

Original Research Article

Factors influencing vitamin A supplementation among children aged 6-59 months at a lower-level urban health facility in Nairobi County, Kenya

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ABSTRACT

Background: Vitamin A is vital for child growth, immunity and vision. Despite global initiatives, deficiency persists, affecting 190 million children worldwide, especially in Sub-Saharan Africa (48%). In Kenya, 9.2% of children remain deficient, with only 28% supplementation coverage. In Nairobi, socioeconomic barriers and low awareness hinder uptake, necessitating targeted interventions.

Methods: The study adopted a descriptive cross-sectional design conducted between June and December 2024 at Riruta Health Centre, Nairobi County. Participants were mothers of children aged 6–59 months who had resided in the area for at least three months and consented to participate. Using Yamane's (1967) formula, a sample of 218 was selected through consecutive sampling. Data were collected using structured questionnaires and analyzed using SPSS version 26.0.

Results: Results showed that 66% of children aged 6–59 months received Vitamin A supplements. Uptake was significantly associated with child's age ($p=0.001$), gender ($p=0.015$) and mother's marital status ($p=0.001$). Economic factors; employment status ($p=0.001$) and access to health services ($p=0.001$) and high maternal knowledge of VAD ($p=0.001$) and VAS ($p=0.001$) also significantly influenced supplementation.

Conclusions: The study found 66% Vitamin A Supplementation (VAS) coverage among children aged 6–59 months. Uptake was significantly influenced by child's age, gender, mother's marital status, employment status, access to health services and maternal knowledge. To enhance VAS uptake, the study recommends to implement targeted health education, support low-income families and strengthen healthcare infrastructure for effective VAS delivery.

Keywords: Children under 5 years, Maternal knowledge, Nairobi County, Socio-demographic factors, Vitamin A supplementation

INTRODUCTION

Vitamin A is an essential micronutrient required in trace amounts to maintain normal physiological functions and overall health. It plays a vital role in cell division, reproduction and differentiation, processes crucial for the growth and development of children aged 6–59 months.¹ Vitamin A supplementation (VAS) supports immune function, enabling young children to resist infections such

as measles and diarrhea, while also preventing night blindness and hearing impairments.² The World Health Organization (WHO) recommends VAS for preschool-aged children twice a year, particularly in regions with persistent vitamin A deficiency. The primary aim of this global initiative is to reduce child morbidity and mortality.^{3,4} Globally, vitamin A deficiency (VAD) affects over 190 million people, contributing to about 2% of all childhood deaths (UNICEF, 2019). Despite global

progress, VAD remains a major public health concern, with one-third of preschoolers affected worldwide. The prevalence is highest in Sub-Saharan Africa (48%) and South Asia (44%), where poverty, limited healthcare access and food insecurity heighten vulnerability.^{4,5}

In Kenya, VAD continues to pose a significant challenge. According to the 2011 Kenya National Micronutrient Survey (KNMS), 9.2% of children aged 6–59 months were deficient, with VAS coverage at only 28% far below WHO's recommended 80%. Regional disparities are evident, particularly in arid and semi-arid counties, where access to healthcare facilities, qualified personnel and supplementation programs is limited.⁶

In Nairobi County, VAS coverage also remains suboptimal due to unique challenges, including socioeconomic inequalities, informal settlements, cultural perceptions and competing health priorities. Limited awareness among caregivers and inadequate integration of supplementation into routine health services further impede uptake. Given that regular VAS can reduce child mortality by 12–24% understanding contextual barriers across global, regional and local levels is crucial for designing targeted interventions that enhance supplementation coverage and improve child health outcomes.⁴ Therefore, this study therefore focuses on factors influencing Vitamin A supplementation among children aged 6–59 months at a lower-level city health facility in Nairobi County, Kenya.

METHODS

The study employed a descriptive cross-sectional design and was conducted between July 2024 and July 2025 at Riruta Health Centre in Nairobi County, Kenya. The facility is a Level 4 public health centre located approximately 13 km from Nairobi's Central Business District, offering comprehensive maternal and child health services. Eligible participants were mothers of children aged 6–59 months attending the Nutrition Department during the study period.

Inclusion criteria

Mothers with children aged 6–59 months who had resided in the Riruta area for at least three months and provided written informed consent were included in the study.

Exclusion criteria

Mothers who were seriously unwell or unwilling to participate during the study period were excluded.

The sample size was calculated using Yamane's formula, assuming a 5% margin of error, resulting in a sample of 218 participants.⁷ A consecutive sampling technique was used to recruit eligible respondents who met the inclusion criteria until the required sample size was reached,

ensuring all available and consenting mothers were included without selection bias.

Ethical considerations were strictly upheld, including obtaining informed consent, maintaining confidentiality and privacy and ensuring voluntary participation. Official research permits were obtained from the University of Nairobi/Kenyatta National Hospital Ethics and Research Committee (UoN/KNH-ERC) under number UP746/10/2023. Additional approvals were sought from relevant county health authorities.

Data were collected using a structured, pretested questionnaire, cleaned and analyzed using SPSS version 26.0. Descriptive statistics such as frequencies and proportions were computed, while Chi-square tests were used for inferential analysis, with significance set at $p < 0.05$ and a 95% confidence interval.

RESULTS

Socio-demographic factors

Distribution of socio-demographic factors (n=150)

Regarding the socio-demographic characteristics of the respondents, results revealed that most children were aged between 6–12 months 70 (46.7%), followed by those aged between 1–2 years 40 (26.7%). In terms of marital status single respondents were the majority comprising 80 participants (53.3%), followed closely by the married category at 42 (28.0%). In terms of gender, female children were more than males at 107 (71.3%) and 43 (28.7%) respectively. Concerning the number of children, most respondents indicated 2, accounting for 110 respondents (73.3%), while the least common category was "3 or more," with only 15 respondents (10.0%).

In terms of education level, the majority of respondents (caregivers) had attained "post-secondary" education, constituting 135 individuals (90%), while the lowest proportion had only primary education, with 7 individuals (4.67%). Finally, regarding religious affiliation, "Christians" was the most prevalent, comprising 75 respondents (50.0%), with "Hinduism" representing the lowest proportion at 10 individuals (6.67%). These findings are summarized in Table 1.

Association between social-demographic factors and vitamin A supplementation

The study investigated the socio-demographic characteristics of 150 mothers and their influence on the uptake of VAS among children. The study found that VAS uptake was significantly associated with the age of the children, the marital status of the mothers and the gender of the children. However, the number of children, education level of mothers and religious affiliation did not significantly influence VAS uptake. Out of these, 99 mothers (66%) ensured their children received VAS,

while 51 (34%) did not. The age of the children was significantly associated with VAS uptake ($\chi^2=47.534$, $df=3$, $p=0.001$). Among children aged 6-12 months, 56.6% received supplementation, while uptake was 34.3% for those aged 1-2 years, 4.0% for those aged 3-4 years and 5.1% for those aged 4-5 years. Marital status also significantly influenced VAS uptake ($\chi^2=18.529$, $df=3$, $p=0.001$). Single mothers (53.3%) had the highest VAS uptake at 64.6%, compared to married mothers (28.0%) at 22.2%, widowed mothers (5.3%) at 3.0% and divorced mothers (13.4%) at 10.1%.

The gender of the children showed a significant association with VAS uptake ($\chi^2=5.914$, $df=1$, $p=0.015$). Female children (71.3%) had a higher uptake at 77.8%, compared to male children (28.7%) at 22.2%. The number of children in the family did not significantly affect VAS uptake ($\chi^2=2.201$, $df=2$, $p=0.333$). Similarly, the education level of mothers, although influential, was not significantly associated with VAS uptake ($\chi^2=0.421$, $df=2$, $p=0.810$). Most mothers had post-secondary education (90.0%), with 88.9% ensuring supplementation. Lastly, religious affiliation did not significantly impact VAS uptake ($\chi^2=2.921$, $df=2$, $p=0.232$). Result is as shown in table 2 below.

Coverage of vitamin A supplementation

The study aimed to identify the current rate of uptake of vitamin A supplements among children aged 6-59 months in Riruta health Centre. The findings showed that more than half, 99 (66%), of the children had currently received the supplements, while the rest, 51 (34%), were not currently supplemented. The findings are depicted in Figure 1 as illustrated below.

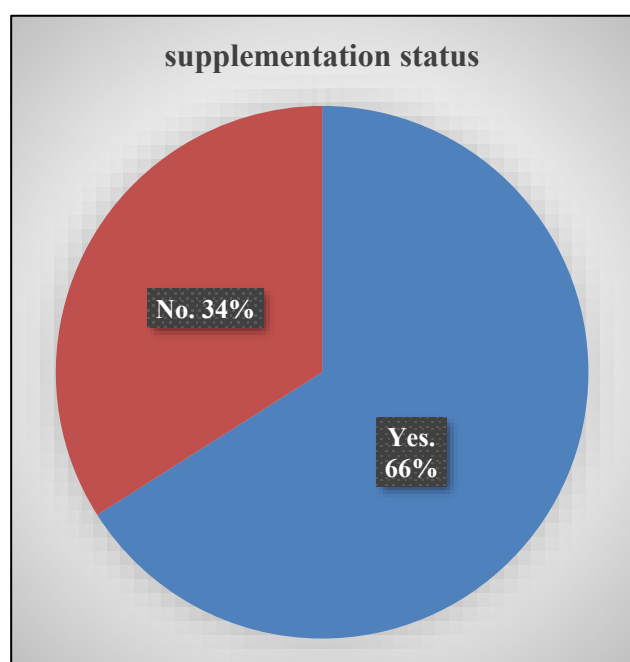


Figure 1: Coverage of vitamin A supplementation among children aged 6-59 months.

Economic factors

Distribution of economic factors

The findings revealed that a substantial majority of respondents were engaged in informal employment, as indicated by 70 individuals, constituting 46.67% of the total sample. Following closely behind was formal employment, with 40 respondents, representing 26.67% of the sample, only a small proportion were unemployed, with 5 individuals comprising 3.33%. Conversely, self-employment was a more prevalent choice, with 35 respondents opting for this mode of employment, accounting for 23.33%.

Regarding access to basic health services, the study considered factors such as preference, cost and distance. The findings revealed that the majority of the respondents were able to access basic health services with ease at 61 (40.7%), however following closely was difficult at 51 (34.0%). Lastly in terms of income distribution, 23.4% reported incomes below 1000 Ksh, indicative of earnings falling below the poverty threshold. Additionally, 19.3% fell within the income bracket of 1000 to 3000 Ksh, representing a modest income range. Furthermore, 21.3% reported incomes between 3001 and 5000 Ksh, suggesting a relatively higher income bracket. However, it's noteworthy that 36.0% of participants reported incomes above 5000 Ksh, indicating earnings above the poverty line. (Kenya National Bureau of Statistics, 2023) as clearly outlined in Table 3.

Economic factors influencing VAS uptake

The study found that economic factors significantly influenced the uptake of Vitamin A Supplementation (VAS) among children. Most mothers were in informal employment (46.7%), with 52.5% ensuring VAS for their children. Formal employment was reported by 26.7% of mothers, with 35.4% ensuring VAS. Only 9.1% of self-employed mothers and 3.0% of unemployed mothers ensured VAS. Employment status significantly impacted VAS uptake ($\chi^2=35.775$, $df=3$, $p=0.001$). Ease of access to VAS was another significant factor ($\chi^2=41.772$, $df=3$, $p=0.001$). Mothers who found access very easy (17.3%) had a 100% VAS uptake rate. Those who found access easy (40.7%) had a 49.5% uptake rate, while those who found it difficult (34.0%) and very difficult (8.0%) had lower uptake rates of 18.2% and 6.1%, respectively. Monthly income also influenced VAS uptake but was not statistically significant ($\chi^2=4.713$, $df=3$, $p=0.194$). Higher income levels generally correlated with higher VAS uptake, with the highest income group (5000 and above) showing the highest uptake rate at 41.4%. Result is illustrated in table 4 below.

Maternal knowledge

The study revealed that maternal knowledge about VAD and VAS significantly impacted the uptake of these

supplements among children. Mothers with high knowledge about VAD ensured a 100% VAS uptake, while those with moderate and low knowledge had uptake rates of 48.5% and 20.2%, respectively ($\chi^2=36.169$, $df=2$, $p=0.001$). Similarly, high knowledge about VAS resulted

in a 100% uptake, with moderate and low knowledge associated with uptake rates of 48.5% and 20.2%, respectively ($\chi^2=34.494$, $df=2$, $p=0.001$). the results are as shown in table 5 below.

Table 1: Socio-demographic characteristics of study participants.

Variables	Respondents	Frequency	%
Age category of children	6-12 months	70	46.7
	1-2 years	40	26.7
	3-4 years	25	16.6
	4-5 years	15	10
Marital status	Single	80	53.3
	Married	42	28
	Widowed	8	5.33
	Divorced	20	13.3
Gender of children	Male	43	28.7
	Female	107	71.3
Number of children	1	25	16.7
	2	110	73.3
	3 and above	15	10
Education level	Primary	7	4.7
	Secondary	8	5.3
	Post-secondary	135	90
Religion affiliated	Islamic	65	43.3
	Christian	75	50
	Hindu	10	6.7

Table 2: Association between socio-demographic factors and vitamin A supplementation coverage (n=150).

Variables	Respondents	Supplementation status		Chi-Value Df, P value
		Yes (n=99 =66%)	No (n=51=34%)	
Age category of children	6-12 months	56 (56.6%)	14 (27.5%)	$\chi^2=47.534$ df=3 p=0.001
	1-2 years	34 (34.3%)	6 (11.8%)	
	3-4 years	4 (4.0%)	21 (41.2%)	
	4-5 years	5 (5.1%)	10 (19.6%)	
Marital status	Single	64 (64.6%)	16 (31.4%)	$\chi^2=18.529$ df=3 p=0.001
	Married	22 (22.2%)	20 (39.2%)	
	Widowed	3 (3.0%)	5 (9.8%)	
	Divorced	10 (10.1%)	10 (19.6%)	
Gender of the children	Male	22 (22.2%)	21 (41.2%)	$\chi^2=5.914$ df=1 p=0.015
	Female	77 (77.8%)	30 (58.85)	
Number of children	1	19 (19.2%)	6 (11.85)	$\chi^2=2.201$ df=2 p=0.333
	2	72 (72.7%)	38 (74.5%)	
	3 and above	8 (8.1%)	7 (13.7%)	
Education level	Primary	5 (5.0%)	2 (3.9%)	$\chi^2=0.421$ df=2 p=0.810
	Secondary	6 (6.1%)	2 (3.9%)	
	Post-secondary	88 (88.9%)	47 (92.2%)	
Religion affiliation	Muslim	40 (40.4%)	25 (49.05)	$\chi^2=2.921$ df=2 p=0.232
	Christian	54 (54.55)	21 (41.2%)	
	Hindu	5 (5.05%)	5 (9.80%)	

Table 3: Distribution of respondents' economic status (n=150).

Variables	Respondents	Frequency	%
Employment status	Unemployed	5	3.33
	Self-employed	35	23.33
	Informal employment	70	46.67
	Formal employment	40	26.67
Access to basic health services	Very easy	26	17.3
	Easy	61	40.7
	Difficult	51	34.0
	Very difficult	12	8.0
Monthly income	<1000	35	23.4
	1000-3000	29	19.3
	30001-5000	32	21.3
	Above 5000	54	36.0

Table 4: Economic factors influencing VAS uptake.

Variables characteristics		Supplementation status		Chi-value Df, P value
		Yes (n=99 66%)	No (n=51, 44%)	
Employment status	Unemployed	3 (3.0)	2 (3.9)	$\chi^2=35.775$ df=3 p=0.001
	Self-employed	9 (9.1)	26 (51.0)	
	Informal employment	52 (52.5)	18 (35.3)	
	Formal employment	35 (35.4)	5 (9.8)	
Access	Very easy	26 (26.3)	0 (0.0)	$\chi^2=41.772$ df=3 p=0.001
	Easy	49 (49.5)	12 (23.5)	
	Difficult	18 (18.2)	33 (64.7)	
	Very difficult	6 (6.1)	6 (11.8)	
Monthly income	<1000	19 (19.2)	16 (31.4)	$\chi^2=4.713$ Df=3 P=0.194
	1000-3000	18 (18.2)	11 (21.6)	
	3001-5000	21 (21.2)	11 (21.6)	
	5000 and above	41 (41.4)	13 (25.5)	

Table 5: Maternal knowledge about VAD and VAS.

Variables characteristics		Supplementation status		Chi-value, Df, P value
		Yes (n=99 66%)	No (n=51, 44%)	
VAD	High	31 (31.3%)	0 (0.0%)	$\chi^2=36.169$ df=2 p=0.001
	Moderate	48 (48.5%)	18 (35.3%)	
	low	20 (20.2%)	33 (64.7%)	
VAS	High	31 (31.3%)	0 (0%)	$\chi^2=34.494$ df=2 p=0.001
	Moderate	48 (48.5%)	19 (37.3%)	
	low	20 (20.2%)	32 (62.7%)	

DISCUSSION

Socio-demographic factors

The study on VAS among children aged 6-12 months revealed several key findings. Slightly more than half of the children received VAS, consistent with studies in sub-Saharan Africa which linked age with supplementation status.⁸ Single mothers were notably more likely to have children up to date with VAS, reflecting their primary role in childcare. Gender also played a significant role,

with female children receiving higher coverage compared to males, possibly influenced by cultural perceptions.⁹ Despite Christians having higher supplementation coverage, there was no significant association between religious membership and VAS, aligning with the notion that socio-economic factors might play a more crucial role.¹⁰ Interestingly, a study done by Kantova highlighted that parents' educational attainment impacted children's supplementation status, yet this was not observed in the study.¹¹ The study found no significant correlation between Vitamin A Supplementation (VAS) uptake and

socio-demographic factors such as marital status, parity, educational level of guardians or religious affiliation. This suggests that VAS uptake may be influenced more by structural and behavioral determinants, such as accessibility of health services, awareness and economic status, rather than personal or cultural characteristics.¹² Similar findings have been reported in other studies, indicating that while education and marital status can enhance health-seeking behavior, they do not always translate into improved supplementation practices unless accompanied by adequate knowledge, targeted health education and supportive healthcare systems.¹³

Economic factors

The study investigated the relationship between economic factors and vitamin A supplementation among children under 5 years old. Employment status significantly influenced supplementation uptake, with individuals in informal employment showing the highest coverage, a finding supported by studies like Izaddoost et al.¹⁴ This aligns with research indicating that flexibility and community support among those in informal jobs facilitate better access to healthcare services.^{14,15} Access to basic healthcare services also played a crucial role, as many respondents received supplements free of charge at public hospitals. This underscores the significance of healthcare accessibility in enhancing nutritional interventions, aligning with the findings of Kraef et al which highlight the impact of service availability on supplementation uptake.¹⁶

However, the lack of a significant association between monthly household income and supplementation uptake contradicts with findings by Zegeye et al indicating that income alone may not determine VAS uptake. Instead, other economic factors, such as employment type and ease of healthcare access, appear to play a more influential role in shaping supplementation behavior among young children.¹⁷

Maternal knowledge

Maternal knowledge about vitamin A and its benefits emerged as a critical factor in VAS uptake. Mothers who were well-informed about the importance of vitamin A for their children's health were more likely to ensure regular supplementation. This finding aligns with research done in Ethiopia, which similarly found that mothers with higher levels of knowledge regarding vitamin A were more likely to ensure their children received supplementation.¹⁸ However, conflicting findings from Berihun et al, suggest that knowledge alone may not always translate to improved supplementation uptake, indicating the need for a comprehensive approach that includes but is not limited to educational interventions.¹⁹ This underscores the importance of health education programs that specifically target maternal knowledge and awareness.

CONCLUSION

The study revealed that 66% of children aged 6–59 months had received Vitamin A supplements. Uptake was significantly influenced by the child's age ($p=0.001$), gender ($p=0.015$) and mother's marital status ($p=0.001$). Economic factors such as employment status ($p=0.001$) and ease of access to health services ($p=0.001$) also showed significant associations. Moreover, high maternal knowledge of Vitamin A Deficiency ($p=0.001$) and Supplementation ($p=0.001$) strongly enhanced uptake, highlighting education's critical role in improving child health outcomes.

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