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Community Knowledge and Perceptions on Malaria and Its Prevention and Control in the Akwapim North Municipality, Ghana

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Authors' contributions

This work was carried out in collaboration between all authors. Author JKLO drafted the proposal, participated in the design of the study, supervised data collection and drafted the manuscript. Authors AAB, EA and FW participated in the proposal design, interpretation of the results and helped to critically revise the manuscript. Authors DKA, KT, JA and JAM reviewed study design and author OS assisted in data analysis. Author OS assisted in reviewing the pilot study. All authors read and approved the final manuscript.

Original Research Article

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ABSTRACT

Background: Malaria is an important cause of morbidity and mortality especially among children less than five years in the Akwapim North Municipality of the Eastern Region of Ghana. Knowledge of community members in malaria is a major factor that can influence malaria prevention and control. In 2012, the municipality was enrolled onto the home-based management of malaria programme in the region using the community based health volunteers. We assessed the knowledge and level of understanding of the people about the disease prior to the introduction. This is to enhance the control of malaria in the

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Municipality.

Methods: A cross sectional study involving 616 adults, were selected from households using a simple random selection method. Information on age, marital status, levels of education, occupation, awareness, knowledge and perceptions on malaria were obtained using a questionnaire. Univariate analyses were expressed as frequencies, percentages and means. Bivariate analysis ascertained the relationship between gender, age, educational level and knowledge on prevention of malaria ($p < 0.05$).

Results: Among the 616 respondents, 58.6 % were females. The median age was 33.0 years old (range 14-81). Respondent's awareness of malaria was 96.7% but rather a poor knowledge of malaria etiology (1.6%). 64.2% of the respondents knew that mosquitoes transmit malaria. Knowledge on the classical symptoms of uncomplicated malaria was moderate (7.6 – 48.7%). The respondent's knowledge of danger signs of severe malaria was low (5.6-16.2%). Myths regarding causes of malaria such as filth, flies were mentioned by 20.9% and 4.2% of the respondents. 81% perceived malaria is preventable and the use of an insecticide treated bed net among respondents was 39.0%. Females were more likely (p -value 0.003) to have more knowledge on prevention of malaria.

Conclusion: Although awareness of malaria in the Akwapim North Municipality is high, there is a serious knowledge gap in identifying the dangers signs associated with the disease. Many community members do agree that malaria is preventable but still harbour myths regarding its etiology. Health education should therefore be reviewed and intensified in the communities.

Keywords: Malaria; knowledge; awareness; prevention; control; Akwapim North Municipality.

1. INTRODUCTION

Malaria is caused by a parasite called Plasmodium, which is transmitted via the bites of infected female anopheles mosquitoes. In the human body, the parasites multiply in the liver, and then infect red blood cells. Symptoms of malaria include fever, headache, and vomiting, and usually appear between 10 to 15 days after the mosquito bite. If not treated, malaria can quickly become life-threatening by disrupting the blood supply to vital organs.

Malaria is still a major public health issue in sub-Saharan Africa and other parts of the developing world [1,2,3]. With an estimated yearly death toll of about six hundred and sixty million people principally among pregnant women and children; the disease arguably still occupies the number one position among diseases of global public health importance [4,5,6].

In Ghana, malaria has been a major cause of poverty and low productivity accounting for about 32.5 percent of all OPD attendances and 48.8 percent of all under five-year admissions in the country [7].

The attempt to control malaria in Ghana began in the 1950s. It was aimed at reducing the malaria disease burden till it's no longer of public health significance. It was also recognized that malaria cannot be controlled by the health sector alone therefore multiple strategies were pursued with other health related sectors. In view of this, interventions were put in place to help in the control of the deadly disease. Some of the interventions applied at the time included residual insecticide application against adult mosquitoes, mass chemoprophylaxis with Pyrimethamine medicated salt and improvement of drainage system. But malaria continued to be the leading cause of morbidity (illness) in the country. Ghana

then committed itself to the Roll Back Malaria (RBM) initiative in 1999 and developed a strategic framework to guide its implementation.

Environmental factors and behavioural patterns of vectors and human populations combine to provide favourable conditions for malaria transmission. While much is known about vector biology and behaviour and the malaria parasites, the importance of human behaviour in malaria transmission has been largely overlooked. Failure to consider community attitudes and beliefs regarding malaria has contributed to the inability of programmes to achieve sustainable control [8].

Perceptions about malaria illness, particularly households' perceived susceptibility and beliefs about the seriousness of the disease are important preceding factors for decision making concerning preventive and curative actions [9]. The understanding of the possible causes, modes of transmission, and individuals' preference and decision about adoption of preventive and control measures vary from community to community and among individual households [10,11,12].

There has been a considerable number of reports about knowledge, attitudes, and practices relating to malaria and its control from different parts of Africa. These reports concluded that misconceptions concerning malaria still exist and that practices for the control of malaria have been unsatisfactory [13,14,15].

A recent dimension to the control of malaria in Ghana is the use of community based health volunteers in scaling-up community based treatment of malaria in all districts through the Home- Base-Care programme targeting children under five years living in rural areas and areas with limited access.

This cross-sectional study was conducted to establish baseline information assessing knowledge, perception and control of the population with regard to malaria in Akwapin North Municipality of Ghana prior to the introduction of the Home- Base-Care programme. The ultimate use of this study would enable the municipality develop effective behavioural change communication (BCC) messages to control the disease. The findings from the present study would also help assess the local success and challenges of a key component of the RBM initiative which is health education and public enlightenment.

2. METHODS

2.1 Study Area

Akwapim North Municipality (AKM) is located in the south-eastern part of the Eastern Region of Ghana and is about 58 km from Accra. It has an estimated population of 122,068 with 450 km² land area and a ratio of urban: rural population of about 1.5:1. It has a population growth rate of 1.4% and a sex ratio of 0.9 male(s)/female. It consists of 8 sub-districts and is served by 2 hospitals and 29 smaller health facilities. Malaria continues to be among the common (40%) causes of out-patient attendance. For the past 5years, there has not been any maternal death due to malaria and child mortality due to malaria has been reduced to 4/100,000 live births [16]. Interventions on malaria have been centred on case management and diverse health promotional activities (community durbars and distribution of posters, flyers, bed nets etc on malaria).



2.2 Study Design

The study was a cross-sectional, community based questionnaire survey utilising structured questionnaires administered to caregivers of children in the Akwapim North municipality.

2.3 Sample Size

The minimum sample size for the study was estimated to be 383. This estimation was obtained by calculation using the formula: $N = \frac{Z^2 pq}{d^2}$ [17] on assumption that 50% of the respondents have knowledge about the etiology and transmission of malaria ($p = 0.5$) at 95% confidence interval ($z = 1.96$) and 5% error of selection ($d = 0.05$). With a response rate of 80%, the estimated sample size became 479 ($383/0.8$), and this was rounded-up to a maximum sample size of 616.

2.4 Sampling Procedures

Based on the minimum sample size of 383, we recruited 616 adult caregivers in a multi-stage sampling of standard census-zones in the district over a one-month period. For each standard census-zone the theoretical sample size was distributed to the thirty zones in the municipality in proportionate to their population size. Within a household, one caregiver was

selected by simple random sampling through a box–draw method to participate in the survey.

2.5 Data Collection Technique, Tools and Procedures

Interviews were used as data collection technique, using structured questionnaire containing both closed and open-ended questions. Information such as age, educational level, occupation, methods of transmission and knowledge on prevention of malaria, ownership/use of treated bed nets, drugs for treatment of malaria, source of information and help seeking behaviour on malaria was obtained.

2.6 Data Processing and Analysis

Raw data was coded using an already developed coding scheme; then edited and double entered into a PC before analysis. Data was analyzed using the Epi v7 info programme and the results presented using appropriate charts and tables. The analysis included determination of basic descriptive statistics. Chi–squared tests of association were conducted between age, gender (male/female), level of education and knowledge on prevention of malaria. A p-value of less than 0.05 was considered significant.

3. RESULTS

Among the 616 respondents, 58.6 % were females (Table 1). The median age was 33.0 years old (range 14-81years old). Results summarized in Table 2 indicate that the respondents were aware that malaria is a disease (96.7%) but had a poor knowledge of malaria etiology (1.6%).None of the respondents could mention the four types of plasmodium species. About 64.2% of the respondents knew that mosquitoes transmit malaria. Knowledge on the classical symptoms of uncomplicated malaria such as fever, malaise, headache and loss of appetite (6.3 – 48.7%) was moderate. However, the respondent’s knowledge of danger signs seen in severe malaria such as convulsion, coma, jaundice and respiratory distress (5.6-16.2%) was significantly low. Myths regarding causes of malaria such as filth, flies were mentioned by 20.9% and 4.2% of the respondents respectively (Fig. 1). Listening to the radio and health workers were mentioned as the major sources of information on malaria by the respondents (24.3% and 16.2%).

Although, 93% of the respondents were of the view that malaria is a fatal disease and 81% also thought it is preventable, only 39.0% could identify insecticide treated bed nets as one of the preventable methods. Whenever any of the respondents were sick, majority (73.2%) would go to the nearest health facility, 20.7% to the chemical seller or pharmacy and 1.4% had no idea as to where to seek help (Fig. 2). An association was sought between age, gender (male/female), level of education and knowledge on prevention of malaria. Females were more likely (p-value 0.003) to have more knowledge on prevention of malaria.

Table 1. Demographic and Socio-economic characteristics of the respondents, Akwapim North Municipality-2012 (N = 616)

Characteristics		N (%)
Sex	Male	255 (41.4)
	Female	361 (58.6)
Age, years (mean +SD)		
	Male	37.5 ±14.1
	Female	34.9±13.0
	Total	36.0±13.6
Formal Education		
	Junior High Secondary School(JHSS)	237 (38.5)
	No education	119 (19.3)
	others	17 (2.8)
	primary	99 (16.1)
	SHS	75 (12.2)
	tertiary school	38 (6.2)
	Vocational/technical	31 (5.0)
Occupation		
	Artisan	94 (15.3)
	Civil/Public Servant	43 (7.0)
	Farm Worker	159 (25.8)
	House Wife	22 (3.6)
	N/A	13 (2.1)
	Servant	1 (0.2)
	Student	29 (4.7)
	Trader	166 (26.9)

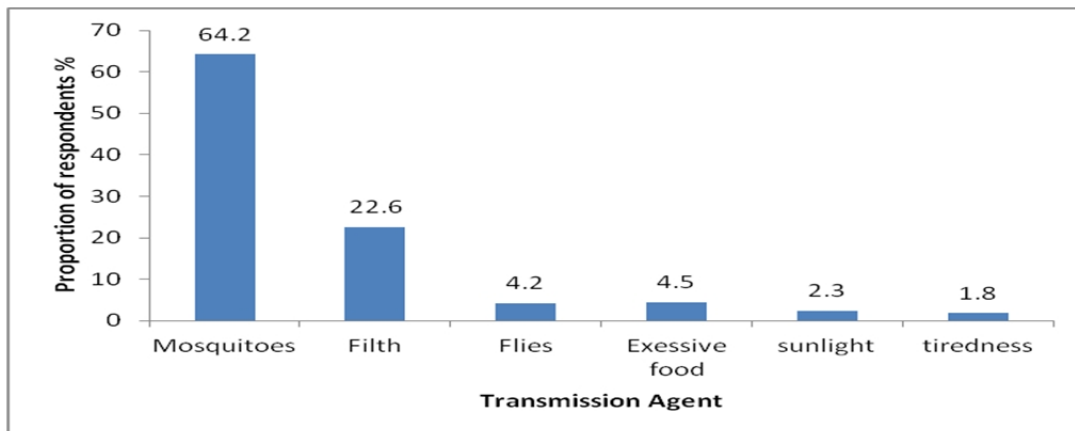


Fig. 1. Mode of Transmission of Malaria, Akwapim North Municipality-2012

Table 2. Evaluation of knowledge and perception of malaria among the respondents, Akwapim North Municipality-2012

(i) Awareness of malaria and symptoms pronounced by the respondents (N = 616)	N (%)		
Awareness of malaria	588 (96.7)		
Uncomplicated malaria			
Loss of Appetite	47 (7.6)		
Headache	180 (29.2)		
fever	300 (48.7)		
Nausea	50 (8.1)		
Vomiting	39 (6.3)		
Complicated malaria			
Severe Anaemia	100 (16.2)		
Coma	35 (5.6)		
Convulsion	50(8.1)		
Jaundice	50(8.1)		
(ii) Perception on malaria			
Whether malaria infection can cause death			
(a) Yes	572 (93.0)		
(b) No	8 (1.2)		
(c) Don't know	36 (5.4)		
Whether malaria can be prevented			
(a) Yes	500 (81.0)		
(b) no	20 (3.2)		
(c) Don't know	96 (15.6)		
Prevention of malaria			
(a) Use of ITN	241(39.0)		
(b) Use Mosquito coil	90 (14.6)		
(c) Weeding and de-silting choked gutters	59 (9.6)		
(d) Use of mosquito spray	99 (16.1)		
(e) Use of anti-malaria drugs	50 (8.1)		
(f) Avoidance of oily foods	67 (10.1)		
(g) Don't know	10 (1.6)		
(iii) Test of association between selected variables and knowledge about malaria prevention			
Age	n	%	p-value
10-29	239	38.8	
30-39	164	26.6	
≥40	213	34.6	.259
Gender			
Male	255	41.4	
Female	361	58.6	.003*
Education			
Formal Education	417	67.7	
No education	199	32.3	.445

*Significant association

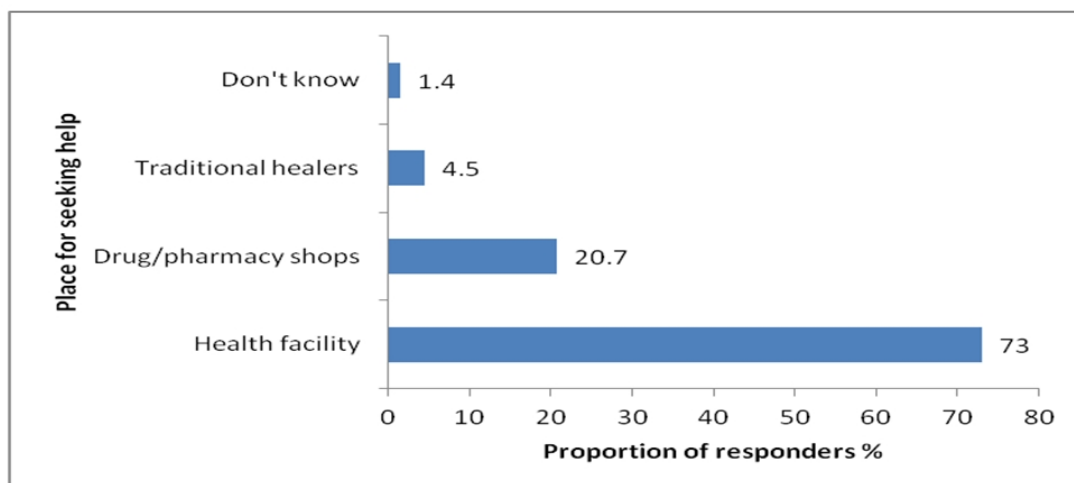


Fig. 2. Help-Seeking Behaviour of Respondents on Malaria, Akwapim North Municipality-2012

4. DISCUSSIONS

In this study, we assessed community awareness and knowledge about cause, mode of transmission, symptoms, treatment, and prevention of malaria as well as perception of malaria in the Akwapim North Municipality of Ghana.

Our study revealed that awareness of malaria among the respondents was very high. The awareness of the respondents that malaria is caused and transmitted by a bite of mosquito is usually a common knowledge in malaria endemic countries such as India, Turkey, Nepal, Haiti, Latin America, Sudan and Ghana [18,19,20,21,22]. However, only a tiny fraction of the respondents could accurately state the correct causative agent and the types. There was also a moderate knowledge level of the classical signs and symptoms of uncomplicated and complicated malaria. The serious gaps in knowledge are also revealed in the respondent's knowledge of danger signs seen in severe malaria such as convulsion, coma, jaundice and respiratory distress. A similar observation was made by Volunteer Partnerships for West Africa in 2012, in a community based study at Darmang Anhuntem, located in the Akuapim South Municipality of the Eastern Region of Ghana [23]. This obviously has a direct link with malaria mortality. Health education interventions should be designed according to the existing knowledge and awareness level of vulnerable population as well as their current treatment-seeking practices, and should be implemented for a sufficient length of time to be effective [20].

The baseline study also revealed that myths regarding causes of malaria such as filth and flies were still held up in the minds of many of the respondents in our study area and are very similar to those reported about 20 years ago in southern Ghana with similar socio-cultural settings [24]. It is however encouraging to note that majority of the respondents currently associate malaria transmission with mosquitoes. The massive educational campaigns about malaria and its control measures adopted as part of the Roll Back Malaria strategies throughout Ghana including the Akwapim North Municipality may have contributed to this as evident by a significant increase in ITN use in recent years in the study area, from 10% to 39%, although it falls short of the 60% utilization coverage target of the Roll Back

Malaria initiative. Similarly in India, mosquito net was found to be a preferred method to avoid mosquito bite [19]. Matta et al. reported 34% respondents mentioned mosquito net as a prime preventive measure against mosquito bite [25]. Prevention of the disease through better knowledge and awareness is the appropriate way to keep the disease away and remain healthy as illness, confusion and health-seeking behaviour may enhance or interfere with the effectiveness of control measures [26].

Majority of the respondents were of the view that malaria is preventable. This corroborates a study in Ethiopia, Swaziland, Nepal and in India [27,28,29,30] where 100%, 78%, 98.6% and 51% respectively of the respondents shared a similar view. However, again in Ethiopia, Nepal Parajuli and Ghimire [31,32] demonstrated that 85.7% and 17.6% respectively, of the respondents in their study did not know malaria can be prevented.

In terms of sex, it was found that more females than males were likely to know more about malaria prevention. It can therefore be said that females have higher knowledge of malaria than males. Since females normally take care of children in times of sickness, they might get into contact with information on malaria more than males. Frequent visits to the clinic and drug stores can lead to knowledge acquisition, thus females are more likely to have higher knowledge of malaria. There was however no differences in terms of educational levels of respondents and the knowledge of whether malaria is preventable. Both the less educated and highly educated had the knowledge that malaria can be prevented. This might mean that knowledge of malaria is not only acquired through formal education. Other sources such as non-formal education might contribute a larger percentage to one's knowledge of the disease. A similar observation was made by Isaac Appiah-Darkwah and Samuel Kofi Badu-Nyarko in a semi urban community in Accra, Ghana [33]. While designing interventions, proactive measures should be undertaken by malarial prevention and control programmes to reduce this gender gap. This is all the more necessary because experiences show that even women-focused interventions may not increase access of quality health care for women, if the gender issues are not explicitly addressed by the programme [34].

Due to the limited time allocation for the study prior to the commencement of the home-based care-programme the findings from structured questionnaires were not verified by focused group discussions and in-depth interviews.

5. CONCLUSION

The present study has demonstrated that although awareness of malaria in the Akwapim North Municipality is high, there is a serious knowledge gap in identifying the dangers signs associated with the disease. Many community members do agree that malaria is preventable but still harbour myths regarding its etiology. Health education should therefore be reviewed and intensified in the communities. Although knowledge is one aspect of a complex interplay of factors, it is an important prerequisite for instigating behavior change and could likely inform attitudes about malaria health-related behaviors. With the global efforts to achieve universal coverage by 2010 [35], programs should not only focus on delivery of goods, but packaging that with effective IEC/BCC messages.

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ETHICAL CONSIDERATIONS

This study was approved by the District Health Directorate. Permission to carry out the study was also sought from the community leaders in Akwapim North Municipality. The study objectives and methods were also explained to each of the respondents prior to interviews or administration of questionnaire prepared in English and Akan, the major local language spoken in the study area.

COMPETING INTERESTS

The authors declare that they have no competing interests

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