while 172 (55.3%) were aware of the six-monthly supplementation schedule. Awareness of night blindness was high, 259 (83.3%), whereas knowledge of Bitot's spots remained low, 40 (13.0%). Health workers were the main information source for 269 (87.3%). Maternal education ( $\chi^2 = 47.62$ ,  $p < 0.001$ ) and family income ( $\chi^2 = 26.74$ ,  $p = 0.001$ ) showed significant association with knowledge levels.

**Conclusion:** Although overall awareness regarding Vitamin A was high, important knowledge gaps persist. Educational status and socioeconomic factors significantly influenced understanding, highlighting the need for strengthened health education during immunisation services.

**Keywords:** Vitamin-A, Vitamin-A deficiency, Awareness, Knowledge, Immunization, Under Five Children. Nutrition, Micronutrient.

### INTRODUCTION

Vitamin A deficiency has long been recognized by the World Health Organization as a major nutritional public health issue, although several aspects, including epidemiology, classification, and biological mechanisms, remain incompletely understood [1,2]. Globally, approximately 30% of children under five years suffer from vitamin A deficiency, affecting nearly 190 million preschool children, mainly in Africa and South-East Asia. Adequate Vitamin A intake is essential for normal growth, immune function, and maintenance of vision. Deficiency may result in visual impairment such as night blindness and increases susceptibility to infections including measles and diarrhoeal diseases [3,4,5]. In Africa, nearly 44.4% of preschool children are affected by VAD, with night blindness occurring in around 2%, which is substantially higher than the 0.5% reported in South-East Asia [6]. The condition continues to represent a major public health concern in low- and middle-income countries [7]. Early treatment is recommended for all children presenting with clinical

manifestations of deficiency [8]. India pioneered the National Vitamin A Prophylaxis Programme aimed at preventing childhood blindness through the administration of high-dose Vitamin A every six months to preschool children. Nutrition education promoting consumption of Vitamin A-rich foods is also integrated within the programme and implemented through Primary Health Centres with support from paramedical workers [9]. The Integrated Child Development Services (ICDS) programme further supports periodic supplementation among children [10,11]. According to UNICEF, Vitamin A supplementation increases child survival by 12–24%. Compared with neighbouring countries, India is heavily stricken both in childhood clinical and subclinical vitamin A deficiency. The National Nutrition Monitoring Bureau (NNMB) survey found that nearly 62 percent of all Indian preschool children lack sufficient vitamin A [12]. Furthermore, research by several different groups has demonstrated that mothers continue to be poorly informed about the importance of vitamin A, its deficiency illnesses, and prophylactic supplementation. [13] So, educating mothers about the importance of preventing vitamin A deficiency and the role of prophylactic measures is essential. [14].

## MATERIALS AND METHODS

**Study Design:** A cross-sectional study was carried out in the field practice area of the Department of Community Medicine after obtaining ethical clearance from the Institutional Ethics Committee, IGIMS, Patna, within six months of time.

**Study Population and Sample size:** Sample size calculation was based on study conducted by Khaliq R et al. [15]. The sample size was calculated by using the formula below, where  $Z = 1.96$ . Considering the 95% confidence interval and prevalence by a previous study 20% and  $q = 1 - P$ , with an allowable error of 5%. The sample size came out to be 246, and with the addition of 10% non-response rate, the total sample size was adjusted to 271. However, we took more samples to increase the power of the study.

**Methodology:** A total of 255 participants were selected using a convenience sampling approach. Data were collected using a pre-tested semi-structured questionnaire covering socio-demographic characteristics and knowledge related to Vitamin A and its deficiency. The questionnaire was translated into Hindi and subsequently back-translated into English to ensure accuracy. A pilot study was conducted to assess the feasibility, clarity, and sequence of questions, following which necessary modifications were made.

**Study Measures:** The primary outcome was to assess the Knowledge of the importance of vitamin-A deficiency among parents of children under 5 years, while the secondary outcome measures were to study awareness of the vitamin-A Deficiency among Parents of Children Under 5 Years.

**Ethics Statement:** Ethical approval bearing number Letter No. 374/IEC/ IGIMS/2025, obtained from the Institutional Ethics Committee and the Dean of Research at the Indira Gandhi Institute of Medical Sciences, Patna, on 17/03/2025.

**Statistical Analysis:** Data quality was ensured through daily verification for completeness and consistency. Data cleaning was done regularly. Statistical analysis was performed using SPSS version 20.0. Descriptive statistics, including mean, frequency, percentage, and standard deviation, were calculated. Associations between variables were examined using Chi-square, and a p-value of  $<0.05$  was considered statistically significant.

## RESULTS

A total of 311 mothers of under-five children attending the immunisation clinic participated in the study. Nearly half belonged to the 26–35 years age group, 147 (47.3%), followed by 36–45 years, 86 (27.7%), while 18–25 years and  $\geq 45$  years groups each constituted 39 (12.5%). Most children were aged 6–12 months, 130 (41.8%), followed by 12–24 months, 111 (35.7%), and 70 (22.5%) were older than 24 months. Male children accounted for 164 (52.8%) of participants. Regarding family composition, 113 (36.5%) had one under-five child, 110 (35.5%) had two, and 88 (28.3%) had more than two children. The majority of mothers were Hindu, 227 (73.0%), and 198 (63.7%) were educated up to graduation or higher, while 15 (4.8%) were illiterate. Most mothers were homemakers 243, 78.1%, and 169 (54.3%) belonged to joint families (Table-1).

Awareness regarding Vitamin A was high, with 301 (96.8%) reporting prior knowledge, and 196 (63%) correctly identifying it as a fat-soluble vitamin. Only 32 (10.3%) correctly knew the age for the first supplementation dose, whereas 172 (55.3%) were aware of the recommended six-monthly schedule. Breast milk was recognised as an important source by 290 (93.2%) of mothers (Table-2).

Awareness about the clinical manifestations of Vitamin A deficiency was good, night blindness was recognised by 259 (83.3%) of mothers, and frequent infections by 251 (80.7%), whereas nearly half identified growth retardation 153 (49.2%) (Table-3).

Health workers were the most common source of information regarding Vitamin A 269 (87.3%), followed by family or friends 181 (58.8%). Mass media 39 (12.7%) and books or online sources 49 (15.9%) played a relatively smaller role (Table-4).

Maternal education showed a statistically significant association with the level of knowledge regarding Vitamin A deficiency ( $\chi^2 = 47.62$ ,  $p < 0.001$ ). Mothers with graduation and above education demonstrated a higher proportion of good knowledge, 89 (44.9%), whereas poor knowledge was predominantly observed among illiterate mothers, 10 (66.7%). In the same way, monthly family income was significantly associated with knowledge level ( $\chi^2 = 26.74$ ,  $p = 0.001$ ), with higher income groups showing better knowledge. No statistically significant association was observed between knowledge level and mother's age or occupation (Table-5).

Maternal education ( $\chi^2 = 47.62$ ,  $p < 0.001$ ) and monthly family income ( $\chi^2 = 26.74$ ,  $p = 0.001$ ) showed statistically significant associations with knowledge levels, whereas maternal age and occupation did not demonstrate significant associations (Table-5).

**Table-1: Distribution of socio-demographic variables of mothers of children under five (N = 311).**

Variables	Frequency	Percentage
<b>Age of mothers (Years)</b>		
(18–25)	39	12.5%
(26–35)	147	47.3%
(36–45)	86	27.7%
> 45	39	12.5%
<b>Age of child (month/year)</b>		
0 to12 month	130	41.8%
12 to 24 months	111	35.7%
> 24 months	70	22.5%
<b>Sex of child</b>		
Male	164	52.8%
Female	147	47.3%
<b>Number of children (under 5 years)</b>		
1	113	36.5%
2	110	35.5%
>2	88	28.3%
<b>Religion</b>		
Hindu	227	(73.0%)
Muslim	81	(26.0%)
Others	3	(1%)
<b>The education of the mother</b>		
Illiterate	15	(4.8%)
Primary school	12	(3.9%)
Middle school	12	(3.9%)
Secondary school	21	(6.8%)
Higher secondary	53	(17.0%)
Graduation and above	198	(63.7%)
<b>Occupation of the mother</b>		
Unemployed	243	(78.1%)
Gov. Job	37	(11.9%)
Private job	29	(9.3%)
Agriculture	2	(0.6%)
<b>Type of family</b>		
Nuclear	122	(39.2%)
Joint	169	(54.3%)
Extended	20	(6.4%)
<b>Monthly income</b>		
< 5000	47	14.14
5000-10000	116	35.3
10000-20000	93	29.9
>20000	55	17.7

**Table-2: Awareness of Vitamin A and Deficiency among Mothers of Under 5 Children (N = 311).**

Variable	Frequency (N)	Percentage (%)
<b>Heard about the vitamin A</b>		
Yes	301	96.8%

No	10	3.2%
<b>Type of Vitamin A</b>		
Water-soluble vitamin	58	18.6%
Fat-soluble vitamin	196	63%
Don't know	57	18.3%
<b>Age for first dose of vitamin A</b>		
At birth	104	33.4%
1.5 month	111	35.7%
9 months	32	10.3%
Don't know	64	20.6%
<b>Frequency of vitamin A doses</b>		
Every month	71	22.8%
Every 6 months	172	55.3%
Every year	5	1.6%
Don't know	63	20.3%
<b>Do you know that breast milk is an important source of vit- A</b>		
Yes	290	93.2%
No	17	5.5%
Don't know	4	1.3%
<b>Skimmed milk lack of Vit-A</b>		
Yes	153	49.2%
No	158	50.8%
<b>Vita-A is important for your child's overall health</b>		
Yes	290	93.2%
No	17	5.5%
Don't know	4	1.3%

**Table-3: Knowledge of the signs or symptoms of Vitamin A deficiency among participants (Multiple Response).**

Sign/Symptoms	Frequency	Percentage
Night blindness	259	83.3%
Dry eyes	139	44.7%
Frequent infections (diarrhoea, respiratory illnesses)	251	80.7%
corneal scarring	42	13.6%
Growth retardation	153	49.2%
Bitot's spot	40	13%
Don't know	9	2.9%

**Table-4: Source of information about the importance of Vitamin A (N = 311).**

Source of Information	Frequency (N)	Percentage (%)
Family or friends	181	58.8%
Health worker	269	87.3%
Mass media (TV, radio, posters)	39	12.7%
Books, online read	49	15.9%
Others	4	1.3%
Don't know about it	14	4.5%

**Table-5. Association of selected socio-demographic variables with the knowledge regarding Vitamin A deficiency among mothers of under-five children (N= 311).**

Variable	Poor Knowledge N (%)	Average Knowledge N (%)	Good Knowledge N (%)	Total N (%)
<b>Mother's age (years) <math>\chi^2</math> (df)=6.214 (6) and p-value (0.398)</b>				
18 – 25	15 (38.5)	18 (46.2)	6 (15.3)	39 (12.5)
26 – 35	38 (25.9)	69 (46.9)	40 (27.2)	147 (47.3)
36 – 45	17 (19.8)	41 (47.7)	28 (32.6)	86 (27.7)
> 45	8 (20.5)	17 (43.6)	14 (35.9)	39 (12.5)
<b>Education of mother) <math>\chi^2</math> (df) = 47.62 (10) and p-value (&lt;0.001)</b>				

Illiterate	10 (66.7)	4 (26.7)	1 (6.6)	15 (4.8)
Primary school	6 (50.0)	5 (41.7)	1 (8.3)	12 (3.9)
Middle school	5 (41.7)	6 (50.0)	1 (8.3)	12 (3.9)
Secondary school	6 (28.6)	10 (47.6)	5 (23.8)	21 (6.8)
Higher secondary	9 (17.0)	25 (47.2)	19 (35.8)	53 (17.0)
Graduation & above	17 (8.6)	92 (46.5)	89 (44.9)	198 (63.7)
<b>Monthly family income (INR) <math>\chi^2</math> (df)= 26.74 (6) and p-value (0.001)</b>				
< 5,000	22 (46.8)	20 (42.6)	5 (10.6)	47 (15.1)
5,000 – 10,000	28 (24.1)	55 (47.4)	33 (28.5)	116 (37.3)
10,001 – 20,000	13 (14.0)	41 (44.1)	39 (41.9)	93 (29.9)
> 20,000	7 (12.7)	20 (36.4)	28 (50.9)	55 (17.7)
<b>Occupation of mother) <math>\chi^2</math> (df)= 3.52 (4) and p-value (0.47)</b>				
Unemployed	45 (18.5)	126 (51.9)	72 (29.6)	243 (78.1)
Employed (Gov./Private/Agriculture)	9 (17.0)	25 (47.2)	19 (35.8)	53 (21.9)

## DISCUSSION

The present study evaluated the maternal knowledge and awareness regarding Vitamin A & its deficiency among mothers attending an immunisation clinic in the Eastern part of India. Similar to the current study, comparable socio-demographic characteristics among mothers attending immunisation clinics were also reported in studies from Puducherry and Ethiopia [6, 16]. This aggregation of characteristics among mothers using routine immunisation services in different geographical areas yields a strong signal for targeting nutrition programs and interventions, and raises the prospect that the life-course model considers maternal health pathways as converging multi-level factors that track throughout the cascades.

A significant number (96.8%) of the mothers of the study sample were able to spontaneously mention that they were aware of the term Vitamin A, which indicates high levels of basic knowledge in this area among the mothers in this study. When compared with some other studies of Indian mothers with children under five years of age [7,17], these results demonstrate that the level of knowledge of Vitamin A by mothers of children under five years of age in the current study is higher than that previously reported, as in those studies, 60 to 85% of mothers knew about Vitamin A. It was suggested that the higher levels of knowledge found in the present study may have resulted from the improvement in MCH programmes, increasing outreach activities, and/or regular counselling during immunisation. In addition, mothers' awareness of the various interventions that were included in the present study (including vitamin A) could also have increased through regular contact with healthcare providers during antenatal and postnatal visits and immunisation appointments. The findings of the present study also highlight the important role that frontline health workers play in delivering community-based health education, with 87.3% of mothers reporting that they have received this information from frontline health workers. The same findings were reported in similar studies that were conducted in Karnataka and Uttar Pradesh, where the role of ASHAs and ANM sin providing Vitamin A awareness to mothers was also identified as the principal role in providing education about micronutrient supplementation [6,18]. There was a high degree of general awareness about vitamin A supplementation, but there was limited accurate knowledge about programme-specific details: only 10.3% of mothers knew that the first dose of vitamin A should be given at 9 months old. There appears to be a gap between being exposed to information about vitamin A supplementation and accurately understanding the information provided, which is consistent with studies from other regions of India and other low- and middle-income countries, where mothers were familiar with vitamin A supplementation, but did not know the dosage schedule or eligibility requirements. This discrepancy indicates that existing communication strategies may focus on information dissemination rather than on understanding and retention. Health education sessions at busy immunization clinics may be provided in short, generalised form with minimal opportunity for clarification and reinforcement of critical details [3,19].

The data on the manifestations of Vitamin A deficiency demonstrated a mixed level of knowledge. There was a high level of awareness of night blindness (83.3%), likely due to its frequent emphasis in public health initiatives and its culturally defined presentation. Similar levels of knowledge have been demonstrated through studies with communities in Nepal and rural India [11,20]. However, the recognition of specific ocular manifestations, such as Bitot's spots (13%), was very low, suggesting that the knowledge of early clinical indicators is limited, which is unfortunate because early identification of manifestations of Vitamin A deficiency contributes significantly to using health services in a timely manner and preventing irreversible ocular complications. Similar results were reported in studies from Ethiopia and Bangladesh, where there was little recognition of early xerophthalmia by mothers, thus demonstrating how important it is to implement targeted educational interventions that focus on obtaining recognition of signs and symptoms rather than on general awareness [16,21].

In the current study, there was also a large association between maternal education and knowledge level ( $\chi^2 = 47.62$ ,  $p < 0.001$ ), signifying that maternal education is a major influence on health awareness and utilisation of health information. Mothers with higher levels of education are likely to understand the messages that provide counselling, have access to health information through multiple means, and embrace preventive practices. Similar associations have been consistently found in many studies from India and other developing nations, where maternal literacy has been found to greatly impact the knowledge of child nutrition and micronutrient supplementation, respectively [9,12,13,22]. Likewise, family income was positively related to knowledge ( $\chi^2 = 26.74$ ,  $p = 0.001$ ), reflecting that the impact of socioeconomic status has an overall influence on the access to healthcare services, exposure to media, and the pattern of health-seeking behaviour. Economic stability may allow for more extensive use of health services and increased responsiveness to programmes that promote preventive health behaviour

Overall, while Vitamin A supplementation programmes appear successful in generating general awareness, important gaps persist in technical understanding related to dosage schedules and deficiency recognition. Strengthening counselling components during immunisation sessions, with emphasis on practical and easily understandable messages, may enhance maternal understanding and improve programme outcomes.

**Limitations of the study:** As this is a cross-sectional study, temporality can't be ascertained. Moreover, our study was conducted at a tertiary care hospital in Eastern India, so it may not be generalised to all parts of the country.

## CONCLUSION

The study identified a high level of general awareness regarding Vitamin A among mothers of under-five children attending an immunisation clinic in Eastern India. Nevertheless, deficiencies in knowledge related to correct supplementation timing and recognition of specific deficiency manifestations were evident. Maternal education and socioeconomic status were significant determinants of knowledge levels. Focused health education and reinforced counselling during routine immunisation services may help bridge existing knowledge gaps and enhance the effectiveness of Vitamin A deficiency prevention programmes.

**Conflict of interest:** None

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