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RESEARCH ARTICLE
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TO DETERMINE THE STATUS OF VITAMIN A SUPPLEMENTATION (VAS) IN 12-59 MONTHS AGED CHILDREN OF CHHATTISGARH

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Abstract-

Background- Vitamin A deficiency disorder spectrum has the unique distinction of being one of the most important causes of 'Preventable Blindness' the world over, and Xerophthalmia still remains a problem in the developing countries. The overall prevalence of Vitamin A Deficiency (VAD) in India is up to 6% and in some backward pockets it is up to 12%.

Aims- To determine the status of Vitamin A Supplementation (VAS) in 12-59 months aged children of Chhattisgarh attending Tertiary Care Hospital.

Methods and materials- this cross-sectional study done in department of paediatrics in tertiary health care hospital at Chhattisgarh from august 2023 to august 2024 to evaluate the vitamin A supplementation status of under 5 aged children. A total of 400 children were studied, who met the inclusion criteria and willing to participate in the study. A pretested questionnaire was asked from them regarding parameters like age, vitamin A deficiency signs, vitamin A supplementation in last 6 months and total number of doses received, number of episodes of minor (treated on OPD basis) and major (requiring hospital admission) illness. Then the children were examined for wasting, stunting, and vitamin A deficiency signs. The reasons for partial or no coverage of vitamin A supplementation was also studied in the study.

Results: Out of 400 children, 28 (7%) children were having moderate wasting while 3 (1%) children were having severe wasting. 21 (5%) children were having moderate stunting and 2 (0.5%) were having severe stunting. Vitamin A deficiency signs was noted in 2 (0.5%) children belonging to 24-35 months age group. Vitamin A supplementation with 1 dose in last 6 months was received by only 134 (33.5%) children, indicating very low VAS coverage. VAS coverage decreases as age increases. In 12-23 months age group, 60.5% children received VAS in last 6 months whereas in 24-35 months age group VAS coverage dropped to 22%. No children received full 9 doses of vitamin a. Reason for partial or no VAS coverage in majority (56.5%) cases was unawareness about 9 doses of vitamin A supplementation as well as its importance. While in 6% cases unavailability of vitamin A at the time of vaccination.

Conclusion- Vitamin A supplementation coverage in under 5 aged children of Chhattisgarh, with 1 dose of vitamin A in last 6 months, was 33.5%, which indicates low VAS coverage in Chhattisgarh and Vitamin A supplementation coverage decreases with increasing age.

Since the study population consisted of under 5 aged children of Chhattisgarh, further study needs to be done among the children of other districts of Chhattisgarh before the data can be extrapolated to the Chhattisgarh statistics. Hence, there is a dire need for operational research on the implementation of vitamin A prophylaxis programme in all Indian states.

Keywords- Vitamin A supplementation, deficiency, immunization.

INTRODUCTION:

Vitamin A is an important micronutrient for maintaining normal growth, regulating cellular proliferation and differentiation, controlling development, and maintaining visual and reproductive functions[1]. An estimated 2.8 million preschool-age children are at a risk of blindness from Vitamin A Deficiency and the health and survival of 251 million others are seriously compromised[2].Vitamin A deficiency disorder spectrum has the unique distinction of being one of the most important causes of 'Preventable Blindness' the world over, and Xerophthalmia still remains a problem in the developing countries[3].The overall prevalence of Vitamin A Deficiency (VAD) in India is up to 6% and in some backward pockets it is up to 12%[4].However, Biochemical (Sub-Clinical) Deficiency continues to be more common in our country[4].

Vitamin A prophylaxis programme was started in 1970 and was integrated with immunization programme in 1992. It is warranted if the prevalence of VAD is above 0.5%[4].

In India, however the coverage of vitamin supplementation (VAS) for children aged 12-59 months was low at 20.2% for one dose in 6 months according to National Family and Health Survey (NFHS) III (2005-2006)[5] and there are wide variations in coverage among different states of India.

For Chhattisgarh coverage of VAS for children aged 12-59 months was 17% for one dose in last 6 months according to NFHS III (2005-2006)[5] study data. There are very few studies showing VAS coverage in Chhattisgarh.

This study therefore aims to determine the present status of vitamin A supplementation in children aged 12-59 months of Chhattisgarh attending a tertiary care centre along with relationship of VAS with frequency of illness and estimation of VAD in study group.

AIMS

To determine the status of Vitamin A Supplementation (VAS) in 12-59 months aged children of Chhattisgarh attending Tertiary Care Hospital.

METHODS & MATERIALS

Type of Study: Observational study

Study Design: It is a cross-sectional, hospital-based study

Study Population: All children in the age group of 12-59 months of Chhattisgarh, seeking medical attention for any illness or for routine immunisation.

Study Area: Department of Paediatrics, Tertiary health care centre.

Study Period: 1 year (August 2023 to August 2024)

Inclusion Criteria: All children aged 12-59 months of Chhattisgarh.

Exclusion Criteria:

1. Children received vaccination outside Chhattisgarh.
2. Children already included in the study during their last visits.
3. Children whose parents/guardians were not willing to participate.

Sample size:

As our study was a hospital-based study, critical sample size was calculated. The sample size was calculated in two steps, using a confidence level of 95% and confidence interval of 5%.

1) Sample size for infinite population was calculated as –

$$\text{Sample size} = \frac{Z^2 * (P) * (1-P)}{C^2}$$

Where, Z is probability for confidence level, Z = 1.96

P is percentage of population taken as 0.5

C is confidence interval, taken 0.05

Using this formula sample size for infinite population was calculated as 600.

2) Sample size for population of 27984, which was the population of 0 to 6 years age group children of Chhattisgarh as per the latest census 2011, was hence calculated as –

$$= \frac{600}{1+ \left(\frac{(600-1)}{27984} \right)} = 379$$

Hence, we have taken the sample size of 400 for simplifying the calculation.

Methodology:

All children fulfilling the inclusion criteria between 12-59 months of age, both outpatients and inpatients. After selection of the children who fulfilled the inclusion and exclusion criteria, their respective parents were explained about the intention of the study, handed over a consent form, and consent was taken from their respective parents.

Then parents were interviewed to elicit the details of their children like present complaints, history of past minor illness, treated on OPD basis and major illness requiring hospitalisation in last 1 year, symptoms of vitamin A deficiency, dietary history to assess the nutrition status and vaccination history including vitamin A supplementation status using a self-administered pretested questionnaire. If child has not received any dose or full dose of vitamin A then reason for incomplete coverage was also asked from the parents.

The clinical examination was done by the investigator to collect data on anthropometry, general physical examination, head to toe examination for vitamin A deficiency signs and systemic examination, to arrive at an appropriate diagnosis. The height was measured by making the child to stand upright, barefoot on the ground with heels, buttocks and shoulder touching the wall and head in Frankfurt plane. The height was measured using sliding stadiometer (Johnson and Johnson) with an accuracy of 0.1 mm. weight was recorded using digital weighing scale, calibrated to 500 grams accuracy. Then child's weight for height (W/H) and height for age (H/A) was compared with WHO growth charts (figure 16) for under 5 children and nutritional status was interpreted based on z score. Their nutritional status was assessed as per following WHO criteria–

Table 1:

Malnutrition	W/H (wasting)	H/A (stunting)
No	>-2 z score	>-2 z score
Moderate	-2 to -3 z score	-2 to -3 z score
Severe	<-3 z score	<-3 z score

The child was managed as per the diagnosis. Those children who has received last dose of vitamin A, 6 months back was given 2 lakhs International Unit of vitamin A. The parents/guardians were counselled about vitamin A supplementation schedule and its importance.

Statistical methods:
Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements like age was presented on Mean with Standard Deviation (SD) and results on categorical measurements like VAD signs, adequacy of VAS and reason for partial/no coverage were presented in number (%). Significance was assessed at 5% level of significance. Frequency Analysis or Crosstab Technique used for most of the tables. Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups.

Statistical Software: The statistical software SPSS (Statistical Package for Social Sciences) version 20.0, was used for the analysis of the data, frequencies, standard deviation, and Microsoft word and Excel have been used to generate graphs, tables etc.

RESULTS:
Of 400 sample taken, about 39.3% belongs to the age group 12-23 months, 19.5% belongs to the group 24-35 months, 18.5% belongs to 36-47 months and 22.8% of the sample belongs the age group 48-56 months. The average age was 29.18 months with standard deviation 15.23 and the range was 12-59 months.
51.5% of children were male and 48.5% were female. The average age of male was 30.49 months with standard deviation 15.47 and the range was 12-59 months. The average age of female was 27.79 months with standard deviation 14.89 and the range was 12-59 months. In group A, 44.6% were male and 55.4% were female. In group B, 56.4% were male and 43.6% were female. In group C, 58.1% were male and 41.9% were female. In group D, 53.8% were male and 46.2% were female.
92.3% of children have no wasting, 7.0% has moderate wasting and only 0.8% has severe wasting. In group A, 89.8% have no wasting, 8.9% has moderate wasting and only 1.3% has severe wasting. In group B, 93.6% have no wasting, 5.1% has moderate wasting and only 1.3% has severe wasting. In group C, 94.6% have no wasting, 5.4% has moderate wasting and none of the children have severe wasting. In group D, 93.4% have no wasting, 6.6% has moderate wasting and none of the children have severe wasting. about 94.3% of patients have no stunting, 5.3% has moderate stunting and only 0.5% has severe stunting. In group A, 94.9% have no stunting, 4.5% has moderate stunting and only 0.6% has severe stunting. In group B, 94.9% have no stunting, 5.1% has moderate stunting and none of the children have severe stunting. In group C, 94.6% have no stunting, 5.4% has moderate stunting m and none of the children have severe stunting. In group D, 92.3% have no stunting, 6.6% has moderate stunting and only 1.1% has severe stunting.

Figure 1: Distribution of Grades of Stunting

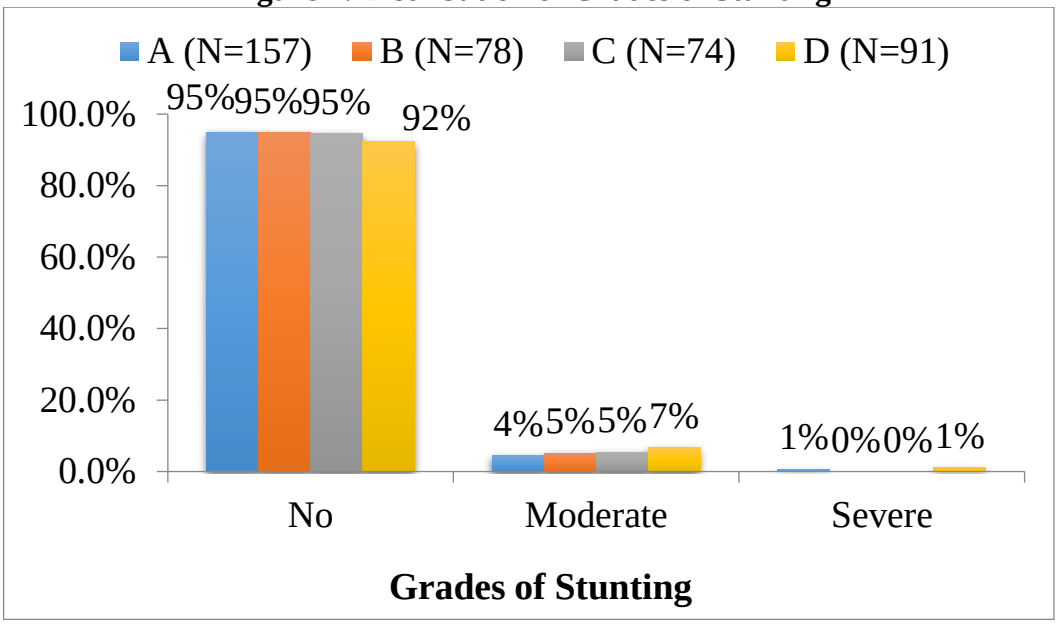


Table 2: Distribution of Clinical Vitamin A Deficiency-

	A (N=157)	B (N=78)	C (N=74)	D (N=91)	Total (N=400)
No	157 (100.0%)	76 (97.4%)	74 (100.0%)	91 (100.0%)	398 (99.5%)
Yes	0 (0.0%)	2 (2.6%)	0 (0.0%)	0 (0.0%)	2 (0.5%)

This table shows the distribution of clinical vitamin A deficiency. Of 400 samples, majority (99.5%) of children has no vitamin A deficiency and only 0.5% has vitamin A deficiency. No signs of vitamin A deficiency have seen in children from group A, group C and group D. In group B, about 97.4% of the children have no vitamin A deficiency and only 2.6% has vitamin A deficiency.

Table 3: Distribution of Episodes of Major Illness (requiring hospitalization) in last 1 year -

	A (N=157)	B (N=78)	C (N=74)	D (N=91)	Total (N=400)
0	48 (30.6%)	26 (33.3%)	25 (33.8%)	38 (41.8%)	137 (34.3%)
1	72 (45.9%)	42 (53.8%)	33 (44.6%)	37 (40.7%)	184 (46.0%)
2	34 (21.7%)	10 (12.8%)	16 (21.6%)	15 (16.5%)	75 (18.8%)
3	3 (1.9%)	0 (0.0%)	0 (0.0%)	1 (1.1%)	4 (1.0%)

This table shows the distribution of episodes of major illness in last year. Of 400 samples, 34.3% of children have no major illness in last year. About 46.0% of the cases have one major illness in last year, 18.8% has two and 1.0% has three episodes of major illness in last one year. In group A, 45.9% has one major illness, 21.7% has two and 1.9% has three major illnesses in last year. In group B, 53.8% has one and 12.8% has two major illnesses in last year. In group C, 44.6% has one and 21.6% has two major illnesses in last year. In group D, 40.7% has one major illness, 16.5% has two and 1.1% has three episodes of major illness in last year.

Figure 2: Distribution of Episodes of Major Illness in last year

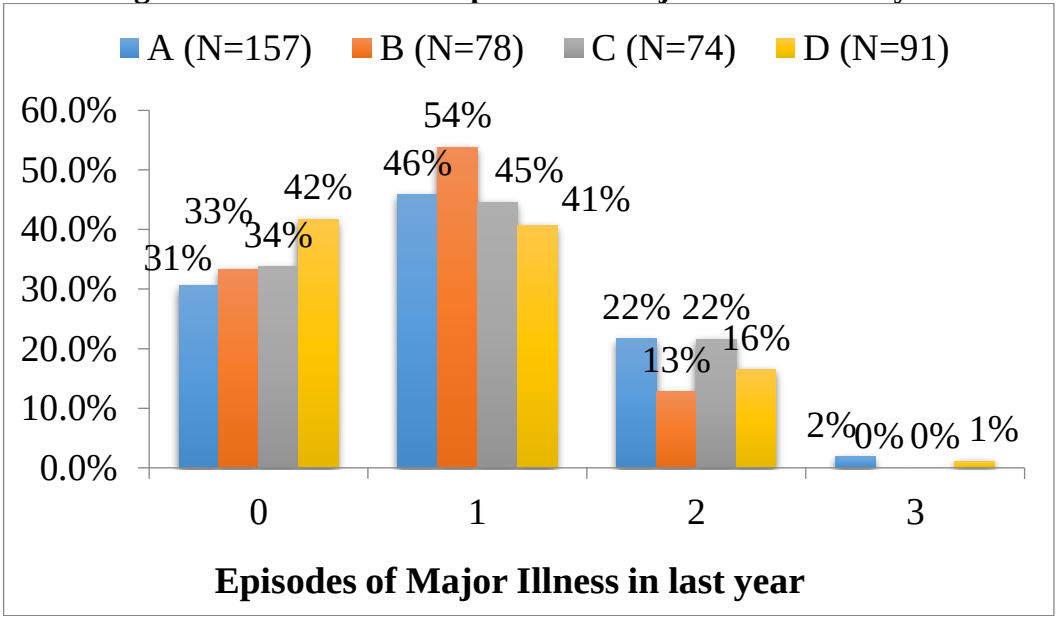


Table 4: Distribution of Episodes of Minor Illness (treated on OPD basis) in last 1 year -

	A (N=157)	B (N=78)	C (N=74)	D (N=91)	Total (N=400)
0	50 (31.8%)	5 (6.4%)	7 (9.5%)	5 (5.5%)	67 (16.8%)
1	45 (28.7%)	18 (23.1%)	13 (17.6%)	10 (11.0%)	86 (21.5%)

2	29 (18.5%)	23 (29.5%)	20 (27.0%)	26 (28.6%)	98 (24.5%)
3	30 (19.1%)	24 (30.8%)	26 (35.1%)	32 (35.2%)	112 (28.0%)
4	3 (1.9%)	7 (9.0%)	7 (9.5%)	17 (18.7%)	34 (8.5%)
5	0 (0.0%)	1 (1.3%)	1 (1.4%)	1 (1.1%)	3 (0.8%)

This table shows the distribution of Episodes of minor illness in last 1 year. Of 400 samples, 16.8% of children have no minor illness in last year. About 21.5% of the cases have one minor illness, 24.5% has two minor illness, 28.0% has three minor illness, 8.5% has four minor illness and 0.8% has five minor illness in last one year.

Table 4: Distribution of Vitamin A received in last 6 months -

	A (N=157)	**B (N=78)**	**C (N=74)**	**D (N=91)**	**Total (N=400)**
No	62 (39.5%)	61 (78.2%)	62 (83.8%)	81 (89.0%)	266 (66.5%)
Yes	95 (60.5%)	17 (21.8%)	12 (16.2%)	10 (11.0%)	134 (33.5%)

This table shows the distribution of vitamin A received in last 6 months. Of 400 samples, 66.5% of children have not received vitamin A and 33.5% of children have received vitamin A in last 6 months. About 60.5% of the children have received vitamin A in group A, 21.8% of the children have received vitamin A in group B, 16.2% of the children have received vitamin A in group C and 11.0% of the children have received vitamin A in group D.

Table 5: Distribution of Number of Doses Received

	A (N=157)	**B (N=78)**	**C (N=74)**	**D (N=91)**	**Total (N=400)**
None	30 (19.1%)	5 (6.4%)	7 (9.5%)	5 (5.5%)	47 (11.8%)
1 – 2	127 (80.9%)	56 (71.8%)	55 (74.3%)	76 (83.5%)	314 (78.5%)
3 – 4	0 (0.0%)	17 (21.8%)	4 (5.4%)	6 (6.6%)	27 (6.8%)
5 – 7	0 (0.0%)	0 (0.0%)	8 (10.8%)	4 (4.4%)	12 (3.0%)

This table shows the distribution of number of doses received. Of 400 samples, 11.8% of children have not received vitamin A. About 78.5% of children have received 1-2 doses, 6.8% has received 3-4 doses, 3.0% has received 5-7 doses and not a single child has received full 9 doses of vitamin A. In group A, 80.9% of the children have received 1-2 doses. In group B, 71.8% has received 1-2 doses and 21.8% has received 3-4 doses. In group C, 74.3% has received 1-2 doses, 5.4% has received 3-4 doses and 10.8% has received 5-7 doses. In group D, 83.5% has received 1-2 doses, 6.6% has received 3-4 doses and 4.4% has received 5-7 doses.

Figure 3: Distribution of Number of Doses Received -

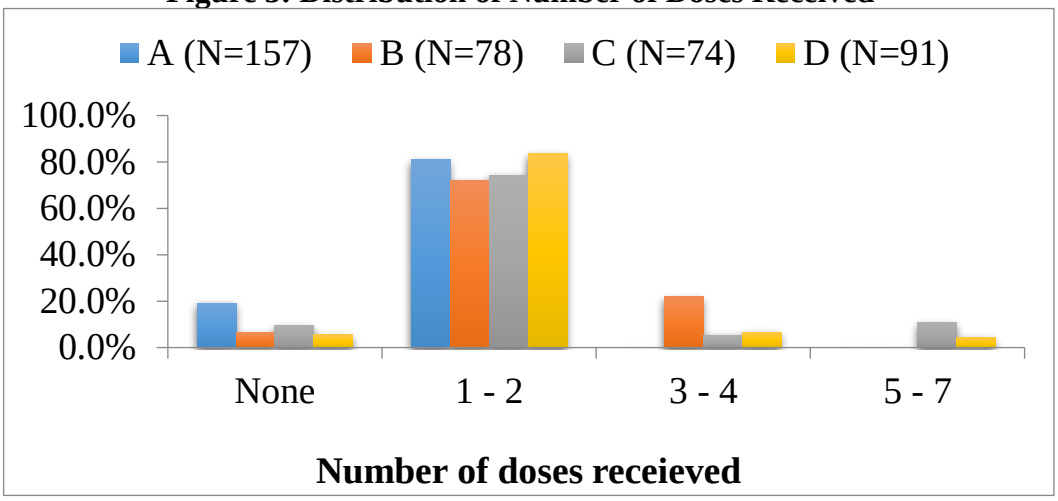


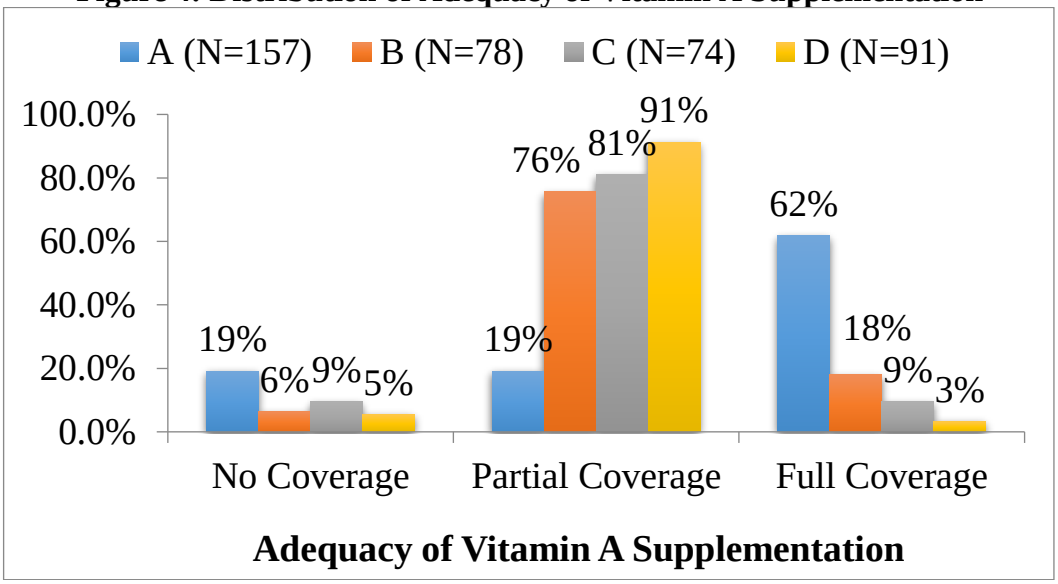
Table 6: Distribution of Adequacy of Vitamin A Supplementation -

	A (N=157)	B (N=78)	C (N=74)	D (N=91)	Total (N=400)
No Coverage	30 (19.1%)	5 (6.4%)	7 (9.5%)	5 (5.5%)	47 (11.8%)
Partial Coverage	30 (19.1%)	59 (75.6%)	60 (81.1%)	83 (91.2%)	232 (58.0%)
Full Coverage	97 (61.8%)	14 (17.9%)	7 (9.5%)	3 (3.3%)	121 (30.3%)

p-value = 0.000

This table shows the distribution of adequacy of vitamin A supplementation. Of 400 samples, about 11.8% of children have no coverage, 58.0% of children have partial coverage and 30.3% of children have full coverage. Here, the p-value is less than the significance level 0.001; there is a significant difference in the distribution of adequacy of vitamin A supplementation between groups. This table reveals that the partial coverage is significantly low in group A (19.1%) compared to group B (75.6%), group c (81.1%) and group D (91.2%). In the similar lines, the full coverage is significantly high in group A (61.8%) compared to group B (17.9%), group c (9.5%) and group D (3.3%).

Figure 4: Distribution of Adequacy of Vitamin A Supplementation



Of 400 samples, about 30.3% of children have full coverage. Unawareness (56.5%) was the main reason for partial/no coverage. The other reasons for partial/no coverage were unavailability (6.3%) and wrong notion (3.5%). In case of about 3.5% children's parents had an opinion that their babies do not need any vitamin A supplementation.

Table 7: Relationship between Vitamin A Supplementation and Grades of Wasting -

Grades of Wasting	Vitamin A Supplementation			Total
	No Coverage	Partial Coverage	Full Coverage	
No	34 (72.3%)	218 (94.0%)	117 (96.7%)	369 (92.3%)
Moderate	11 (23.4%)	13 (5.6%)	4 (3.3%)	28 (7.0%)
Severe	2 (4.3%)	1 (0.4%)	0 (0.0%)	3 (0.8%)
Total	47 (100.0%)	232 (100.0%)	121 (100.0%)	400 (100.0%)

p-value = 0.000

This table shows the relationship between vitamin A supplementation and grades of wasting. Here the p-value is less than the significance level 0.001; the relationship between vitamin A supplementation and grades of wasting is significant. The table reveals that the moderate and severe malnutrition is significantly high in no coverage (23.4% and 4.3%) compared to partial coverage (5.6% and 0.4%) and full coverage (3.3% and 0.0%).

The relationship between vitamin A supplementation and grades of stunting is not significant. The table reveals that the moderate and severe malnutrition is relatively high but not significant in no coverage (10.6% and 2.1%) compared to partial coverage (3.9% and 0.4%) and full coverage (5.8% and 0.0%).

Figure 5: Relationship between Vitamin A Supplementation and Grades of Stunting –

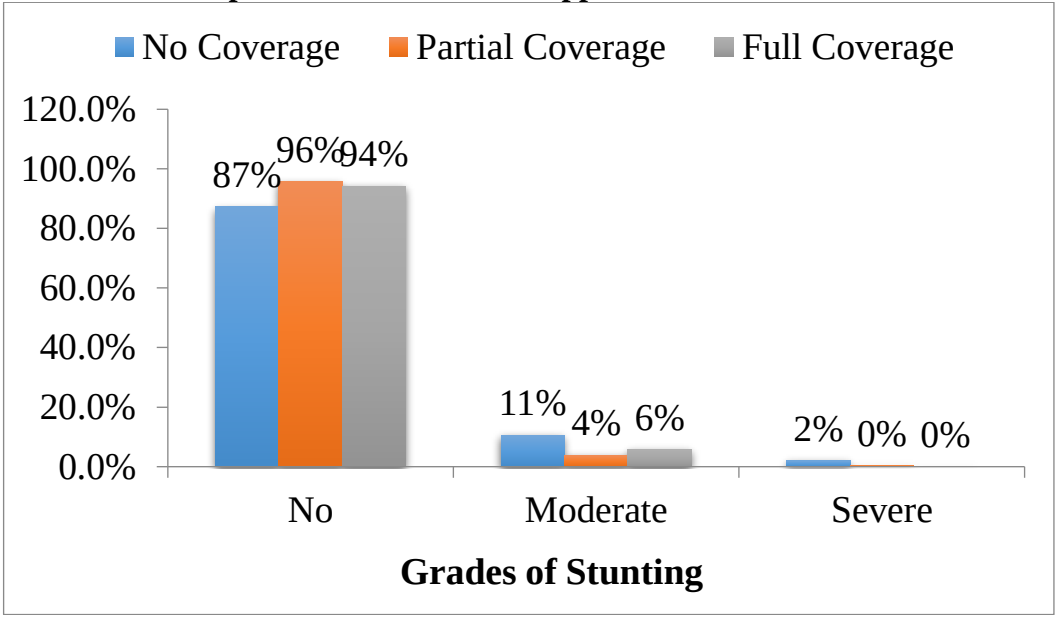


Table 8: Relationship between Vitamin A Supplementation and Frequency of Major Illness -

Major illness in last year	Vitamin A Supplementation			Total
	No Coverage	Partial Coverage	Full Coverage	
0	2 (4.3%)	75 (32.3%)	60 (49.6%)	137 (34.3%)

1	13 (27.7%)	116 (50.0%)	55 (45.5%)	184 (46.0%)
2	29 (61.7%)	40 (17.2%)	6 (5.0%)	75 (18.8%)
3	3 (6.4%)	1 (0.4%)	0 (0.0%)	4 (1.0%)
Total	47 (100.0%)	232 (100.0%)	121 (100.0%)	400 (100.0%)

P-value = 0.000

This table shows the relationship between vitamin A supplementation and frequency of major illness. Here the p-value is less than the significance level 0.05; the relationship between vitamin A supplementation and major illness is significant. The table reveals that the presence of major illness is significantly high in no coverage (95.7%) compared to partial coverage (67.7%) and full coverage (50.4%).

Figure 6: Relationship between Vitamin A Supplementation and Frequency of Major Illness –

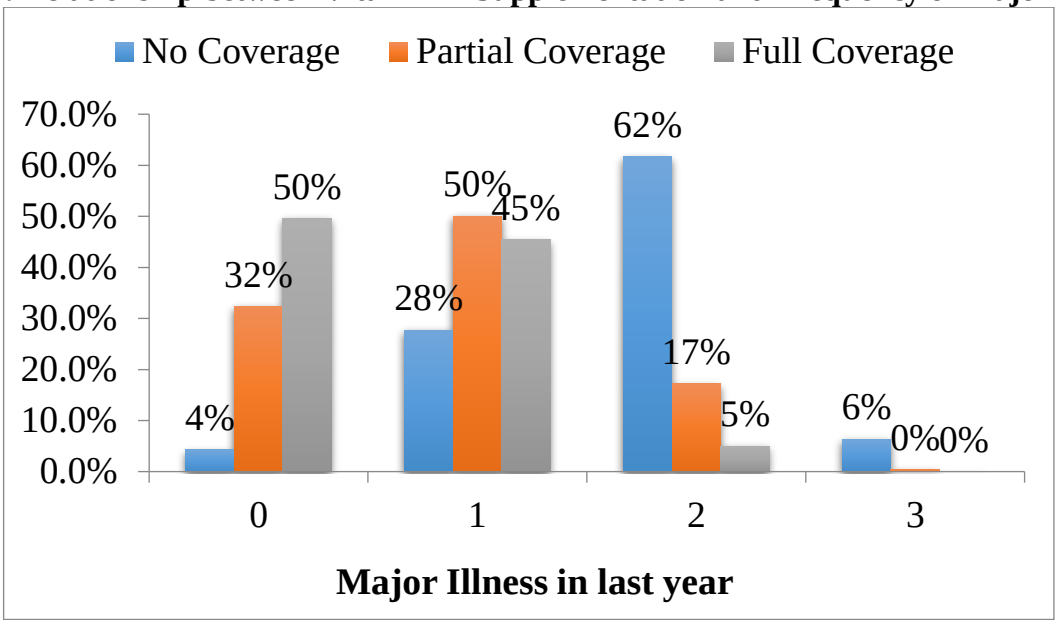


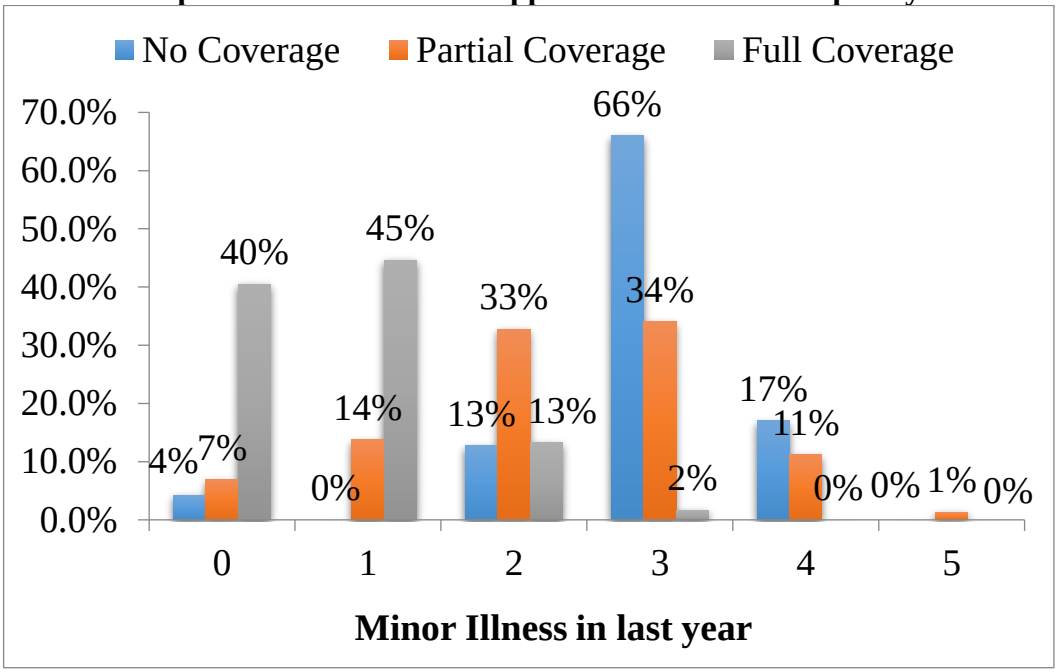
Table 9: Relationship between Vitamin A Supplementation and Frequency of Minor Illness –

Minor illness in last year	**Vitamin A Supplementation**			**Total**
	No Coverage	**Partial Coverage**	**Full Coverage**	
0	2 (4.3%)	16 (6.9%)	49 (40.5%)	67 (16.8%)
1	0 (0.0%)	32 (13.8%)	54 (44.6%)	86 (21.5%)
2	6 (12.8%)	76 (32.8%)	16 (13.2%)	98 (24.5%)
3	31 (66.0%)	79 (34.1%)	2 (1.7%)	112 (28.0%)
4	8 (17.0%)	26 (11.2%)	0 (0.0%)	34 (8.5%)
5	0 (0.0%)	3 (1.3%)	0 (0.0%)	3 (0.8%)
Total	47 (100.0%)	232 (100.0%)	121 (100.0%)	400 (100.0%)

P-value = 0.000

This table shows the relationship between vitamin A supplementation and frequency of minor illness. Here the p-value is less than the significance level 0.05; the relationship between vitamin A supplementation and minor illness is significant. The table reveals that the presence of minor illness is significantly high in no coverage (95.7%) and partial coverage (93.1%) compared to full coverage (59.5%).

Figure 6: Relationship between Vitamin A Supplementation and Frequency of Minor Illness –



DISCUSSION:

The present study included 400 children aged 12-59 months of Chhattisgarh attending a tertiary care hospital, which caters primarily to the population of Chhattisgarh, which is the most densely populated district of state of Chhattisgarh. The children were divided into 4 groups based on their age-

Group A – 12-23 months,
Group B – 24-35 months,
Group C – 36-47 months,
Group D – 48-59 months,

The mean age was 29.18 months with Standard Deviation (SD) of 15.23 months. In 43 trials of VAS included in a Cochrane systematic review 2010, the mean age was 30.5 months[6].

Nutritional status of our children:

Table- 10 Comparison of our data of wasting with NFHS-III (2005-06) data[5] –

Age-group (in months)	Weight for Height (Indicator of wasting)			
	Severe (below -3 z score)		Moderate (between -2 to -3 z score)	
	Our data	NFHS-III	Our data	NFHS-III
12-23	1.3%	3.1%	8.9%	14.6%
24-35	1.3%	4.9%	5.1%	9.8%
36-47	0%	1.5%	5.4%	6.7%
48-59	0%	2.1%	6.6%	4.6%
Total	**0.8%**	**2.9%**	**7%**	**8.9%**

In our study, we found that **7.8%** children aged 12-59 months were suffering from wasting, out of which 0.8% suffered from severe wasting and 7% suffered from moderate wasting which is

comparable to NFHS-III data of Chhattisgarh[5], which showed that, **11.8%** of 12-59 months aged children are suffering from wasting. Out of 11.8% children, 2.9% were severely wasted while 8.9% were moderately wasted. But it is quite lower than India's percentage of wasting in under 5 aged children as per UNICEF data of 2014, i.e 20%[8].

Table- 11 Comparison of our data of stunting with NFHS-III (2005-06) data[5] –

Age-group (in months)	Height for Age (Indicator of Stunting)			
	Severe (below -3 z score)		Moderate (between -2 to -3 z score)	
	Our data	NFHS-III	Our data	NFHS-III
12-23	0.6%	17.2%	4.5%	36.6%
24-35	0%	19.4%	5.1%	41.3%
36-47	0%	18.4%	5.4%	46.9%
48-59	1.1%	23.9%	6.6%	46.0%
Total	**0.5%**	**19.7%**	**5.3%**	**42.7%**

In our study, we found that 5.8% children aged 12-59 months of Chhattisgarh were stunted, out of which, 0.5% children were severely stunted while 5.3% children were moderately stunted which was quite lower than the NFHS-III data of Chhattisgarh[5], according to which 62.4% children were stunted, 19.7% children were severely stunted while 42.7% were moderately stunted. Our data was also lower than the UNICEF's (2014) data of stunting for India that is 48%[8].
This discrepancy in our data and NFHS/UNICEF data might be accounted by the fact that the hospital in which the study was done is a private hospital, hence it caters to children of higher socioeconomic status and hence, better nutritional status.

Vitamin A Supplementation status:
Out of 400 children, it was observed that only 33.5% children had received a dose of vitamin A in last 6 months, whereas a study by Semba using NFHS III (2005-06) data showed that VAS coverage of Chhattisgarh achieved was 17% while overall coverage of India was 20.2%[5].
The VAS coverage of 70% with one dose of vitamin A in the past 6 months, among 6-59 months old children is required in order to achieve a significant reduction in U5MR. Hence, this data reveals that there is still a large lacuna in VAS, to the target population.

Table 12: Comparison of our VAS data with NFHS III (2005-06) data[5] –

Age groups	Percentage of children received one dose of VAS in last 6 months		
	Our data	Chhattisgarh	India
12-23 months	60.5%	25.7%	41.4%
24-35 months	21.8%	22.5%	Not available
36-47 months	16.2%	14.5%	16.4%
48-59 months	11%	11.3%	9.4%

Similar to most of the studies on VAS coverage in India, this study showed decrease in VAS coverage with age. The higher VAS coverage of 33.5% seen in our study as compared to 17% of the state of Chhattisgarh, can be explained by the fact that district of Chhattisgarh has a higher literacy rate and better socio-economic indicators as compared to the other districts of Chhattisgarh, hence, there is better utilization of health services. Still, it was seen in our study, that only 30.3% children had received adequate doses of VAS as per the age and 11.8% of our children had not receive even a single dose of VAS. Therefore, it can be concluded that there is a poor implementation of Vitamin A Prophylaxis Program, with poor utilization and inadequate timing & continuity of this program in

almost all the states of India due to poor organizational quality, social unaccountability and lack of awareness of this program.
In our study, 56.5% children did not receive adequate VAS because of unawareness of care taker about VAS program while 63% children didn't receive due to unavailability of vitamin A at the time of contact with the health center and another 7% remain deprived of adequate VAS because of improper knowledge and wrong belief about VAS.

Vitamin A Deficiency (VAD):
In our study, only 2 (0.5%) children had clinical signs of VAD out of 400 children examined for VAD signs which is similar to our finding of very low proportion of our children having malnutrition. While, according to a study[9] done in 2007, out of 208,379 (with median = 1094 and IQR = 283.0 - 8978.0) pre-school aged children of rural India screened for Vitamin A deficiency disorders, 12,510 (with median= 80 and IQR = 36.5 - 201.0) children were found to be suffering from clinical vitamin A deficiency. With this background information, median prevalence of vitamin A deficiency disorders in Indian preschool-age children was determined to be **7.0%** and inter-quartile range (IQR) = 3.3-9.3%. This implies that there were ~1.7 million vitamin A-deficient preschool-age children[9].

Relationship of VAS with malnutrition:
Our results revealed that wasting (moderate and severe) is significantly high (p-value = 0.00) in children having no VAS coverage as compared to children with partial or full VAS coverage. Whereas stunting had no significant relation (p-value = 0.107) with VAS coverage.
This can be explained by the fact that these children with wasting and stunting might not have received adequate doses of vitamin A because of unawareness about the VAS program or unaffordability, presumably because of the fact that caretakers of these children were from poor socioeconomic status and not well educated.
A study done in Bangladesh, was in contrast to our finding, that study found a significant relationship in between VAS and stunting whereas no relationship has been found in VAS and wasting[10].

Relationship of VAS with morbidity:
We found that relationship between VAS coverage and morbidity (measured in terms of episodes of major and minor illness) was significant as the P-value was 0.00 which was less than the significance level of 0.005. Hence, it can be concluded that children with partial or full coverage had lesser number of episodes of major as well as minor illness. This is similar to various studies which has shown that VAS decreases the incidence as well as the severity of diarrheal and lower respiratory tract infection infections, especially in malnourished children.
VAS is one of the most cost-effective interventions for reducing childhood mortality and improving VAS status is associated with 24% reduction in all cause childhood mortality[7]. Our study was a hospital-based study conducted in a Private Tertiary Care Hospital catering to children of Chhattisgarh mostly, hence, it is expected that caretaker of these children is concerned about the health of their children, but still in our study VAS coverage is very low. Therefore, it is quite obvious that in backward pockets of the state of Chhattisgarh, VAS coverage must be lower than our data. This reflects, that our Vitamin A Prophylaxis Program is not adequately covering the target population. Hence, there is a need to undertake comprehensive and well-designed national representative studies in rural, urban and slum settings of India, to estimate both clinical and biochemical vitamin A status as well as diet surveys to assess dietary pattern of vitamin A.

Limitations:
1. This study was done in Chhattisgarh population, where well equipped health facilities are available for immunisation but other districts of Chhattisgarh are not having sufficient health facilities. Thus, our findings are not applicable for other districts of Chhattisgarh.

2. Parents were interviewed regarding number of episodes of minor/major illness in last year as well as number of doses of vitamin A received and the associated recall bias cannot be ruled out despite the relatively short interval of recall.
3. We recorded only those episodes of illness that brought the patient to health facility but there is a possibility that many episodes of minor illness goes unnoticed/untreated.
4. In our study we have not taken socioeconomic status, to compare it with malnutrition and VAS.

Recommendations:
1. Vitamin A deficiency should be given more importance and the parents should be advised regarding vitamin A rich foods.

2. As the major cause of poor VAS coverage was found to be unawareness about vitamin A schedule, so, whenever the parents are coming for routine immunisations or for routine check-up they should be counselled regarding VAS.
3. Vitamin A supplementation should be done in capsule form as chances of contamination as well as improper dosage are less.

CONCLUSION:

Vitamin A supplementation (VAS) is one of the most cost-effective interventions for reducing childhood mortality, and improving vitamin A status is associated with a significant reduction in all cause childhood mortality. Similarly, in our study, we found that VAS significantly reduces the episodes of major and minor illness in under 5 children and a significant proportion of children with wasting had not receive VAS appropriately.
In this study it was observed that Vitamin A supplementation coverage in under 5 aged children of Chhattisgarh, with 1 dose of vitamin A in last 6 months, was 33.5%, which indicates low VAS coverage in Chhattisgarh and Vitamin A supplementation coverage decreases with increasing age.
Since the study population consisted of under 5 aged children of Chhattisgarh attending CRH, further study needs to be done among the children of other districts of Chhattisgarh before the data can be extrapolated to the Chhattisgarh statistics. Hence, there is a dire need for operational research on the implementation of vitamin A prophylaxis programme in all Indian states.

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