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Consumption and Determinants of Vitamin A Supplementation among Children Aged 6 to 59 Months in Buea and Kumba Health Districts, Cameroon

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ABSTRACT

Background: Although the prevalence of vitamin A deficiency (VAD) in Cameroon has dropped slightly in recent years, the prevalence remains high in some areas and is considered a significant public health problem in Cameroon. Nevertheless, vitamin A supplementation (VAS) among children is the best way to tackle this problem. The study aims to determine the consumption and determinants of VAS among children aged 6-59 months in Cameroon. **Methods:** This study was a community-based cross-sectional study conducted using a validated questionnaire from February 2023 to June 2023 in Buea and Kumba health Districts. Multistage sampling was used to select caregiver-child pair from districts implementing routine VAS program. **Results:** A total of 407 mothers/caregivers were recruited for this study. The proportion of VAS was 68.8%, 63.4% had adequate knowledge and 64.9% had good attitude towards VAS. Almost all the participants faced no challenges in accessing VAS services. The factors associated with VAS were the time taken (P=0.001), the means of transportation (P=0.037), access to the health facility (P=0.032), child schooling (P=0.006), knowledge on VAS (P= 0.024) and educational level of the caregivers (P=0.020). **Conclusion:** The VAS coverage was 68.8% below the amount recommended by WHO which is 80-90% coverage. Also, the factors associated with VAS included time taken, the means of transportation, access to the health facility, knowledge of the caregivers on VAS, child schooling, and the education level of the caregiver.

Introduction

Vitamin A is a fat-soluble vitamin and an essential micronutrient for the proper functioning of the visual system, growth, and development, immune competence, reproduction ability, healthy clear skin, and facilitating cell differentiation (Benn *et al.*, 2015, Berde *et al.*, 2019, Kassa *et al.*, 2020). Inadequate amount of vitamin A in children leads to a condition known

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as Vitamin A deficiency (VAD), which is a major public health problem and a risk factor for childhood deaths from diarrhea and measles in low and middle-income countries (LMICs) and an important cause of preventable childhood blindness in low-income countries (Aghaji *et al.*, 2019).

Globally, VAD affects an estimated 190 million preschool children, of whom 56.4 million are in Africa (Aghaji *et al.*, 2019, Nigusse and Gebretsadik, 2021). In 2014, a survey done in Cameroon revealed that there were 103 deaths per 1000 live births as a result of VAD. VAD can be reduced by five major interventions: supplementation, dietary modification, fortification, promotion of both public health, and breastfeeding (Rajaeieh *et al.*, 2021). VAS can protect children from the adverse health consequences of VAD (Seufert *et al.*, 2024). It has been found to be one of the most cost-effective strategies for improving child survival and has been associated with protective effects against mortality and morbidity, substantially cutting the incidence of diarrhea, measles and night blindness (Sherwin *et al.*, 2012).WHO recommends for the routine administration of VAS to children 6–59 months twice a year (once every six months) (Kassa *et al.*, 2020).

VAD coverage in Cameroon was 34.3% according to District Health Information Software (DHIS2) in 2022. Several studies have identified some factors that affect VAS coverage both positively and negatively. These include sociodemographic and socioeconomic determinants such as; maternal/caregiver's education, children's age and sex, religious status, area of residence, economic status, and immunization status, breastfeeding status and socioeconomic status, parental exposure to media, mode of communication and campaign awareness on child VAS status, access to health facility or vaccination site, and employment status (Abedin *et al.*, 2019). Nevertheless, ensuring vitamin A is available to children in adequate quantities remains problematic, especially in areas affected by environmental catastrophes and conflict, and hard-to-reach areas. Hence, it remains essential that vitamin A be made available to all children (6-59 months) including vulnerable populations such as conflict zones. This study aims to determine the consumption and determinants of VAS among children aged 6-59 months in Cameroon.

Materials and Methods

Study site

The study was carried out in Buea and Kumba Health Districts. These Health Districts are situated in the South West Region of Cameroon plagued with the anglophone crisis. The Buea Health District (BHD) consists of 7 health areas, namely, Bokwango, Bova, Buea Road, Buea Town, Molyko, Muea, and Tole. BHD covers a total surface area of 870 $km^{2.}$ .Buea has a population of 300,000 (at the 2013 Census) (Agborndip *et al.*, 2020). Moreover, the Kumba Health District service is found in Kumba, the chief town of Meme division, South West region of Cameroon. Kumba has an estimated population of about 400,000 inhabitants (2015 census) with about three quarters of the population falling in the youthful age.

Study design and selection of participants

This was a community-based cross-sectional study in which a structured questionnaire was used to collect data on the proportion of VAS, the knowledge and attitude of caregivers on VAS as well as the challenges faced by these caregivers in accessing VAS services from 407 households with children 6-59 months in Buea and Kumba Health Districts. This study was conducted from February 2023 to June 2023, and the sample size was calculated using the Fischer's formula. The sample size was calculated using the formula: n = $Z^2 \times \frac{PQ}{d^2} \times k$

where: n = minimum sample size, z = confidence value = 1.96 for a 95% confidence interval, p = estimated proportion of VAS coverage in Cameroon (2020) =14.0%, Q= (1-p), k = design effect = 2 for cluster sampling, d = error margin (0.05)

Therefore, n=$1.96^2 \times \frac{0.14(1-0.14)}{0.05^2} \times 2$=370, giving a minimum of 370 participants.

To minimize the risk of not attaining desired sample size, 10% will be added to the calculated sample size.

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$370 \times \frac{10}{100} = 37, \quad 370 + 37 = 407$

Therefore, 407 participants were estimated. A multistage sampling technique was utilized for this study:

- Random sampling was used to select health districts, and cluster sampling was used to group the health areas into clusters.
- Each health area (HA) of the districts was considered a cluster.
- Simple random sampling by balloting was used to select the HAs per health district.
- Thereafter, probability proportionate to size was used to obtain the number of households that was surveyed, and consequently, participants were recruited in each HA (cluster) with respect to the total population of the selected clusters per health district; purposive sampling was used to decide which households with children 6-59 months were surveyed by the data collectors once on the field.

Inclusion Criteria: It included households with children 6-59 months. A caregiver was required to provide consent for the child to be recruited into the study. All the children 6-59 months who live within the Buea or Kumba health districts were also included.

Exclusion Criteria: The current study excluded mothers or caregivers of children (6-59 months) who were not available to participate in the study due to ill health or other issues as well as caregivers who could not provide their children's vaccination card.

Data was collected using a structured questionnaires adopted from a previous study (Kassa *et al.*, 2020), which was self-administered. Primary data was collected using structured questionnaires that were pretested in Alpha Club-Limbe before the final survey. The questionnaire contained information on different sections based on the objectives of the study: socio-demographic information for both the child and the mother or caregiver. This included amongst other information, the knowledge, attitudes, practices and challenges of mothers or caregivers on VAS. Data collection was done by the research team with the help of community mobilizers who helped to identify households with children of 6-59 months. Every household that gave consent by the mother/caregiver was sampled. In addition, the participant in a household who was being interviewed at a particular time was later asked by the investigator to give directives on the next household with children aged 6 to 59 months.

Ethical consideration

The study was approved by the institutional review board of the Faculty of Health Sciences, University of Buea (Reference number: 2023/ 2017-03/UB/SG/IRB/FHS). An administrative clearance was obtained from the Regional Delegation of Public Health for the South West region, from the two health districts and authorisation was obtained from the community heads. Informed consent was obtained from all participants before their enrolment in the study.

Data analysis

Data was analyzed using SPSS Version 27. Descriptive statistics was used to summarize data as frequencies, percentages, and charts. Bivariate analysis (chi-square test) was used to check for associations between the dependent and the independent variables. Multivariate analysis (multiple logistic regression) was used to identify factors associated with the consumption of VAS, and significance level was set at P-value<0.05.

Results

A total of 407 children were included in the study from the four out of the seven HEs that form the Buea health district: Buea Road (70), Buea town (21), Molyko (28) and Tole (15). Also, from three HAs of Kumba health district: Kumbambeng (100), kumba town (92) and Fiango (81). The mean age of the children was 26.15±15.29 months and age range was 6 – 59 months (**Table 1**).

The age range of the caregivers was 15 – 65 with the mean age and standard deviation of 30.92 ± 7.07. Caregivers of the children were mostly females (89.7%), married (55.8%), had tertiary education (44.5%) and were self-employed or owned their businesses (45.7%). **Table 2** summarizes caregivers' statistics.

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Table 1. Socio-demographic characteristics of children within the study area.

Variables	n	%
Age category (month)		
6-12	104	25.6
13-24	112	27.5
25-36	86	21.1
37-59	105	25.8
Sex of child		
Female	200	49.1
Male	207	50.9
Child goes to school		
Yes	117	28.7
No	17	4.2
Not applicable	273	67.1

The findings revealed that more than two-thirds (68.8%) of the children had been supplemented with vitamin A in the last six months in the study area (**Figure 1**). Almost all (95.1%) of the children who had been supplemented reported no side effects and supplementation was mostly done in the health facility 175 (43.0%). In addition, mebendazole (19.4%) and intermittent preventive treatment for malaria in infants (11.3%), Measles Rubella vaccine (5.4%) and yellow fever vaccine (11.3%) were the vaccines/supplements also administered alongside vitamin A. Several reasons were reported for the non-VAS of children; they included: the inadequate knowledge about VAS dosage among caregivers (16.5%), the caregiver being very busy or reluctant to take child to the hospital for supplementation (8.9%), the caregiver forgot to take child to the hospital for supplementation (3.7%), the child was not available (1.7%) and finally, insufficient or limited supply of VASs available at the closest health facility. Less than half (43.0%) of the children were supplemented in a health facility, home (18.2%), school (3.7%), church (1.5%) and market (0.5%).

For this study, most of the participants generally had adequate knowledge (88.2%) about vitamin A. Almost all the participants had heard about vitamin A before (95.3%) and 86.2% defined it as a supplement which helps in child growth, visual system, and immune competence. Participant knowledge was high, particularly concerning the administration and dietary sources of vitamin A. Nearly all participants (97.3%) knew that the supplement is taken orally, and a similarly high proportion (97.5%) could identify common food sources. However, slightly fewer participants (86.0%) were familiar with the specific liquid capsule form of the VAS. However, slightly less than two-third did not know the period of supplementation (61.9%), which is after every six months, most of them did not know about VAD, (70.5%), its cause and consequences (72.7%), and the majority got to know about vitamin A from the health facility (67.8%).

Table 2. Socio-demographic characteristics of children.

Variables	n	%
Age group of caregivers (year)		
15-24	65	16.0
25 -34	236	58.0
35-44	92	22.6
>44	14	3.4
Sex of caregiver		
Female	365	89.7
Male	42	10.3
Marital status		
Cohabiting	23	5.7
Divorced	8	2.0
Married	227	55.7
Single	136	33.4
Widow	13	3.2
Employment status		
No job	71	17.4
Self-employed/Business	186	45.7
Government/Private employed	88	21.6
Farmer	33	8.1
Others	29	7.2
Educational level		
No formal education	15	3.7
Primary	60	14.7
Secondary	151	37.1
Tertiary	181	44.5
Religion		
Christian	382	93.9
Muslim	16	3.9
Others	9	2.2
Household size category		
2-8	387	95.1
9-16	20	4.9
Place of residence		
Rural (village)	65	16.0
Urban (town)	342	84.0

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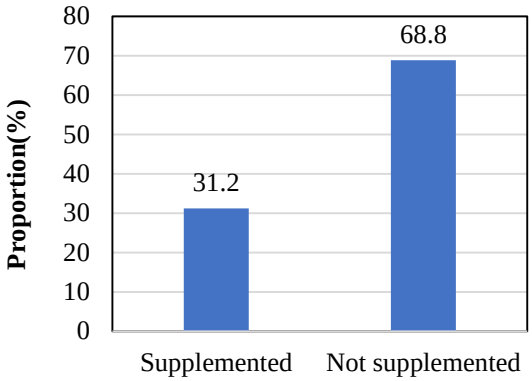

Figure 1. Child VAS in the last six months

The participants who reported to have adequate knowledge (63.4%) had supplemented their children with vitamin A while 5.4% had inadequate knowledge on vitamin A. A high percentage of the caregivers (93%) were able to correctly identify the VAS capsules. Nonetheless, more than half of the participants did not know any natural source of vitamin A (67.7%). More than half of the respondents said they did not know consequence of VAD (62.7%).

Majority of the participants had a good attitude towards the consumption of VAS (91.6%). Detailed findings revealed that participants (60.2%) agreed children should continue with VAS and 65.1% reported community acceptance of VAS, initiative to go for VAS (60.9%), willingness for the next dose of VAS (41.8%) and encouraging others to take VAS (57.2%). Despite a high level of acceptance, with 76.2% of caregivers reporting no skepticism or reluctance toward VAS, knowledge gaps persisted. Notably, 59.7% were uncertain about the essential role of vitamin A for child health. Caregivers had good attitude (64.9%) and had supplemented their children with vitamin A, while 3.9% had poor attitude.

Challenges faced by caregivers in accessing VAS services were assessed. Findings revealed that 98.0% of the caregivers had access to health facility in their communities, and 95.8% reported that there was at least a health facility in the community that administers VAS. Moreover, 96.8% of the participants reported VAS was carried out in their community, and 30.7% indicated their children were always supplemented at home (**Table 3**).

The determinants of VAS were investigated using both univariable and multivariable table analyses through Pearson's Chi square (**Table 3**) and multiple logistic regression (**Table 4**).

Table 3. Challenges faced by caregivers in accessing VAS services.

Variables	n	%
Access to a health facility in the community		
No	8	2.0
Yes	399	98.0
VAS in health facility		
No	17	4.2
Yes	390	95.8
VAS in community		
No	13	3.2
Yes	394	96.8
Usual place for VAS		
At home	125	30.7
In health facility	273	67.1
Time walked to reach the closest health facility (in minutes)		
3-5	111	27.3
6-10	173	42.5
11-30	88	21.6
More than 30	35	8.6
Means used for health facility		
Motorcycle	95	23.3
Privately owned vehicle	18	4.4
Taxi	156	38.3
Walking	134	32.9
Cost of transportation (Francs CFA)		
No cost	154	37.8
100-300 ($0.2 – $0.6 USD)	206	50.6
301-600 ($0.7- $1.0 USD)	41	10.1
>600 ($1.0 USD)	6	1.5

***VAS**: Vitamin A supplementation.*

Multivariable analysis revealed that time to walk to the health facility from the house, the means of transportation to the health facility, access to the health facility, knowledge of the caregivers on VAS, child schooling, and the education level of the caregiver were significantly associated with VAS.

Caregivers who took 6 to 10 minutes to walk to the health facility from their houses were about 3

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times more likely to supplement their children with vitamin A compared to those who spent 11 to 30 minutes (AOR: 3.33, 95% CI: 1.74-6.41, *P*=0.001). The caregivers who had access to a health facility were about 19 times more likely to accept VAS for their children compared to those who did not have access to a health facility in the community (AOR: 19.58, 95% CI: 1.28-29.79, *P*=0.032). Also, caregivers who reported that they usually walked/trekked to the health facility were 80% less likely to accept supplementation for their children compared to caregivers who used bus as a means of transportation to the health facility (AOR: 0.02, 95% CI: 0.01-0.78, *P*=0.037). Furthermore, caregivers who had inadequate knowledge on VAS were about 54% less likely to allow supplementation of their children with vitamin A compared to those who had adequate knowledge about vitamin A (AOR: 0.46, 95% CI: 0.24-0.90, *P*=0.024). Children who had not started going to school were about 5 times more likely to have taken vitamin A compared to children who were not going to school (AOR: 4.86, 95% CI: 1.58-14.89, *P*=0.006). Finally, the caregivers who had attained at least a primary level of education were about 5 times more likely to have accepted supplementation of their children compared to caregivers who had no formal level of education (AOR: 5.72, 95% CI: 1.31-24.90, *P*= 0.020).

Discussion

This study aimed to determine the factors that affect VAS among children aged 6-59 months in the Buea and Kumba Health Districts. A total of 407 children were recruited for the study with slightly more male children (50.9%). Detailed findings revealed that most of the caregivers were female (89.7%), this is not surprising, given that the survey was conducted in a typical African set-up, where women are believed to be the ones to stay home and take care of both the home and children. In the African society, women are regarded as guardians of their children's welfare, and men have explicit responsibility to provide for them materially (Akinola, 2018, Lucha *et al.*, 2022). These findings are slightly higher than a similar study conducted in Libya, where mothers constituted 68% of the study population (Abdulmalek and Benkhaial, 2018).

The 68.8% of children aged 6 to 59 months old had been supplemented with vitamin A in the past six months, which is lower than the value recommended by WHO ranging from 80-90% (Kassa *et al.*, 2020). The failure in receiving the full recommended dose of vitamin A by children makes them vulnerable to VAD disorders such as night blindness, reduces immune function and decreases resistance to infections. However, the consumption of VAS from the findings is slightly higher than that in South Dayi District, Ghana in 2016 (Hadzi *et al.*, 2016) and Bangladesh (Marjan *et al.*, 2021), where they had a VAS of 64.3% and 63.6% in the last twelve months. The difference in proportion of VAS may be due to the different strategies used in routine child welfare clinics and schools, distributing the vitamin A capsules at different places, differences in health worker motivation and knowledge of caregivers. From the present study, the main reason for caregiver's non-supplementation of their children could be the lack of awareness campaign, followed by fear of vitamin toxicity and child sickness or adverse effects after supplementation (Hadzi *et al.*, 2016).

Most of the caregivers had adequate knowledge (88.2%) about vitamin A and most (93%) were able to correctly identify VAS capsules. The ability of caregivers to identify the capsule could be that they had witnessed their children receiving vitamin A supplements from the health workers. The reason for the adequate knowledge among the participants in this study can be accounted for by the health workers' continuous education on vitamin A, vaccines and other health tips in the health education activities organized at Child Welfare Clinic (CWC) (Bastos Maia *et al.*, 2019). The current findings concur with findings of a study conducted in southern Ethiopia where caregivers could identify most of the aspects of knowledge related to VAS. Detailed findings of the later study revealed also that a greater proportion of the mothers/caregivers had heard about vitamin A, could identify at least one rich dietary source of vitamin A and knew at least one manifestation or consequence of VAD. Night blindness was recognized as a symptom by 93.8% of the

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caregivers (Kassa *et al.*, 2020). These findings however contradict results of a study conducted in Ghana and Sierra Leone which revealed that more than two-thirds of the caregivers had inadequate knowledge on VAS (Rahman, 2017). The main reason in the current study for the caregivers not to supplement their child with Vitamin A could be the lack of awareness of the campaign followed by fear of side effects from vaccine (Hadzi *et al.*, 2016).

In addition, most (91.6%) caregivers had a good attitude towards VAS and had supplemented their children with vitamin A. A supportive and positive attitude towards VAS is a step forward in improving its coverage and improving child health (Hodges *et al.*, 2013). The poor attitude of caregivers towards VAS might lead to misconceptions and reluctance in supplementation. These findings are in line with results of a similar study conducted in Kenya, which reported that 88% of mothers were willing to take their children for next dose of VAS, 99% of these mothers' advice other mothers to take their children for VAS. However, only 7% of the mothers had come for vitamin A supplementation out of their own initiative (Hadzi *et al.*, 2016).The reason for the good attitude towards vitamin A supplementation of the caregivers is because vitamin A is administered without isolating the children, does not cause any side effects after administration and the means of administration is easy.

Table 4. Factors associated with VAS among children 6-59 months in the Buea and Kumba Health Districts, Cameroon (n=407)**.**

Variables	Vitamin A supplementation		P-value[b]
	Yes	No	
Child goes to school			0.001
Yes	70(17.2)[a]	47(11.5)	
Not applicable	203(49.9)	70(17.2)	
No	7(1.7)	10(2.5)	
Total	280(68.8)	127(31.2)	
Marital status			
Single	119(29.2)	61(15.0)	0.298
Married	161(39.6)	66(16.2)	
Total	280(68.8)	127(31.2)	
Educational level			
No formal education	6(1.5)	9(2.2)	<0.001
Primary	51(12.5)	9(2.2)	
Secondary	90(22.1)	61(15.0)	
Tertiary	133(32.7)	48(11.8)	
Total	280(68.8)	127(31.2)	
Household size			
2-8	265(65.1)	122(30.0)	0.539
9-16	15(3.7)	5(1.2)	
Total	280(68.8)	127(31.2)	
Knowledge towards VAS			
Inadequate knowledge	22(5.4)	26(6.4)	<0.001
Adequate knowledge	258(63.4)	101(24.8)	
Total	280(68.8)	127(31.2)	
Attitude toward VAS			
Poor attitude	16(3.9)	18(4.4)	0.004
Good attitude	264(64.9)	109(26.8)	
Total	280(68.8)	127(31.2)	
Time to health facility (in minutes)			
3-5	67(16.5)	44(10.8)	<0.001
6-10	139(34.2)	34(8.4)	
11-30	57(14.0)	31(7.6)	
>30	17(4.1)	18(4.4)	
Total	280(68.8)	127(31.2)	

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Access to health facility			
No	1(0.2)	7(1.7)	0.001
Yes	279(68.6)	120(29.5)	
Total	280(68.8)	127(31.2)	
Place of residence			0.847
Rural(village)	3(0.7)	62(15.2)	
Urban (town)	14(3.4)	328(80.6)	

[a]: n (%); [b]: Chi-square test.

Table 4. Factors associated with VAS among children 6-59 months in the Buea and Kumba Health Districts, Cameroon (n=407) (multivariable analysis).

Variable	Vitamin A supplementation		AOR	95% CI	P-value
	Yes	No			
Time to reach health facility					
3-5 minutes	44(10.8)[a]	67(16.5)	1.86	0.85-4.06	0.119
6-10 minutes	34(8.4)	139(34.2)	3.33	1.74-6.41	0.001
>30 minutes	18(4.4)	17(4.2)	0.53	0.19-1.47	0.221
11-30 minutes	57(14.0)	31(7.6)	1	1	
Access to health facility					
Yes	120(29.5)	279(68.6)	19.58	1.28-29.79	0.032
No	7(1.7)	1(0.2)	1		
Means to health facility					
Motorcycle	27(6.6)	68(16.7)	0.10	0.01-3.10	0.192
Privately owned vehicle	2(0.5)	16(3.9)	0.21	0.01-8.80	0.411
Taxi	41(10.1)	115(28.3)	0.13	0.01-3.90	0.239
Walking	56(13.8)	78(19.2)	0.02	0.01-0.78	0.037
Bus			1		
Knowledge on VAS					
Inadequate knowledge	26(6.4)	22(5.4)	0.46	0.24-0.90	0.024
Adequate knowledge	101(24.8)	258(63.4)	1		
Child schooling					
Not applicable	203(49.9)	70(17.2)	4.86	1.58-14.89	0.006
Yes	70(17.2)	47(11.5)	2.00	0.64-6.28	0.236
No	7(1.7)	10(2.5)	1		
Educational level of caregiver					
Primary	9(2.2)	51(12.5)	5.72	1.31-24.90	0.020
Secondary	61(15.0)	90(22.1)	1.04	0.28-3.81	0.957
Tertiary	48(11.8)	133(32.7)	1.56	0.41-5.97	0.518
No formal education			1		

[a]: n (%).

Almost all the participants faced no challenges in accessing vitamin A supplementation services. Most of the caregiver reported that vitamin A was administered in the closest health facility, vitamin A was available in the community and greater proportion spent about 6 to 10 to walk to the closest health facility or for those who used a taxi spent less than a 1 dollar for transportation cost to get to the closest health facility that provides VAS services. The challenges faced in accessing VAS services serve as barriers to VAS and reduces VAS coverage, leading to VAD. The reason for the short time taken to reach the health facility can be accounted for by the fact that the current study was conducted in the urban areas which have more health facilities than rural areas which offer VAS services; therefore, accessibility to health facility makes caregivers to travel for short distances to go for supplementation. Our finding contradicts findings of a similar study where 33% of the caregivers spent between 10 to 20 minutes walking to the health facility (Kassa *et al.*, 2020).

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The education level of the caregiver, child schooling, time taken to get to the closest health facility, the means of transportation, access to the health facility and knowledge of the caregivers on VAS, were significantly associated with vitamin A supplementation in this study. The respondents who had inadequate knowledge on vitamin A supplementation were about 50% less likely to allow supplementation of their children with vitamin A compared to those who had adequate knowledge about vitamin A. According to a study conducted in Ghana, caregivers' knowledge on vitamin A was also found to be a significant factor that affects the consumption of vitamin A in children (Rahman, 2017).

Furthermore, caregivers who had attained primary level of education were about 5 times more likely to accept VAS for their children compared those who did not go to school. In a similar study by Raut *et al.*, education of the mothers/caregivers was found to play a significant role in child VAS. Thus, maternal/caregiver educational level is an important factor relating to receipt of a vitamin A capsule (Haselow *et al.*, 2022, Raut *et al.*, 2019). In contrast to another study in Bangladesh, the caregivers' education was significantly associated to the proportion of VAS. It was observed that parents who had tertiary education were more concerned about VAS of their children than the uneducated ones (Patrick *et al.*, 2023). Also, most highly educated caregivers are always at work or school, thus, hardly available to take the children to the health facility for supplementation.

In addition, the present study also reported that those caregivers who had access to the health facility were about 19 times more likely to get their children supplemented compared to those who had no access to the health facility. A similar study by Raut *et al*. also revealed that access of the mothers to the health facility played a key role in enhancing the VAS coverage (Raut *et al.*, 2019). Most health facilities are fixed sites for vitamin A supplementation, therefore having access to these health facilities eases supplementation.

Certain limitations must be considered when interpreting results obtained from this study. The child vaccination card was a prerequisite for the study, therefore children without any of these were excluded from the study which meant their vitamin A status was not determined. Also, could have been affected by recall bias as caregivers might not properly recall all required information such as how long they take or spend to go to the health facility. To overcome recall bias, several questions were asked to get valid and reasonable responses from the participants. However, privacy was assured during data collection and participants provided their responses anonymously. As such there was little incentive to report inaccurate answers.

Conclusion

The findings revealed that more two in three (68.8%) children 6-59 months in in the Buea and Kumba Health Districts are supplemented for vitamin. Most of the surveyed caregivers had adequate knowledge and attitude towards VAS and almost all faced no challenges in accessing vitamin A supplementation services. The time trekked to reach the health facility from the house, the means of transportation to the health facility, access to the health facility, knowledge of the caregivers on vitamin A supplementation, child schooling, and the education level of the caregiver significantly influenced the consumption of vitamin A supplements. There is need to develop and implement educational strategies that will enable increased vitamin A supplementation coverage in these areas. Ensure proper vitamin A supplementation especially in hard-to-reach areas twice a year as recommended by World Health Organization.

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Authors' contribution

Mbeng TEB and Tambe AB designed the study, supervised the data-collection and enrolment of the respondents, participated in the data analysis, interpretation of results and drafted the manuscript. Tambe AB, Ashu JN, Watching D, Mbhenyane XG

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and Eyongeta DE designed, supervised the study, did the statistical analysis, and proofread the manuscript. All authors participated in the review of the manuscript and approved the final version.

Conflict of interests

The authors declare no conflict of interests.

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