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Effectiveness of Behaviour Change Communication Initiatives on Vitamin A Supplementation Knowledge Among Caregivers of Children Aged 6-59 Months in Vihiga County, Kenya

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Abstract: Vitamin A Supplementation (VAS) is a low-cost high impact, acceptable, and clinically effective intervention recommended by the World Health Organization to combat the effects of the prevalent Vitamin A deficiency in children 6-59 months which remains a public health concern globally. Maintenance of good health and prevention of diseases in this age group therefore requires adequate intake of Vitamin A. Sadly, VAS coverage has remained low over the years, averaging 61% across 64 priority countries globally and Eastern and Southern Africa recording a coverage of 57%, Kenya 67.3% which is way below the WHO target of 80%. One of the key barriers associated with low VAS uptake is inadequate knowledge. This study was conducted to test the effectiveness of community-based intervention in scaling up VAS uptake for children aged six to fifty-nine months in Vihiga County, Kenya. A quasi-experimental pre-post design was employed with two arms, intervention, and control. In total, 393 and 389 caregivers of children 6-59 months were recruited at baseline and endline respectively at both arms. The intervention undertaken included development and dissemination of VAS behaviour change communication materials targeting caregivers of children 6-59 months using guides developed during the study. Logistic regression models were used, and Difference-In-Difference analysis applied to detect changes between the two arms. Due to the intervention, VAS knowledge by caregivers significantly increased by 18.4% (p= <0.001). Key significant factors associated with this increase were caregivers having MCH Handbook (OR=2.21, 95% CI: 1.31-3.74; p=0.003), receiving information on VAS from health worker at facility (OR=1.73, 95% CI: 1.01, 2.97; p=0.047), receiving information from community health volunteers (OR=2.35, 95% CI: 1.50, 3.66; p<0.001) and having secondary education (OR =3.36, 95% CI: 1.27-8.94; p=0.015. This study concludes that this intervention was effective in increasing the VAS knowledge among the caregivers of children aged six to 59 months.

Keywords: Vitamin A Supplementation Knowledge, Vitamin A, Behaviour Change Communication, Caregivers

1. Introduction

Vitamin A Supplementation (VAS) is a high impact low-cost, acceptable, and clinically effective intervention recommended by the World Health Organization to combat the effects of the prevalent Vitamin A deficiency in children 6-59 months which remains a public health concern globally [16, 17]. Maintenance of good health and prevention of diseases in this age group therefore requires adequate intake of Vitamin A. Sadly, VAS coverage has remained low over the years, averaging 61 percent across 64 priority countries worldwide and Eastern and Southern Africa recording a coverage of 57% [14], Kenya 67.3% [4] which is way below the WHO target of 80%. One of the key barriers associated with low VAS uptake is inadequate knowledge, which has consistently remained low with studies reporting varying level of knowledge ranging from 40% in Libya [1], 23.5% in Tharaka Nithi, Kenya [2], Ethiopia at three quarters of

caregivers having knowledge on VAS [3]. UNICEF recommends scale up of VAS knowledge as a strategy to increase VAS uptake [13].

In 2020, Nutrition Intervention Monitoring System (NIMS) survey reported 40.4% and 43.4% of caregivers knew the VAS schedule and benefits respectively [9]. In a similar survey in 2021, only 46.7% of caregivers of children 6-59 months reported receiving any message on VAS and 36.2% at Vihiga County [10]. The two NIMS surveys reported low knowledge on VAS at Vihiga County with only 24.4% knowing the benefits of VAS in 2021, a drop from 44.8% reported in the previous year [9, 10]. This clearly demonstrates a knowledge gap which corroborates with the low VAS coverage in the county at 26% in 2019 and 54.9% in 2020 respectively [4, 5]. A community level VAS behaviour change communication and messaging was implemented at the county over a period of 6 months to assess its effect on caregiver knowledge.

Objective: To assess the effect of community-based intervention on caregivers' Vitamin A Supplementation knowledge and attitudes in Vihiga County, Kenya.

2. Materials and Methods

This was a quasi-experimental pre-post study design with intervention and control arms targeting caregivers of children aged between six and fifty-nine months. The following formula was employed to calculate the required sample size [7].

$$n = D\,[(Z_\alpha + Z_\beta)^2 * ((P_1(1- P_1) + P_2\,(1- P_2))/\,(P_2 - P_1)^2]$$

$$n = 2[(1.96 + 1.282)^2 * ((0.55(1 - 0.55) + 0.77\,(1 - 0.77))/\,(0.77 - 0.55)^2] = 185$$

respondents per arm. A 10% was added to the sample to cushion against non-response and therefore a final sample size of 204.

Data was collected using validated structured questionnaires administered to consenting sampled respondents. The intervention lasted six months between January and June 2022 and included VAS messaging at community level by trained Community Health Volunteers who engaged with the caregivers at their households and at community gatherings. Monthly monitoring activities were carried out every month to track the implementation of the messaging and resolving any challenges arising. At the control arm, no additional action was employed, and the VAS program went on as is routine.

Data was analysed using STATA version 17 computer statistical analysis programme.

Descriptive statistics included mean and standard deviation for continuous variables and frequency distribution and proportions for categorical and discrete variables. The results from intervention and control arms were compared using independent sample t-test for continuous variables and Fisher's exact test for categorical and discrete variables. To test if there were significant changes between baseline and endline attributable to the intervention, difference-in-difference (DID) analysis was conducted with significance level set at 0.05 at 95% Confidence level.

3. Results

A total of 393 (96.3%) respondents were surveyed at baseline and 389 (95.3%) at the endline.

Table 1. *Caregivers Socio-Demographic Characteristics.*

	Baseline							**End-line**						
	Control		**Intervention**		**Total**		**p-value**	**Control**		**Intervention**		**Total**		**p-value**
	n	**%**	**n**	**%**	**n**	**%**		**n**	**%**	**n**	**%**	**n**	**%**	
Gender														
Female	181	93.3	170	85.4	351	89.3	0.012	184	94.8	184	94.4	368	994.6	0.83
Male	13	6.7	29	14.6	42	10.7		10	5.2	11	5.6	21	5.4	
Age groups (years)														
<19 years	3	1.5	5	2.5	8	2		5	2.6	5	2.6	10	2.6	
20 - 30	63	32.5	75	37.7	138	35.1		85	43.8	107	54.9	192	49.4	
31 - 40	58	29.9	76	38.2	134	34.1	<0.001	71	36.6	46	23.6	117	30.1	0.08
41 - 50	16	8.2	29	14.6	45	11.5		18	9.3	20	10.3	38	9.8	
51 or more	54	27.8	14	7	68	17.3		15	7.7	17	8.7	32	8.2	
Education														
No schooling	4	2.1	1	0.5	5	1.3		3	1.5	5	2.6	8	2.1	
Primary education	94	48.5	93	46.7	187	47.6	0.483	99	51	100	51.3	199	51.2	0.45
Secondary education	84	43.3	89	44.7	173	44		71	36.6	77	39.5	148	38	
Tertiary	12	6.2	16	8	28	7.1		21	10.8	13	6.7	34	8.7	
Marital Status														
Divorced/separated/widowed	7	3.6	13	6.5	20	5.1		14	7.2	9	4.6	23	5.9	
Married	160	82.5	173	86.9	333	84.7	0.028	147	75.8	164	84.1	311	79.9	0.12
Single	27	13.9	13	6.5	40	10.2		33	17	22	11.3	55	14.1	
Religion														
Catholic	10	5.2	12	6	22	5.6		18	9.3	4	2.1	22	5.7	
Islam	3	1.5	0	0	3	0.8	0.105	1	0.5	2	1	3	0.8	0.008
No religion	0	0	3	1.5	3	0.8		0	0.0	0	0.0	0	0.0	
Protestant	181	93.3	184	92.5	365	92.9		175	90.2	189	96.9	364	93.6	

3.1. Socio-Demographic Characteristics of the Caregivers

Majority (94.6% at baseline and 89.3% at endline) of caregivers in this study were female, 69.2% (baseline) and 79.4% (endline) were between the age of 20 and 40 years. The respondents were literate with 98.7% (baseline) and 97.9% (endline) having attained primary school level of education and above. Majority of respondents (84.7% and 79.9% at baseline and endline respectively) were married as shown on Table 1 above.

3.2. Caregivers' Knowledge on Vitamin A Supplementation

A set of questions was used to assess caregiver knowledge on VAS that included areas like whether they had ever heard of VAS, their source of information, VAS supplementation schedule, benefits, and where they could source the supplement. Factors associated with changes in knowledge were also analysed.

3.2.1. Sources of Information on VAS

At baseline, 87% and 94% in control and intervention respectively were aware of VAS while at end line, the proportion increased to 98% and 96% respectively at control and intervention. The differences were however not statistically significant (p=0.055). The main source of information on VAS was health workers at 87.6% and 85.1% at control and interventions arms during the endline and the community health volunteers reported as source of information by 58.6% and 64.1% of respondents at control and intervention arms during the endline as presented in Table 2 below.

Table 2. *Sources of Information about Vitamin A Supplementation.*

	Baseline (%)		End-line (%)		DID	
	Control	Intervention	Control	Intervention	Change	p-value
Heard or read about VAS	87.1	94.0	97.9	96.4	-8.4	0.055
Source of information on VAS						
Book/Newspaper/ magazine	3.6	2.7	2.6	3.6	1.9	0.459
Posters/ charts/ banners	1.2	1.1	0.5	2.1	1.7	0.320
Radio	4.1	8.0	9.8	5.6	-8.1	0.034
Television (TV)	1.8	4.8	5.7	2.6	-6.1	0.033
Health worker at health facility	83.4	65.2	87.6	85.1	15.7	0.049
Community Health Volunteer (CHV)	55.6	51.0	58.6	64.1	10.1	0.010
Relatives & friends	1.8	2.1	3.6	1.5	-2.4	0.306
Outreach event/ road shows	7.7	1.6	2.1	3.6	7.6	0.015
Community meeting/ baraza	1.8	0.5	0.0	0.5	1.8	
School/ ECDE Centre	7.7	1.6	5.7	8.2	8.6	0.008
Church/Mosque/religious gathering	1.8	0.0	1.5	0.5	0.8	

3.2.2. Knowledge on Benefits of Vitamin A

Knowledge on benefits of a product or services and the risks associated with its absence has the capability to influence uptake. In this study, the respondents were asked to mention the benefits of Vitamin A they knew. The benefits in focus included boost to child's immunity, reduction in severity of illnesses, ensuring proper functioning of the eyes and reduction in deaths. To assess the depth of knowledge in this area, caregivers who mentioned at least 2 of the benefits were considered to have a level of knowledge that could motivate action as reported in Table 3 below.

Table 3. *Knowledge on Benefits of Vitamin A by Caregivers of Children 6-59 Months.*

	Baseline (%)		End-line (%)		DID	
	Control	Intervention	Control	Intervention	Change	p-value
Benefits						
Boost immunity	56.4	46.2	52.1	43.6	1.7	0.84
Reduce severity of illnesses	30.9	31.7	39.5	43.1	2.8	0.07
Ensure proper functioning of the eyes	11.9	16.6	5.7	11.8	1.4	0.40
Reduce deaths	2.6	0.5	2.1	0.0	0.0	na
Other mentioned correct benefits	8.3	1.5	16.0	10.8	1.5	0.06
Proportion with at least 2 right responses	36.6	23.6	32.5	27.7	8.2	0.17

The study reported low levels of knowledge on benefits of Vitamin A at both arms of the study even though an increase was recorded at the intervention arm. The respondents who could name at least two benefits of Vitamin A increased overall by 8.2% points between control and intervention arms. The change was however not statistically significant (p=0.171). Though the caregivers were generally aware of vitamin A, their depth of knowledge was shallow.

3.2.3. Knowledge on Source of Vitamin A Services

The study explored caregiver knowledge on possible sources of vitamin A Supplementation where they could take their children for the service.

Overall, at both baseline and endline, nearly all respondents (Baseline 98% and 95% for control and intervention arms respectively; end line 99.5% and 100% at control and

intervention arms respectively) knew where to get vitamin A supplementation services for their children. Specifically, health facility and community health volunteers were the sources most of the participants knew about. For health facility, in the intervention arm, the proportions changed from 87.4% to 98.5% compared to control arm which changed from 91.8% to 90.7% representing a difference-in-difference change of 12.2% which is statistically significant (p=0.001) and attributable to the intervention. For community health volunteers, in the intervention arm, the proportions changed from 12% to 57% compared to Control arm which changed from 42% to 72% representing a difference-in-difference change of 15% which is statistically significant (p=0.003) and attributable to the intervention. The outreach as a source of services, though recorded a significant increase was driven by the fact that outreach services were less frequent at the control arm which consequently recorded a decline in caregivers who reported this platform as a source of vitamin A Supplementation services. Overall, the caregivers displayed universal knowledge on where to get Vitamin A for their children with variations between the control and intervention arms. Table 4 summarises the findings.

Table 4. *Knowledge On Sources Of Vitamin A Supplementation Services.*

Knows where to get Vitamin A	Baseline (%)		End-line (%)		DID	
	Control	Intervention	Control	Intervention	Change	p-value
Health facility	91.8	87.4	90.7	98.5	12.2	0.001
Purchase from shops	8.3	1.0	7.2	4.6	4.7	0.051
ECDE school	0.5	0.0	2.6	5.6	3.5	
Outreach	4.1	5.5	0.5	8.7	6.8	0.022
Malezi Bora	0.0	3.5	0.0	0.5	-3.0	
During immunization campaigns	4.1	2.0	0.0	1.5	3.6	
Community Health Volunteer	42.3	12.1	72.2	67.4	25.4	0.003
Knows where to get Vitamin A	98.0	95.0	99.5	100.0	3.5	

3.2.4. Knowledge on Other Sources of Vitamin A Other Than Supplementation

The natural source of vitamin A is the diet which can be achieved through foods that contain adequate vitamin A such as green leafy vegetables, fruits, and animal sources. Other sources of Vitamin A are consuming bio-fortified foods and those fortified by adding the vitamin to commonly available foods like cooking oils and flours. The need for vitamin A supplementation is necessary because children usually do not receive the minimum acceptable daily requirements for vitamin A through the diet. Knowledge on other sources on vitamin A other that supplementation is therefore important, and respondents were therefore asked if they knew other ways of protecting their children from vitamin A deficiency. At baseline, 53% and 80% of caregivers at intervention and Control arms respectively cited eating vitamin A rich foods such as fruits and vegetables to safeguard children from vitamin A deficiency. This proportion changed at end-line to 83% in the intervention and 69% in the Control. This stands for a change of 40% that could be attributable to the intervention (p<0.001). Overall, 77% of the respondents in the intervention and 85% in the control at baseline and 84% in the intervention and 75% in the control arm mentioned at least one of the ways of preventing vitamin A deficiency (DID = 15%, p=0.007). The proportion of respondents who indicated not knowing other sources of vitamin A rose at control from 15% to 24% at baseline and endline respectively but dropped at intervention arm from 21% at baseline to 13% at endline as shown on Figure 1.

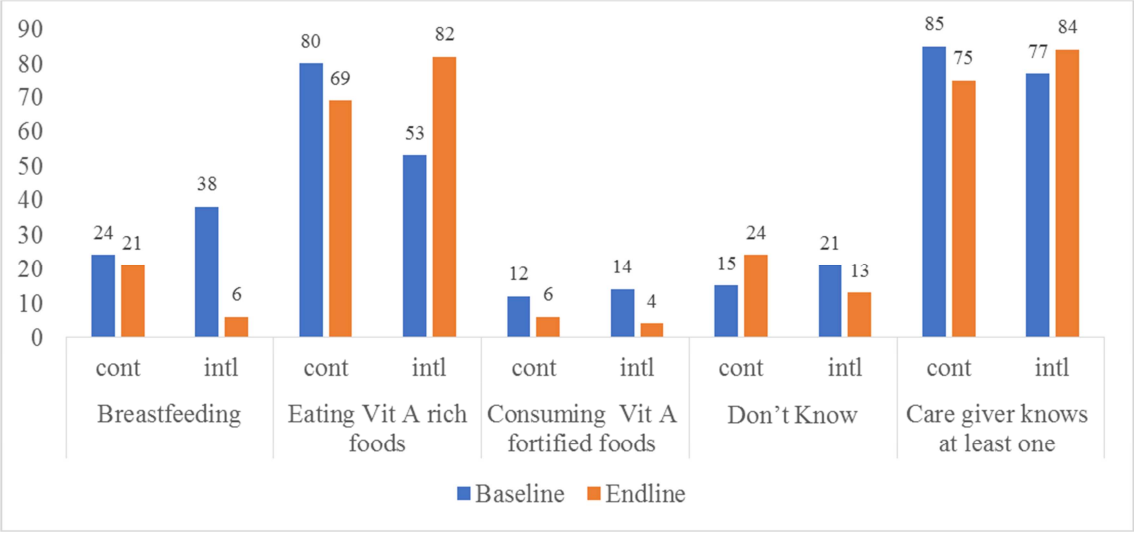

Figure 1. *Other Sources of Vitamin A Other Than Supplementation.*

3.3. Overall Knowledge on Vitamin A Supplementation

The caregivers' overall knowledge on Vitamin A supplementation was assessed using 6 binary questions and 4 five-point Likert scale questions with the scale 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 coded 0. A summative composite score was generated by adding all the 10 questions to generate a continuous composite knowledge score as presented in Table 5 below which summarizes the overall results from these knowledge questions.

At baseline, the overall mean score was 7.4 (sd±2.0) in the Control arm and 7.0 (sd±2.4) in the intervention arm. In the Control arm, the knowledge score decreased to 7.2 (sd±1.6) and in the intervention arm, it increased to 7.3 (sd±1.6), and this resulted to a significant difference-in-difference change of 0.6 (p=0.014). To further assess the depth of knowledge, respondents who scored more than half of the score (>5) were considered to have adequate knowledge. This proportion also showed statistically significant increase that could be attributed to the intervention. That is, in the Control arm, baseline was at 86% and slightly decreased to 83% at endline while in the intervention arm, the proportions increased from 70% at baseline to 86% at endline, being a significant difference of 18.4% (p=0.001) which could be attributable to the intervention. Caregivers from the intervention arm displayed an increased overall knowledge on VAS.

Table 5. *Proportions of true Responses from the Knowledge Questions on Vitamin A supplementation.*

	Baseline (%)		Endline (%)		DID	
	Control	**Intervention**	**Control**	**Intervention**	**Change**	**p-value**
Overall score [Continuous] (mean (sd))	7.4 (2.0)	7.0 (2.4)	7.1 (1.6)	7.3 (1.6)	0.6	0.014
Scored at least 6 [binary] (>half of the total score)	85.6	69.9	83.0	85.6	18.4	<0.001
Specific knowledge questions						
Benefits of vitamin A to children	36.6	23.6	32.5	27.7	8.2	0.171
Age to start receiving vitamin A	71.6	62.3	78.5	78.5	9.3	0.223
How many times in a year should a child of age 6-59M receive VAS?	50.5	64.3	62.9	64.1	-12.6	0.080
Up to what age should a child continue receiving Vitamin A capsules.	71.1	60.3	72.7	64.6	2.7	0.726
In your community, from where can a mother/ caregiver get Vitamin A capsules for their children?	97.9	95	100	100	2.9	na
Apart from vitamin A capsules, how else can children be protected from Vitamin A deficiency?	84.5	77.4	75.8	83.6	14.9	0.007
Vitamin A capsule cannot be given to sick children	65.5	63.3	62.4	57.9	-2.3	0.755
Children of age six to fifty-nine months should receive VAS every 6 months	88.7	86.4	73.2	87.2	16.3	0.005
Vitamin A can reduce the frequency of child sicknesses	90.7	93.5	94.8	91.3	-6.3	0.126
Vitamin A supplementation is not only for malnourished children	79.4	75.9	59.8	79.5	23.2	<0.001

As presented in Table 5 above, Figure 2 represents the changes in the overall knowledge on VAS graphically.

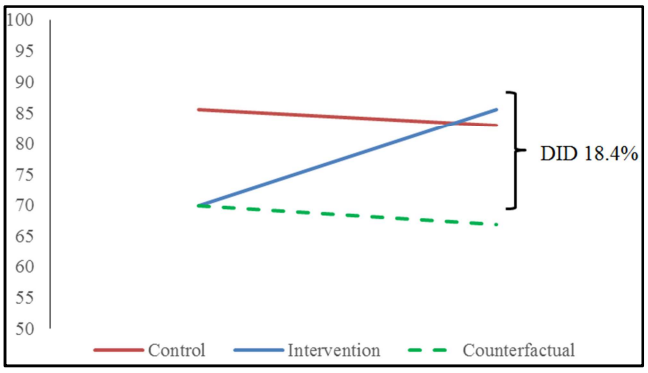

Figure 2. *DID change in Knowledge Scores on Proportion Scoring More than Half.*

3.4. Factors Associated with Changes in Knowledge

This study showed a statistically significant change in the knowledge by caregivers attributable to the intervention. Bivariate and multivariate logistic regression models were used to examine the factors associated with the changes. First, the variables on the conceptual framework including socio-demographic characteristics of the caregivers, children and knowledge areas were examined for association using the bivariate regression models. The variables statistically significant at bivariate analysis were further subjected to multivariate regression analysis to examine the predictors of vitamin A supplementation knowledge as presented in the sections hereunder.

3.4.1. Association of Socio-Demographic Characteristics with Changes in Knowledge

The socio-demographic characteristics of both caregiver and child were examined through bivariate logistic regression to determine their influence of acquisition of VAS knowledge by caregivers in this study. The bivariate analysis results are presented in Table 6.

Table 6. *Bivariate Analysis on Association Between Knowledge and socio-Demographic Characteristics of the Caregiver.*

	OR (95% CI)	p-value
Caregiver's Sex		
Male	Ref	
Female	1.04 (0.54, 2.01)	0.908
Caregiver's Age		
<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
Caregiver's Education level		
No schooling	Ref	
Primary	1.28 (0.87, 1.87)	0.212
Secondary	2.54 (1.05, 6.16)	0.039
Tertiary	0.83 (0.48, 1.46)	0.526
Marital status of the caregiver		
Divorced/separated/widowed	Ref	
Married	2.11 (1.07, 4.17)	0.031
Single	2.93 (1.20, 7.15)	0.018
Religion of the caregiver		
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
Household Primary Source of Income		
Non-specific	Ref	
Faming	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
Household head		
Father	Ref	
Spouse	0.69 (0.26, 1.82)	0.454
Self	0.53 (0.19, 1.47)	0.225
Other relative/kin	0.84 (0.23, 3.01)	0.784
Who makes decisions		
Self	Ref	
Husband/Partner	1.07 (0.57, 2.02)	0.840
Joint decision between self and spouse	1.94 (1.17, 3.23)	0.011
Parents and others	1.64 (0.66, 4.07)	0.289
Child's age in months		
<12 months	Ref	
12-18 months	0.97 (0.50, 1.88)	0.917
19-47 months	1.15 (0.68, 1.96)	0.598
48+ months	0.78 (0.42, 1.45)	0.435
Child's gender		
Male	Ref	
Female	1.17 (0.81, 1.69)	0.401
Child's school status		
Not started	Ref	
Day care	0.83 (0.22, 3.10)	0.783
Play group	1.26 (0.66, 2.38)	0.482
PP1/PP2	1.59 (0.87, 2.92)	0.134
MCH Handbook available?		
No	Ref	
Yes	2.37 (1.49, 3.78)	<0.001
Attitude scores	1.09 (0.98 – 1.20)	0.103
Heard of vitamin A before	4.52 (2.38, 8.57)	<0.001

Among all the socio-demographic characteristics examined, education level, marital status, decision making at the household level and availability of the child's health booklet 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 = 0.039). Marital status was associated with 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 = 0.031) and those who that were single 2.93 times (OR=2.93, 95% CI: 1.20 – 7.15, p = 0.018) more likely to have higher knowledge compared to the divorced, separated or widowed. Additionally, those who made decisions jointly with spouse were 1.94 times (OR=1.94, 95% CI: 1.17 – 3.23, p = 0.011) were more likely to have higher knowledge compared to the those who made decisions alone and this was attributable to the intervention. Further, those who had a Mother and child health Handbook were 2.37 times more likely to have higher knowledge compared to those who did not have one (OR = 2.37, 95% CI: 1.49 - 3.78, p < 0.001).

3.4.2. Association Between Knowledge and Source of Information on VAS

Caregivers in this study received information on VAS from varied sources including posters, reading from books or newspapers, radio, television, facility health workers, community health volunteers, relatives and friends, community meetings and schools. Since the study relied on recall of VAS information, associations were examined between the various sources of information on VAS to determine those that led to higher retention and therefore increased knowledge. For this bivariate analysis, overall knowledge score was modelled as a continuous variable and information sources binary coded as 1 if marked and 0 otherwise. Since overall knowledge was modelled as a continuous variable, coefficients are reported as opposed to odds ratio as presented in Table 7.

Table 7. *Bivariate Association Between Overall Knowledge score and Sources of Information on Vitamin A Supplementation.*

Source of information	β (95% CI)	p-value
Book/Newspaper/Magazine	0.73 (-0.04, 1.51)	0.062
Posters/Charts/banners	-0.12 (-1.35, 1.10)	0.845
Radio	0.33 (-0.20, 0.86)	0.218
Television	0.80 (0.10, 1.50)	0.025
Health worker at health facility	0.35 (0.01, 0.70)	0.044
Community health Volunteer	0.88 (0.61, 1.15)	<0.001
Relatives and friends	-0.21 (-1.11, 0.68)	0.644
Outreach events/roadshows	0.37 (-0.35, 1.09)	0.313
Community meetings/baraza	0.73 (-0.90, 2.37)	0.379
School/ECD	-0.01 (-0.59, 0.56)	0.963
Churches/Mosques/religious gatherings	1.07 (-0.31. 2.46)	0.129

Results showed that sources of information with significant association with increased knowledge on VAS were Community Health Volunteer (β = 0.88, 95% CI=0.61-1.15, p < 0.001), television (β = 0.80, 95% CI = 0.10 -1.50, p = 0.025), and marginally health workers at the health facility (β = 0.35, 95% CI = 0.01- 0.70, p = 0.044). There are VAS information sources like the ECD centres, radio and community level outlets like religious and community gatherings that were not significantly associated with increased VAS knowledge in this study.

3.4.3. Multivariate Analysis on Factors Associated with Changes in VAS Knowledge

Bivariate analysis showed individual associations while controlling for study arm and timepoint. Based on the bivariate analysis, six variables satisfied the criteria for inclusion in the multivariate logistic regression modelling. However, while having ever heard of vitamin A was significant at the bivariate level, it was excluded from the multivariate analysis because of collinearity because specific sources of information which would be only answered by those who had ever heard of vitamin A were included in the model. Table 8 presents these results.

Table 8. *Multivariate Analysis on Factors Associated with Vitamin A Supplementation Knowledge.*

	Adjusted OR (95% CI)	p-value
Source of information on VAS		
Television	4.41 (0.54, 36.11)	0.167
Health worker at facility	1.73 (1.01, 2.97)	0.047
Community health volunteer	2.35 (1.50, 3.66)	<0.001
Education level		
No schooling	Ref	
Primary	1.20 (0.78, 1.85)	0.417
Secondary	3.36 (1.27, 8.94)	0.015
Marital status		
Divorced/separated/widowed	Ref	
Married	1.07 (0.43, 2.66)	0.888
Single	1.25 (0.39, 4.07)	0.706
Who makes decisions		
Self	Ref	
Husband/Partner	1.28 (0.62, 2.63)	0.506
Joint decision between self and spouse	1.55 (0.87, 2.75)	0.138
Parents and others	2.06 (0.64, 6.58)	0.225
MCH Handbook available	2.21 (1.31, 3.74)	0.003

Though significant at bivariate analysis level, Television as a source of VAS information, marital status and decision making on care seeking were not statistically significant at multivariate analysis. The key predictors of changes in VAS knowledge were the facility health worker and community health volunteer as source of VAS information, secondary level education and availability of Maternal Child health handbook. Specifically, those who had the MCH Handbook available were 2.21 times more likely to have higher vitamin A knowledge compared to those who did not (OR=2.21, 95% CI: 1.31-3.74; p=0.003). This could be associated with the fact that Mother and Child Health handbook acts as reminder since it has detailed information about VAS schedule, dosage and return dates for the next dose of Vitamin A. The caregivers should therefore be encouraged to have and maintain MCH Handbook which in addition acts as Education, Information and Education material for the caregivers. Getting information on VAS from a health worker at health facilities was a positive predictor and those who got it from this source were 1.73 times more likely to retain the knowledge (OR=1.73, 95% CI: 1.01, 2.97; p = 0.047) and so was the community health volunteer (OR=2.35, 95% CI: 1.50, 3.66; p < 0.001). The community health volunteer as a source of information was highly associated with increase in overall VAS knowledge. Caregivers with secondary level were 3.36 times more likely to have higher VAS knowledge (OR =3.36, 95% CI: 1.27-8.94; p = 0.015. The predictors of increased VAS knowledge were as found in this study were Caregivers with secondary level education, the facility health worker and community health volunteer as sources of VAS information and caregiver having MCH handbook. Investing therefore in building the capacity of the facility health workers and the community health volunteers and ensuring all caregivers have a MCH Handbook is instrumental in increasing VAS knowledge as demonstrated in this study.

4. Discussion

Empowering caregivers with the necessary nutrition education is instrumental in the uptake of services [14, 6]. Cognizant of this, the present study explored the effectiveness of community level behaviour change communication on caregiver knowledge on Vitamin A Supplementation (VAS). The study showed high awareness on VAS among caregivers at both arms of the study at baseline and endline and which mirrored findings in other studies; India [12] which recorded awareness at 90.4%; Southern Ethiopia [3] and Mbagathi hospital, Kenya [11] which documented awareness on VAS by caregivers at above 90%. Low awareness was reported at 23.5% in a study in Southern Ethiopia [8], 40% in Libya [1]. Further, the study sought to find the source of information on VAS and a high proportion of caregivers at both control and intervention arms reported having heard about vitamin A from a healthcare worker at a health facility (Baseline: 83.4% Control and 65.2% intervention; End-line: 87.6% Control and 85.1% intervention). The intervention, though targeting the community level interventions had a positive influence at the health facility with a marginal statistically significant increase in health facility as a source of information on VAS (p=0.049). As pertains the community health volunteer (CHV) as source of information on VAS, the results at baseline at the control arm recorded 55.6% which increased to 58.6% at endline. The same changed from 51.0% at intervention arm during baseline to 64.1% at endline. An increased proportion of respondents at endline had their source of information from CHVs with a statistically significant change between baseline and end line (p= 0.010) which is attributable to the intervention. Other significant sources of information on VAS included school/ECDE Centres which were part of the community-based intervention outlets in this study (baseline: 8% Control and 2% intervention; end-line: 6% control and 8% intervention; p=0.008) and radio (baseline: 4% Control and 8% intervention; End-line: 10% Control and 6% intervention). From these results, the intervention was successful in delivering Vitamin A Supplementation information to the caregivers through the household visits and other community level platforms during the study period. From the statements above, it is evident that the caregivers had a variety of sources of VAS information with variations per study arm. Similar findings were in documented in other studies; Tharaka Nithi Kenya 62.9% [2], Ethiopia 97.2% [3] of caregivers reporting health workers as their source of

information on VAS. In another study in Kenya among mothers of children under five, health workers were reported as the main source of information on VAS while media was the source for 10% and 6% reported the source to be members of the community [11]. In a study in Libya [1], health workers were least in terms of source of information on VAS which was also like findings in a study in India [12] which reported 60% of mothers to pre-school children received information on VAS from friends and family members. In a nutrition intervention monitoring system survey in Kenya [10], only 46.9% of respondents reported having seen or heard a message on VAS, most of which was from health workers and the proportion was lower at 36.2% at Vihiga County which differs with findings of this study.

Although the World Health Organization recommends VAS for children 6-59 months to deal with vitamin A deficiency [16], there is need for other efforts to achieve sustainable prevention approaches such as consumption of foods rich in Vitamin A coupled with nutrition education on consumption of the same [15]. Findings of this study show a significant 15% increase on respondents who knew at least one other source of Vitamin A other than VAS. The respondents however demonstrated gaps in specific areas like consuming Vitamin A fortified foods as a source of Vitamin A. A study in Southern Ethiopia [8] reported 71.2% of mothers of children 6-59 months could list one or more natural foods as source of Vitamin A. In contrast, a study in India [12] reported 20% had received information on Vitamin A rich foods and further argued that nutrition education needs to be stepped up to increase knowledge on Vitamin A rich foods. Further, the study found a significant relation between mother's education and knowledge of foods rich in Vitamin A [12]. Similarly, [2] observed that caregivers of children 12-59 months lacked adequate information on foods rich in Vitamin A. The proportion of caregivers in this study who knew vitamin A could be found from food sources was higher than one documented in the same county in 2021 which was at 57.7% [10]. The caregivers at the intervention arm demonstrated an increase in knowledge on other sources of Vitamin A for their children and appreciated the nutrition education provided to them through this study. They realized they had most of the food which could provide vitamin A to their children. Since this messaging was part of the behaviour change communication, and being statistically significant, the change is attributable to the intervention.

Overall, the intervention resulted in a significant knowledge mean standard deviation of 0.6 with p=0.014 and on further assessment of the depth of knowledge, the change on knowledge scores for caregivers who had knowledge on more than half of the knowledge questions increased (DID 18.4%, p= <0.001). The results in the present study agree with those from a quasi-experimental study in India [15] assessing the effectiveness of planned teaching program on knowledge regarding VAS among mothers of under-five which reported a significant increase in overall VAS knowledge with deliberate effort to educate mother. The findings however differ with those from a NIMS survey in Kenya [10] which reported that only 24.4% of caregivers in Vihiga knew the correct schedule for VAS.

In bivariate analysis, it was notable that the socio demographic characteristics of caregivers were not significantly associated with VAS knowledge. The findings are consistent with those of a study in India which found no significant association between VAS knowledge and the age of caregiver, religion, type of family, occupation [15] but found statistically significant association between VAS knowledge and caregiver's education status with more educated ones displaying better knowledge. Another study in India [12] similarly found a positive association between education and VAS knowledge. The results reported a significant association between VAS knowledge and marital status, joint decision making between caregiver and spouse, availability of Child health card and general awareness on VAS. 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) and this was consistent with findings in India [15] which reported significant association between general awareness and VAS knowledge.

In multivariate analysis, the predictors of change in overall VAS knowledge were receiving information on vitamin A Supplementation from a health worker (OR 1.73 (1.01, 2.97) p=0.047, the community health volunteer (OR2.35 (1.50, 3.65) p=<0.001, having secondary level of education (OR 3.36 (1.27, 8.94) p=0.015 as well as being in possession of Mother and child Health Handbook (OR 2.21 (1.31, 3.74) p=0.003 which doubles as a job aid with complete VAS schedule. This implies that building the capacity of health workers and the CHVs to deliver VAS messaging and facilitating them to reach caregivers has a direct influence on their knowledge.

5. Conclusion

Vitamin A Supplementation is a low-cost high impact intervention recommended by the World Health Organization (WHO) for children 6-59 months to combat the effects of vitamin A Deficiency. The coverage of this life saving intervention is low and often associated with low knowledge by caregivers on key aspects of VAS including its importance.

Findings from this study showed the community level behaviour change communication by the community health volunteers targeting caregivers and the community in general through household visits and other community meetings resulted in significantly increased knowledge on Vitamin A Supplementation. The Community Health Volunteers as both source of VAS information and supplementation services and better knowledge were the key predictors of higher VAS uptake in this study. This study concludes that this intervention was effective in increasing the VAS knowledge among the caregivers.

Conflict of Interests

There is no conflict of interests to declare.

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