



Article

Influence of Radio Messages on the Awareness and Adoption of Malaria Preventive Measures among Rural Dwellers in South-West Nigeria

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Abstract: This paper examined the influence of radio messages on the awareness and adoption of malaria preventive measures among rural dwellers in South-west Nigeria. The study investigated the participants' frequency of exposure to radio messages on malaria preventive measures, message adoption, and attitudes towards adopting measures. We used a multiple-stage sampling technique to select 48 participants from Aye North, Orile-Oshodi, Ofada, Owobaale/kasumu, Isale Oba II, and Ilepa II. The findings showed that the participants were exposed to messages on malaria preventive measures through radio broadcasts; however, exposure did not necessarily influence message adoption. Instead, a positive attitude towards the message influenced adoption. The study concluded that there is a need for radio stations to engage people's participation daily in health-related issues to achieve the desired change in health behaviour. The authors recommend that radio stations provide time to create daily health messages that influence people's engagement to achieve the desired change in health behaviour.

Keywords: radio messages; awareness; adoption; malaria; perceptions; preventive measures; public; rural dwellers



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1. Introduction

The radio is a popular communication medium in Nigeria, and 65% of citizens, predominantly rural dwellers, rely on it for health information (Ibidapo 2021; Talabi et al. 2022). Radio messages have been used to promote malaria prevention, such as using insecticide-treated bed nets, malaria drugs, and insecticides to prevent mosquito bites or to treat malaria infection (Ibidapo 2021). The radio has been a popular channel for transmitting malaria prevention messages and raising public awareness of important health behaviours (Sanusi et al. 2021).

Kabiru (2019), while examining malaria preventive measures among rural dwellers in Oyo State, found that most of the population needed knowledge of malaria preventive measures. Apart from a lack of knowledge, Kabiru (2019) also found that some rural dwellers identified discomfort associated with mosquito bed nets, while others identified the cost of preventive measures like treated mosquito nets and anti-malaria drugs to be the reason for having frequent malaria.

However, while marking the 2023 World Malaria Day with the theme #EndMalariaIn-Nigeria, Muanya (2023) revealed that there are 51 million cases and 207,000 deaths reported yearly. Muanya (2023) further disclosed that Nigerians spend NGN 2.04 trillion on malaria prevention and treatment, with 55% of the recurrent health budget on malaria treatment. Also, in Osun State, while marking the 2023 World Malaria Day, the programme manager of the Osun State malaria elimination control, Dr Olufemi Oroge, revealed that Nigeria is contributing 31.3% of global malaria deaths and that the country is leading with about 27% of global cases (Ezediuno 2023).

Similarly, enormous amounts of money were spent annually to curtail malaria's prevalence in Osun State, especially on the radio (Ezediuno 2023). According to Ezediuno (2023), the essence of these messages is to allow people to acquire accurate information about malaria disease and its preventive measures and form new health behaviours.

Furthermore, in the World Health Organization (WHO 2022) report, malaria disease now kills a child every minute. It said the rise in cases is due to stalled funding and disruption caused by the COVID-19 pandemic (WHO 2022; Talabi et al. 2023). However, USAID (2020) reported that the Federal Government of Nigeria obtained NGN 364 million in loans from a few multilateral banks, such as the World Bank, the African Development Bank, and the Islamic Development Bank, to finance malaria interventions in thirteen states over five years (2020–2024).

On the other hand, Adeniran (2022), while investigating the effectiveness of using the radio to sensitise and validate knowledge of malaria disease in Ekiti, found that some individuals who are knowledgeable of the malaria disease and the preventive measures frustrate the efforts of many malaria preventive measures initiated to wage war against malaria. Adeniran (2022) also revealed that some individuals used the treated insecticide bed nets to dry fish, while others used them as bathing sponges.

Ibidapo (2021), while investigating the acceptance of malaria preventive messages in rural areas, discovered that some individuals are usually sceptical about the effectiveness of preventive measures, which may result in alternative remedies. According to Ibidapo (2021), this has resulted in the causes and transmission of malaria, especially in rural areas. Ibidapo (2021) further revealed that the inability to access preventive measures, such as insecticide-treated nets, insecticides, or anti-malaria medication, after listening to a radio broadcast on malaria prevention, has also rendered the fight against malaria in rural areas ineffective.

Meanwhile, Omonijo and Omonijo (2019) argued that because the radio stations focus more on promoting brands of insecticides and malaria drugs, other measures like the clearing of bushes and avoiding stagnant water are ignored. Omonijo and Omonijo (2019) claimed these measures are effective if there is a willingness on the part of the masses to adopt them. Notwithstanding, as observed by some communication scholars (Ibidapo 2021; Adeniran 2022; Omonijo and Omonijo 2019), radio has been and is still sensitising and educating rural dwellers on malaria prevention measures, yet there are prevalent cases of malaria.

Consequently, there are concerns about whether radio gives enough time to issues that border malaria morbidity and mortality. There are also concerns about whether critical components of the malarial disease, such as transmission, prevention, symptoms, cure, etc., are adequately addressed in these messages. Against this backdrop, there is a need to investigate the influence of radio messages on the awareness and adoption of malaria preventive measures among rural dwellers in South-west Nigeria. Thus, by the preceding arguments, the research objectives were to investigate how frequently rural dwellers in South-west Nigeria are exposed to radio messages on malaria preventive measures, know the extent to which rural dwellers in South-west Nigeria adopt malaria preventive measures, know the attitude of rural dwellers in South-west Nigeria towards the adoption of malaria preventive measures, and find out the communication techniques used to encourage the adoption of malaria preventive measures on the radio in South-west Nigeria.

Duodu et al. (2021) studied how people in rural and urban areas perceive the prevalence of malaria and the preventive measures. The study's objective was to examine the variables that affect mosquito nets in Nigeria, including the perceived seriousness of malaria and disparities between rural and urban areas in the association between socio-demographic parameters and the use of mosquito nets. The study accommodated 40,693 women between the ages of 15 and 49 years. The result showed that approximately 48% of the women slept inside a mosquito net the night before the study.

Duodu et al. (2021) asserted that people who thought that malaria could result in death used treated mosquito nets more frequently in urban and rural areas. Thus, Duodu et al. (2021) established the participants' perceptions of malaria preventive measures; however,

the authors needed to investigate the participants' sentiments on mosquito nets, resulting in a low rate of usage and, in turn, the prevalence of malaria disease. This is the gap that the current study investigated by observing the attitudes of rural residents in Osun State towards adopting malaria measures.

Awosolu et al. (2019) conducted a cross-sectional survey to examine the high rate of malaria transmission in Ibadan. The primary focus of the study was to evaluate the risk factors, parasite density, and high transmission rate of malaria infection in two communities in Ibadan. In terms of the methodology, Awosolu et al. (2019) carried out a cross-sectional hospital-based study involving 300 participants. Blood samples were taken, and a questionnaire was used to gather information on socio-demographic and environmental factors.

Awosolu et al. (2019) discovered that 165,300 participants tested positive for *Plasmodium falciparum*. Awosolu et al. (2019) concluded that malaria infection is endemic in the study area and is influenced by rural–urban mobility. The authors recommended implementing a multidimensional and integrated control strategy. Awosolu et al. (2019) highlighted the prevalence of malaria cases in the study area. As a result, the current study examined whether radio messages on malaria prevention in South-west Nigeria captured key messages targeted at the population.

While examining the communication techniques and the type of media used to transmit malaria messages, Stanislau (2019) observed that it is necessary to research newer strategies for communicating malaria prevention, control, and management since the mainstream media seems ineffective in influencing the changing behaviour. Stanislau's (2019) study aimed to evaluate the communication techniques used to create awareness about malaria prevention in Nigeria. The study deployed a questionnaire to measure the awareness of malaria prevention of 250 residents of Cross River State and the communication technique used to create this awareness. The study found that limited media and communication techniques were used to create awareness of malaria prevention. Stanislau (2019) concluded that the media industry was communicating malaria preventive messages through adverts, jingles, and other promotions compared to other techniques, resulting in low awareness of malaria preventive measures. Stanislau's (2019) study is relevant to this study as it sought to examine how well participants can recall the communication techniques used to communicate malaria preventive measures to validate the recalled techniques' effectiveness in influencing message adoption.

Furthermore, this study adopted the Health Belief Model. In the observation of Nzotta and Orji (2020), the Health Belief Model is a psychological framework intended to define and predict healthy behaviour. According to the Health Belief Model, the most effective behaviour change messages successfully address perceived advantages, barriers, self-efficacy, and dangers (Becker 2004; Akpoghiran 2015).

The main assumptions of this theory state that the target audience must be provided with a reward/incentive to alter their behaviour; the target audience must believe that continuing the current behaviour poses a risk. An audience that the health messages are intended for must believe that changing their behaviour will have benefits and that those benefits will exceed barriers. Lastly, the target audience must be confident enough to change their behaviour (Nzotta and Orji 2020).

This theory is related to this research because it can help predict and explain malaria awareness, prevention, and change in health behaviour among rural residents in South-west Nigeria. One of the model's tenets suggests using an effective medium to spread health issues; thus, Oladimeji et al. (2019) asserted that in South-west Nigeria, the residents' access to radio messages goes a long way in enlightening residents to cultivate positive habits by regularly checking themselves, thus making this theory relevant to this study. Similarly, this model will assist the researcher in investigating the factors that lead to the adoption of certain health behaviours, such as using treated mosquito nets or using insecticides to prevent mosquito bites resulting in malaria transmission.

2. Materials and Methods

This study adopted a qualitative research design and a focus group discussion to understand the participants' perceptions of radio messages on the awareness and adoption of malaria preventive measures. We also used a multiple-stage sampling technique for this study. We chose this technique because it allowed us to divide the populations into clusters. The sampling began with obtaining a list of all the Southwest states: Ekiti, Lagos, Ogun, Oyo, Osun, and Ondo.

Thus, purposive sampling was employed to choose a local government with a radio station or a strong radio transmitting signal to rule out the possibility of some residents not being exposed to these messages due to issues with transmitter waves. For this purpose, we selected Oye Local, Oshodi-Isolo, Obafemi-Owode, Egbeda, Iwo, and Akoko North-west Local Government Areas as study areas. In the next step, we selected electoral wards from each local government area using a simple random sampling technique (lottery method). [Oribhabor and Anyanwu \(2019\)](#) claimed that this sampling technique gives every member of the population an equal chance of being chosen for the study.

For the study, the electoral wards that we sampled are Aye North (Oye, Ekiti); Orile-Oshodi (Oshodi-Isolo, Lagos); Ofada (Obafemi-owode, Ogun); Owobaale/kasumu (Egbeda, Oyo); Isale Oba II (Iwo, Osun); and Ilepa II (Akoko). In the last stage, a convenient sampling technique was adopted in this study to select participants to take part in the focus group discussions. According to [Greener and Martelli \(2018\)](#), the convenient sampling technique allows the researcher to collect data quickly where participants are readily available. The rationale is that testing the entire electoral wards may be practically impossible; therefore, we selected participants based on proximity to examine their behaviour and awareness of the topic under investigation. We also used a Focus Group Guide for data gathering. The rationale behind adopting the Focus Group Guide is to help determine the participants' opinions, beliefs, attitudes, and ideas in line with the study objectives. The Focus Group Discussion had six sessions, each with eight participants, and forty-eight participants participated.

Furthermore, twenty-two (22) females and twenty-six (26) males participated in the discussions, and each session and participant were given codes for easy recognition and analysis. For example, FGD, which took place in Ekiti, was coded F1, while the response from the participant was coded R1-R8. The coding prevented the use of names and initials, protecting the participants' confidentiality. Inline F2 was performed in Osun, F3 in Lagos, F4 in Ogun, and F5 in Oyo, while F6 was performed in Ondo. Also, the data from the Focus Group Discussions is presented thematically by the research objectives. We analysed the data thematically while making inferences about the participants' awareness, behaviour, and adoption of radio messages on malaria prevention.

3. Results

3.1. Theme 1: Exposure to Malaria Preventive Messages on the Radio

The data from the FGD revealed the participants' exposure to messages and the radio stations covering malaria prevention messages. The discussions showed that few stations transmitted messages daily, while others transmitted weekly or monthly. These stations are OSBC 104.5 FM, Osun state, Orange 94.5 FM Ondo state, Orisun 89.5 FM, Osun state, Radio Lagos 107.5, Progress 100.5 FM, Ekiti, Paramount 95.5 FM Ogun state, Positive 88.9 FM, and Fresh 105.9 FM, Oyo state. Providing more insight into focus group discussion four, a participant said:

I remember that sometime in April 2023, while listening to Paramount 95.5 FM, I heard people talking about malaria prevention. They were saying malaria is a dangerous disease that kills as well. What caught my attention was that children and pregnant women were the vulnerable victims of malaria. The message encourages people to use preventive measures like sleeping under the mosquito bed net and getting treated if infected. That message changed my perception of malaria as it was one of those diseases I never took seriously, but now I know it is dangerous as a result of my exposure to that message (F4R3).

Also, from the discussions, it was observed that most of the messages were sponsored. They were either jingles to promote insecticides or malaria drugs. Few of the messages were from the Federal Ministry of Health. The participants could sing a few lines from their recalled jingles, which helped the researcher track these messages (please check the appendix for an extract). Some recalled brands were Amartem, Lonart, Goodnight, Baygon, and Mortein. One of the participants from F2R7, recalling part of the jingle he listened to on OSBC 104.5 FM, said:

While I was at my shop listening to OSBC 104.5 FM because I like that frequency, I heard one song about malaria prevention that says *Amatem soft gel* is a game changer and is easy to swallow. I wouldn't say I like *Amatem*; I prefer *Lonart* because my body system does not react negatively to it, unlike *Amatem*. (F2R7, 2023)

Similarly, a respondent (F6R5) recalled listening to messages about malaria prevention from Orange 94.5 FM. According to this respondent, part of the message mentioned that if people can use *Mortein* and sleep under mosquito bed nets, they can fight malaria. Progress 100.5 FM was also mentioned to have promoted the Goodnight insecticide. In a further explanation from the discussion, a participant (F1R2) recalled part of the messages by saying:

I can remember last week, while on a bus, visiting a relative of mine. The bus I boarded tuned to Orisun 89.5 FM Ile Ife, and I heard one song about Baygon knocking down mosquitoes fast; it also said, "Imagine a life without Baygon". Baygon is expensive. I use locally made insecticides to keep mosquitoes away from my home. (F2R8, 2023)

We discovered that the participants were exposed to radio messages on malaria prevention, which was shown in their ability to recall messages. However, some participants could not recall messages but attested to exposure. Thus, remembering these messages in this study was essential as it helped the researcher to understand the extent to which the participants were willing to adopt these messages.

3.2. Theme 2: Perception of Malaria Preventive Measures

The second theme examined the participants on malaria preventive measures on the radio. From the discussions, we discovered that some participants adopted specific behaviours after listening to messages, while some other participants' messages did not influence adoption. A participant (F5R6), while explaining the experience of adopting the use of insecticide bed nets, said:

I use mosquito net to prevent mosquito bites and use anti-malarial drugs whenever I am infected with malaria. So far, this has kept me and my family safe from malaria. However, that does not mean I do not get infected; I do. This year, I have treated malaria three times. However, the malaria treatment rate has reduced. (F5R6, 2023)

However, we observed that some respondents did not see the need to adopt any of the measures. They considered these measures (insecticide bed nets, insecticide, clearing of bushes, avoiding stagnant water) ineffective in killing mosquitoes, which can cause malaria. Another observation was the respondent's tendency to always use anti-malaria drugs with deliberate effort not to consider other measures:

I do not use anything for now. The mosquito net or the insecticide is not adequate. People will continue to be exposed to mosquito bites irrespective of any method anyone adopts. Since malaria drugs are easy to get despite being expensive, I would prefer to treat myself using them. (F2R4, 2023)

I do not use any method except when I am sick with malaria; I will treat it with malaria drugs. I feel because of our environment, which encourages the breeding of mosquitoes, these methods (mosquito nets, insecticide, clearing of bushes, etc.) are infectious because no matter what, you will still catch malaria. (F6R5, 2023)

This finding implies that not everyone is adequately sensitised or convinced of the effectiveness of these measures; hence, the responsibility rests on the media and relevant stakeholders to create more time and programmes that will continually educate the people, particularly the rural people, on the need to adopt these measures as well as their effectiveness. Although these measures cannot guarantee malaria eradication in Nigeria because of its topography, they can contribute by reducing cases to the barest minimum. Hence, it is expected that radio stations will continue to sensitise the populace to the dangers of ignoring these measures. Similarly, the deliberate refusal or ignorance of the effectiveness of these measures by the respondents signifies the ineffectiveness of the malaria preventive measures on the radio.

3.3. Theme 3: Malaria Preventive Messages and Duration of Measure Adoption

The third theme from this discussion is how long the respondents have constantly used their adopted measure(s) to prevent malaria and their experiences using the preferred preventive measure. This theme is relevant to this study because helped to reveal the influence of the malaria preventive message on the participants, which would have resulted in them adopting the measures for a specific duration of time. From the discussions, it was discovered that some participants had been using mosquito bed nets since 2020; some had been using insecticide for the past seven years, while others had adopted the habit of clearing bushes around their homes to keep away mosquitoes:

I have been using a mosquito bed net since 2020 till now. It was given to me at the health centre when my wife gave birth to our son. I do not feel the bed net effectively keeps my family and me safe from malaria because I have been treated for malaria four times this year. (F5R6, 2023)

I make use of insecticides to prevent mosquito bites. I have been using it for over seven years now. Preferably, I make use of "Baygon. I consider using insecticides effective in preventing mosquito bites. (F6R5, 2023)

Similarly, the discussion revealed that the participants had been using certain measures for years, which ranged from twelve years, seven years, five years, three years, two years, and one year, six months to four months. Hence, the implication of this result is that radio messages on malaria prevention positively influenced the respondents, which resulted in a change in health behaviour. Also, the findings of this theme revealed that it captured the participants' experiences with the adopted measures. The findings revealed that some of the audience trusted their adopted measures to be effective in reducing the number of times an individual is infected with malaria disease (F6R5, F3R8, F1R7, F1R8, and F4R4). At the same time, other respondents did not believe in the effectiveness of the adopted measures, regardless of usage (F5R1, F5R4, F4R7, F4R4, and F5R6).

3.4. Theme 4: Message Exposure and Recalled Technique

In the fourth theme, we examined the various techniques by which the malaria messages on the radio were presented to the participants. Messages could be presented as talk shows/interviews, discussion programmes, personal testimonies, radio dramas, documentaries, public service announcements, and jingles. Some respondents recalled the messages to have been broadcasted in the form of talk shows, while others claimed they were songs (jingles):

I heard the opportunity to listen to this particular drama on Lagos 107.5 FM. . . I think they usually mention at the end of each episode that the Lagos state government sponsors it. In one of those episodes, I heard a woman who nearly lost a twelve-year-old child to malaria and a husband. Part of the message said, "Malaria is a leading cause among first-time pregnant women and small children, and malaria is responsible for over 30% of deaths in the country". I did not know malaria was this serious until I came across that message. (F3R3, 2023)

I think this message on Positive 88.9 FM always says, “What is a killer to you? Is it war, abi na drug, abi na trailer to you? All of them na killer. But malaria is the number one killer”. The song is funny, and that is why I like it. I think that the message emphasises the dangers of malaria. The message mentioned Amatem malaria drug in the end. (F6R1, 2023)

These findings showed that most of the participants were exposed to jingles of different unnamed brands of anti-malaria drugs and insecticide sprays. Few participants agreed that messages were presented in a discussion/interview format. Other participants indicated that messages were presented as testimonials. One of the respondents could recall messages presented through radio drama. These findings imply that the messages only communicated specific measures to the respondents with the sole aim of selling the brand advertised. Hence, there is a need for radio stations to create unique programmes where issues of malaria disease can be addressed often. The belief is that the more people are informed, the greater the possibility of reducing malaria cases in Nigeria.

3.5. Theme 5: Attitude towards Message Adoption

From the discussion, some participants disliked mosquito bed nets, and others disliked insecticides. The argument was that the insecticide causes respiratory issues. At the same time, the mosquito nets make the user sweaty due to the tiny holes, which are also designed to prevent mosquitoes from biting the user. The findings also showed that some participants felt the mosquito bed nets were ineffective at preventing malaria since they became infected even after using the mosquito nets. Although some of the respondents believed mosquito nets could not prevent them from contracting malaria, they reduced the number of times they became infected.

I have a severe problem with using insecticide spray because I will have a cough after usage. So, this is the primary reason I wouldn't say I like to use insecticide spray (F1R5, 2023).

I heard that treated malaria bed net causes respiratory issues, and one can fall sick because of the chemicals. Although it has not happened to me before, I fear it might happen if I use it (F4R2, 2023).

I wish I could deal with the issues of bushes around my home. The bushes behind my house contribute to the breeding of mosquitoes. I have tried several to speak with the landowner to come and clear the bushes. I am pained because I have spent so much buying different insecticide brands (F6R4, 2023).

Another observation raised during the discussion was the need to make mosquito nets accessible. Some respondents who felt mosquito nets were idle in preventing malaria disease disclosed that efforts to obtain them from stores/markets around their vicinity proved abortive except when given as gifts by NGOs or governments during malaria prevention campaigns. Meanwhile, only a few respondents considered other measures, such as clearing bushes and drains and avoiding stagnant water, as challenging due to factors beyond their control in their environments. Hence, there is a need for further sensitisation of the populace regarding the benefit of adhering to these malaria preventive measures.

This research examined public perceptions regarding the awareness and adoption of radio messages on malaria preventive measures among rural dwellers in South-west Nigeria. The first objective investigated the frequency of exposure to radio messages on malaria preventive measures among rural dwellers in South-west Nigeria. The findings showed that the participants were exposed to radio messages on malaria preventive measures; however, most of them recalled monthly exposure as opposed to daily or weekly exposure to messages on malaria prevention. Also, some participants needed help to keep track of their exposure as they struggled to recall it. The participants who could recall messages said they mainly involved the advertisement of insecticides or malaria drugs. The findings also support a study by [Ibidapo \(2021\)](#), who observed that 65% of Nigerian citizens in rural areas rely on the radio for health information. However, the findings

showed that most of the participants were exposed to these messages monthly instead of daily or weekly. Kabiru (2019) discovered that most rural dwellers lacked knowledge of malaria preventive measures because of the underreporting of malaria-related issues in the media. Therefore, there is a need for radio stations to design health programmes that will sensitise the populace about the dangers of malaria and prevention daily. Malaria messages on the radio should go beyond the advertisement of anti-malaria drugs and insecticides; programmes that convince the audience of the need to adopt the messages should be transmitted daily to reinforce the need to reduce malaria prevalence in Nigeria.

The second objective examined the extent to which rural dwellers in South-west Nigeria adopt malaria preventive measures. The results showed that most of the participants used mosquito nets, anti-malaria drugs, and insecticides to prevent malaria. However, other preventive measures such as clearing bushes, avoiding stagnant waters, and cleaning drains were ignored by most of the participants except for a few who acknowledged these measures to minimise mosquito breeding effectively. The findings also showed that the majority of the participants believed that these measures were not effective since they became infected with malaria even after using these measures. The findings agree with Ibidapo (2021), who discovered that some individuals in rural areas are usually sceptical about the effectiveness of preventive measures, which may result in alternative remedies. Hence, it is expected that radio stations continue to sensitise the populace to the dangers of ignoring these measures.

The third objective examined the attitudes of rural dwellers in South-west Nigeria towards adopting malaria preventive measures. The findings showed that after exposure to malaria preventive measures, most of the participants decided to sleep inside a treated mosquito bed net. In contrast, others chose the use of an insecticide as a measure of preventing malaria disease. The participants also felt the need to get diagnosed and treated by health professionals when infected with malaria disease because of the health risk that comes with being infected with malaria. These findings agree with Duodu et al. (2021), who stated that people who thought malaria could result in death used treated mosquito nets more frequently in urban and rural areas as provided by the assumption of the Health Belief Model; the most effective behaviour change messages addressed perceived the advantages, barriers, self-efficacy, and dangers. Hence, there is a need for radio stations to design radio programmes that will mainly address the risks and advantages of health messages. The last objective investigated the communication techniques used to encourage the adoption of malaria preventive measures on the radio in South-west Nigeria. The findings showed that most of the participants were exposed to jingles from different brands of anti-malaria drugs and insecticides. Few participants agreed that messages were presented in a discussion/interview format. Also, a few participants agreed that messages were also presented as testimonials. None of the participants could recall that messages were presented in radio dramas, documentaries, or public service announcements. These findings imply that the messages only communicated specific measures to the participants to sell the brand advertised, as the participants could recall the brands of the anti-malaria drugs and insecticides. Hence, there is a need for radio stations to create unique programmes where issues of malaria disease can be addressed often.

Also, regarding the findings of this study, it is imperative to discuss how the HBM model connects with the results of this study. As stated earlier, there were factors assumed by this model to facilitate the adoption of a new health behaviour. These factors are perceived susceptibility, perceived benefits, perceived seriousness of the health issue, and barriers. The findings indicated that the participants recognised they were vulnerable to malaria, which showed their ability to identify its various symptoms and health implications. Also, the ability to identify the health implications of malaria shows that the participants understood the seriousness of malaria to health. Identifying measures like the use of treated insecticide bed nets, malaria drugs, insecticide, etc., to prevent malaria implies that the participants were aware of the benefit of adopting these measures to keep them safe. A close examination of the barriers from the results showed that some of the respondents needed to find specific measures that were more convenient to use. Some considered mosquito bed nets or insecticides

inappropriate due to the cost of purchase, health conditions, or inability to access them. The Health Belief Model provides a basis for understanding the participants' awareness and knowledge of malaria preventive measures. Similarly, radio messages have been able to create awareness of malaria prevention by providing information on the mode of transmission, symptoms, health implications, treatment, and prevention. We believe that a well-designed message on malaria prevention can shape attitudes positively; this is because the individuals who perceive a high threat of malaria and are convinced about the preventive measures are more likely to adopt the proper health behaviour that can help reduce malaria to the barest minimum, particularly in the rural areas.

As provided in the findings, this study concluded that the participants were exposed to radio messages on malaria preventive measures. This study was used to ascertain the participants' exposure levels and methods of adoption. The results showed that the participants disregarded other methods, such as clearing bushes around their homes, cleaning dirty drainage systems, and avoiding open or stagnant water. They preferred using insecticide-treated nets, anti-malaria drugs, and insecticides for malaria prevention. [Omonijo and Omonijo \(2019\)](#) argued that these measures are effective. However, the participants' exposure to commercial jingles on malaria prevention did not allow the participants to consider adoption. Thus, the pharmaceutical companies sponsoring the jingles are profiting from the investment, while cheaper means of prevention are neglected. Hence, it is expected that the media put more effort into sensitising the local populace about the effectiveness of these methods.

Further findings showed that the frequency of exposure was recorded to be mainly yearly and monthly as opposed to daily or even weekly. The participants may have needed regular exposure to these messages to affect the adoption of the measures, as evidenced by the prevalence of malaria cases in Nigeria, as revealed by the qualitative data of this study. As a result, yearly exposure to these messages might not result in the desired outcome in health behaviour. Therefore, the media should allocate more time for daily broadcasts of health issues, especially malaria, to obtain the desired change in health behaviour. Government and non-government organisations should consider the radio an effective channel for broadcasting health-related issues to rural dwellers.

Radio stations should frequently sensitise rural dwellers regarding the need and effectiveness of adopting other measures aside from using treated mosquito nets, insecticides, and anti-malaria drugs. Although this study provided qualitative evidence for understanding the influence of radio messages on the awareness and adoption of malaria preventive measures among rural dwellers in southwest states, further information on the difficulties radio stations face in the daily broadcast of malaria prevention messages still needs to be provided. This study did not consider other communication channels, such as television, to broadcast malaria preventive messages and whether using indigenous language to broadcast these messages would be more effective. Therefore, future studies should examine possible challenges regarding radio stations' daily broadcast of malaria preventive messages. The authors also suggest that future studies should examine whether using indigenous languages to broadcast malaria preventive messages will result in more effective changes in health behaviour.

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