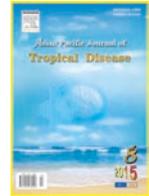




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Knowledge and practice of malaria prevention among caregivers of children with malaria admitted to a teaching hospital in Ghana

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ABSTRACT

Objective: To assess the knowledge and practice of malaria prevention among caregivers of children admitted to a teaching hospital in Ghana.

Methods: A descriptive cross-sectional survey was conducted on caregivers of children who were hospitalized at the paediatric wards of the Komfo Anokye Teaching Hospital from March 2009 to June 2009. Data were analysed using StataTM version 8.2.

Results: Nearly all caregivers (97.1%) had heard of malaria. Of this proportion, 89.7% knew mosquito bite as a cause of malaria. The proportion of caregivers who were able to recognise the signs and symptoms of malaria were 87.6% (for fever), 47.1% (for vomiting) and 28.1% (for headache). Radio and television were the major sources of information about malaria.

Conclusions: Caregivers of children have adequate knowledge about malaria and its mode of transmission. Further education on the implementation of the preventive methods is still needed to help reduce the incidence of malaria among children.

1. Introduction

Although malaria is a completely preventable and treatable disease, it is responsible for nearly a million deaths each year with Africa bearing the brunt of the disease accounting for more than 90% of the total number of cases[1-3]. Malaria is hyperendemic in Ghana and many other developing countries and it is a major public health problem in the country[4].

Malaria does not only affect the health of individuals negatively, it also poses a huge strain on the health system in Ghana and contributes immensely to the economic burden of the country. Other reports have similarly suggested that African governments spend more than 1% of their gross domestic product to combat malaria and the estimated annual direct and indirect costs attributable to malaria in sub-Saharan Africa are in excess of US \$ 12 billion[5].

Although some progress has been made towards achieving the Millennium Development Goal 6 in Ghana and some developing countries, more than one-third of the 108 malaria endemic countries (nine of which are in Africa) have documented reduction in malaria by 50% in 2008 as compared to the levels in 2000[6]. In Ghana, attempts have been made to strengthen health care services and make preventive strategies more available. The Roll Back Malaria campaign has partnered with several organizations including World Health Organization, United Nations International Children's Emergency Fund, NetMark, and bilateral agencies to promote insecticide treated nets (ITNs) campaigns.

In an effort to control the burden of malaria, several other preventive methods have been developed and proven effective. Malaria vector control is one of such methods aimed at protecting individuals from mosquito bites. This has been shown on a community level to reduce the incidence of malaria transmission. Malaria vector control is most often achieved through preventive methods including ITN, residual spraying, repellents, and maintaining a clean environment. All these means of control can be employed at the individual level, thus placing the responsibility

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of preventing transmission in the hands of individuals[7-9]. The ability to effectively use individual methods of prevention depends mainly on the knowledge and practices of individuals within the community[10-12].

In spite of the progress made by various organisations in reducing malaria, there is still high incidence of malaria in Ghana[13] and further interventions need to be implemented.

One such intervention that could be useful in preventing malaria especially among children is for caregivers/parents to have adequate knowledge about the route of malaria transmission, methods of malaria prevention and the early detection of signs and symptoms of malaria. However, most caregivers/parents in developing countries including Ghana do not have adequate knowledge of malaria transmission routes and the signs and symptoms associated with malaria. This lack of knowledge is reflected in the high turnout of children infected with malaria on admission at the paediatric wards of the Komfo Anokye Teaching Hospital (KATH). At any point in time 20% of children on admission at the paediatric wards of KATH have laboratory proven malaria (Annual Report of Statistic Department, KATH, 2012). This study was, therefore, conducted among a cohort of caregivers to assess their level of knowledge about malaria transmission and preventive methods.

2. Materials and methods

2.1. Study site

The study was conducted on the paediatric wards of the KATH, a tertiary hospital in the Kumasi Metropolis. KATH is a referral hospital for the northern sector and the middle belt of Ghana. About 350 patients are admitted to the paediatric wards every month, of which 20% are laboratory proven malaria and 50% are treated as clinical malaria (KATH statistics unit, unpublished data). The study was conducted from March 2009 to June 2009.

2.2. Study design and population characteristics

This was a hospital based descriptive cross-sectional survey. Parents/caregivers of children who had been hospitalized for laboratory proven malaria were recruited into the study. For every caregiver recruited, the demographic profile including educational level, knowledge on malaria, knowledge on methods of malaria prevention and practice of these methods and other clinical variables of malaria were recorded onto a case report form. The case report forms were explained for subjects who were illiterates in their local dialects.

2.3. Sample size

The sample size was determined based on a previous study conducted by Omole *et al.* in Nigeria which found that 85% of

mothers had knowledge on prevention of malaria in Nigeria[14]. Based on this estimate, a sample size of 210 was determined using a confidence limit of 95%, marginal error of 5% and a non-response rate of 10%.

2.4. Statistical analysis

All data were entered into Microsoft Access 2007 and analysed with StataTM version 8.2, StataCorp, Texas 77845 USA. Univariate analysis with point estimates and 95% confidence interval of base line characteristics were determined.

2.5. Ethical clearance

The study was approved by the Committee on Human Research, Publications and Ethics of the Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. Written informed consent was obtained from all caregivers before they were enrolled in the study.

3. Results

A total of 210 caregivers were enrolled into the study. Of this 179 (85.2%) were females. The mean age of study subjects was (32.80 ± 10.97) years and the median age was 30 years. The commonest occupation of study subjects was trading (47.6%) followed by farming (11.4%) and then hairdressing (5.7%). Twenty subjects (9.5%) were unemployed. Most of the caregivers had formal education with the commonest level being junior high level education [74 (35.2%)], followed by primary education [52 (24.8%)], tertiary education [4 (1.9%)] and senior high education [11 (5.2%)].

Out of the 210 caregivers enrolled, 204 (97.1%) had heard about malaria before. Radio was the commonest source of information [131 (64.2%)], followed by television [125 (61.3%)] and health workers [37 (18.1%)]. One hundred and eighty four (90.2%) out of the 204 caregivers knew of some methods of malaria prevention. The commonest method of malaria prevention mentioned by caregivers was insecticide treated nets [174 (85.3%)], followed by insecticide spray [70 (34.3%)] and environmental hygiene [31 (15.2%)]. Thirteen respondents (6.4%) mentioned good nutrition, use of orange peels and electric fans as methods of preventing malaria.

We also interviewed subjects on whether they practiced any of the methods of malaria prevention. Of the 204 subjects who had heard about malaria before, 171 (83.8%) practiced one or more methods of malaria prevention. One hundred and fourteen (55.9%) caregivers practiced the use of insecticide treated nets, 42 (20.6%) used insecticide spraying method, 17 (8.3%) practiced environmental hygiene and 10 (4.9%) used mosquito coils. Table 1 describes the knowledge and different methods of malaria prevention practiced by caregivers.

The study also explored the knowledge of caregivers on the signs

and symptoms of malaria. One hundred and eighty four (87.6%) caregivers identified fever as a symptom of malaria, 59 (28.1%) identified headache, 29 (13.8%) mentioned abdominal pains, 99 (47.1%) mentioned vomiting, 52 (24.8%) mentioned convulsion and 56 (26.7%) mentioned diarrhoea.

Table 1

Knowledge and practice of the methods of malaria prevention.

Classification	Respondents	Percentage (%)
Source of information (n = 204)		
Radio	131	64.2
Television	125	61.3
Health workers	37	18.1
Friends	10	4.9
At immunization center	4	2.0
Knowledge on methods of malaria prevention (n = 204)		
Yes	184	90.2
No	20	9.8
Methods known		
Insecticide treated bed net	174	85.3
Insecticide spraying	70	34.3
Environmental hygiene	31	15.2
Insecticide repellent	26	12.7
Protective clothing	20	9.8
Mosquito coil	17	8.3
Good nutrition	8	3.9
Orange peels	3	1.5
Electric fan	2	1.0
Practice of malaria prevention (n = 204)		
Takes action for prevention	171	83.8
Does not take action	33	16.2
Method used		
Insecticide treated bed net	114	55.9
Insecticide spraying	42	20.6
Environmental hygiene	17	8.3
Insecticide repellent	15	7.4
Protective clothing	14	6.7
Mosquito coil	10	4.9

We also investigated the knowledge of caregivers on the causes of malaria. One hundred and eighty three (89.7%) caregivers mentioned mosquito as the cause of malaria, 34 (16.7%) mentioned housefly as the cause of malaria, and 27 (13.3%) mentioned poor personal hygiene as a cause of malaria. Figure 1 describes the possible causes of malaria as mentioned by caregivers.

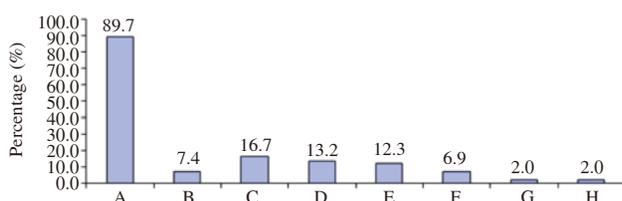


Figure 1. Caregivers' knowledge on causes of malaria.

A: Mosquito bite; B: Housefly; C: Contaminated food; D: Poor personal hygiene; E: Unhygienic environment; F: Oily food; G: Sun heat; H: Don't know.

4. Discussion

Knowledge on malaria among caregivers is important to prevent malaria among their children. Awareness of malaria among caregivers was high as almost all the respondents had heard of

malaria and most of them knew that mosquito bite is the cause of malaria and this is consistent with other studies in Ghana, Nigeria and Tanzania[11,15-17]. With regard to clinical features of malaria, the commonest symptom identified by the caregivers was fever. Similarly, Vinnemeier *et al.* found in Ghana that fever is the most common predictor of malaria parasitaemia[18].

There are many radio and television stations in Ghana and this makes information dissemination easy and effective. Some of these stations do regular and periodic health education programmes including malaria. However, the health workers seem not to be educating the public well enough on malaria. Malaria is the most frequently seen and treated infectious disease in hospitals in Ghana, but the health care workers are only interested in treating the patients and not educating them on causes of malaria and how to prevent their children from getting malaria. This is probably because of massive work load at the out patient departments and also many hospitals do not have public health units and the few that have, they are poorly resourced and are therefore underutilized. At some of the immunization centers, health care workers sell ITNs to the general population and distribute ITNs free of charge periodically to children under 5 years of age, yet only 1.9% of caregivers had heard of malaria from these centers. It is therefore important for the policies on malaria prevention to be modified to actively involve health workers in public education.

With regard to malaria prevention and control, knowledge of caregivers on methods of malaria prevention is very important. Greater proportion of the caregivers (90.2%) knew correctly one or more methods of malaria prevention. However, a few of the caregivers believed wrongly that using an electrical fan and good nutrition could entirely prevent children from getting malaria. In Ethiopia, Alemseged *et al.* in a study on caregivers' knowledge about childhood malaria found out that caregivers commonly knew cleaning of the surrounding (43.7%), personal hygiene (35.7%) and use of mosquito net (35.0%) as the methods of malaria prevention[19]. The results from our study could imply public education on the causes of malaria is still inadequate. Educational programmes needs to be strengthen to reach especially the rural poor.

Malaria is entirely preventable by preventing mosquito bite. Many of the caregivers practiced correctly one method or another of malaria prevention. The commonest method used among the caregivers was ITNs followed by insecticide spraying. Omole *et al.* found that the main protective measures practiced by the mothers against mosquito bites were netted windows (86.2%), use of insecticide spray (76.1%), and mosquito coil (17.0%)[14]. However, most caregivers were knowledgeable about the use of insecticide treated nets. Other authors similarly found that availability of mosquito nets was relatively high (70%), but only few respondents were using ITNs as a method of preventing malaria[12,20].

Even though most caregivers in our study practiced one or more methods of malaria prevention, their children were still admitted to paediatric wards and treated for malaria. This implies that the

children could have been exposed to malaria through other means not related to the methods they described in this study. It is therefore important for other ways of malaria transmission to be explored in order to reduce the rate of malaria transmission. Besides, caregivers may also combine various methods of malaria prevention for their children for instance using insecticide treated bed nets with intermittent insecticide spray, insecticide repellent and long protective clothing. This can reduce the mosquito density and also the effective number of mosquito bites to the children.

Findings from this study suggest that most caregivers are well informed about malaria and the conventional malaria prevention methods. However, the exposure of their children to malaria emphasizes the need for intensifying further education from the medical community on the effective implementation of the preventive methods of malaria transmission.

Conflict of interest statement

We declare that we have no conflict of interest.

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