RESEARCH PAPER

Prevalence and Associated Factors of Malaria Infection Among Out Patients Visiting St. Gregory Catholic Hospital in the Gomoa East District

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ABSTRACT

Plasmodium species are the parasites that cause malaria. Malaria is acknowledged globally as a crippling and dreadful infectious disease that claims millions of lives and results in severe complications like hypoglycemia, brain involvement, acute renal failure, and severe anemia.

Method: A quantitative research approach, a cross-sectional design was employed in this study. Simple random sampling was used to engage 307 adult outpatients. A convenience sampling technique was used. A structured questionnaire was used for data collection. The collected data were analyzed by using frequency, percentage, and the chi-square test.

Result: Revealed that the Prevalence of malaria was high among respondents (64.17%). Demographic factors such as gender, age, education level, and marital status were all found not to influence malaria prevalence (p>.05). No significant association was found to exist between environmental factors such as sleeping under insecticide treated net, living near stagnant water, frequency of desilting stagnant water, staying outside late at night, and staying around bushy area (p>.05). Ability to afford insecticide spray, having constant and stable electricity, not living in a thatched roof, living in a block house, having netted doors and windows, and knowledge on malaria transmission were all found not to influence malaria prevalence in this study(p>.05). Only having toilet facility at place of residence showed significant association with malaria prevalence (p=.022).

Conclusion: The prevalence of malaria among St. Gregory Catholic Hospital outpatients was high. The illness may be reduced by ongoing public health initiatives that focus on using bed nets appropriately and draining standing water.

Keywords: Malaria infection, Prevalence, Environmental factors, and Socioeconomic factors

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INTRODUCTION

Malaria is caused by parasites called Plasmodium species. [1] million people worldwide die from malaria, an infectious disease that causes serious symptoms like hypoglycemia, cognitive problems, severe anemia, and acute renal failure.[2] Malaria is a vector-borne tropical disease that affects over 241 million people globally and claimed 627,000 lives in 2020.[1] Although over 20 species have been identified as malaria vectors in Africa, only a few of these species are truly in charge of spreading the disease, and the most prevalent vectors vary according to the eco-epidemiological setting.[3]

Malaria infections are present all throughout the world, particularly in Africa, South and Central America, and South and Southeast Asia. In Sub-Saharan Africa, the transmission rate is particularly high.[4] Despite being a preventable and curable disease, malaria continues to have a substantial impact on people's health around the world, particularly among pregnant women and children in both rural and urban settings.[1] Malaria not only kills but also disables many of its survivors, slowing economic progress. Two strategies that can reduce the chance of transmission include insecticide-treated mosquito netting and indoor residual spraying.

The World Health Organization expected 249 million malaria cases worldwide, with Africa accounting for 94% of those. [6] The World Malaria Report indicates that 409,000 people died from malaria in 2019, with 229 million infections worldwide. According to the 2017 World Malaria Report, P. falciparum was the most

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common malaria parasite species in Africa, accounting for about 99.8% of all estimated severe malaria cases. South-Eastern Asia ranked second with 62.8%, followed by the Eastern Mediterranean at 69% and the Western Pacific with 71.9%.[1]

The main risk variables that contributed to malaria spread were socioeconomic, environmental, and demographic. According to the authors, demographic factors include age and gender, followed by environmental factors such as the presence or absence of bushes and forests that facilitate mosquito breeding, and socioeconomic factors such as income, occupation, and educational attainment, all of which have a direct impact on treatment patterns and human exposure.[7] Finding the prevalence and contributing factors of malaria infection among outpatients at St. Gregory Catholic Hospital in the Gomoa East District is required since the researcher has found that these factors contribute to malaria.

Despite being one of the deadliest infectious illnesses in human history, malaria continues to threaten more than half of the world's population.[8] Malaria infection is a major health problem in tropical poor countries, killing millions of people.[9] Malaria is among the leading causes of death in Sub-Saharan Africa. Every year, over 200 million cases of malaria occur, resulting in around 500,000 deaths; Sub-Saharan Africa accounts for more than 90% of malaria-related deaths. Malaria harms both the economic development of many developing countries and the health of their populations.[10,11]

Despite Ghanaian governments' efforts to diminish its prevalence, malaria remains endemic and perennial throughout the country, with seasonal variations being more obvious in the north.[12] It is endemic in Ghana, accounting for 40% of all hospital outpatient appointments. St. Gregory Catholic Hospital's records department reported 5722 and 4626 cases of malaria infection in 2022 and 2023, respectively. The recorded incidence of malaria remains extremely high and noticeable, even if it was lower in 2023 than in 2022.[13]

This study aims to ascertain the prevalence of malaria infection and the factors that contribute to it among patients and clients who present to the St. Gregory Catholic Hospital's outpatient department. This information will be used to inform the development of interventions aimed at reducing the prevalence.

METHODS

Study area and period:

The study was conducted at the St. Gregory Catholic Hospital located at Gomoa Buduburam in the Central Region of Ghana. The St. Gregory Catholic Hospital belongs to the Catholic Archdiocese of Cape Coast and is under the Catholic Health Service Trust- CHST. It is a Non-Profit Mission Health Facility under the umbrella of the Christian Health Association of Ghana (CHAG). Subsequently, the clinic gained the status of being an implementer of the National Health Insurance services in the year 2010, and in October 2011, it was accredited with Primary hospital status. It has an average of 300 staff. All health Services are rendered at the facility.

Study design:

A cross-sectional research design was employed for the study

Study Population

The target population for this study was adult out-patients at the St. Gregory Catholic Hospital. These patients were adults and of sound mentality to partake in the study. Information from the records unit indicated that an average of 120-130 adults were seen daily at the health facility.

Sample Size Determination

The sample size for this study was generated by using the Yamane sample size formulae. The formula is stated as; $n = \frac{N}{1 + N\,(e)^2}$, Where n is the sample size, N is the population size (which was taken as 1,250 since data was gathered with a period of 10days) and e is the level of precision. A 95% confidence level and a level of Precision (e) = 0.05 were assumed for the equation.

$\boldsymbol{n} = \frac{1250}{1 + 1250\,(0.05)^2}$, = 303. To cater for non-responses and attrition bias, a 10% of the retrieved sample size was added, hence a sample size of 333 was considered for the study.

Sampling techniques

The respondents during the visit of the researcher were selected by simple random sampling, where all respondents had an equal chance to be selected.

Data Collection tools

Quantitative data analysis can be done manually or with the help of a computer programme (Burns & Grove, 2011). The analysis of data from quantitative research involves, among others, descriptive techniques to describe demographics and study variables, as well as statistical techniques to test proposed relationships among variables. A questionnaire guide was used for this study. The choice of these instruments is based on the proposition of Ogah (2013) that in a survey where a large number of participants are used questionnaire is the most efficient data collection tool to use. These questionnaires were prepared to reflect the demographic details of the respondents as well as the research questions/objectives, namely, prevalence of

malaria infection among outpatients at the Gregory Catholic hospital, demographic factors that contribute to malaria infection, environmental factors that contribute to malaria infection, and socio-economic factors that contribute to malaria infection.

Pre-Testing of data collection tools

Pretesting of the questionnaire was done at Hope Christian Hospital using fifteen adult outpatients. Ambiguity of questions was rectified and finalized. Appropriate revision and rephrasing of questions were made based on the outcome of results from the pre-test for the final use.

RESULT

Table 1: Background Characteristics of respondents

	Frequency (N=306)	**Percent (%)**
Gender		
Male	74	24.10
Female	233	75.90
Age(years)		
<20	11	3.58
20-29	76	24.76
30-39	85	27.69
40-49	66	21.50
50-59	44	14.33
>60	25	8.14
Level of education		
No formal	69	22.48
Basic	84	27.36
Secondary	105	34.20
Tertiary	49	15.96
Marital status		
Single	95	30.94
Co-habiting	5	1.63
Separated	13	4.23
Married	190	61.89
Widow	4	1.30

Table 1 shows the frequency and percentage of respondents**.** A total of 307 respondents were engaged in the study. The majority of the respondents were females (n=233, 75.90%). Respondent's age ranged from 18 to 80 with a mean (M) age of 38.54 standard deviation (SD)] of 13.06. The majority (n=85, 27.69%) of the respondents fell within age bracket 30-39 years with the least respondents falling below age 20 (n=11, 3.58%). Most of the respondents (n=105, 34.20%) had attained secondary school education with only 49(15.96%) attaining tertiary education. More than half (n=190, 61.89%) of the respondents were married, with only 4(1.30%) being a widows.

Prevalence of malaria infection among outpatients at the Gregory Catholic Hospital

More than half (n=197, 64.17%) of the respondents had been diagnosed with malaria in the past 12 months, whereas 110 (35.83%) had no malaria infection within the last 12 months before the study

Table 2: Frequency of Malaria diagnosis within the last 12 months

Frequency of malaria diagnosis	**Frequency (N=197)**	**Percent (%)**
Rarely	43	21.83
Sometimes	133	67.51
Most times	21	10.66

Table 2 above shows that the Majority (n=133, 67.51%) of respondents with a history of malaria infection in the last 12 months were sometimes diagnosed with malaria, 43(21.83%) were rarely diagnosed, and 21(10.66%) were most times diagnosed with malaria.

Table 3: Frequency of malaria infection among household members

Frequency of malaria infection among household members	**Frequency (N=307)**	**Percent (%)**
No	32	10.42
Rarely	85	27.69
Sometimes	183	59.61
Most times	7	2.28

Table 3 shows that Most of the respondents indicated that their household sometimes get malaria infection (n=183, 59.61%), and only 7(2.28%) respondents indicated that their household members are most often diagnosed with malaria.

Table 4: Beliefs affecting malaria infection

		Frequency (N=307)	**Percent**
I do not believe malaria infection is real	No	246	80.13
	Yes	61	19.87
My family and I consider malaria spiritual	No	270	87.95
	Yes	37	12.05

I never consider indoor residual spray effective and good	No	229	74.59
	Yes	78	25.41
Malaria is never a killer; I'm not scared of mosquitoes	No	261	85.02
	Yes	46	14.98
With prayers, malaria can never happen to you	No	273	88.93
	Yes	34	11.07
I believe malaria is a disease of children and not adults	No	284	92.51
	Yes	23	7.49
My belief does not permit me to use a mosquito net	No	263	85.67
	Yes	44	14.33

Table 4 presents the personnel who believe that affect malaria infection. Most of the respondents respondent 246(80.13%) no to the question "I do not believe malaria infection is real", 37(12.05%) consider malaria as spiritual, 78(25.41%) never consider indoor residual spray as effective and good, 46(14.98%) also believe that malaria is not a killer disease and therefore not afraid of it, 34(11.07%) believe that, with prayers one would not contract malaria infection, 23(7.49%) Believe that Malaria only affects children and not adults, and 44(14.33%) also indicated that their beliefs do not permit them to use mosquito net.

Table 5: Chi-squared analysis of the association between malaria prevalence and gender

Gender	Malaria prevalence		Total	p-value
	No	Yes		
Male	22	52	74	.209
Female	88	145	233	
Total	110	197	307	

Table 5 shows that respondents' gender had no statistical association with malaria infection [$X^2(1, N=307) = 1.58$, P=.209]

Table 6: Chi-squared analysis of the association between malaria prevalence and age

Age	Malaria prevalence		Total	p-value
	No	Yes		
<20	3	8	11	.960
20-29	29	47	76	
30-39	31	54	85	
40-49	22	44	66	
50-59	17	27	44	
>60	8	17	25	
Total	110	197	307	

Table 6 shows that respondents' age had no statistical association with malaria infection [$X^2(5, N=307) = 1.03$, P= .960]

Table 7: Chi-squared analysis of the association between malaria prevalence and education level

Education level	Malaria prevalence		Total	p-value
	No	Yes		
No formal	31	38	69	.054
Basic	34	50	84	
Secondary	34	71	105	
Tertiary	11	38	49	
Total	110	197	307	

Table 7 shows that the Level of respondents' education had no statistical association with malaria infection [$X^2(3, N=307) = 7.63$, P= .054]

Table 8: Chi-squared analysis of the association between malaria prevalence and marital status

Marital status	Malaria prevalence		Total	p-value
	No	Yes		
Single	32	63	95	.218
Co-habiting	3	2	5	
Separated	8	5	13	
Married	65	125	190	
Widow	2	2	4	
Total	110	197	307	

Table 8 shows that the marital status of respondents had no statistical association with malaria infection [$X^2(4, N=307) = 5.76$, P= .218].

DISCUSSION

Prevalence of malaria infection among outpatients at the Gregory Catholic Hospital

To ascertain the prevalence of malaria among OPD patients at Gregory Catholic Hospital during the previous 12 months, respondents were asked to provide retrospective answers. More than half (n=197, 64.17%) of the respondents reported having a malaria diagnosis over the

previous 12 months, while 110 (35.83%) reported not having a malaria infection during the same time period. This indicates that the prevalence of malaria was high. Given that Ghana is one of the Sub-Saharan African nations where malaria is endemic, this finding—while concerning—was evident. comparable to the results of this investigation. a greater incidence of malaria parasite infection among Swedish migrants. Nevertheless, Agyemang-Badu et al. Again, Agyemang-Badu et al. (2023) also reported a higher malaria prevalence of 43% in Ghana using a respondent-reported 12-month history of malaria infection. [14]

A systematic evaluation of 144 studies found that the prevalence of malaria among adult Ethiopians was lower, at 13.61%.11 The conclusions of this study may differ from those of other studies due to the use of a different methodology. In comparison to this study, it was found that the Arusha Region of Northern Tanzania had a lower malaria prevalence of 7.9%. Another possible explanation for the variation in prevalence is that the current study was based on patients who had previously contracted malaria during the previous 12 months.[15] To find the prevalence, the study screened for malaria. Compared to this study, which used secondary data from Ghana's Shai-Osudoku District Hospital, it revealed a significantly lower prevalence (20.9%).[16,17]

Demographic Factors That Contribute to Malaria Infection

Chi-squared test of association was used to determine the demographic factors associated with the prevalence of malaria infection. A p-value < .05 was deemed statistically significant. Gender, Age, education level, and marital status of respondents were not found to be associated with malaria infection prevalence p>.05. Similarly, the Correlation test showed a very weak correlation between malaria prevalence and respondents' gender, age, education level, and marital status.

Nevertheless, other research has found a correlation between certain demographic factors and the incidence of malaria, which runs counter to the results of this investigation. According to reports, one of the most important factors linked to malaria transmission in Brazil's Amazon region is sex.[18] Additionally, research in Ibadan, southwestern Nigeria, found that children under the age of five had a higher risk of contracting malaria than adults, and that the highest prevalence was seen in males and those without formal education.[19] On the other hand, this study also found that individuals who had completed college and high school (6–12 grade) were far less likely to contract malaria than those who had not attended any school. It indicated that not having formal education positive impact on malaria disease prevalence.[20,21]

Environmental factors that contribute to Malaria Infection

The prevalence of malaria has been thought to be influenced by a wide range of environmental factors. One of the most important methods for lowering the rate of malaria prevention has been identified as sleeping beneath an insecticide-treated net. As a result, Ghana has begun distributing long-lasting insecticide-treated nets nationwide to help reduce the number of cases of malaria. However, there was no statistically significant correlation between the prevalence of malaria and sleeping under an insecticide-treated net. Because stagnant waterways have been identified as mosquito breeding grounds, they need to be constantly desilted. However, the frequency of desilting stagnant waters and leaving them close by did not appear to have an impact on the prevalence of malaria in this investigation.

Staying outside late at night is thought to make people more vulnerable to mosquito bites because mosquitoes are most active at the night. Therefore, it is assumed that being outside late at night helps prevent malaria. However, there was no correlation between the prevalence of malaria infection and spending late nights outside, according to this study.

Additionally, there was no statistically significant correlation between the prevalence of malaria infection and staying in bushy areas. This finding contradicts the findings of Kołodziej et al. (2024), who found that residents of bushy areas, such as northern Tanzania's national parks, had a greater prevalence of malaria.

CONCLUSION

Malaria prevalence was high among outpatients at St. Gregory Catholic Hospital in the Gomoa East District, regardless of respondents' demographic, environmental, or socioeconomic variables. The malaria burden could be lowered by focusing on changing attitudes towards malaria prevention and control through ongoing health education.

Ethical Approval

Ethical clearance was sought from the Kaaf University, and the ethical clearance obtained was used to seek permission from St. Gregory Catholic Hospital, ethical clearance no (PG42100323). The respondents were contacted on clinic days and selected for the study. The study essence was explained to the potential respondents. The consent of the respondents is one of the key issues in the research exercise. Before conducting the sensory evaluation, all

respondents were informed about the context of the study and the anonymous nature of the research. Written informed consent was obtained from respondents who voluntarily accepted to be part of the study after they were educated on the essence of the study.

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The authors declare no competing interests

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