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Factors Influencing Prevention and Control of Malaria among Pregnant Women Resident in Urban Slums, Southern Ghana

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Abstract

Throughout Africa and particularly in Ghana, there are concerns about malaria infection during pregnancy. This study aimed to investigate factors that influence malaria prevention and control practices among pregnant women residing in Chorkor and Korle-Gonno in Accra, Ghana. One hundred and twenty pregnant women between ages 18-49 were randomly recruited during antenatal sessions at a maternity facility in Accra, as participants for the study. An interviewer-administered questionnaire was used to collect data, which were analysed using SPSS version 16.0. It was found that in Chorkor and Korle-Gonno, 57.4% and 42.6% participants respectively reported having been infected with malaria during their current pregnancy. There was no significant relationship between religious beliefs of participants and their malaria prevention and control practices ($X^2 = 0.28, P = .53$). However, there was a significant relationship between malaria prevention and control practices of participants and their income earning ($X^2 = 53.94, P = .00$) and employment ($X^2 = 61.76, P = .00$) statuses. With the exception of ethnicity ($X^2 = 35.62, P = .22$), other socio-cultural conditions had a significant relationship with malaria prevention and control practices of the participants. The findings suggest the need to consider and integrate factors, such as poverty and poor living conditions in malaria prevention and control strategies. (*Afr J Reprod Health 2013 (Special Edition); 19[1]: 44-53*).

Keywords: Ghana, Malaria prevention and control practices, pregnant women, slums.

Résumé

Partout en Afrique et en particulier au Ghana, il y a des inquiétudes sur l'infection du paludisme pendant la grossesse. Cette étude visait à étudier les facteurs qui influencent les pratiques de la prévention et de la lutte contre le paludisme chez les femmes enceintes résidant à Chorkor et à Korle-Gonno à Accra, au Ghana. Cent vingt femmes enceintes ayant entre 18 à 49 ans ont été recrutées au hasard pendant les séances prénatales à un centre de maternité à Accra, en tant que participantes à l'étude. Un questionnaire administré par un intervieweur a été utilisé pour collecter des données, qui ont été analysées en utilisant la version 16.0 de la SPSS. Il a été constaté que, dans Chorkor et Korle-Gonno, 57,4% et 42,6% respectivement des participantes ont déclaré avoir été infectées par le paludisme pendant leur grossesse en cours. Il n'y avait pas de relation significative entre les croyances religieuses des participantes et leur prévention du paludisme et des pratiques de contrôle ($X^2 = 0,28, P = 0,53$). Cependant, il y avait une relation significative entre la prévention du paludisme et des pratiques de contrôle chez les participantes et leurs salaires ($X^2 = 53,94, P = 0,00$) et l'emploi ($X^2 = 61,76, P = 0,00$) statuts. À l'exception de l'ethnicité ($X^2 = 35,62, P = 0,22$), d'autres conditions socioculturelles ont une relation significative avec les pratiques de prévention et de lutte contre le paludisme chez les participantes. Les résultats suggèrent la nécessité d'examiner et d'intégrer les facteurs, tels que la pauvreté et les mauvaises conditions de vie dans les stratégies de prévention et de lutte contre le paludisme. (*Afr J Reprod Health 2013 (Special Edition); 19[1]: 44-53*).

Mots-clés: Ghana, paludisme pratiques de prévention et de contrôle, femmes enceintes, taudis

Introduction

Globally, there are concerns about malaria infection because it is one of the major causes of morbidity and mortality, especially in Africa. Malaria is a life-threatening parasitic disease transmitted from person to person by the bite of anopheles mosquitoes¹⁻³. The 2011 World Malaria Report indicated that there were 216 million cases

of malaria and an estimated 655,000 deaths in 2010³. Even though the disease is preventable and curable, in many parts of sub-Saharan Africa, like Ghana, malaria is one of the major causes of death among children less than five years of age and pregnant women^{1,4-6}.

The disease is responsible for one out of every four maternal deaths in Africa, because pregnant women are four times as likely to get sick of

malaria and twice as likely to die from it⁶. In addition, malaria infection during pregnancy presents substantial risks for the mother and unborn child because pregnant women who are infected with the disease may experience spontaneous abortion, stillbirth, low birth weight, maternal anaemia, premature birth and intra-uterine growth retardation^{7,8}. In Ghana, the current malaria control strategies include diagnosis and treatment of clinical cases and the promotion of the use of insecticide-treated nets (ITNs) to prevent malaria.

In Africa, malaria has a huge negative effect on economic growth and perpetuates a vicious cycle of poverty because it costs the continent US \$10 billion to \$12 billion every year in lost gross domestic product⁹. In Ghana, for example, the economic cost associated with malaria treatment is overwhelming as it has a significant impact on the productivity and wealth of households. It has been and continues to be the primary cause of loss of healthy life days as it accounts for more than 50 percent of out-patient hospital attendances^{5,10}. Also, the total cost of controlling malaria in Ghana in 2002 was estimated at US\$ 50.05 million in direct and indirect costs¹¹. In 2003, it was the leading cause of hospital admissions, accounted for 24.6% of the total admissions, 19.5% of the total bed days, 17.1% of total deaths and 12.4 percent of the total user fees collected in selected Ghanaian public health facilities¹².

The costs of seeking malaria care can be divided into direct, indirect and opportunity-loss costs¹³. While the absolute cost of treatment as a share of non-food expenditure might be lower for the poor than that for the non-poor, the relative cost of treatment is higher¹³. A study conducted in Ghana in 2002 revealed that the average direct cost of treatment from orthodox health care providers was US\$6.87 per malaria episode while the indirect cost amounted to US\$ 8.92 per case, indicating an average overall cost of US\$ 15.79 per malaria episode to the household¹¹. Malaria also contributes to the loss of productive time to economically active patients, including pregnant women and their caretakers.

Indirect cost of malaria represents 56.48% of the total cost of illness to households and about nine workdays are lost by economically active

patients while more than five workdays are lost by their caretakers¹¹. These costs could place heavy financial burdens on households and invariably influence their decision regarding malaria treatment because on average, up to 55% of the overall costs are borne by households¹⁴. Given that the treatment of malaria involves cost, many people in Ghana, including pregnant women do not visit health facilities, but treat themselves from their homes with herbal medicines. Also, some people opt for herbal medicine because they believe it is less expensive, more effective and has fewer side effects compared to pharmaceutical drugs. These beliefs are usually based on cultural, historical and anecdotal evidence.

In order to reduce the prevalence rate of malaria infection, several national and international arrangements have been put in place. Key among these is the signing of the Abuja Declaration in 2000 on Roll Back Malaria (RBM), which aimed at reducing the malaria burden by 2010. This declaration aimed at improving access to malaria treatment, enhancing protective measures through the promotion of insecticide-treated nets (ITNs) and preventing and managing malaria during pregnancy⁵.

In respect of the Roll Back Malaria programme, Ghana set up the National Malaria Control Programme (NMCP), which was tasked to ensure easy access to malaria treatment and promote the use of insecticide-treated nets, especially among pregnant women and children under five years. Over the years, Ghana has employed a mixed model for ITN distribution, including free net distribution, targeted subsidies, commercial market access, and bed net retreatment¹⁵. Although there have been concerns about the extent to which the price of ITNs acts as a barrier to its use, especially among pregnant women, the malaria control community has been successful in increasing the number of households that own ITNs¹⁶.

Rationale and Study Objectives

Previous studies have investigated the prevalence of malaria in Ghana. However, this study goes beyond current research to investigate factors that influence malaria prevention and control practices

among pregnant women residing in Korle-Gonno and Chorkor (slum communities located in Accra, the capital city of Ghana). In view of the fact that malaria prevalence cannot be explained from only a medical point of view, it is essential to consider other factors, such as religious beliefs, economic and socio-cultural conditions of people, especially pregnant women.

Additionally, the abundance of herbal medicine and treatment of different diseases by a single herbal preparation are common in Ghana. While concerns have been raised about the safety and potency of these herbal medicines in terms of preparation, hygiene, dosage and packaging¹⁷, many people, including pregnant women still patronize them due to financial constraints, lack of health care facilities, religious or cultural beliefs, among others. Furthermore, given that malaria infection during pregnancy could negatively affect both the mother and the unborn child⁸, it is essential to investigate factors that influence pregnant women's malaria prevention and control practices. Pregnant women residing in slum areas may be at more risk of malaria infection than their upscale counterparts because of the prevalence of mosquito breeding spots in these communities. This is of particular concern because more than one billion people or about 14% of the total global population live in slum areas¹⁸.

In Ghana for instance, urban inequalities have increased, with large populations living in informal settlements, which are commonly referred to as slums and characterized by limited access to water and sanitation infrastructure¹⁹. Despite the fact that the general structure and appearance of slum neighbourhoods suggest unfavourable health effects¹⁹, not many studies

have examined the health of pregnant women residing in these areas. This study therefore aimed to investigate factors (religious beliefs, economic and socio-cultural conditions) that influence malaria prevention and control practices among pregnant women residing in Korle-Gonno and Chorkor.

Methods

Research Design

An analytical cross-sectional design was employed to examine the relationship between malaria prevention and control practices of pregnant women and their religious beliefs, economic and socio-cultural conditions.

Study Areas

The study was conducted in two slum communities, Chorkor and Korle-Gonno, which are located in the central parts of the Greater Accra Region of Ghana. The communities are homogeneous in nature because residents in both communities have relatively low education levels, high levels of unemployment and generally low incomes. These communities were selected for the study because previous studies^{19,20} have reported that compared to residents in other settlements in Accra, the living conditions of slum dwellers are generally poor. Residents in these areas normally live in crowded houses without adequate access to water, sanitation and private bathrooms, which could negatively affect their health, as shown in **Figure 1**.



Figure1: Houses located in the study areas

Study Population

A total of 120 (60 resided in Chorkor and the other 60 resided in Korle-Gonno) pregnant women between ages 18-49 who accessed antenatal care at a maternity facility in Accra, were recruited during regular antenatal sessions as participants for the study. The attendance report obtained from the records section of the facility indicated that about 300 pregnant women from each of the two communities visited the facility from July to December 2009 and July to September 2010. The attendance report was divided into subgroups according to the communities of residence and a simple random sampling was used to select the required number from each subgroup.

The participants were selected without prior knowledge of their clinical and family history. The study was approved by the Faculty of Social Sciences Board of the University of Ghana and permission was sought from the maternity clinic where the participants accessed antenatal care and services. Before the data was collected, each participant was clearly informed about voluntary participation and the objectives of the study. As well, a verbal consent of each participant was sought before they were engaged in the study.

Questionnaire

A structured questionnaire was used to collect data from participants in their homes at Chorkor and Korle-Gonno. The pregnant women were assisted to complete the questionnaires through face-to-face interviews. The questionnaire included questions concerning demographic information; malaria infection during pregnancy, treatment and cost; religious beliefs and malaria prevention and control; economic and socio-cultural conditions, and malaria prevention and control practices. Participants' antenatal care records were not used during the data collection.

Data Analysis

The data was analysed using Statistical Package for Social Sciences (SPSS) 16.0. Statistical relationships were sought between malaria prevention and control practices and religion, economic and socio-cultural conditions of participants. The dependent variables are malaria prevention and control practices and the independent variables are: religion, economic and socio-cultural conditions of participants. The results were presented as frequencies, chi-squares and *p*-values. The level of significance was considered at *p*-value of 0.05.

Results

Demographic Characteristics of Participants

The majority of pregnant women who participated in the study were between ages 21 and 25 years (48.3% in Chorkor and 55% in Korle-Gonno) as shown in **Table 1**. Also, majority of the participants reported that their highest level of education was Middle School or Junior High School (60% and 63.3% for participants from Chorkor and Korle-Gonno respectively). With regard to ethnicity, while the majority of the participants were from the Ga-speaking ethnic group, the background of the participants was diverse as indicated in **Table 1**. Ga is the local language of the indigenes of Accra.

As shown in **Figure 2**, out of the 120 pregnant women included in the study, 57.4% in Chorkor and 42.6% in Korle-Gonno reported having had malaria during their current pregnancy. Also, the majority of participants (61%) perceived the cost of treating malaria as expensive. Information on employment and income earning statuses of participants are indicated in **Table 1**.

Table 1: Demographic profile of participants

Item	Chorkor (N=60)		Korle-Gonno (N=60)	
	No.	%	No.	%
Age				
Under 20 years	2	3.3	12	20
21 to 25 years	29	48.3	33	55
26 to 30 years	4	6.7	5	8.3
31 to 35 years	25	41.7	7	11.7
36 to 40 years	0	0	1	1.7
41+ years	0	0	2	3.3
Educational Background				
Primary School Level	0	0	1	1.7
Middle School or Junior High School Level	36	60	38	63.3
Secondary or Senior High School Level	19	31.7	3	5.0
Tertiary Level	4	6.7	13	21.7
Post Graduate Level	0	0	1	1.7
No Formal Education	1	1.7	4	6.7
Religious Affiliation				
Christianity	52	87	57	95
Islam	6	10	2	3
Traditionalists	2	3	1	2
Ethnicity				
Ga	35	58.3	24	40
Akan	19	31.6	22	36.6
Others	6	10	14	23.3
	N=120			
	No.		%	
Type of Dwelling				
Separate Bungalow	3		2	
Compound House	117		98	
Employment Status				
Employed	53		44.2	
Not Employed	67		55.8	
Income Earning Status				
Earn Income	50		41.7	
Do not Earn Income	70		58.3	

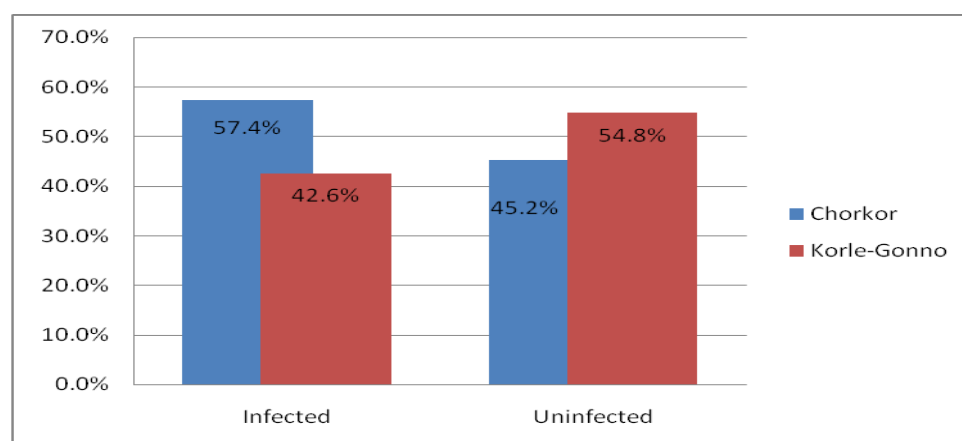


Figure 2: Malaria infection during pregnancy

Table 2: Chi-Square Test: Relationship between participants' religious views, economic and socio-cultural conditions and their malaria prevention and control practices

Variables	N	Chi-Square (X^2)	P-value
Religious beliefs and malaria prevention and control practices	120	0.28	.53
Economic conditions and malaria prevention and control practices			
Employment status	120	61.76	.00
Income earning status	120	53.94	.00
Socio-cultural conditions and malaria prevention and control practices			
Age	120	16.79	.00
Education	120	1.57	.00
Type of dwelling	120	108.30	.00
Ethnicity	120	35.62	.22

Table 3: Chi-Square Test: Relationship between malaria infection and pregnant women's employment status and income earning status

Variables	N	Chi-Square (X^2)	P-value
Malaria infection and employment status of pregnant women	120	9.38	.00
Malaria infection and income earning status of pregnant women	120	14.66	.00

In order to achieve the aim of the study, the relationship between the religious beliefs of the pregnant women and their malaria prevention and control practices, such as the use of ITNs, repellents and clean environment was examined. The chi-square (X^2) value was .28 with a *P*-value of .53. Since the *P*-value was greater than the preselected significance level of .05, there was no statistically significant relationship between

religious beliefs of pregnant women and their malaria prevention and control practices.

In addition, a chi-square test was done to examine the relationship between participants' economic conditions (employment status and income earning status) and their malaria prevention and control practices. The chi-square value of 61.76 and *P*-value of .00 (Table 2) showed that there was a statistically significant

relationship between employment status and malaria prevention and control practices of participants. Likewise, the chi-square value of 53.94 and *P*-value of .00 (Table 2) showed that there was a statistically significant relationship between income earning status and malaria prevention and control practices of participants. Also, a statistically significant relationship was found between malaria infection and participants' employment and income earning statuses (Table 3). Hence, the results indicated a statistically significant relationship between economic conditions of pregnant women and their malaria prevention and control practices.

Moreover, the influence of socio-cultural conditions (age, education, ethnicity and type of dwelling) on malaria prevention and control methods of participants was determined using a chi-square test. A statistically significant relationship was found between age, education, type of dwelling and malaria prevention and control practices of the participants as shown in Table 2. However, no significant relationship was found between ethnicity and malaria prevention and control practices of participants, chi-square value of 35.62 and significance level of .22 (Table 2).

Discussion

This study aimed to investigate factors that influence malaria prevention and control practices among pregnant women residing in two slum communities. Evidence showed that the majority of pregnant women in this study indicated they had been infected with malaria during pregnancy. This is similar to findings from a study conducted in Southwest, Nigeria, which recorded high malaria prevalence rate of infection among pregnant women¹. In malaria endemic areas, the risk of infection is generally higher among pregnant women and children who reside in slum areas with poor living conditions.

Since the majority of participants in this study sought professional assistance for malaria treatment, it suggests that they perceived malaria as a disease that needs to be cured by medical professionals and medically approved medications. It is vital to mention that in this study, malaria

infection during pregnancy was not based on participants' laboratory results but by asking them whether they had malaria during their pregnancy. Also, participants' medical records about malaria infection were not verified.

The cost of malaria treatment also played a role in this study. The findings revealed that majority of the participants perceived orthodox malaria treatment to be expensive. This implies that many of the pregnant women may not seek care from health facilities due to the monetary cost involved and possibly would resort to herbal medications, which are relatively cheaper. The results of other studies show that cost is a significant barrier to health access, especially for poor households²¹⁻²³. Also, in Ghana and other parts of Africa, self-medication with anti-malaria pharmaceutical drugs is a common practice because many households use it as a means of reducing the cost of malaria treatment, such as the cost of hospital consultation, laboratory tests and transportation to health facilities. Since in Africa, pregnant women are four times likely to get sick of malaria⁶, treating malaria from home presents substantial health risks for pregnant women and their unborn babies.

For the reason that a high percentage of the participants were neither employed nor earned personal income, a significant relationship was found between participants' employment and income earning statuses and their malaria prevention and control practices. This confirms the assertion that the amount of money available for treatment during malaria episodes is a function of the income of women²⁴. It is estimated that about 40% of the world's population resides in areas where malaria is endemic, and these people are on average very poor²⁵.

Malaria is a disease of poverty because wealth could protect people from malaria infection^{3,9,26}. Wealthy people are likely to (a) have higher levels of education and malaria prevention awareness, (b) have the ability to purchase anti-malaria drugs that could reduce the rate of malaria infection and (c) live in better housing conditions and have access to improved health care services³. Relatedly, the evidence draws attention to the fact that where malaria prospers most, human societies have prospered least and this suggests that malaria and poverty are closely linked²⁷.

Additionally, it was found in this study that religious beliefs of the participants did not influence their malaria prevention and control practices. Thus, the participants had equal chances of being infected with malaria irrespective of their religious affiliations. This finding could explain why participants in this study preferred to attend and take medications from hospitals when they were infected with malaria. The finding is in contrast with the results of the study conducted in Nigeria on the prevalence of malaria parasite infection among pregnant women. The study found that about 90% of pregnant women in Southwest Nigeria refused to take malaria drugs due to their religious beliefs¹. It is however important to point out that although the pregnant women included in this study preferred clinical diagnosis and treatment of malaria, this may not be practiced if they cannot afford the cost involved.

Furthermore, it was found that with the exception of ethnicity, other socio-cultural conditions (age, education and type of dwelling) did influence the malaria prevention and control practices of the participants. Socio-cultural factors could influence vital characteristics, such as adherence to treatment, an influential characteristic of how patients incorporate treatments into everyday life²⁸. With regard to the type of dwelling, the finding supports the conclusion that malaria afflicts primarily the poor who are likely to live in malaria endemic areas and in dwellings that offer few, if any, barriers against mosquitoes⁹.

In malaria endemic communities the risk of malaria infection is higher in poorly built houses than in well-built ones^{29,30}. Similarly in southern Sri Lanka, the risk of malaria was found to be 2.5-fold higher between residents of poorly constructed houses compared to people living in houses of good construction type³¹. In this study, participants resided in slum localities where most of the dwellings were compound houses (different households living together and sharing a common bathroom and toilet) that included an average of six households. The majority of households in Ghana, about 79% live in rooms in compound houses³².

It was found that an average of five people lived in one room and as a result, the use of

preventive measures, especially insecticide-treated bed nets may be difficult. This could be a setback in malaria prevention through the promotion of the use of ITNs. Other studies^{30,33} have also revealed that the use of ITNs reduce the proportion of malaria morbidity and mortality. It has also been suggested that overcrowding might increase the risk of malaria, since mosquitoes are attracted by higher concentration of carbon dioxide and other chemicals in crowded households³⁴. Likewise, another study³⁵, reported that large families sharing a single household tend to have a higher prevalence of malaria and this relationship may be due to the fact that large family households contain people who are generally poor, illiterate and living in poorly constructed houses.

Notably, education influenced the malaria prevention and control practices of participants. Although the educational background of participants who were infected with malaria during pregnancy and those not infected were not compared, evidence showed that the educational background of majority of the participants was low. As stated earlier, malaria infection during pregnancy was not based on participants' clinical history but their personal reports. This notwithstanding, a study which was based on participants' clinical history found that illiterate pregnant women in Nigeria had the highest malaria prevalence rate¹. Further, another study in Bangladesh found that the level of education was related to prevalence of malaria³⁵. This is not surprising because persons who are educated are likely to have some knowledge about how malaria is transmitted, as well as prevention and control measures.

Ethnicity did not have a significant relationship with malaria prevention and control practices among the pregnant women in this study. On the other hand, a study in Thai-Myanmar on poverty and malaria found differences in the health situation of communities along ethnic and class divisions³⁶. Considering both ethnicity and economic conditions, Brokerhoff and Hewett concluded in their study that better health and care seeking behaviours of some ethnic groups may be a result of household economic conditions that differed between ethnic groups³⁷. Traditional beliefs and practices could influence malaria

prevention and treatment-seeking choices of different ethnic groups.

Study Limitations

The generalization of the results is limited because the study was based on a sample of pregnant women who accessed antenatal care at a maternity facility in Accra, Ghana. Also, the participants were selected without prior knowledge of their clinical and family history. Nevertheless, the findings provide evidence regarding factors that influence pregnant women's malaria prevention and control practices.

Conclusion

Certainly, the findings of this study and others indicate that many factors (e.g., economic condition, type of dwelling and education) could influence adherence to malaria prevention and treatment. Given that majority of the participants were neither employed nor earned personal income, malaria prevention and control methods should be affordable. Also, pregnant women residing in slum areas may have more challenges preventing malaria infection due to overcrowding, lack of water, poor toilet facilities, and lack of appropriate drainage systems. Since the principal goal of malaria prevention and control programmes is to reduce the prevalence of the disease, as well as its economic and social costs, intervention strategies should be sensitive to the financial needs and the socio-cultural conditions of the poor, especially pregnant women residing in slums in Ghana.

Contribution of Authors

HK conceived the study and MD-G and HK worked on the design. HK was in charge of data collection and both MD-G and HK worked on the data analysis. Both MD-G and HK compiled the manuscript. All authors mentioned in the article approved the manuscript.

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