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Effects of age and gender on malaria knowledge among people attending Federal Medical Centre, Owerri, Imo and University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu, Southeast Nigeria

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Abstract

Malaria is responsible for most morbidity and fatality in Sub-Saharan Africa, with Nigeria having the highest proportion. This study was undertaken to evaluate the effect of age and gender on people's knowledge towards malaria at Federal Medical Centre, Owerri, Imo and University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu, Southeast Nigeria. A hospital-based study was conducted on 500 participants attending health care. A well-structured questionnaire was administered to elicit information on socio-demographic characteristics and respondents' knowledge on cause, signs and symptoms, and prevention of malaria. The socio-demographic variables for the respondents showed that 50.4% were male, while 49.6% were female; (34%, 66%) were < 11 years and ≥ 11 years respectively. The association of participants' knowledge towards cause, signs and symptoms, and prevention of malaria with age was (< 11 years: Mean score = 28.8, 28.1, 34.9, SD = 3.8, 1.46, 11.2; ≥ 11 years: Mean score = 53.8, 63.3, 59.1, SD = 4.54, 0.91, 4.74) respectively. The association of respondents' knowledge on malaria cause, signs and symptoms, and prevention with gender was (male: Mean score = 48.9, 50.47, 50.3 SD= 1.79, 0.58, 3.50; female: Mean score = 38.1, 40.9, 43.7, SD = 2.54, 1.48, 3.58) respectively. The older and the male study populace had better significant knowledge towards malaria with respect to cause, signs and symptoms, and prevention than their counterparts.

Keywords: Knowledge; Malaria; Age; Gender; Health; Nigeria Open Access

1. Introduction

Plasmodium is an obligate intracellular protozoan parasite responsible for the transmission of malaria, life-threatening infectious disease worldwide. There are six plasmodium species that transmit disease to humans but *Plasmodium falciparum* is the most prevalent in sub-Saharan Africa. According to [1-3], most deaths caused by malaria are attributed to *P. falciparum*. 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]. Sub-Saharan Africa (SSA) carries the heaviest malaria burden, with an estimated 234 million cases 95%) and 593,000 deaths (96%) in 2021. The top 16 most malaria-affected countries, by cases, are all in SSA. Worldwide, Nigeria accounts for 26.6% and 31.3% of all malaria cases and deaths. This report is consistent with the findings revealed by [2, 4, 5] stating that Nigeria's increased efforts and strategies to control malaria have not resulted in any reduction in disease incidence or mortality for several years. Thus, Nigeria accounted for most of the global

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mortality from malaria in 2021 (31%) compared to 2019 (24%) [1, 6, 7]. In the same vein, 38.4% of global malaria deaths occurred in Nigerian children younger than five years old in 2021 [1]. Further, *P. vivax*, *P. ovale wallikeri, P. ovale curtisi* and *P. malariae are* non-*Plasmodium falciparum* species incriminated in malaria disease [8-10].

In fact, the world has witnessed numerous preventive and management strategies aimed at nipping malaria scourge in the bud, 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 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, particularly in SSA. 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 [11-14].

Ascertaining people's knowledge level with respect to malaria cause, signs and symptoms, prevention and management is fundamental since there is a global paradigm shift in malaria control towards involvement of community and individual rather than use of insecticides alone [10]. According to the investigations carried out by [15, 16], there is a direct proportionality between community's level of knowledge and the malaria incidence and burden. It has been proven 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.

It has been reported that gender and age influence the knowledge of malaria among the population generally. It has also been suggested that malaria has a different impact on women than men due to social and biological factors. The term *gender* refers to the economic, social and cultural attributes and opportunities associated with being male and female, whereas the term *sex* refers to male and female differences in immunological, anatomical and physiological differences that influence exposure, clearance and susceptibility to infections. Gender relations thus define how women and men at all ages organize their lives in all aspects, including duties, responsibilities, and opportunities. A previous study conducted in African country pinpointed the importance of approaching malaria management from a gender perspective. This includes looking within the household at how the social and economic power of women and men can influence decisions to respond to illness [17-36]. Access to education is age and gender sensitive, female folks are denied of education in some climes. 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]. 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]. This research was designed to evaluate the association between age and gender versus people's knowledge regarding malaria infection with emphasis on causes, signs and symptoms, prevention, and management of the malaria infection in Imo and Enugu State, South East Nigeria.

2. Material and methods

Questionnaires were administered to the respondents in order to elicit information on their socio-demographic and Knowledge, Attitude and Practice (KAP) towards malaria. Information was collected from the respondents via face-to-face interviews the team conducted. 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. In any case, questions pertaining to practices were multiple-choice to assess the frequency with which participants' performed the various activities and actions. At the end of each interview, the interviewers probed for further knowledge related to malaria that the respondents did not mention spontaneously. However, this was done only for selected variables.

The data were quantitatively analyzed, using SPSS version 20.0, in terms of the percentage of respondents with correct knowledge of causes, signs and symptoms, prevention and management of malaria. Students T-test was done to determine the significance of the effect of age and gender on the respondents' knowledge on malaria.

3. Results

3.1. Socio-demographic variables for respondents

A total of 500 individuals participated in the study; 248 (49.6%) were female, 252 (50.4%) were male. Regarding age distribution, 34% were <11 years, 8.8 % (11-20), 51% (21-30), 17.2% (31-40), 10.2% (41-50), 6.2% (51-60), 2.0% (61-70) and 0.6% above 70 years (Table 1).

Table 1 Socio-demographic characteristics of the study populace

Variable	Frequency (n=500)	Percentage (%)
Age range (in years)		
<11	170	34.0
11-20	44	8.8
21-30	105	51.0
31-40	86	17.2
41-50	51	10.2
51-60	31	6.2
61-70	10	2.0
>70	3	0.6
Gender		
Male	252	50.4
Female	248	49.6

3.2. Knowledge of causes of malaria

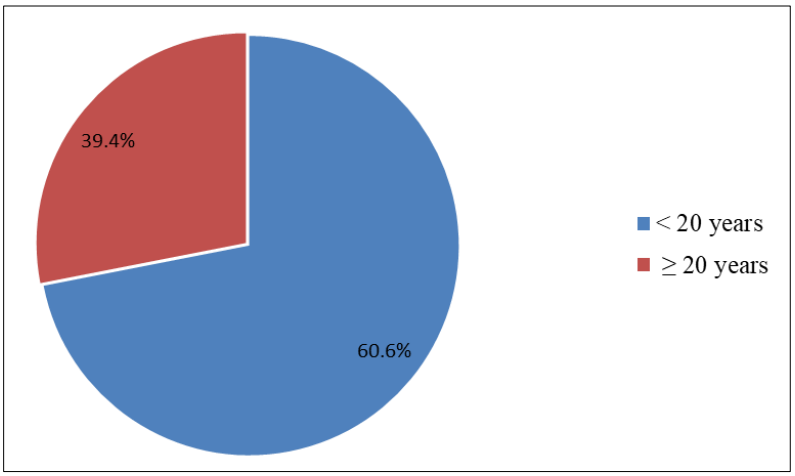
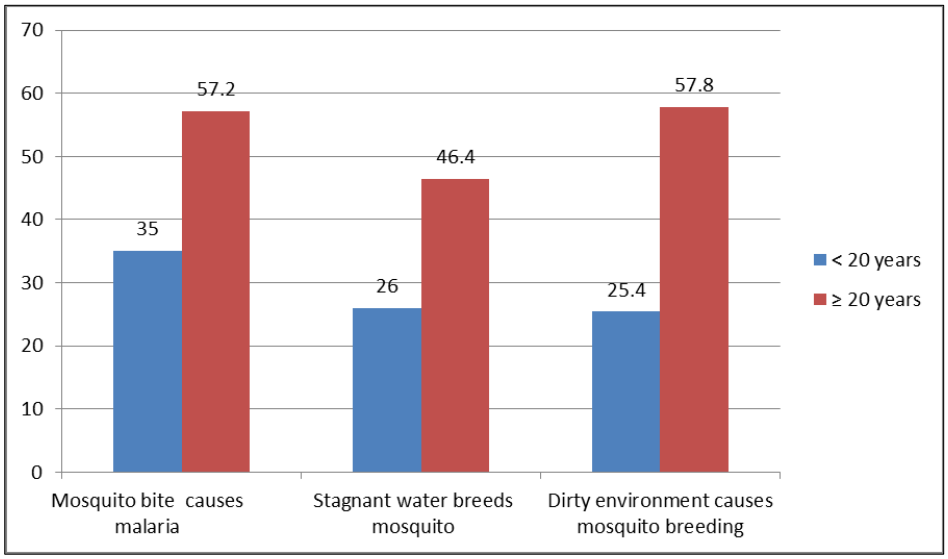


Figure 1 Association of participants' general knowledge about malaria with their age

Up to 28% and 60.6% of participants of age bracket <11 and ≥20 had heard about malaria infection respectively (Fig. 1). About 57.2% of respondents ≥20 knew that malaria is transmitted through a mosquito bite, while 35% had the same knowledge among respondents <11. The majority of respondents ≥20 (57.8%) had the knowledge that dirty environment leads to breeding of mosquitoes, thus causing malaria. Only 25.4% of those <11knew 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 46.4% of ≥20 gave the correct response, while only 26% of those <11 had the knowledge (Fig. 2). Further, 52.4% male and 47.6% female participants had heard about malaria infection (Table 2). Also, (49.8 vs 42.4%), (45vs 27.4%) and (48.2 vs 35%) of male and female

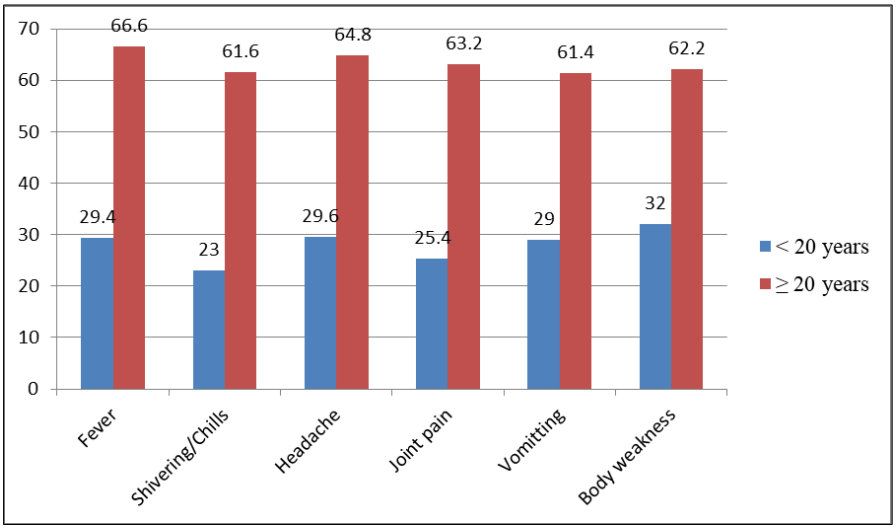
respondents had knowledge that malaria is transmitted through a mosquito bite, dirty environment leads to breeding of mosquitoes, thus causing malaria and stagnant water serves as breeding sites for mosquitoes respectively (Table 2).



(< 11 years: Mean score = 28.8, SD = 3.8; ≥ 11years: Mean score = 53.8, SD = 4.54)

Figure 2 Association of participants' knowledge about malaria cause with their age

3.3. Knowledge of malaria signs and symptoms



Mean score in those < 11 years = 28.1, SD =1.46; Mean score in those ≥ = 63.3 (SD = 0.9)

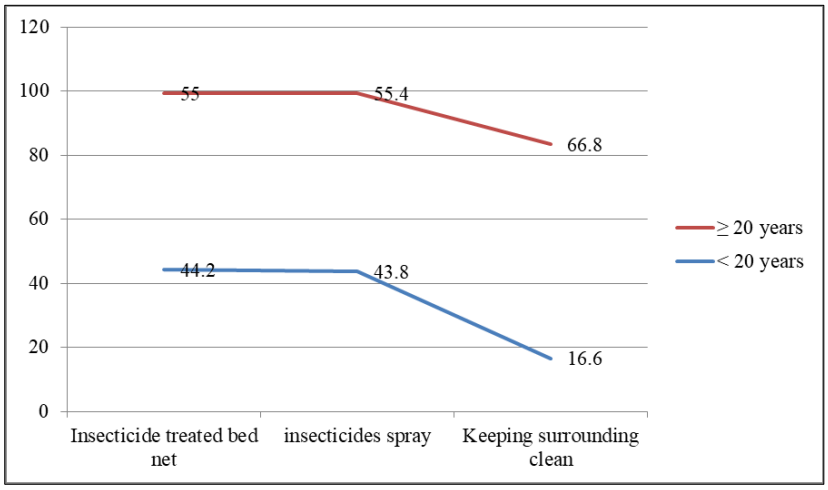
Figure 3 Association of participants' knowledge about malaria signs and symptoms with their age

The respondents that fell within the age bracket ≥20 and <11 reported fever (66.6 vs 29.4%), chills/shivering (61.6 vs 23%), headache (64.8 vs 29.6%), Joint pains (63.2 vs 25.4%), vomiting (61.4 vs 29%), body weakness (62.2 vs 32%) as signs and symptoms of malaria infection respectively (Fig. 3). Similarly, male and female respondents demonstrated their knowledge of malaria signs and symptoms as fever (52.2 vs 43.6%), chills/shivering (49 vs 35.6%), headache (51.8 vs 42.6%), Joint pains (49.4 vs 39.2%), vomiting (50.6 vs 39.8%), body weakness (49.8 vs 44.4%) as signs and symptoms of malaria infection respectively (Fig. 3).

3.4. Knowledge of malaria preventions

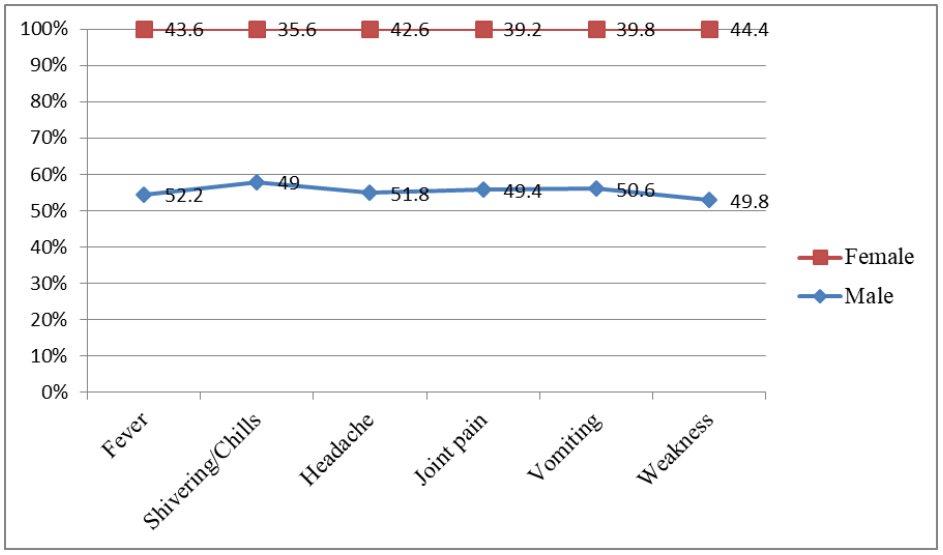
Majority of the respondents (55%) of age ≥20 knew that sleeping under Long Lasting Insecticidal Nets every night helps prevent malaria infection. Only 44.2% of those of age < 11 have similar knowledge. Many of the respondents (55.4%) of ≥20 knew that spraying insecticides inside houses help prevent malaria infection, while only 43.8% of younger ones have the knowledge. Keeping surrounding clean helping enhances malaria infection prevention is known by 66.8% of

respondents of the older study populace, while 16.6% of the younger counterpart knew that environmental cleanliness plays vital role in preventing malaria (Fig. 4).



(Mean score in those < 11 years: 34.9, SD = 11.2; Mean score in those ≥ = 59.1, SD =4.74)

Figure 4 Association of participants' knowledge about malaria prevention with their age



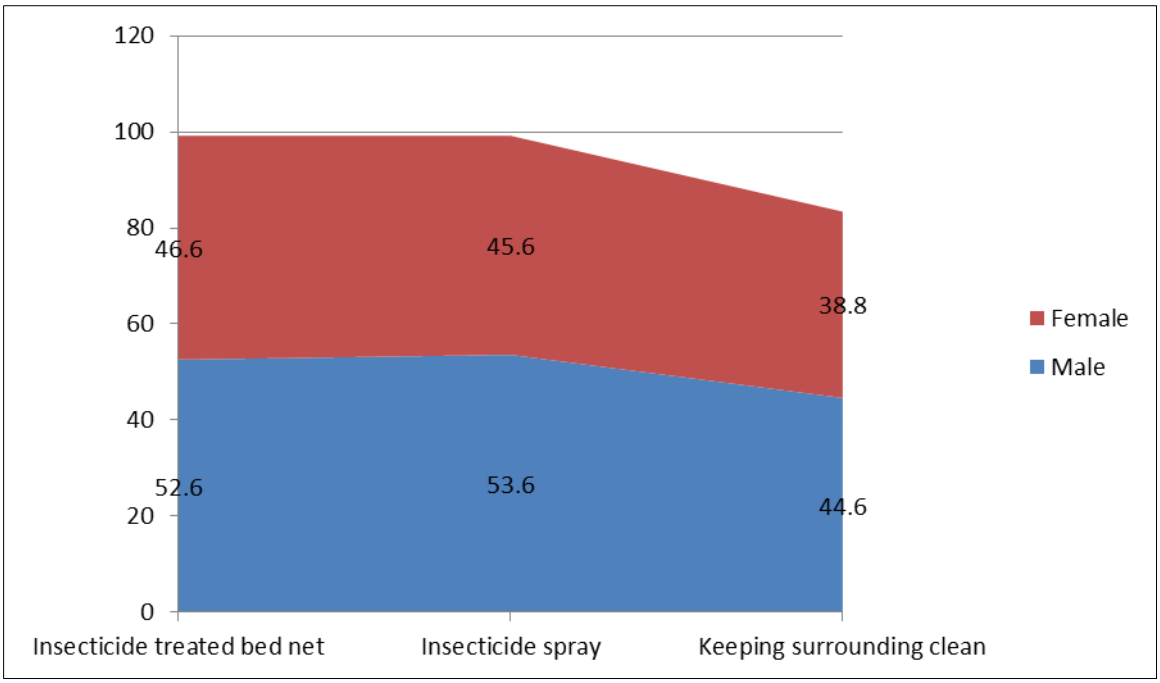
(Mean score for male: 50.47, SD = 0.58; Mean score for female = 40.9, SD = 1.48)

Figure 5 Association of participants' knowledge about malaria signs and symptoms with their gender

Table 2 Association of respondents' knowledge about malaria cause with their gender (n = 500)

Variable	**Percentage (%)**	
	Male	**Female**
Heard about malaria	52.4	47.6
Mosquito bite causes malaria	49.8	42.4
Stagnant water breeds mosquito	45.0	27.4
Dirty environment breeds mosquito	48.2	35.0

Male: Mean = 48.9, SD = 1.79; Female: Mean = 38.1, SD = 2.54



(Mean score for male: 50.3, SD = 3.50; Mean score for female = 43.7, SD = 3.58)

Figure 6 Association of participants' knowledge about malaria prevention with their gender

4. Discussion

This study found that age and gender have significant influences on knowledge towards malaria. Older and male study populace showed a greater level of knowledge about malaria transmission, signs and symptoms, and prevention than did their younger (< 20) and female counterparts. This finding can be attributed to cultural, socio-economic and religious affiliations among other factors. The outcome of this present study is consistent with the findings of previous studies undertaken in other African countries and beyond. A study carried out in Senegal by [29] revealed that adolescents generally have poor levels of malaria knowledge and low uptake of malaria prevention and control interventions is with consistent with the finding of this study. In the same vein, males had substantially higher levels of knowledge about malaria transmission, symptoms, and prevention, which could be attributed to their higher degree of access to information, as well as certain behavioral and cultural factors. A study indicated that women's understanding of malaria prevention and treatment is significantly weaker than that of men, due to women's comparatively lower literacy levels [28]. Also, a study found a higher prevalence of language barriers for women accessing malaria services, due to higher rates of illiteracy. In Yemen, women under study had vaguer understandings of the methods of malaria transmission compared to men, and more frequently associated the disease with flies, missing breakfast, drinking bad water and breast feeding [26]. Similarly, [30] reported that the overall knowledge of malaria prevention practices among a large proportion of women was found to be low in Burkina Faso. Further, according to [31-36], increasing age showed increasing odds on knowledge of signs and symptoms of malaria; women aged 35-39 years, 40-44 years, and 45-49 years were more likely to have good knowledge of the signs and symptoms of malaria compared to women aged 15-19 years, women aged 20-39 years were significantly associated with women with good knowledge of malaria prevention, compared with women aged 15-19 years.

5. Conclusion

This study revealed significant differences in the level of knowledge towards malaria, particularly with respect to causes, symptoms, prevention and management of malaria. The male respondents had significantly better knowledge than their female counterparts. Similarly, the older study populace showed significantly better knowledge than the younger respondents. Thus, it is very important to consider age and gender when designing malaria interventions and elimination programmes to save lives and nip malaria scourge in the bud.

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 approved by the Health Research Ethics Committees of the health institutions where the study was carried out.

Statement of informed consent

Informed consent was obtained from all the subjects and parents/guardians for the children.

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