



(RESEARCH ARTICLE)



## Effects of formal education on malaria knowledge among people attending Federal Medical Centre, Owerri, Imo State, Nigeria

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### Abstract

Globally, malaria continues to be a life-threatening infectious disease in more than 100 countries. It is endemic in Africa, especially Nigeria where it is a major cause of morbidity and mortality. It affects all age brackets but more severe among children under the age of 5 and pregnant women. This study was undertaken to evaluate the knowledge of people attending health care at Federal Medical Centre (FMC), Owerri in Imo State, Nigeria on malaria with emphasis on causes, signs and symptoms, preventions, and management of the disease. The study was conducted in Federal Medical Centre, Owerri Imo state, Southeast Nigeria. This cross-sectional hospital based study was conducted on 250 participants. A well-structured questionnaire was administered to elicit information on socio-demographic characteristics and respondents' knowledge on cause, signs and symptoms, prevention and management of malaria. The socio-demographic variables for the respondents showed that 26.0% had no formal education, whereas 74.0% had formal education. On the knowledge of causes of malaria, 67.4% of the educated study populace had sound knowledge against their counterpart that had 31.9%. Regarding knowledge of malaria signs and symptoms, the respondent without and with formal education had 40.34% and 79.7% respectively. The respondents without formal education had 38.0% against their counterpart that had 61.3% knowledge on malaria prevention. With respect to knowledge on management of malaria, those that had formal education reported 88.9% knowledge, while the participants without formal education recorded 38.8%. Generally, respondents with formal education had significantly better knowledge than those without formal education.

**Keywords:** Knowledge; Malaria; Formal; Education; Health; Nigeria

### 1. Introduction

Malaria is a serious global life-threatening infectious disease transmitted by *Plasmodium*, an obligate intracellular protozoan parasite. Among the six *Plasmodium* species that cause malaria in humans, *Plasmodium falciparum* is the most prevalent in sub-Saharan Africa. *P. falciparum* is responsible for most deaths from malaria [1-3] According to the latest report by the World Health Organization (WHO), there were an estimated 247 million malaria cases against 245 million cases in 2020 and 619,000 malaria deaths worldwide in 2021 compared to 625,000 in 2020 [1]. Nigeria's increased efforts and strategies to control malaria have not resulted in any reduction in disease incidence or mortality for several years [2, 4, 5]. Thus, Nigeria accounted for most of the global mortality from malaria in 2021 (31%) compared to 2019 (24%) [1, 6, 7]. Additionally, in 2021, 38.4% of global malaria deaths occurred in Nigerian children younger than five

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years old [1]. More so, other *Plasmodium* species such as *P. vivax*, *P. ovale wallikeri*, *P. ovale curtisi*, and *P. malariae* have been implicated in malaria disease [8-10].

According to [11, 12, 13], several malaria preventive and management strategies can yield impactful results including maintaining the safety of the environment through the collaborative effort of individuals and societies, effective long lasting insecticide bed net (ITNs) use, early diagnosis and prompt/proper medication. In spite of the various intervention programmes embarked upon by individuals, agencies, institutions, nations and international bodies alike, malaria continues to be the most challenging parasitic disease globally. In Nigeria, the major malaria prevention and management strategies in practice are prompt diagnosis and immediate treatment of cases. Furthermore, mosquito vector control, environmental management, indoor residual sprays and insecticide-treated nets are also implemented assiduously [14].

Determination of people's knowledge status regarding malaria cause, signs and symptoms, prevention and management is imperative since there is a global paradigm shift in malaria control towards involvement of community and individual against the sole use of insecticides [10]. According to studies conducted by [15, 16], it was reported that when community's knowledge increases, the malaria incidence and burden decline. It is said that knowledge, attitude, and practice (KAP) is the educational diagnosis of a community, which is fundamental in disease control program [11]. Although quite enormous studies have been conducted and documented on malaria prevalence, there is paucity of research on people's knowledge regarding malaria infection in the majority of Nigeria, particularly in South East Nigeria.

According to the study carried out by [11, 17], it was reported that formal education enhances the knowledge of malaria among the population generally. According to [18, 19], education has a positive impact on the uptake of malaria services. The probability of dying from malaria is inversely related to income and education. A clustering of risk factors, including low education, increases people's vulnerability to malaria and may be as important as the exposure itself. This makes quality schooling and socioeconomic development critical components of the global effort to defeat the disease. The populace with at least secondary school level of education could have been exposed to myriad of information on malaria in school environment, and equally at vintage position to access and understand malaria messages from various channels it is communicated. Knowledge about malaria is vital in evaluating people's acceptance and participation in malaria control programmes [20], and the level of knowledge is a function of the environment [21]. Since the significant number of the respondents in the studied population had no formal education [22], determining impact of formal education on their malaria knowledge will play enormous role in deploying appropriate interventions that will increase their knowledge on malaria, thereby improving their level of acceptance and participation in malaria control strategies. Emphatically, in order to achieve and enhance success and sustainability of malaria control programmes, the involvement of the targeted population in the control is very important coupled with the need to identify and implement effective control measures [23]. With this information available and implementation in place, the Nigeria National Malaria Elimination Programme will record maximum output in the areas where malaria prevalence is still high. This research was designed to evaluate the knowledge of people regarding malaria infection with emphasis on causes, signs and symptoms, prevention, and management of the malaria infection in Imo State, South East Nigeria.

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## 2. Materials and methods

A pre-tested questionnaire was administered to the respondents in order to collect information on their socio-demographic and malaria knowledge on cause, signs and symptoms, preventions and management. Information was elicited from the respondents via face-to-face interviews. The survey gathered information offered both spontaneously and in response to specific questions that addressed their knowledge about malaria. Questions about knowledge were open-ended to avoid guessing about the answers to multiple-choice questions, which might give a false impression concerning the participants' knowledge. The data obtained were quantitatively analyzed, using SPSS version 21.0, in terms of the percentage of respondents with accurate knowledge of causes, signs and symptoms, prevention and management of malaria infection. Students T-test was performed to evaluate the significance of the effect of formal education on the respondents' knowledge on malaria.

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## 3. Results

### 3.1. Socio-demographic variables for respondents

A total of two hundred and fifty (250) individuals participated in the study; 132 (52.8 %) were female, 118 (47.2 %) were male. Regarding age distribution, 24.0 % were <11 years, 8.8 % (11-20), 22.0 % (21-30), 14.8 % (31-40), 11.6 % (41-50), 10.4 % (51-60), 4.8 % (61-70) and 3.6 % above 70 years. Among the respondents, 34.4 % were single, married

6.4 %, divorced 5.2 %, and widowed 4.0 %, Nigerian 99.6 %, petty traders 20.0 %, farmers 8.8 %, civil servants 24.4 %, unskilled labour 15.2 % and others 31.6 %, and formally educated 74.0 % while 26.0 % were not.

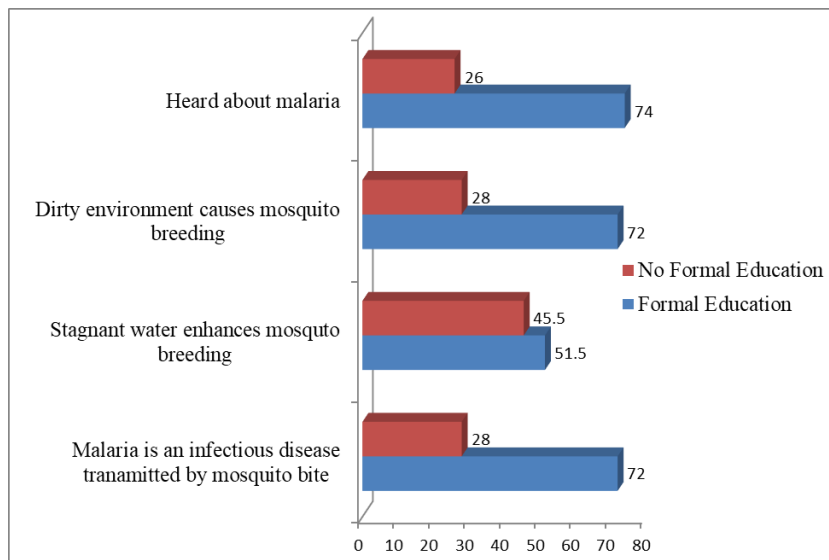
**Table 1** General demographic, socioeconomic, and environmental characteristics of the study participants

Variable	Frequency (n=250)	Percentage (%)
<b>Age range (in years)</b>		
<11	86	34.4
11-20	31	12.4
21-30	51	20.4
31-40	41	16.4
41-50	25	10.0
51-60	13	5.2
61-70	3	1.2
>70	0	0.0
<b>Gender</b>		
Male	118	47.2
Female	132	52.8
<b>Marital status</b>		
Single	86	34.4
Married	141	56.4
Divorced	13	5.2
Widowed	10	4.0
<b>Nationality</b>		
Nigerian	249	99.6
Non-Nigerian	1	0.4
<b>Occupation</b>		
Petty trader	50	20.0
Farmer	22	8.8
Civil servant	61	24.4
Unskilled labour	38	15.2
Others (Not working)	79	31.6
<b>Level of Education</b>		
Primary	51	20.4
Secondary	63	25.2
Tertiary	71	28.4
Informal	65	26.0

### 3.2. Knowledge of causes of malaria

Up to 74% and 26% of participants with and without formal education had heard about malaria infection respectively. About 72% of respondents with a formal education knew that malaria is transmitted through a mosquito bite, while

28% had the same knowledge among respondents without formal education. The majority of respondents with formal education (72%) had the knowledge that dirty environment leads to breeding of mosquitoes, thus causing malaria. Only 28% of those without formal education knew that dirty environment could lead to malaria. Knowledge about stagnant water serving as breeding sites for mosquitoes was also investigated in the area of malaria causative factors, and it was discovered that 51.5% gave the correct response, while only 45.5% of those without formal education had the knowledge.

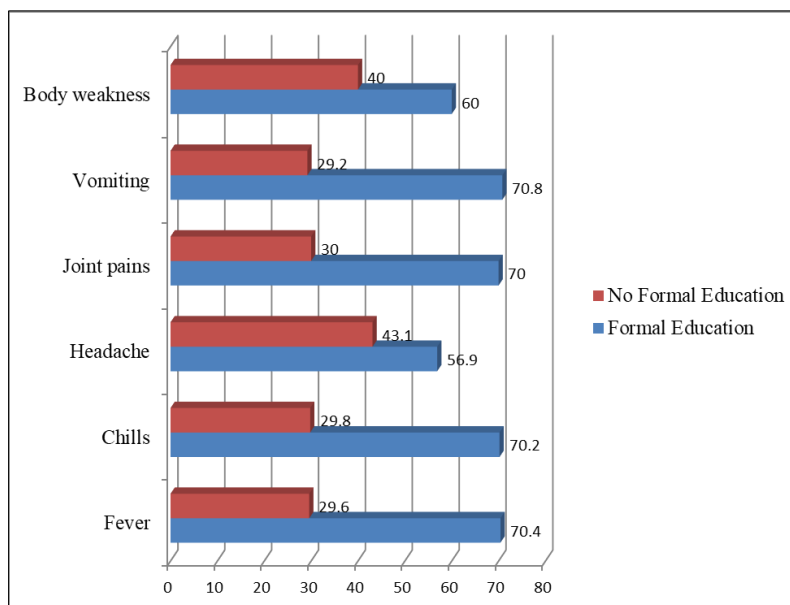


Mean score in those without formal education = 31.9 (SD = 5.3); Mean score in those with formal education = 67.4(SD =6.1)

**Figure 1** Knowledge of participants with respect to causes of malaria

### 3.3. Knowledge of malaria signs and symptoms

The respondents with and without formal education reported fever (70.4, 29.6%), chills/shivering (70.2 vs 29.8%), headache (56.9 vs 43.1%), Joint pains (70 vs 30%), vomiting (70.8 vs 29.2%), body weakness (60 vs 40%) as signs and symptoms of malaria infection respectively while insignificant number mentioned itching and convulsion.

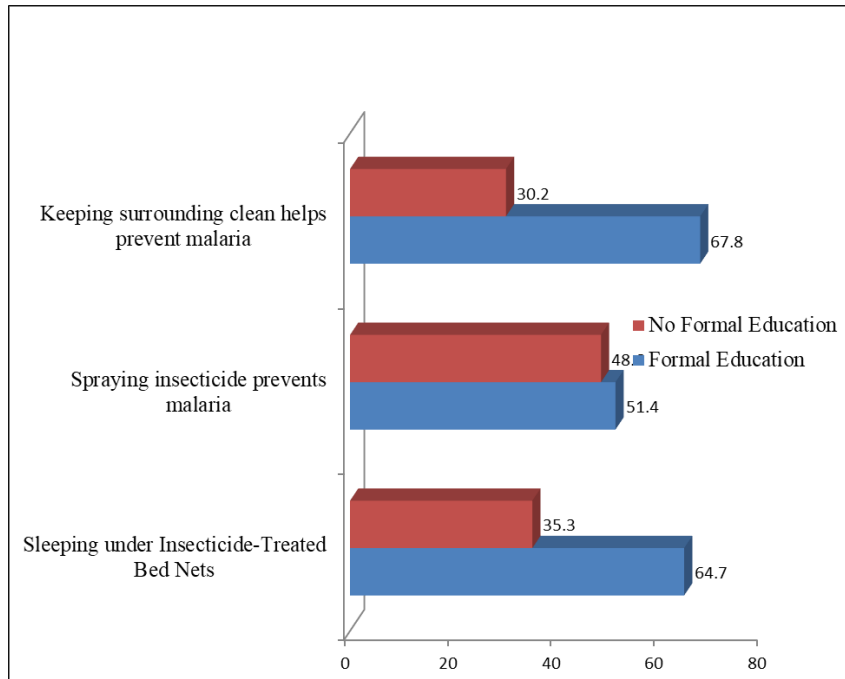


Mean score in those without formal education = 33.6 (SD =2.8); Mean score in those with formal education = 66.4 (SD = 2.8)

**Figure 2** Knowledge of respondents towards signs and symptoms of malaria

### 3.4. Knowledge of malaria preventions

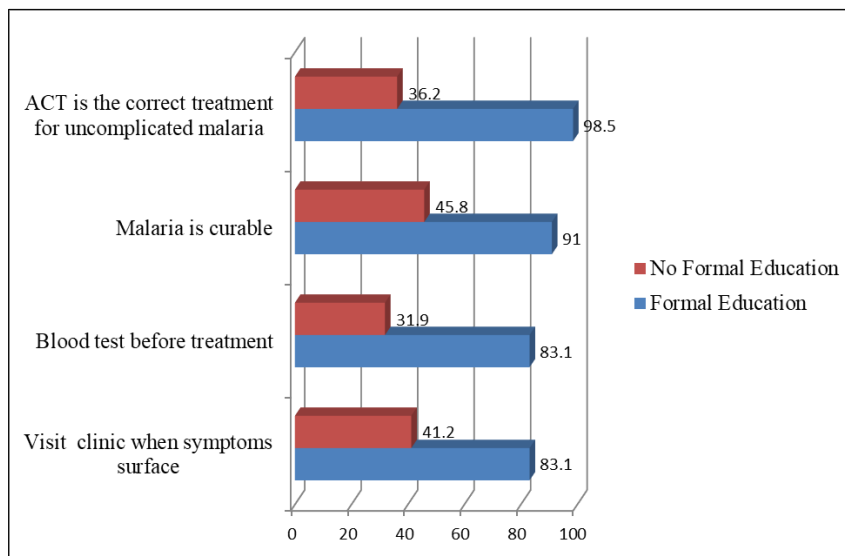
Majority of the respondents with formal education (64.7%) knew that sleeping under Long Lasting Insecticidal Nets every night helps prevent malaria infection. Only 35.3% of those without formal education have similar knowledge. Many of the respondents with formal education (51.4%) knew that spraying insecticides inside houses help prevent malaria infection, while only 48.6% of the ones without formal education have the knowledge. Keeping surrounding clean helping enhances malaria infection prevention is known by 67.8% of respondents with formal education, while 30.2% of those without formal education knew that environmental cleanliness plays vital role in preventing malaria.



Mean score in those without formal education =38.0 (SD = 6.7); Mean score in those with formal education =61.3 (SD =6.1)

**Figure 3** Knowledge of malaria prevention

### 3.5. Knowledge on management of malaria



Mean score in those without formal education =38.8 (SD =3.48); Mean score in those with formal education = 88.9 (SD =4.27)

**Figure 4** Knowledge respondents on management of malaria infection

The majority of the respondents with formal education (98.5%) knew that Artemisinin based Combination Therapy is the recommended treatment for uncomplicated malaria infection. Even fewer numbers of those without formal education (36.2%) have the same knowledge. The guideline that stipulates that blood test to confirm malaria diagnosis should be done before the commencement of treatment is known by 83.1% of respondents with formal education, but only 31.9% of those without formal education share the same knowledge. A small number, among those with formal education (83.1%), and smaller number among those without formal education (31.9%) knew that the quick blood test for malaria infection is called malaria Rapid Diagnostic Test (RDT).

#### 4. Discussion

The study revealed that more female sought more health care than their male counterpart as 52.8% female and 47.2% male were recorded. The result can be attributed to social and cultural norms which impact women's and men's ability to access malaria prevention and treatment services. Some studies have investigated the impact of gender norms on men's access to malaria services. These studies have found that men underutilize health care services for malaria as compared to women in similar circumstances, possibly due to male social norms that dictate that men must be strong and 'get over' their illness by themselves, or because men assign a lower priority to their health or feel uncomfortable asking for assistance [17]. On the contrary, in Kenya, for example, women must often ask their husband for permission to access malaria treatment for themselves and their children [24, 25]. Mothers in Yemen had difficulties seeking treatment for their children when male family members were not available to give the necessary medical consent [2009]. Similarly, a study in Ethiopia found that restricted mobility among women impeded their ability to attend primary health care clinics for malaria testing and treatment [25]. In Jharkand, India, women, especially those aged 35–40 years, have faced harassment from their husbands and in-laws for expenses incurred in relation to their illness and their inability to continue household work. Some studies have found that women are reluctant or unable to attend services when the health practitioners are predominantly or exclusively men. In fact, a woman who seeks services from a male provider can be accused by her family of sexual infidelity. Other studies in Gambia, Kenya and Malawi found a strong cultural attribution of fever among women with supernatural causes rather than medical illness. These gender-driven superstitions reduced women's ability to access medical malaria services. When women do access malaria treatment services, they are sometimes blamed for seeking treatment at a late stage in their illness. Even when the correct course of treatment is prescribed, women may not be able to follow it due to a lack of resources and care-giving responsibilities, both of which can lead to lower dosing, sharing pills and/or not completing treatment [27].

Further, higher level of education having a positive impact on the knowledge that malaria is transmitted through mosquito bite, as found in this research were previously reported in other studies such as seen in Nigeria and other parts of Africa: in Enugu, South East Nigeria, it was revealed that 78.4% and 42% of the educated and non-educated study populace had knowledge of malaria transmission by mosquito bite respectively; in Tanzania, where 22.8% of literate respondents, as against 3.7% of their illiterate counterpart knew that malaria is transmitted through the bite of mosquito [17]. However, in a suburban community in Accra Ghana, it was found that although 63% of respondents with formal education believed that malaria is caused by mosquito bite and 45% of those without formal education similar knowledge; the difference was found not to be statistically significant [17]. The Ghana finding was in a suburban area, where residents probably could access information on malaria causation through electronic media, or awareness creation activities. Most of the respondents in the Ghana study were also literate, as opposed to those in this study, where 53.0% had no formal education. The Tanzanian study, which was in a rural community as the community used for this study also showed the significant positive effect of higher level of education on the knowledge that, dirty environment and stagnant water lead to breeding of mosquitoes, and increased incidence of malaria infection [17]. Again, though a higher percentage of respondents with formal education in the Ghana study knew that dirty environment and stagnant water could lead to malaria; the difference was not statistically significant [17]. Formal education has been shown to significantly improve knowledge on malaria prevention [1]. The same study in Ghana that found that educational level has no effect on knowledge of causes of malaria, also reported that there are no differences in educational levels of respondents and knowledge about malaria being preventable [17]. More respondents in the Ghana study could have been exposed to more information on malaria, since being in a suburban location could give them more access to health information, than rural dwellers in our study. Artemisinin-based Combination Therapy (ACT) is the globally recommended firstline treatment for uncomplicated malaria infection. The use of this drug formulation was commenced in Nigeria in the year 2005[1, 17]. It is encouraging that both formally educated study populace and those that were not exposed to formal education had good knowledge about this very important guideline in the treatment of uncomplicated malaria, notwithstanding that there is wide margin between the two groups. More so, those with formal education had significantly better knowledge when it comes to this aspect of management of malaria. This finding was also made in rural, Northwest Tanzania, in the year 2010 [17]. In the past, malaria diagnosis was mostly made presumptively and treatment commenced with antimalarial drugs. Among other problems, this led to the development of resistance to these drugs [1], thus highlighting the need to create awareness about this information.

Parasitological diagnosis of malaria can be evaluated through microscopy, or Rapid Diagnostic Test (RDT) [1]. Study populace with formal education in this study significantly had better knowledge of these very vital and fundamental guidelines for the diagnosis and treatment of malaria. This is consistent with the finding in a study conducted in Enugu State in 2017, Osun State in 2013 and other part of Nigeria; where respondents with formal education had significantly better knowledge about the current trends in the management of malaria [17].

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## 5. Conclusion

This study revealed significant differences in the level of knowledge demonstrated by study with formal education, and those without formal education; particularly with respect to causes, symptoms, prevention and management of malaria. Those with formal education had significantly better knowledge than those without formal education. Similar findings were also recorded in the previous studies conducted in Nigeria and other parts of the world. Therefore, it will be very imperative to factor the educational status of majority of the population in the targeted area into malaria interventions or eliminating programmes, while designing such for maximum output to enhance winning the battle against malaria.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of ethical approval*

The protocol of the research was reviewed and approved by the Health Research Ethics Committee of the health institution where the study was carried out.

### *Statement of informed consent*

Regarding the voluntary respondents in this research, informed consent was obtained from all the subjects and parents/guardians for the children.

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