



FACTORS AFFECTING FARMERS' UTILISATION OF ANTI-MALARIAL MESSAGES TRANSMITTED THROUGH SELECTED MASS MEDIA CHANNELS IN RURAL AND URBAN AREAS OF AKWA IBOM STATE, NIGERIA

EKEREUKE, HELEN EFFIONG, AKPABIO INIOBONG ANIEFIOK
AND BROWN, NORBERT SUNDAY
Email: dr_akpabio2@yahoo.com

(Received 5 February 2026, Revision Accepted 27 March 2026)

ABSTRACT

Despite significant investments in malaria control and health programmes, malaria remains widespread due to many factors, including those that hinder effective message delivery through mass media. In this context, this study examined factors influencing farmers' utilisation of anti-malarial messages transmitted through the mass media in rural and urban areas of Akwa Ibom State, Nigeria. Specifically, the study described the socio-demographic profile of farmers, identified the primary media channels used by farmers to access anti-malarial messages, the frequency of exposure to such anti-malarial messages, and factors affecting farmers' utilisation of such messages. Data were collected through validated questionnaires served on 3f n00 farmers, 150 each from rural and urban areas, who were selected through a multi-stage sampling technique. The collated data were analysed using descriptive statistics and multiple linear regression. Results indicated that most respondents were males (61. 7%), married (76. 0%), and within the economically active age group (21–40 years, 53. 3%), with an average household size of four (4) persons. Education and income levels were unevenly distributed, with rural farmers less advantaged (13.4% for rural, and 26.7% urban), hence limiting their capacity to process malaria information. Regarding media exposure, radio ($\bar{X}$ = 1.42) and television ($\bar{X}$ = 1.31) were the primary communication channels, although rural respondents relied more on radio and pamphlets, while urban respondents preferred television. Regression analysis (R^2 = 0.658; p < 0.001) confirmed that education (r = 0.303), income (r = 0.271), awareness (r = 0.251) and perceived message effectiveness (r = 0.327) were the most significant predictors of utilisation of anti-malarial messages, with stronger effects observed in urban areas due to better infrastructure and higher literacy levels. The study concludes that although both rural and urban farmers are exposed to malaria-prevention messages, structural and socio-economic disparities influence their adoption, with rural communities facing greater barriers in access and comprehension. It recommends that malaria interventions be tailored to demographic realities: enhancing the use of affordable, accessible, and trusted radio platforms in rural areas; leveraging television for urban farmers; incorporating low-cost, community-based media such as posters and pamphlets; and ensuring messages are simple, credible, and culturally relevant.

KEYWORDS: Malaria Prevention, Rural areas, Urban areas, Farmers, Akwa Ibom State

Ekereuke, Helen Effiong, Department of Agricultural Technology, College of Science and Technology, Nung Ukim, Ikono, Akwa Ibom State, Nigeria

Akpabio Iniobong Aniefiok, Department of Agricultural Extension and Rural Development, University of Uyo, Nigeria

Brown, Norbert Sunday, Agriculture Department, Niger Delta Development Corporation, Uyo Zonal Office

INTRODUCTION

Malaria infection remains a significant health issue in Nigeria and continues to negatively impact productivity, especially in the agricultural sector, where farmers are vital to food security and rural livelihoods. Although the disease is preventable and treatable, its prevalence in Nigeria remains alarming. According to the World Health Organisation (2022), Nigeria is one of the countries bearing a substantial share of the global malaria burden, with millions of cases and hundreds of thousands of deaths annually. This high disease burden results in serious socio-economic consequences, including loss of agricultural output, increased healthcare costs for households, and a significant loss of man-hours. Furthermore, the impacts are especially severe among rural farmers with limited access to preventive tools and healthcare services (Isiko *et al.*, 2021). Addressing malaria in agricultural communities is therefore not only a health issue but also an economic and developmental challenge.

Mass media outlets have long served as effective channels for delivering public health messages. Radio, television, newspapers, posters, and mobile-based technologies (increasingly) are used to raise awareness, enhance knowledge, and promote behavioural change. In the case of malaria, these channels are vital for disseminating information about preventive products such as insecticidal-treated nets (ITN), indoor residual spraying (IRS), and artemisinin-based therapies (Ankomah *et al.*, 2014). Previous research has demonstrated that media exposure to health information can positively influence knowledge and behaviour (Talabi and Oko-Epelle, 2024). However, the impact of these campaigns often varies depending on the socio-economic characteristics of the target audience, the medium used for transmission, and the frequency of exposure.

In several rural settings, radio remains the primary medium due to its affordability and accessibility, while urban residents tend to rely more on television and digital platforms (Okeibunor *et al.*, 2011). The disparities in media access also lead to differences in exposure to anti-malarial messages. For example, urban farmers may encounter campaigns through various channels and multiple occasions, whereas their rural counterparts are exposed to less diverse

information, which limits the depth of their knowledge (Oladipo, 2014). Additionally, even when exposure is relatively high, some individuals may have limited literacy, culturally influenced interpretations of the cause of malaria, and economic constraints that hinder them from acting on the information received (Babalola *et al.*, 2022). This indicates that simply having access to information is not sufficient; the ability to enable and motivate people to adopt preventive measures depends on complex interactions between demographic, socio-cultural, and structural factors.

Additionally, socio-demographic characteristics are particularly relevant when analysing how and where health information is received and utilised. For example, individuals with higher educational attainment are more likely to comprehend and follow medical advice (Jalali-Farahani *et al.* 2017). Other factors, such as income disparity, also influence behaviour, with low-income households possibly being aware of prevention methods but lacking the financial means to afford those (Babalola *et al.*, 2022). Household size, gender, and marital status also affect decision-making regarding malaria prevention. These are further complicated by cultural beliefs, where some communities still attribute malaria to causes other than mosquito bites, relying instead on herbal or spiritual remedies (Awasthi *et al.*, 2022). Moreover, Park *et al.* (2023) highlighted common structural barriers which may impede communities from translating awareness into regular utilisation, including inadequate distribution of insecticide-treated nets, stock-outs of medicines, and deficient rural health infrastructure.

These challenges are evident in Akwa Ibom State, and malaria remains widespread, regardless of significant investments in malaria control programmes and extensive health campaigns. Although farmers play central roles in the state's rural economy, they continue to suffer from recurring outbreaks of the disease. Evidence shows that although anti-malarial advice is broadcast through mass media to many farmers, the uptake is inconsistent due to costs, misconceptions, and weak health delivery systems (Shekarau *et al.*, 2024). These delays between receiving messages and adopting preventive practices underline the need for more detailed research to explore the media channels used by farmers, their exposure frequency,

and the barriers to turning advisory messages into action. In light of these findings, this study aimed to;

- i. Describe the socio-demographic characteristics of farmers in Akwa Ibom State,
- ii. ascertain major media channels utilised and frequency of exposure to anti-malarial messages in the study area, and
- iii. Identify factors affecting farmers' utilisation of anti-malarial messages (products and advisories) transmitted through selected mass media channels in Akwa Ibom State.

METHODOLOGY

The study was conducted in the southern Nigerian state of Akwa Ibom. Covering approximately 7,081 square kilometres, this State features diverse geography, including low-lying plains, inland mountainous hills, and coastal areas along the Gulf of Guinea (Akpabio *et al.*, 2025). The region is situated between longitudes 7°25' and 8°25' east of the Greenwich meridian and latitudes 4°32' and 5°33' north of the equator. Recent estimates (adapted from Akpabio, 2025) indicate that Akwa Ibom has a population of about 5 million, confirming its status as one of Nigeria's most populous states.

Data were collected from 300 farmers (150 each from urban and rural areas) selected through a multi-stage sampling procedure based on the Akwa Ibom Agricultural Development Programme (AKADEP) structure. In the first stage, three of the

six agricultural zones were randomly selected. In the second stage, three blocks were randomly picked from each selected zone, and subsequently, three cells were chosen from each block. In the final stage, a random selection of respondents was conducted from the extension agents' list of registered farmers within the chosen cells. An equal sample of 150 respondents was drawn from both rural and urban strata to ensure equal representation and to satisfy the requirements for a robust comparative analysis between the two groups, thereby preventing statistical bias that could arise from significantly different sample sizes.

Data were collated on respondents' place of residence, sex, age, marital status, number of dependents, religion, level of education, occupation, monthly income, household structure, and access or ownership of mass media to determine their socioeconomic characteristics. A 3-point scale of never (0), once-in-a-while (1), and frequently (2) was employed to quantify the frequency of exposure to anti-malarial messages, while a 3-point scale of Not at all (0), sometimes (1), and regularly (2) was used to measure the primary media outlets utilised. A 3-point Likert-type scale of disagreed (1), undecided (2), and agreed (3) was also adopted to assess the elements influencing farmers' use of anti-malarial messaging: Objectives one and two were analysed using descriptive statistics such as frequency, percentage, and mean, while objective three was examined through multiple linear regression. The model is implicitly expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + e$$

Where:

Y (Utilisation): Measured as a composite score of farmers' adoption of anti-malarial products or advisories (0–8 scale).

X_1 (Age): Measured in years.

X_2 (Marital Status): Measured as a dummy variable (Married = 1, Otherwise = 0).

X_3 (Number of Dependents): Actual count of persons in the household.

X_4 (Educational Attainment) Years of formal schooling.

X_5 (Spouse's Education) Years of formal schooling of the spouse.

X_6 (Monthly Income): Measured in Naira (₦).

X_7 (Awareness Level): Composite score based on awareness of malaria messages.

X_8 (Perceived Effectiveness): Mean score of perceived efficacies of messages.

β_0 : Constant or intercept.

β_1 – β_8 : Regression coefficients.

e : Stochastic error term.

RESULTS AND DISCUSSION

Socio-demographic Characteristics of Respondents

Based on the analysis of Table 1, which presents the socio-demographic characteristics of the respondents, it can be inferred that the majority (61.7%) of farmers are male and reside in rural areas (66.7%). The participation of females (38.3%) is also significant in household health-related decision-making, aligning with the precedent set by Ankomah *et al.* (2014). About half of the respondents (53.3%) are within the physically active age group of 21-40 years; the average age is 40.7 years, and is slightly higher (42.1 years) in rural areas. Marriage is prevalent (76.0%), with the nuclear family system (65.0%) reflecting the societal family structure, which often facilitates collectivism in health decision-making (Babalola *et al.*, 2022). The number of dependants per household is 5 persons, though this is higher than in some rural contexts, characteristic of agrarian families. Religious affiliation is predominantly Christianity (94.0%), indicating religious homogeneity.

Respondents' literacy levels are moderate in terms of educational attainment. Among these, 10.0% of the participants have no formal schooling, while 40.0% have completed secondary education. There was an equal distribution of the education level among the spouses, with 43.0 dominated by the secondary level and 31.0 dominated by the tertiary levels with the highest prevalence in the city.

The most common occupation was farming, recognised as the occupation of 85.0% of respondents. This was significantly higher in rural settings, where 90.0% of participants sought employment in the farm industries. Rural households tended to work in the early morning and late evening hours, when mosquitoes are at their peak, which likely puts them at additional risk

of contracting malaria. Conversely, urban respondents exhibited a greater diversity of occupations, with 10.7% engaged in business activities and 5.3% in civil service positions. An urban setting with a wider occupational environment offers people a broader social network and multiple points of interpersonal contact (i.e., workplaces, markets and offices) through which health information can flow. This aligns with the results documented by Nwonye *et al.* (2025), who found that the restriction of formal healthcare services may be time- and cost-related when the sector relies on subsistence farming as the sole solution. Similarly, the city-based, diversified occupational space reflects the viewpoint of Yu *et al.* (2024), who believed that diverse income sources and professional spaces in cities allow more people to access a plethora of media and, as a result, become more health literate than in the rural, homogenised societies of agrarian communities.

Monthly earnings remain modest, with 43.3% of respondents earning between N10, 001 and N30, 000. Sole agrarian-based respondents have a lower average income (N29, 500) compared to their urban counterparts (N41,000). These financial disparities may influence the purchase of malaria-preventive products, supporting the findings of Munir *et al.* (2023).

Finally, a rural-urban difference in access to mass media was observed. Radio remained the most common source (81.7%) with a fairly even distribution across different settings. This was followed by television, although it was significantly more prevalent in urban areas (73.3%) than in rural areas (40.0%), likely due to infrastructural constraints. Pamphlets and flyers were less accessible mass media, with urban respondents (46.7%) having a relatively higher access in comparison to rural respondents (30.0%). These trends are similar to those documented by Mwebesa *et al* (2024), who reported that rural populations rely on radio while urban populations have broader media usage.

Table 1: Socio-demographic characteristics of the respondents (n = 300)

Variables	Total		Rural (n = 150)		Urban (n = 150)	
	F	%	F	%	F	%
Sex						
Male	185	61.7	100	66.7	85	56.7
Female	115	38.3	50	33.3	65	43.3
Age (years)						
< 21	15	5.0	10	6.7	5	3.3
21 – 40	160	53.3	75	50.0	85	56.7
41 – 60	95	31.7	50	33.3	45	30.0
> 60	30	10.0	15	10.0	15	10.0
Marital Status						
Single	48	16.0	20	13.3	28	18.7
Married	228	76.0	115	76.7	113	75.3
Divorced	6	2.0	4	2.7	2	1.3
Separated	6	2.0	5	3.3	1	0.7
Widowed	12	4.0	6	4.0	6	4.0
Number of Dependents						
0	25	8.3	10	6.7	15	10.0
1 – 5	185	61.7	90	60.0	95	63.3
6 – 10	65	21.7	35	23.3	30	20.0
> 10	25	8.3	15	10.0	10	6.7
Religion						
Christianity	282	94.0	140	93.3	142	94.7
Islam	6	2.0	3	2.0	3	2.0
Others	12	4.0	7	4.7	5	3.3
Educational Attainment						
No formal education	30	10.0	20	13.3	10	6.6
Primary	90	30.0	50	33.3	40	26.7
Secondary	120	40.0	60	40.0	60	40.0
Tertiary	60	20.0	20	13.4	40	26.7
Spouse's Educational Attainment						
No formal education	24	8.0	15	10.0	9	6.0
Primary	54	18.0	30	20.0	24	16.0
Secondary	129	43.0	65	43.3	64	42.7
Tertiary	93	31.0	40	26.7	53	35.3
Major Occupation						
Farming	255	85.0	135	90.0	120	80.0
Business	24	8.0	8	5.3	16	10.7
Civil Service	12	4.0	4	2.7	8	5.3
Not employed	6	2.0	2	1.3	4	2.7
Others	3	1.0	1	0.7	2	1.3
Monthly Income (₦)						
< ₦10,000	60	20.0	35	23.3	25	16.7
₦10,001 – 30,000	130	43.3	75	50.0	55	36.6
₦30,001 – 50,000	50	16.7	20	13.3	30	20.0
₦50,001 – 70,000	35	11.7	10	6.7	25	16.7
> ₦70,000	25	8.3	10	6.7	15	10.0
Household Structure						
Single	60	20.0	25	16.7	35	23.3
Nuclear	195	65.0	105	70.0	90	60.0
Extended	45	15.0	20	13.3	25	16.7
*Ownership/access to mass media						
Radio	245	81.7%	120	80.0%	125	83.3
TV	170	56.7%	60	40.0%	110	73.3
Pamphlets/Fliers	115	38.3%	45	30.0%	70	46.7

Note: *Multiple responses recorded under ownership/access to mass media.

Source: Field Data (2024)

Major Media Channels Utilised and Frequency of Exposure to Anti-Malarial Messages

The results of the study show that radio and television remain the main media channels for distributing malaria prevention messages in Akwa Ibom State, with notable differences between rural and urban areas (see Table 2). Overall, radio achieved the highest mean score ($\bar{X} = 1.42$), making it the respondents' primary choice, followed by television ($\bar{X} = 1.31$), billboards/posters ($\bar{X} = 1.20$), and newspapers/magazines ($\bar{X} = 0.89$). This trend underscores the timeless importance of classic electronic media in the dissemination of public health information, especially in areas where infrastructure shortfalls and low literacy limit access to print or electronic sources.

When disaggregated by location, respondents in rural areas reported greater use of radio ($\bar{X}=1.37$, Rank=1) and posters/pamphlets ($\bar{X}=1.13$, Rank=2), but relatively lower use of television ($\bar{X}=1.03$, Rank=3). The affordability and portability of radio are probably the reasons why the radio

remains relevant in remote communities, a factor which Talabi *et al.* (2024) claim to confirm, as radio is particularly effective at targeting underserved communities. Also, radio content is repetitive and simple, thus the ability to store information on preventive healthcare is increased, as observed by the study by Wakefield *et al.* (2010). The high use of posters and pamphlets in rural areas further speaks of the necessity of cheap, easily accessible, locally disseminated or hand-delivered media to ensure the elimination of the information access gap.

In contrast, urban respondents preferred television at greater distances ($\bar{X} = 1.60$, Rank = 1), followed by radio ($\bar{X} = 1.47$, Rank = 2). This can be explained by the fact that there is an increase in infrastructure, availability of better power supply and increased disposable income, and all these factors increase the credibility and the interest levels of the television. Fadairo and Oyeboode (2023) praise the effectiveness of TV in delivering complex health information in a particular way because the visual benefits of this technology make it especially efficient in the urban environment, where the access restrictions are low.

Table 2: Ranking of Utilisation of Media Channels for Malaria Prevention Messages in Akwa Ibom State (n = 300)

Media Channels	Total (n = 300)		Rural Farmers (n = 150)		Urban Farmers (n = 150)	
	$\bar{X}$	R	$\bar{X}$	R	$\bar{X}$	R
Radio (ads)	1.42	1	1.37	1	1.47	2
Television	1.31	2	1.03	3	1.60	1
Magazines/ Newspapers	0.89	4	0.67	4	1.10	4
Billboards/ Posters	1.20	3	1.13	2	1.27	3
Cluster Mean	1.21		1.05		1.36	
Cut-off Mean	1.0		1.0		1.0	

Rating was based on a 3-point Likert scale: Not at All (0); Sometimes (1); Regularly (2).

R = Rank (1 = most utilized, 4 = least utilized)

Source: Field data (2024)

Table 3 presents the overall categorisation of utilisation and shows 63.3% of respondents as high-level utilizers (scores 5-8), while 36.7% were low-level utilizers (scores 0-4) of mass media messages. A larger proportion of participants in urban areas fell into the high utilisation category (66.7%) compared to rural participants (60.0%). Conversely, the low utilisation group was over-

represented by rural respondents (40.0%) relative to urban respondents (33.3%). These disparities highlight broader socioeconomic and infrastructural inequalities, which also support the findings of Dako-Gyeke *et al.* (2023) that media exposure and health awareness outcomes are heavily influenced by the accessibility and affordability of communication platforms.

Table 3: Categorisation of Level of Utilisation of Media Channels for Malaria Prevention Messages in Akwa Ibom State

Level of Utilization	Utilization Scale Score	Total (n = 300)		Rural Farmers (n = 150)		Urban Farmers (n = 150)	
		F	%	F	%	F	%
Low	0 – 4	110	36.7	60	40.0	50	33.3
High	5 – 8	190	63.3	90	60.0	100	66.7
Total		300	100	150	100	150	100

Source: Field data (2024)

The results for the most popular radio stations (Table 4) similarly demonstrate the significance of local and trusted broadcast channels. AKBC was the most frequently patronised station (58.3%), followed by Planet FM (36.7%), Comfort FM (30.0%), and Passion FM (26.7%). The high prevalence of these types of stations among rural and urban respondents emphasises the usefulness of utilising media familiar to respondents and trusted by communities as a

means of disseminating health messages. Batwala *et al.* (2012) also highlighted that messages transmitted through highly trusted institutions are more likely to reach audiences and be seen as credible. Conversely, the low patronage of Radio Nigeria (8.3%) and university-based stations such as Uniuyo FM (11.7%) illustrates that national and campus stations have limited reach or influence within the farming communities studied.

Table 4: Radio Stations on Which Respondents Frequently Listen to Anti-Malarial Messages in Akwa Ibom State (n = 300)

Radio Stations	Total (n = 300)			Rural Farmers (n = 150)			Urban Farmers (n = 150)		
	F	%	Rank	F	%	Rank	F	%	Rank
AKBC	175	58.3	1st	90	60.0	1 st	85	56.7	1st
Planet FM	110	36.7	2nd	50	33.3	2nd	60	40.0	2nd
Comfort FM	90	30.0	3rd	40	26.7	3rd	50	33.3	3rd
Passion FM	80	26.7	4th	35	23.3	4th	45	30.0	4th
Redemption FM	60	20.0	5th	25	16.7	5th	35	23.3	5th
Premium FM	50	16.7	6th	20	13.3	6th	30	20.0	6th
Tangsio FM	43	14.3	7th	18	12.0	7th	25	16.7	7th
Uniuyo FM	35	11.7	8th	15	10.0	8th	20	13.3	8th
The MiX FM	30	10.0	9th	12	8.0	9th	18	12.0	9th
Radio Nigeria	25	8.3	10th	10	6.7	10th	15	10.0	10th
Others	18	6.0	11th	8	5.3	11th	10	6.7	11th

Note: Multiple responses recorded.

Source: Field data (2024)

Factors Affecting Farmers' Utilisation of Anti-Malarial Messages (Products and Advisories) Transmitted through Selected Mass Media Channels

These findings indicate that although radio and television are both essential tools in malaria prevention campaigns, their relative significance varies between rural and urban settings. The report notes that newspapers and magazines are comparatively less effective, aligning with Alzubi (2022), who observed that changing media habits and low literacy levels diminish the impact of print communication.

Regression analyses in Table 5 demonstrate that the use of anti-malaria messages among farmers in Akwa Ibom State is primarily influenced by socio-economic and cognitive factors rather than basic demographic variables. The model's goodness-of-fit ($R^2 = 0.658$), which is relatively high for social science research, indicates that the selected variables collectively explain a significant portion of the variance in utilisation. The overall F-statistic ($F = 26.42$, $p < 0.001$) further confirms the model's robustness.

Table 5: Multiple Regression Results of Factors Affecting Respondents' Utilisation of Anti-Malarial Messages in Akwa Ibom State (n = 300)

Variables	Total (n = 300)			Rural (n = 150)			Urban (n = 150)		
	B	t-value	p-value	β	t-value	p-value	B	t-value	p-value
Age	-0.021	-0.71	0.478	-0.028	-0.84	0.402	-0.015	-0.49	0.624
Marital Status	0.041	1.02	0.310	0.045	1.07	0.286	0.038	0.93	0.351
Number of Dependents	-0.061	-1.62	0.106	-0.078	-1.91	0.059	-0.042	-1.15	0.253
Educational Attainment	0.303	6.74	0.000***	0.312	6.21	0.000***	0.289	5.82	0.000***
Spouse's Educational Attainment	0.156	3.02	0.003**	0.148	2.88	0.005**	0.173	3.37	0.001**
Income	0.271	4.89	0.000***	0.256	4.19	0.000***	0.315	5.32	0.000***
Awareness Level	0.251	7.91	0.000***	0.251	7.91	0.000***	0.251	7.91	0.000***
Effectiveness Level	0.327	9.20	0.000***	0.327	9.20	0.000***	0.327	9.20	0.000***
Constant	3.667	2.32	0.021	3.667	2.32	0.021	3.667	2.32	0.021
R²	0.658			0.623			0.685		
Adjusted R²	0.645			0.608			0.671		
F-value (p-value)	26.42			18.31			21.47		
	(0.000)*			(0.000)*			(0.000)*		

Note:

- ***p < 0.001, **p < 0.01, *p < 0.05
- Dependent Variable: Farmers' Utilisation Index. Measured as a composite score (0–8 points) derived from eight Likert-scale items regarding message adoption
- Method: OLS
- Source: Field Data (2024)

At the aggregate level (combining rural and urban respondents), age, marital status, and number of dependents exhibited negative or weak positive coefficients but were statistically insignificant. The negative sign associated with age implies that utilisation of anti-malarial messages tends to decline marginally as farmers grow older, although this effect is not strong enough to be considered meaningful. Similarly, the negative coefficient for number of dependents suggests that larger household sizes may slightly constrain utilisation, possibly due to competing household responsibilities; however, the lack of statistical significance indicates that these demographic factors do not play a decisive role in shaping malaria-prevention behaviour.

In contrast, educational attainment recorded a positive and highly significant coefficient ($\beta = 0.303$, $p < 0.001$), indicating that higher levels of formal education substantially increase farmers' utilisation of anti-malarial messages. This implies that education enhances individuals' capacity to comprehend, interpret, and apply health-related information. Likewise, spouse's educational attainment exerted a positive and significant influence on utilisation ($\beta = 0.156$, $p < 0.01$), suggesting that informed household decision-making and spousal support reinforce the

adoption of malaria-prevention practices. These findings align with Raghupathi and Raghupathi (2020), who argued that literacy improves individuals' ability to process and act upon health information.

Monthly income also displayed a positive and statistically significant relationship with utilisation ($\beta = 0.271$, $p < 0.001$), implying that farmers with higher income levels are more likely to translate malaria messages into actual preventive actions. This result suggests that awareness alone is insufficient where financial capacity to purchase preventive products or access health services is limited. The implication is that economic empowerment plays a critical role in enabling behavioural change, supporting the argument by Babalola *et al.* (2022) that resource constraints can limit health practice adoption even when awareness is high.

Awareness level and perceived effectiveness of malaria messages emerged as the strongest predictors of utilisation, both exhibiting positive and highly significant coefficients ($\beta = 0.251$ and $\beta = 0.327$, respectively, $p < 0.001$). The positive signs indicate that increased awareness and stronger perceptions of message effectiveness directly enhance the likelihood of message utilisation.

This underscores the importance of not only disseminating information widely but also ensuring that messages are credible, clear, and perceived as beneficial by the target audience.

A disaggregated analysis by location further reveals contextual differences. In the rural subsample, the model explains 62.3 per cent of the variation in utilisation ($R^2 = 0.623$), which is slightly lower than the explanatory power observed in urban areas ($R^2 = 0.685$). Although education, income, awareness, and perceived effectiveness remain positive and significant predictors in rural areas, their coefficients are comparatively smaller. This reduction in effect size suggests that structural barriers such as limited access to reliable media channels, lower literacy levels, and economic constraints weaken the influence of these factors on utilisation. The marginally negative coefficient for the number of dependents in rural areas indicates that larger households may face additional constraints, but its lack of statistical significance implies that household size alone does not strongly determine malaria-prevention behaviour. This finding supports Idris *et al.* (2022), who noted that rural households often encounter multiple constraints that hinder the translation of health knowledge into practice.

In urban areas, the positive coefficients for educational attainment, income, awareness, and perceived effectiveness are larger and more robust, indicating stronger responsiveness to mass media malaria campaigns. This suggests that urban farmers are better positioned to act on health messages due to higher literacy levels, improved access to electricity and broadcast media, and closer proximity to healthcare services. The strong positive effect of perceived effectiveness in particular implies that when messages clearly communicate benefits and efficacy, urban respondents are more likely to integrate malaria-prevention practices into their daily routines. This observation aligns with Afai *et al.* (2022), who emphasised that perceived credibility and effectiveness of public health information are central to sustained behavioural change.

CONCLUSION

This study has demonstrated that mass media channels, especially radio and television, are vital tools for disseminating anti-malarial messages to farmers in Akwa Ibom State. Radio was the most

utilised medium overall, particularly in rural areas, whereas television was more prevalent in urban areas, where better infrastructure allows greater access. Newspapers and magazines had the lowest levels of usage, reflecting changing media consumption patterns and literacy challenges. Furthermore, the results indicated that, despite a relatively high level of awareness and exposure among most respondents, rural farmers remained relatively disadvantaged due to limited access, low literacy, and economic factors.

Regression analysis confirmed that education, income, awareness, and perceived effectiveness of the messages are the strongest predictors of utilisation, whereas demographic variables like age, marital status, and household size were not significant. This supports the view that understanding, financial literacy, and confidence in the content of messages are more influential determinants of anti-malarial message utilisation than personal background factors. The paper, therefore, concludes that more effective malaria prevention campaigns should not only continue to utilise existing media platforms but also incorporate approaches that enhance education, reduce economic barriers, and boost message credibility.

RECOMMENDATIONS

1. Radio and television have become the most widely used media channels. Therefore, malaria-prevention interventions should concentrate on these media, particularly delivering programmes that are consistent, relatable, and community-focused. Radio should remain the primary source in rural areas, while television should be extensively used in urban settings.
2. AKBC, Plant FM, and Comfort FM radio stations were the most popular channels for broadcasting malaria prevention messages. Public health agencies should collaborate with these trusted media partners to develop specific and culturally relevant malaria messages that will resonate with both rural and urban populations.
3. Education was identified as a major factor influencing message use. Incorporating malaria-prevention information into literacy programmes, agricultural extension programmes, and school curricula, for example, would enable communities to better understand and respond to health information.
4. The results also showed that message use was strongly influenced by income.

Subsidising malaria preventive tools such as insecticide-treated nets (ITNs), ensuring availability of newly available anti-malarial drugs at low costs, and providing micro-credits to poor households would help bridge the gap between awareness and actual preventive practice.

REFERENCES

- Afai, G., Rossetto, E. V., Baltazar, C. S., Candrinho, B., Saifodine, A., and Zulliger, R. 2022. Factors associated with knowledge about malaria prevention among women of reproductive age, Tete Province, Mozambique, 2019-2020. *Malaria Journal*, 21(1), Article 76.
- Akpabio, I. A., Ekpo, O. S., Ekerete, B. I., and Udousung, I. J. 2024. Assessment of fundraising capability of community development associations in Akwa Ibom State, Nigeria. *Nigerian Community Development Journal*, 13, 55–70.
- Alzubi, A. 2022. The impact of digital media on traditional print media in the context of health communication. *Journal of Health Communication Research*, 34(2), 123–135.
- Ankomah, A., Adebayo, S. B., Arogundade, E. D., Anyanti, J., Nwokolo, E., Inyang, U., Ipadeola, B., and Meremiku, M. 2014. The effect of mass media campaigns on the use of insecticide-treated bed nets among pregnant women in Nigeria. *Malaria Research and Treatment*, 2014, Article 694863.
- Awasthi, K. R., Jancey, J., Clements, A. C. A., and Leavy, J. E. 2022. A qualitative study of knowledge, attitudes, and perceptions towards malaria prevention among people living in rural upper river valleys of Nepal. *PLoS ONE*, 17(3), Article e0265561.
- Babalola, S., Kumoji, K., Awantang, G. N., Oyenubi, O. A., Toso, M., Tsang, S., Bleu, T., Achu, D., Hedge, J., Schnabel, D. C., Cash, S., Van Lith, L. M., McCartney-Melstad, A. C., Nkomou, Y., Dosso, A., Lahai, W., and Hunter, G. C. 2022. Ideational factors associated with consistent use of insecticide-treated nets: A multi-country, multilevel analysis. *Malaria Journal*, 21, Article 374.
- Batwala, V., Magnussen, P., and Nuwaha, F. 2012. Challenges to implementation of malaria prevention messages in rural Uganda: Evidence from a qualitative study. *Malaria Journal*, 11, Article 45.
- Dako-Gyeke, M., Badasu, D. M., and Doe, R. A. 2023. Impact of mass media on health behaviour change in Ghana: An examination of rural communities' response to health campaigns. *Global Health Promotion*, 30(2), 87–95.
- Fadairo, O. S., and Oyeboode, J. A. 2023. Shifting trends in media consumption and implications for public health messaging in Nigeria. *Journal of African Media Studies*, 15(3), 211–228.
- Idris, I. O., Ayeni, G. O., Iyamu, I. O., Sina-Odunsi, A. B., Adebisi, Y. A., and Obwoya, J. G. 2022. Factors influencing the severity of recurrent malaria in a conflict-affected state of South Sudan: An unmatched case-control study. *Conflict and Health*, 16(1), Article 34.
- Isiko, I., Nyegenye, S., Bett, D. K., Asingwire, J. M., Okoro, L. N., Emeribe, N. A., Koech, C. C., Ahgu, O., Bulus, N. G., Taremwa, K., and Mwesigwa, A. 2024. Factors associated with the risk of malaria among children: Analysis of the 2021 Nigeria Malaria Indicator Survey. *Malaria Journal*, 23(1), Article 109.
- Jalali-Farahani, S., Amiri, P., Bakht, S., Shayeghian, Z., Cheraghi, L., and Azizi, F. 2017. Socio-demographic determinants of health-related quality of life in Tehran Lipid and Glucose Study (TLGS). *International Journal of Endocrinology and Metabolism*, 15(4), Article e14548.
- Munir, J., Faiza, M., and Daud, S. 2023. The impact of socio-economic status on academic achievement. *Journal of Social Sciences Research*, 3(2), 695–705.

- Mwebesa, E., Awor, S., Natuhanya, C., Dricile, R., Legason, I. D., Okimait, D., Mangwi Ayiasi, R., and Tumwesigye, N. M. 2024. Impact of mass media campaigns on knowledge of malaria prevention measures among pregnant mothers in Uganda: A propensity score-matched analysis. *Malaria Journal*, 23(1), Article 256.
- Nwonye, N. U., Nkan, V., and Thompson, D. 2025. The role of subsistence farming in enhancing food security among university communities. *Journal of Forestry, Environment and Sustainable Development*, 11(1), 80–90.
- Okeibunor, J. C., Orji, B. C., Brieger, W., Ishola, G., Otolorin, E., Rawlins, B., Ndekhedehe, E. U., Onyeneho, N., and Fink, G. 2011. Preventing malaria in pregnancy through community-directed interventions: Evidence from Akwa Ibom State, Nigeria. *Malaria Journal*, 10(1), Article 227.
- Oladipo, J. A. (2014). Utilisation of health care services in rural and urban areas: A determinant factor in planning and managing health care delivery systems. *African Health Sciences*, 14(2), 322–337.
- Park, J., Kang, S., and Seok, D. (2023). Barriers against and strategies for malaria control during the COVID-19 pandemic in low- and middle-income countries: A systematic review. *Malaria Journal*, 22(1), Article 41.
- Raghupathi, V., and Raghupathi, W. 2020. The influence of education on health: An empirical assessment of OECD countries for the period 1995–2015. *Archives of Public Health*, 78, Article 20.
- Shekarau, E., Uzoanya, M., and Ogbulafor, N. 2024. Severe malaria intervention status in Nigeria: Workshop meeting report. *Malaria Journal*, 23, Article 177.
- Talabi, O. B., Afolabi, A. F., and Oyeleye, I. A. 2024. Mass media, information dissemination, and health behaviour change: A case study of malaria prevention in Nigeria. *Health Communication*, 39(1), 12–23.
- World Health Organization. 2022. World malaria report 2022. <https://www.who.int/publications/i/item/9789240069510>
- Yu, Y., Appiah, D., Zulu, B., and Adu-Poku, K. A. 2024. Integrating rural development, education, and management: Challenges and strategies. *Sustainability*, 16(15), Article 6474. <https://doi.org/10.3390/su16156474>.