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Knowledge Attitudes and Practices Regarding Vitamin A Supplementation among Caregivers of Children Aged from Six to Fifty-Nine Months in Vihiga County, Kenya

Elijah Njeru Mbiti

Researcher, School of Public Health, Mount Kenya University, Thika, Kenya

Alfred Owino Odongo

Lecturer, School of Public Health, Mount Kenya University, Thika, Kenya

Dominic M. Mogere

Lecturer, School of Public Health, Mount Kenya University, Thika, Kenya

Abstract:

Vitamin A is an essential micronutrient needed in small amounts for, among other uses, the normal functioning of the visual and immune systems. The deficiency of this vital nutrient, therefore, compromises a children's ability to fight diseases and increases their risk of getting sick. The World Health Organization recommends Vitamin A Supplementation (VAS) as a strategy to combat the effects of vitamin A deficiency, but unfortunately, the coverage is low (64% in priority countries and 59% in East and Southern Africa, as reported in UNICEF global nutrition database 2000-2021). The study area recorded low coverage at 26% in 2019 and 54.9% in the year 2020. This study employed a descriptive cross-sectional study design to determine the knowledge, attitude, and practices among caregivers of children 6-59 months regarding vitamin A supplementation in Vihiga County, Kenya, and the influencing factors. In total, 393 caregivers out of the sample size of 400 (98.3%) were recruited into the study. Binary logistic regression was used to determine associations between variables and a p-value <0.05 was considered significant. High VAS awareness was reported in this study, with 90.6% of caregivers having heard of VAS. The main sources of VAS information were health workers (74.3%) and Community Health volunteers (53.2%). Other sources were Radio & TV (6.9%), Social gatherings (7.1%). There was, however, low knowledge of the benefits of VAS (30%) and the problems associated with vitamin A deficiency (30.3%). Sadly, a quarter of caregivers (24.6%) did not know any VAS benefit. A significant proportion of caregivers (77.6% $p < 0.001$) had adequate knowledge of VAS, scoring more than half of the 10 knowledge questions. In addition, caregivers displayed a highly positive attitude towards VAS, scoring between 88.3% and 92.6% on attitude questions. There was low VAS uptake, with only 59.5% of children having taken the supplement during the semester preceding the survey, mainly sourced from health facilities (68.4%), outreach (15.8%), CHV (10.7%) and the ECDE centres (5.1%). For children who missed VAS in the semester of reference, 38% of caregivers indicated they had no reason for missing, 20% said there was no need since the child had completed immunization, while others just forgot (9%). The key drivers of VAS uptake were knowledge ($p < 0.001$), availability of services at health facilities ($p = 0.001$) and services by community health volunteers ($p = 0.028$). Although more than three-quarters (77.6%) of caregivers demonstrated good knowledge, it did not correspond to the VAS uptake recorded in this study, pointing to a knowledge-practice gap. The VAS knowledge was shallow in terms of specific areas like benefits. The caregivers, however, had very positive attitudes towards VAS. Further, this study concludes that better knowledge is an important ingredient for VAS uptake and recommends implementing programmes to improve caregiver knowledge and optimization of the various service delivery platforms to increase both knowledge and uptake.

Keywords: Vitamin A supplementation, knowledge attitudes and practices, caregivers, vitamin A, Kenya

1. Introduction

Vitamin A is an essential micronutrient needed in small amounts for the normal functioning of the visual system and maintenance of cell function for growth, epithelial integrity, red blood cell production, immunity, and reproduction (Khillan, 2014). World Health Organization (2011) estimated that vitamin A deficiency (VAD) affects approximately 190 million children aged six to fifty-nine months, most of whom are from Africa and South-East Asia. A deficiency of vitamin A compromises a children's ability to fight diseases and therefore increases their risk of getting sick, prolonged hospital stay, missed school days and death (Doris H. *et al.*, 2016). Vitamin A Supplementation, a low-cost, acceptable and effective intervention (WHO, 2011), is recommended to combat the effects of VAD (Mayo, W. *et al.*, 2011), but unfortunately, the

coverage is low (64% in priority countries globally and 59% in East and Southern Africa as reported in UNICEF global nutrition database for 2000-2021) (UNICEF, 2023).

Even though adequate Vitamin A capsules are available in Kenya, the two-dose coverage has persistently remained below the WHO target of 80%. The coverage in the county of Vihiga, where this study was conducted, was 26% and 67.7%, respectively, for the years 2019 and 2020 (KHIS, 2019, KHIS, 2022). This study was carried out to establish the factors affecting VAS coverage which is an important starting point towards finding a solution. The objective of the study was to determine the knowledge, attitude, and practices among caregivers of children aged 6-59 months regarding vitamin A supplementation in Vihiga County, Kenya.

2. Methods

The location of the present study was Vihiga County, which is one of the 47 counties in Kenya and was conducted in 2021. It is one of the counties with the lowest VAS coverage for 2019 at 26% and 54.9 in 2020. The study population was caregivers of children 6-59 months resident at the county and employed a cross-sectional design. Multistage sampling procedures were used to randomly select 2 sub-counties of Vihiga County out of the five. Secondly, a pre-listing of households with children 6-59 months was done, from which a random sample was drawn and households visited. Where a household had more than one eligible child, a simple random procedure was used to select an index child. Validated structured questionnaires were used to collect data from consenting caregivers from sampled households.

2.1. Data Analysis

Data were analysed using STATA version 17 computer statistical analysis programme and frequencies and percentages were reported for categorical variables. Binary logistic regression was used to determine associations between variables and a p-value <0.05 was considered significant. The sample size for this study was determined by the formula shown below as used by (Fischer *et al.*, 1983).

$$n = (Z^2 \times p(1-p))/d^2$$

Where:

n = desired minimum sample size of caregivers to be interviewed,

Z = reliability coefficient at alpha (0.05) level of significance, which is 1.96

p = prevalence of the issue under study – proportion of children 6-59 months supplemented with Vitamin A in Vihiga, 54.9% (0.55) in 2020, q=1-p (0.45)

d = degrees of precision desired =0.05.

$$n = (1.96^2 \times 0.55 \times (1-0.45))/0.05^2 = 381 \text{ plus } 5\% \text{ loss} = 400 \text{ and therefore } n=400$$

3. Results

A total of 393 caregivers were surveyed, representing 98.3% response rate and the results are presented in the sections below.

3.1. Socio-Demographic Characteristics of the Caregivers

The majority (98.3%) of the caregivers in this study were of female gender, aged between 17 and 72 years, with a mean age of 34 years. On education, 47.6% and 44.0% had attained primary and secondary levels of education, respectively, with only 1.3% having no formal education, while 7.1% had attained tertiary level (post-secondary). The majority of the caregivers (84.7%) were married and 99.2% were affiliated with some religion. The main sources of income for the caregivers were business (20.9%), farming (41.0%), informal employment (19.0%) and other non-specific sources (15.5%), shown in table 1.

Characteristic	Frequency n=393	Percentage
Gender		
Female	351	98.3
Male	42	10.7
Age		
≤19 years	8	2.0
20 - 30	138	35.1
31 - 40	134	34.1
41 - 50	45	11.5
51 or more	68	17.3
Education		
No schooling	5	1.3
Primary education	187	47.6
Secondary education	173	44.0
Tertiary	28	7.1
Marital Status		
Single	40	10.2
Married	333	84.7
Divorced/Separated	6	1.5

Widowed	14	3.6
Characteristic	Frequency n=393	Percentage
Religion		
Catholic	22	5.6
Islam	3	0.8
Protestant (various)	365	92.8
No religion	3	0.8
Main Source of Income		
Business	82	20.9
Farming	161	41.0
Formal employment	14	3.6
Informal employment	75	19.0
Non-Specific	61	15.5

Table 1: Caregivers' Socio-demographic Characteristics

3.2. Demographic Characteristics of Study Children

Data were collected for a total of 393 children aged between 6 and 59 months, corresponding to the number of caregivers surveyed. In households with more than one child within the age bracket of interest, one child was randomly sampled, and questions were asked regarding that child. The child characteristics considered were child's age, gender, and schooling status. The age categorization was linked to critical patterns of Vitamin A Supplementation, with those between 6-11 months being within primary immunization age and receiving 100,000IU. Children aged 12-18 months receive the measles vaccine at 18 months and are likely to go to health facilities. Children between 19 and 47 months are usually harder to reach as they are not in school and do not frequent health facilities. Children 48-59 months normally attend school and can be reached through the ECDE platform. Table 2 presents the characteristics of children in the survey.

Characteristic	Frequency n=393	Percentage
Gender		
Female	189	48.2
Male	203	51.8
Age		
6-11 months	64	16.3
12-18 months	50	12.7
19-47 months	212	53.9
48-59 months	67	17.1
Started School		
No	170	59.2
Yes	117	40.8
School level		
Daycare	11	9.4
PP1	43	36.8
PP2	7	6.0
Playgroup	56	47.9

Table 2: Demographic Characteristics of Study Children

There was near parity in the gender of the children, with 48.2% being female and 51.8% male and a bigger proportion was between the ages of 19 and 47 months. The majority of the children (59.2%) had not started schooling. For the children in school, the majority (47.9%) were in the playgroup.

3.3. Caregivers' Knowledge of Vitamin A Supplementation

Knowledge of Vitamin A Supplementation (VAS) was assessed using a set of questions focusing on the caregiver's general awareness, source of information, benefits, problems associated with deficiency, and the supplementation schedule. Factors associated with VAS knowledge were also analysed.

3.3.1. Sources of Information on VAS

Most of the caregivers (90.6%) reported having ever heard of Vitamin A supplementation. While allowing multiple responses, caregivers mentioned their source of information as: Health workers (74.3%), Community Health Volunteer (53.2%), social gatherings like community and religious gatherings (7.1%), Radio/Television (6.9%), print media including newspapers, magazines, posters, banners, charts (4.1%), schools particularly the early childhood development

and education centres (4.1%), relatives/friends (1.8%). From these results, the health workers and community health volunteers were the main source of information on VAS at Vihiga County, as shown in figure 1.

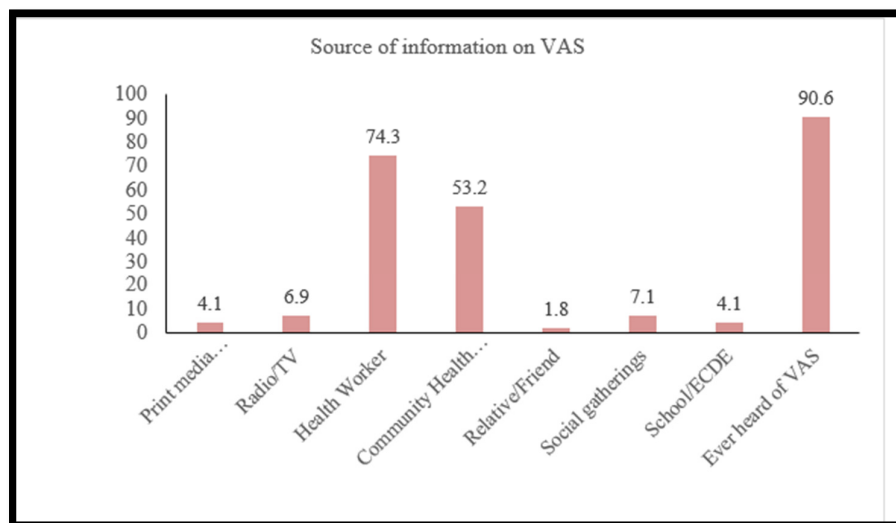


Figure 1: Sources of Information on Vitamin A

3.3.2. Knowledge of Benefits and Problems Associated with Vitamin A Deficiency

Understanding the advantages of a product or service and the risks associated with not using it has the power to affect uptake. In this study, caregivers were asked to list any benefits of vitamin A they were aware of and problems associated with its deficiency. Further, to assess the depth of knowledge, caregivers who mentioned at least two benefits were considered to have a level of knowledge capable of motivating action, as reported in figure 2.

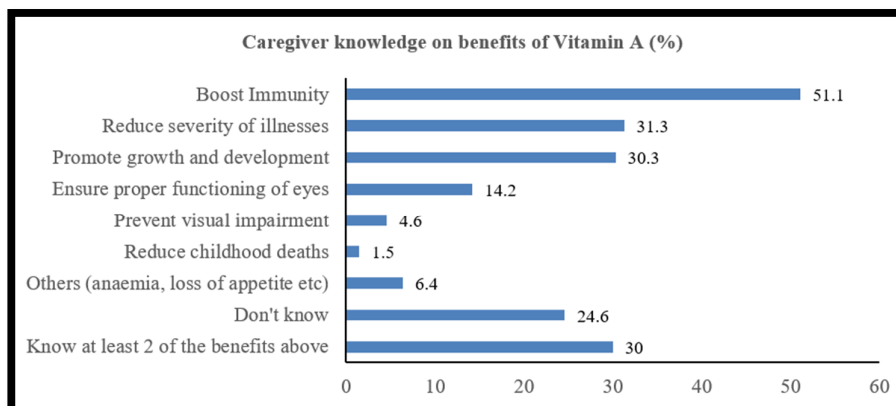


Figure 2: Knowledge of Benefits of Vitamin A

On knowledge of problems associated with vitamin A deficiency, caregivers were asked to list any problems associated with Vitamin A deficiency and to determine the depth of their knowledge. Those who mentioned at least two problems were considered to have a level of knowledge that could motivate action, as reported in table 3.

	Frequency n=393	Percentage (%)
<i>What possible problems would children with vitamin A deficiency have?</i>		
Poor growth and development	198	50.4
Frequent illness	161	41.0
Night blindness	86	21.9
Death	7	1.8
Don't know	85	21.6
Others	37	9.4
<i>Know at least 2 of the problems above</i>	119	30.3

Table 3: Problems Associated with Vitamin A Deficiency

The study reported low levels of knowledge on the benefits of Vitamin A and the problems associated with its deficiency. About half of caregivers (51.1%) knew vitamin A to boost the immunity of their children. 31.3% and 30.3% associated it with preventing the severity of childhood illnesses and promoting growth and development, while only 14.2% linked it with the proper functioning of the eyes. Half of the caregivers (50.4%) knew vitamin A deficiency could result in poor growth and development, while 41.0% said deficiency would result in frequent illnesses. The depth of knowledge was shallow, with only 30.0% of caregivers knowing at least two benefits and a similar proportion being able to recall two problems associated with vitamin A deficiency. It is worrying that a quarter of caregivers neither knew any benefits of vitamin A nor problems associated with its deficiency.

3.3.3. Knowledge of Vitamin A Schedule

Table 4 presents the knowledge of respondents regarding the age children should start receiving vitamin A supplementation, frequency, and duration between doses. It also presents results on up to what age a child should receive vitamin A supplementation.

	Frequency n=393	Percentage
Age to start VAS	263	66.9
How many times in a year a child should receive VAS	226	57.5
How often a child should receive VAS	234	59.5
Up to what age child should receive VAS	258	65.6

Table 4: Knowledge of Vitamin A Schedule

Two-thirds (66.9%) of caregivers knew the correct age to start VAS was six months, while 57.5% and 59.5% correctly stated children should have a dose two times a year, a dose every six months, respectively. Nearly two-thirds (65.6%) of caregivers knew children should receive VAS up to the age of 5 years. These results show that about one-third of caregivers did not understand the VAS schedule.

3.3.4. Overall Knowledge of VAS

The caregivers' overall knowledge of Vitamin A supplementation was assessed using six binary questions and four five-point Likert scale questions, ranging from strongly disagree to strongly agree. To generate an overall knowledge score, the Likert scale questions were dichotomized such that agree and strongly agree were categorized as true and the rest as false. True responses were coded 1 and false were coded 0. A summative score was generated by adding all 10 questions to generate a composite knowledge score.

To further assess the depth of knowledge, respondents who scored more than half of the score (>5) were considered to have adequate knowledge. Table 5 presents the results of the knowledge questions. Overall, 77.6% of caregivers had knowledge of more than half of the knowledge questions ($p < 0.001$).

	Frequency	Percentage	p-value
Scored at least half of 10 questions	305	77.6	<0.001
Specific Knowledge Questions			
Benefits of Vitamin A to Children	118	30.0	0.171
Age to start receiving vitamin A	263	66.9	0.223
How many times in a year should a child aged 6-59M receive VAS?	226	57.5	0.080
Up to what age should a child continue receiving Vitamin A capsules?	258	65.6	0.726
In your community, from where can a mother/caregiver get Vitamin A capsules for their children?	379	96.4	na
How often should a child receive VAS?	234	59.5	0.007
Vitamin A capsules cannot be given to sick children	353	89.8	0.755
Children of age six to fifty-nine months should receive VAS every six months	344	87.5	0.005
Vitamin A can reduce the frequency of child sicknesses	362	92.1	0.126
Vitamin A supplementation is not only for malnourished children	305	77.6	<0.001

Table 5: Proportions of True Responses from the Knowledge Questions on VAS

3.3.5. Factors Associated with VAS Knowledge

In this study, about three-quarters of caregivers had adequate knowledge of Vitamin A. Various variables were checked for association with the acquisition of knowledge, as shown in table 6.

	OR (95% CI)	p-value
<i>Caregiver's Sex</i>		
Male	Ref	
Female	1.04 (0.54, 2.01)	0.908
<i>Caregiver's Age</i>		
<20y	Ref	
20-30y	1.23 (0.38, 3.93)	0.730
31-40y	1.30 (0.40, 4.22)	0.658
41-50y	1.65 (0.46, 5.94)	0.440
>50y	0.88 (0.26, 3.06)	0.845
<i>Caregiver's Education Level</i>		
No schooling	Ref	
Primary	1.28 (0.87, 1.87)	0.212
Secondary	2.54 (1.05, 6.16)	0.030
Tertiary	0.83 (0.48, 1.46)	0.526
<i>Marital Status of the Caregiver</i>		
Divorced/separated/widowed	Ref	
Married	2.11 (1.07, 4.17)	0.029
Single	2.93 (1.20, 7.15)	0.015
<i>Religion of the Caregiver</i>		
Catholic	Ref	
Islam	0.18 (0.03, 1.28)	0.088
No religion	0.44 (0.03, 5.84)	0.533
Protestant	0.53 (0.20, 1.39)	0.196
<i>Household Primary Source of Income</i>		
Non-specific	Ref	
Farming	1.30 (0.88, 1.91)	0.184
Business/Trade	1.04 (0.67, 1.61)	0.859
Formal employment	0.80 (0.51, 1.25)	0.331
Informal employment	0.74 (0.45, 1.21)	0.229
Heard of vitamin A before	4.52 (2.38, 8.57)	<0.001

Table 6: Association between Knowledge and Socio-Demographic Characteristics

Among all the variables examined, education level, marital status, and ever having heard of Vitamin A before were found to be positively associated with knowledge changes. Specifically, participants with secondary education were 2.54 times more likely to have higher knowledge about vitamin A compared to those with no schooling (OR=2.54, 95% CI: 1.05 - 6.16, $p = 0.030$). Marital status was associated with the acquisition of VAS knowledge, with those married being 2.11 times more likely to have higher VAS knowledge compared to those who were widowed or divorced (OR=2.11, 95% CI: 1.07 - 4.17, $p = 0.029$) and those who were single 2.93 times (OR=2.93, 95% CI: 1.20 - 7.15, $p = 0.015$) more likely to have higher knowledge compared to the divorced, separated or widowed.

3.4. Attitudes on Vitamin A Supplementation

The study sought to establish attitudes by caregivers regarding Vitamin A Supplementation and used a set of four five-point Likert questions with a scale ranging from strongly disagree to strongly agree. To generate an attitude score for each question, the Likert scale questions were dichotomized such that agree and strongly agree were categorized as true and the rest as false. True responses were coded 1 and false coded 0, then adding them. Figure 3 presents the proportion of each response among the five indicators questions to measure the same.

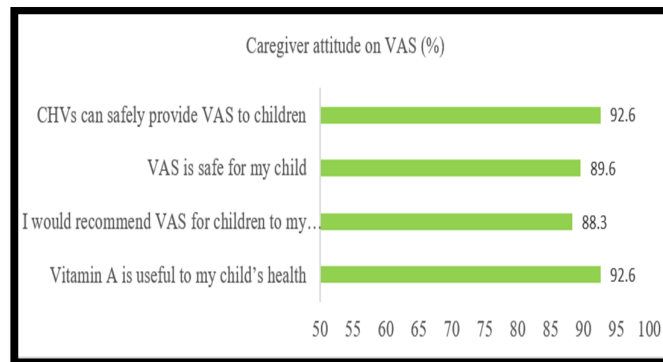


Figure 3: Caregivers' Attitudes on VAS

There was generally a positive attitude towards Vitamin A supplementation both in terms of getting it from CHVs and also its usefulness for children's health. This was so because of the high proportions of respondents responding in the affirmative (agree and strongly agree), as shown in figure 3 above.

3.5. Practices on Vitamin A Supplementation Uptake

The caregivers were asked whether their children had ever received a dose of Vitamin A and, further, if they had a dose during the semesters preceding the survey. Vitamin A Supplementation is reported in the semesters, with semester one running between January and June while semester two running between July and December of each calendar year.

3.5.1. Vitamin A Uptake Status

Caregivers who reported their children had ever received vitamin A were 88.8%. However, when restricted to the past six months preceding the survey (previous semester), which was the focus of this survey, the uptake recorded dropped to 59.5%. The uptake by age group, as shown in table 7 was sub-optimal.

	Yes		No		Total
	n	%	n	%	
Child ever received Vitamin A	349	88.8	44	11.2	393
Child received VAS in the past Semester (children 6-59 months)	234	59.5	159	40.5	234
Age breakdown for children who received VAS in the last semester					
	n	%	n	%	Total
6-11 months	33	51.6	31	48.4	64
12-18 months	29	58.0	21	42.0	50
19-47 months	137	64.6	75	35.4	212
48-59 months	35	52.2	32	47.8	67

Table 7: Vitamin A Supplementation Uptake

3.5.2. Sources of Vitamin a Capsules

The caregivers who reported their children received Vitamin A in the preceding semester to the survey were asked where they received the services from. The majority (68.4%) reported having received the services from a health facility, 15.8% during outreach sessions, 10.7% at their households from community health volunteers, while a small proportion of 5.1% got the services from an ECDE Centre as shown in table 8.

Where VAS service sources were sourced from	Age of Children in Months					
	6-11	12-18	19-47	48-59	Total	%
Health facility	29	21	93	17	160	68.4
Community Health Volunteer	2	2	17	4	25	10.7
ECDE Centre	1	0	4	7	12	5.1
Outreach site	1	6	23	7	37	15.8
Total	33	29	137	35	234	100

Table 8: Sources of Vitamin a Services

Whereas the Vitamin A Supplementation policy provides VAS delivery through health facilities, integration into campaigns, Outreach, Community Units and ECDE centres, most caregivers still access VAS services from health facilities, leaving other platforms largely under-utilized.

3.5.3. Reasons for Not Having Received VAS

Caregivers were asked to state the primary reason the 159 children did not receive VAS in the semester preceding the survey. Figure 4 presents the results.

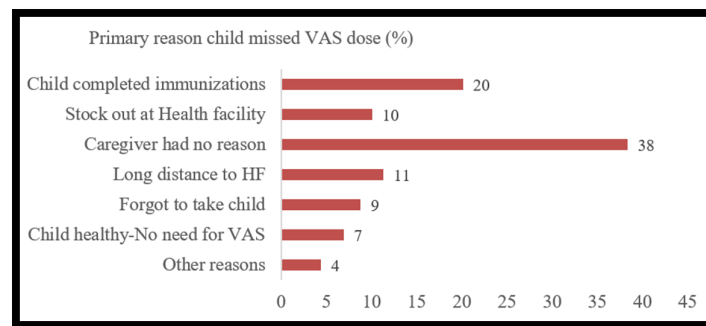


Figure 4 Reasons Children Missed VAS

The most prevalent reasons cited by caregivers whose children did not receive VAS included long distance to health facility (11%), stock out of Vitamin A at health facility (10%), child completed immunizations and therefore the caregiver stopped taking children for VAS (20%) and forgetting to take children for VAS (9%). Some caregivers (7%) thought their children did not need VAS since they were looking healthy. The majority of the caregivers (38%), however, had no particular reason for not taking their children for VAS. It is noteworthy that most of the reasons fronted by caregivers had to do with a lack of knowledge of the importance of VAS.

3.6. Factors Associated with VAS Uptake

The socio-demographic characteristics, knowledge and sources of vitamin A services were examined for association with VAS uptake.

3.6.1. Association between Vitamin A Uptake and Socio-Demographic Characteristics

The socio-demographic factors examined for caregivers were age, gender, education level, marital status, religion, primary source of income and for children, age, gender, and schooling status. The results are presented in table 9.

	OR (95% CI)	p-value
Caregiver's Sex		
Male	Ref	
Female	0.45 (0.17, 1.21)	0.115
Caregiver's Age		
<20y	Ref	
20-30y	1.40 (0.53, 3.95)	0.470
31-40y	1.55 (0.56, 4.21)	0.410
41-50y	1.00 (0.36, 3.05)	0.940
>50y	1.80 (0.61, 5.25)	0.290
Caregiver's Education Level		
No schooling	Ref	
Primary	1.53 (0.47, 4.93)	0.480
Secondary	1.68 (0.52, 5.47)	0.385
Tertiary	2.01 (0.55, 7.27)	0.288
Marital status of the caregiver		
Single	Ref	
Divorced/separated/widowed	0.40 (0.04, 3.66)	0.421
Married	0.47 (0.09, 2.40)	0.365
Religion of the caregiver		
Catholic	Ref	
Islam	1.09 (0.11, 10.97)	0.939
No religion	0.18 (0.01, 2.23)	0.181
Protestant	0.48 (0.22, 1.02)	0.056
Household Primary Source of Income		
Non-specific	Ref	
Farming	0.86 (0.40, 1.84)	0.091
Business/Trade	0.50 (0.23, 1.11)	0.085
Formal employment	0.25 (0.06, 1.16)	0.077
Informal employment	0.68 (0.30, 1.51)	0.342

<i>Child's Age in Months</i>		
<12 months	Ref	
12-18 months	1.30 (0.61, 2.73)	0.494
19-47 months	1.71 (0.97, 3.02)	0.061
48+ months	1.03 (0.52, 2.04)	0.938
<i>Child's Gender</i>		
Male	Ref	
Female	1.16 (0.85, 1.58)	0.338
<i>Child's School Status</i>		
Not started	Ref	
Daycare	0.65 (0.22, 1.95)	0.445
Playgroup	0.65 (0.39, 1.09)	0.105
PP1/PP2	0.79 (0.48, 1.30)	0.356

Table 9: Association between VAS Uptake and Socio-Demographic Characteristics

All examined socio-demographic characteristics of the caregivers and those of children were not significantly associated with vitamin A uptake.

3.6.2. Association between Vitamin A Uptake and Other Variables

According to the policy guideline for integrated preventive Vitamin A Supplementation and deworming for children 6-59 months in Kenya, 2022 (MOH, 2022), the recommended service approaches are:

- Routine contacts at the health facility,
- Integration into campaigns and Malezi Bora,
- Community units, outreaches and early childhood development and education centres.

In this survey, caregivers reported having received Vitamin A Services from the health facility, outreach, ECDE centres and community units by the CHVs. The study examined which of the service outlets were significantly associated with vitamin A uptake. Further, the study examined the association between caregiver knowledge of VAS and uptake, as presented in table 10.

	OR (95% CI)	p-value
Source		
Health facility	2.39 (1.40, 4.08)	0.001
ECDE/School	0.66 (0.22, 1.95)	0.451
Community Health Volunteer	2.99 (1.13, 7.93)	0.028
Outreach	1.24 (0.87, 1.76)	0.226
Caregiver Knowledge of VAS		
Caregiver has knowledge in more than half of the 10 knowledge areas	1.52 (1.03, 2.23)	0.030

Table 10: Association between Vitamin A Uptake with Sources of Services and Caregiver Knowledge

The caregivers who sought VAS services from a health facility were 2.4 times more likely to receive vitamin A (OR = 2.39, 95% CI:1.40, 4.08; p = 0.001) and from Community Health Volunteer (OR=2.99, 95% CI:1.13, 7.93; p=0.028) were 2.99 times more likely to receive VAS. The two platforms were significantly correlated with higher vitamin A uptake. Receiving the supplementation from ECDE centres and outreach were not significantly associated with increased uptake. Caregivers who had better VAS knowledge (answered more than half of the 10 knowledge questions correctly) were 1.52 times more likely to have their children take vitamin A. Therefore, there was a strong association between knowledge of vitamin A supplementation and uptake in this study.

4. Discussion

The present study sought to establish the knowledge, attitudes, and practices among caregivers of children aged 6 to 59 months on Vitamin A Supplementation in Vihiga County, Kenya. A total of 393 caregivers were reached out of the sample of 400, with a response rate of 98.3%. The majority (98.3%) were female, aged between 20 and 40 years, with a mean age of 34 years which is in keeping with childcare practices in the study area. The majority of caregivers (84.7%) were married and nearly all (99.8%) were affiliated with some religion. These findings are similar to those from a study in India, where the majority (68%) of child caregivers were women aged between 20 and 30 years (Mishra, K. *et al.*, 2019). According to a study conducted in South Africa on the attitudes of carers of children under the age of five years towards growth monitoring, 61.2% of caregivers were women, the majority of whom were between the ages of 25 and 34, all belonged to one or more religious groups, and 80.6% were married (Mphasia, M.H. *et al.*, 2023).

The results of this study showed high awareness of VAS among caregivers, with 90.6% having heard of VAS before. The findings are consistent with those of other studies, including those from India (Prajapati, A. *et al.*, 2015), which recorded awareness at 90.4%, Southern Ethiopia (Kassa, G. *et al.*, 2020), and Mbagathi Hospital, Kenya (Njue, M.W. *et al.*, 2010), which documented awareness on VAS by caregivers at above 90%. In contrast, low awareness of VAS was reported

at 23.5% in a study in Southern Ethiopia (Nigusse T. & Gebretsadik A., 2021), 40% in Libya (Abdulmalek, L.J., Benkhaial, F.S., 2018).

Further, the study sought to find the source of information on VAS and Health workers at health facilities and community health volunteers were reported as the main source of information at 74.3% and 53.2%, respectively. Similar results were reported in other research, with caregivers in Tharaka Nithi, Kenya, citing health workers as their source of knowledge on VAS in 62.9% of cases (Kananu N. C., 2021) and Ethiopia in 97.2% of cases (Kassa, G. *et al.*, 2020). The results differ from those from a study in Libya (Abdulmalek, L.J., Benkhaial, F.S., 2018) which documented health professionals as the least likely source of information on VAS. This was also echoed by findings in a study from India (Prajapati, A. *et al.*, 2015), which found that 60% of mothers of young children in pre-school received information on VAS from friends and family.

In the present study, 30% of caregivers knew at least two benefits of VAS, while 30.3% recalled two problems associated with VAS deficiency, with slightly more than half of them knowing the VAS schedule. Overall, 77.6% ($p < 0.001$) of caregivers had knowledge of more than half of the ten knowledge questions posed. These results agree with those from a quasi-experimental study in India (White, S., 2018) assessing the effectiveness of planned teaching programmes on knowledge regarding VAS among mothers of under-five. The findings, however, differ from those from a NIMS survey in Kenya (NIMS, 2021) which reported that only 24.4% of caregivers in Vihiga knew the correct schedule for VAS.

There was a significant relationship between VAS knowledge and marital status (married: $p = 0.029$, single: $p = 0.015$), secondary education attained: $p = 0.030$, and VAS knowledge: $p = 0.001$. The results corroborate those of a study conducted in India, which found no statistically significant relationship between caregiver age, religion, family structure, or occupation and VAS knowledge but found a significant relationship between caregiver education status and knowledge, with more educated caregivers showing more knowledge (White S., 2018). Similar results were obtained in another Indian study (Prajapati A. *et al.*, 2015), which linked education to a better knowledge of VAS. This finding was in line with research from India (White S., 2018), which found a significant correlation between general awareness and VAS knowledge. Caregivers who had ever heard of Vitamin A Supplementation (awareness) were 4.52 times more likely to have better knowledge (OR=4.52, 95% CI: 2.38 - 8.57, $p < 0.001$).

Caregivers in this study demonstrated a highly positive attitude towards Vitamin A, scoring between 88.3% and 92.6% on the various knowledge questions. The results are consistent with 88% reported in a study in Libya among parents of children under five years (Abdulmalek, L.J. & Bankhaial, F.S., 2018). Likewise, Kamau M.W. *et al.*, (2012), in a study in Kenya, reported no negative attitudes or beliefs on Vitamin A supplementation. Further, the caregivers, too, had positive attitudes towards the role played by community health volunteers on vitamin A supplementation.

Even though 88.8% of children aged 6-59 months in the present study were reported to have ever taken a dose of Vitamin A, only 59.5% of those children got vitamin A supplements in the semester before the survey, against a WHO target of 80%. The study found no significant association between VAS uptake and socio-demographic characteristics of the caregivers and children. These findings are similar to those in studies in Nigeria and Bangladesh, which found no significant association between the gender of both caregivers and children (Aghaji A. *et al.*, 2019; Semba *et al.*, 2010). However, the findings were inconsistent with a study in Bangladesh (Marjan, N. *et al.*, 2021) which reported parental education, religion, and age of children to be positively associated with higher uptake of VAS. Kassa. *et al.* (2020), in a study in Ethiopia, reported higher uptake of VAS by children of illiterate caregivers. Similarly, Raut, M.K. *et al.* (2019) found that maternal education was strongly correlated with vitamin A intake when they analysed various DHS from low- and middle-income countries.

The majority of caregivers (68.4%) accessed VAS services from a health facility which was statistically significant ($p = 0.001$). The community health volunteers as a source of VAS were also significantly associated with higher uptake. The results were similar to those from a study in Ghana which reported receiving VAS from a health facility as being significantly associated with higher VAS uptake (Lartey S., 2019). Knowledge of VAS was statistically associated with higher uptake of VAS ($p = 0.030$), which corroborates findings from an Ethiopian study that linked less VAS knowledge to decreased uptake (Semba, R. *et al.*, 2010). The results are also consistent with research findings from Ghana (Lartey, S., 2019, Hadzi D. *et al.*, 2016), Southern Ethiopia (Kassa *et al.*, 2020), Kenya (Kamau, M.W. *et al.*, 2012), Libya (Abdulmalek L.J. & Benkhaial F.S. 2018), and Nigeria (Atimati, A. O. *et al.*, 2014) that found that parents who had more knowledge were more likely to have their children receive VAS. In this study, receiving services from health facilities, community health volunteers and knowledge of VAS was significantly associated with higher uptake.

5. Conclusions

Vitamin A Supplementation, being a low-cost, high-impact nutrition intervention, is an effective strategy to improve child survival. Although more than three-quarters of caregivers in this study demonstrated good VAS knowledge, the depth of the same was shallow in terms of specific areas like benefits. The caregivers, however, had very positive attitudes towards VAS.

Vitamin A Supplementation uptake was low at 59.5% compared to the overall knowledge at 77.6%, depicting a knowledge practice gap. This study concludes that better knowledge is an important ingredient for increased VAS uptake.

6. Recommendations

To improve VAS uptake, this study recommends measures be put in place to increase caregiver knowledge of VAS. Further, the County Government of Vihiga should optimise all VAS delivery platforms to reach all eligible children with VAS services.

7. References

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