

Clinical Study

Knowledge and Misconceptions about Malaria among Pregnant Women in a Post-Conflict Internally Displaced Persons' Camps in Gulu District, Northern Uganda

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Background. In Uganda Malaria continues to be a major public health problem accounting for about 30–50% of all outpatient consultations and 35% of hospital admissions and a leading cause of mortality and morbidity. Pregnant women and their unborn children are vulnerable to malaria. **Methods.** A cross-sectional survey was conducted in 20 postconflict IDP camps of Gulu district selected randomly as clusters. 769 pregnant women were interviewed. **Results.** The majority of the respondents 85% have ever heard about malaria. Most (80%) 571 respondent attributed malaria to be transmitted by mosquito bites, 15 said cold weather, 53 said dirt, and 35 said not sleeping under net. Most (91%) 683 respondents mentioned that malaria was caused by mosquito, 28 mentioned cold food, 3 mentioned playing in the rain, 19 mentioned cold weather, and 6 mentioned eating mangos. **Conclusion.** Most pregnant women in the post conflict IDP camps have relatively high knowledge about malaria transmission, signs, symptoms, and consequences during pregnancy. However, majority of respondents had misconception about the cause of malaria while a few had misconception about the mode of malaria transmission.

1. Background

An estimated 30 million women living in malaria endemic areas of Africa become pregnant each year [1]. Pregnant women and their unborn children are vulnerable to malaria, which is a major cause of perinatal mortality, low birth weight, and maternal anaemia [2]. The poor bear the highest burden of malaria. They are at higher risk of becoming infected with malaria because they live in dwelling that offer little protection from mosquitoes [3]. Malaria prevention during pregnancy is a major public health challenge and the Roll Back Malaria (RBM) global Partnership has recommended a three prong approach for reducing the burden of malaria among pregnant women which are effective case management, use of insecticide treated nets (ITNs), and intermittent presumptive treatment (IPT) [4]. In Uganda,

the government has promoted the use of insecticide treated nets (ITNs) and intermittent presumptive treatment (IPT) among pregnant women. However, malaria still continues to be a major public health problem accounting for about 30–50% of all outpatient consultations and 35% of hospital admissions in the country [5]. Several studies conducted in malaria-endemic areas of Africa regarding knowledge, attitudes, and practices toward malaria control measures among pregnant women indicate that malaria is perceived as a serious illness, and knowledge of malaria risks during pregnancy is relatively high [6–10]. A number of studies also reveal that misconceptions concerning malaria still exist and that practices for the control of malaria have been unsatisfactory [11, 12]. This study was conducted to assess the level of knowledge and misconception about malaria among pregnant women in a post conflict internally displaced persons' (IDP) camps in Gulu.

2. Methods

The study was conducted in IDP camps of Gulu district. Gulu district has two counties (Aswa and Omoro) and a municipality. The district is part of the region which was affected, by the two decades of arm conflict. The populations were forced into concentration camps with little social and health services and therefore lived in appalling conditions. From July 2007 to June 2008, Gulu had 31 IDP camps [13] with a total of 10,888 pregnancies [14]. A cross-sectional study was conducted in 20 randomly selected IDP camps. A camp constituted a cluster. Ten (10) IDP camps were randomly selected in each county. The numbers of pregnant women interviewed per IDP camp were determined using proportion to size cluster sampling method. We determine the centre of each IDP camp first and then the starting household. Consecutive sampling method was used by moving to the next nearest household. A total of 769 pregnant women were interviewed. Inclusion criteria were pregnant women who gave self-report of carrying pregnancy. Being residents of the 20 selected camps. Being present on the interview date and giving a written informed consent to participate in the study. The exclusion criteria were being seriously sick or in labour. The study was approved by the Faculty of Medicine Research and Ethic Committee, Makerere University which granted permission to study pregnant women less than 18 years as emancipated minors.

A semistructured questionnaire was administered by trained research assistants who were fluent in the local language (Acholi). The questionnaire was translated into Acholi with the help of an expert linguistic and back-translated into English and pretested in municipality before administering to the study population. Data was collected on sociodemographic characteristics and knowledge on malaria. Data was entered into Epidata version 3.1 cleaned, edited, coded, and exported to STATA 11 for analysis. Continuous variables were summarised using means and categorical variables were displayed into tables and charts for general description (Figure 1).

3. Results

769 pregnant women were interviewed with age ranging from 14 to 45 years with a mean age of 25.3 years and standard deviation (SD) of 6.2. The modal age of respondents was in the bracket of 20–24 (29%) years and those 35 years and above constituted 10%. Of the 769 respondents, 26% had not got formal education while 70% had primary education level and only two (2) had tertiary education. Most pregnant women were cohabiting (62%) followed by married pregnant women (30%). Most respondents were Para 3 or more. Detailed socio-demographic characteristics are presented in Table 1.

Also, of the 769 respondents, 85% have ever heard about malaria and 47% of these people heard about malaria for the first time from the health centre (Table 2). Knowledge about malaria signs and symptoms were fairly distributed with 146 (20%) of the respondents citing feeling cold, 141 (19%) fever, 66 (9%) mentioned they did not know any of the signs or

TABLE 1: Socio-demographic characteristics of respondents.

Variable	Frequencies	Percentage
	<i>n</i>	(%)
<i>Age</i>		
14–19	152	20
20–24	225	29
25–29	190	25
30–34	124	16
35–45	075	10
<i>Education levels</i>		
Not educated	200	26
Primary	540	70
Secondary	027	04
Tertiary	002	00
<i>Marital status</i>		
Married	233	30
Single	057	07
Cohabiting	477	62
Divorce	001	00
Widow	001	00
<i>Parity</i>		
Para 0	127	17
Para 1-2	232	30
Para ≥3	410	53

TABLE 2: Awareness about malaria signs and symptoms.

Variables	Frequency	Percentage
	<i>n</i>	%
<i>Have ever heard about Malaria</i>		
Yes	648	85
No	116	15
<i>Sources of information about malaria</i>		
Cannot recall	022	03
From community	100	15
Radio	230	36
Health centre	296	46
<i>Malaria Signs and Symptoms mentioned</i>		
Diarrhoea	013	02
Others	026	04
Dizziness	028	04
Malaise	038	05
Jaundice	057	08
I do not know	066	09
Vomiting	109	15
Headache	109	15
Fever	141	19
Chill	146	20

symptoms of malaria. Other signs and symptoms of malaria mentioned are presented in Table 2.

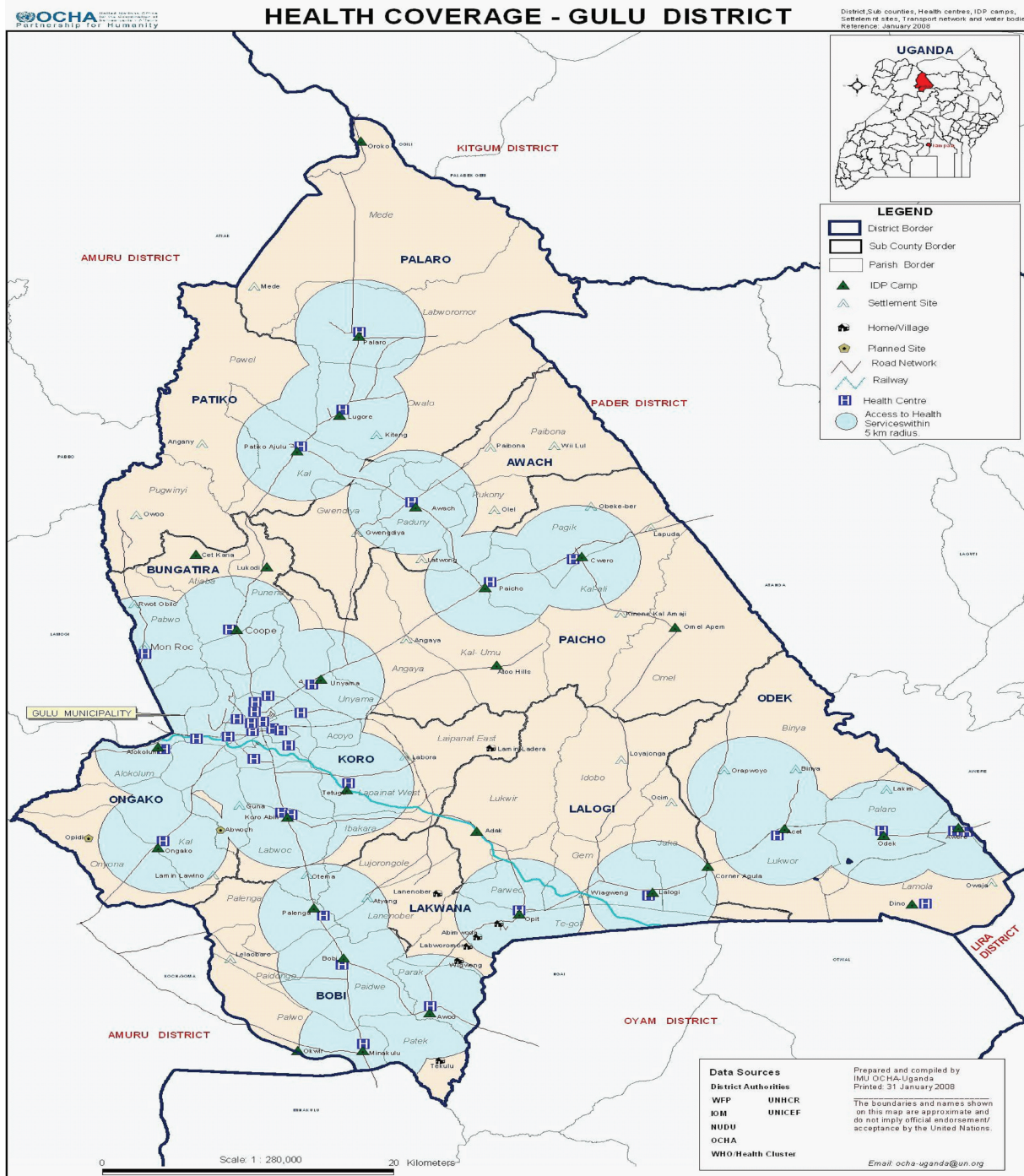


FIGURE 1: Map of Gulu District showing Health Units and IDP Camps. Permission was granted from UNOCHA Gulu office to use the map for the research purpose only.

Also, 571 (80%) of the respondent attributed malaria to be transmitted by mosquito bites, 15 mentioned cold weather, 53 mentioned dirt, 35 said not sleeping under net, and 5% did not know (Table 3). 683 of the respondents mentioned that malaria was caused by mosquito, 3 respondents said that malaria was caused by playing in the rain, 28 respondents said that cold food was the cause of malaria, 19 respondents said that cold weather, 6 said eating mango, and

10 respondents said they did not know the cause of malaria (Table 3).

Abortion was cited by 50% of the respondents as a consequence of malaria during pregnancy followed by jaundice at 34%. Giving birth to a low weight baby was the least mentioned by 16 (2%). When asked about groups at risk of malaria, 331 (46%) indicated that pregnant women were at risk for malaria while 287 (40%) said it was children less than

TABLE 3: Malaria knowledge among pregnant women.

Variables	Frequencies	Percentage
	<i>n</i>	%
<i>Mode of transmission</i>		
Cold weather	015	02
When you do not sleep under net	035	05
I do not know	039	05
From dirt	053	07
Mosquito bites	571	80
<i>Perceive causes of malaria</i>		
Playing in rain	003	00
Eating sour things	006	01
Do not know	010	01
Cold weather	019	03
Cold food	028	04
Mosquito	683	91
<i>Malaria consequences during pregnancy</i>		
Give birth to a low weight baby	016	02
Causes death	018	03
Foetal death	019	03
Premature delivery	026	04
Transmitted across placenta to the fetus	030	04
Causes anaemia	235	34
Causes abortion	348	50
<i>Groups at risk of Malaria</i>		
People living with HIV/AIDS	012	02
Do not know	086	12
Children under 5 Years	287	40
Pregnant women	331	46

five years and 86 (12%) of the pregnant women could not mention any group at risk of malaria. Table 3 summarises malaria knowledge among pregnant women.

The age of respondent was found not to be correlated with malaria knowledge and was not significantly associated with malaria knowledge. However, education level had a weak positively correlated with knowledge of perceive cause of malaria ($\rho = 0.129$, P value = 0.0004) and was found to be significantly associated with the knowledge of the perceived cause of malaria (Table 4).

4. Discussion

Our study shows that in the post conflict IDP camps of Gulu district, pregnant women have not demonstrated a better understanding of the cause of malaria as observed by other studies done elsewhere [15–17]. Majority of respondents reported to have ever heard about malaria with the main source of information being from health centres followed by radio. However, those who indicated that they heard from within the community were the least while 3% of the pregnant women could not recall the source. However, a

great percentage of the pregnant women indicated that they had not heard about malaria. In contrast, a study done in Tanzania shows that almost all the respondents have never heard about malaria [18].

Also, a high percentage of the respondents were knowledgeable about mosquitoes as a cause of malaria/fever. In-deed, in the local dialect the word *two lyeto* means fever caused by mosquitoes. This is a misconception about the cause of malaria because mosquito is a vector. This misconception was mentioned by majority across educational status and was found to be weakly correlated with educational level. However, when a chi-square test was performed, it was found to be statistically significant. Other study done in Ethiopia indicates that educational status was not significantly associated with basic awareness about the cause of malaria [19]. While mosquito was implicated as a cause of malaria, the aetiological agent of malaria was not mentioned as people usually incriminate mosquitoes as the causative agents of malaria [20–22]. Other causes of malaria mentioned by pregnant women were cold food, playing in rain, cold weather, and eating mango. A study done in Kampala by Njama et al. indicated that 90% of the caregivers knew that mosquitoes cause malaria although they equally indicated other perceived causes such as drinking unboiled water and respiratory illnesses [23]. Another study done in Uganda shows that malaria is believed to be caused by poor diet and exposure to bad environmental conditions [24]. While in Ghana, it has been reported that malaria is presumed to be caused as a result of excessive heat and eating oily or starchy food [25, 26]. In Guatemala, malaria is thought to be caused by exposure to cold or wet conditions, weakness or poor general health, poor eating habits, and problems related to hygiene [27]. Also, a study from coastal Kenya found that most mothers did not know the association between mosquitoes and malaria [28]. Misconceptions about malaria still exist among pregnant women in this study. Therefore, there is need for awareness creation among pregnant women to know that mosquito is a vector for malaria parasite that causes malaria so that all these misconceptions are addressed. People's perceptions and understandings about the perceived cause and transmission of malaria have strong implications on the preventive measures such as the current scale-up ITNs implementation [24, 25]. Therefore, public health education interventions should always be designed to cover the existing knowledge and should be implemented for a sufficient length of time for it to be effective [29].

Majority of the pregnant women knew that mosquito bite was the mode of malaria transmission. This demonstrated high level of knowledge on malaria transmission compared with findings from other malaria endemic countries [30, 31]. However, this study also revealed evidence of knowledge gaps about malaria transmission by some pregnant women who reported that malaria is transmitted through cold weather, from dirt, when you do not sleep under net and others had no clue on the mode of malaria transmission. It is evident therefore that misconception about malaria transmission still exist in endemic country like Uganda as shown by the results of this study. Results from other studies done in Africa have shown that malaria is misconceived to be transmitted

TABLE 4: Respondent's knowledge of malaria cause by educations level (n).

Variable	Education level			
	Not educated	Primary	Secondary	Tertiary
causes of malaria				
Playing in rain	002	001	000	000
Eating sour things	002	004	000	000
Do not know	007	003	000	000
Cold weather	006	012	001	000
Cold food	013	013	002	000
Mosquito	157	501	023	002
Total number (n)	187	534	026	002

Chi-Square (χ^2) = 25.12.

P value = 0.011.

through drinking contaminated/unboiled water, staying in the sun and working in rain [12, 32, 33].

This study has demonstrated that pregnant women had a good knowledge about malaria signs and symptoms. The most commonly mentioned symptom was feeling cold, followed by fever, headache, vomiting, and jaundice. This high level of awareness of the clinical features of malaria might be due to increased access to mass media, health education by health workers, and the village health team in the community. Other studies done elsewhere also shows similar results that participants had good knowledge on malaria signs and symptoms [30, 32].

A half of the respondent cited abortion as the consequences of malaria infection during pregnancy. Other consequences of malaria infection during pregnancy mentioned by respondents were anaemia, transmission across to the foetus, premature delivery of babies, foetal death, death of the pregnant woman, and giving birth to a low weight baby. Other study done in Nigeria indicates that knowledge of the consequences of malaria during pregnancy was poor among pregnant women [34]. This study has shown that pregnant women knew at least one of the consequences of malaria infection during pregnancy. This knowledge is good for setting up appropriate malaria prevention strategy among pregnant women since they are aware of malaria danger during pregnancy. Other study has indicated that the increased risk posed to pregnant women by malaria was almost universally recognized, but the knowledge of the health impact of malaria to the health of the foetus was very low [35].

Also, most of the pregnant women had knowledge of group of people who are perceived to be at risk for malaria. Among these groups mentioned were pregnant women, children under five years, and people living with HIV/AIDS. However, some of the respondent could not tell people who were at risk for malaria. The lack of knowledge by majority of pregnant women that they were at increase risk for malaria calls for more sensitisation in the community so that awareness is increased among pregnant women about malaria infection during pregnancy.

5. Conclusion and Recommendation

This study indicates that pregnant women in the post conflict IDP camps in Gulu district were aware about malaria

transmission, signs, symptoms, and consequences of malaria during pregnancy. However, misconception about the cause of malaria still exists and thus, there is need for more public health education about the cause of malaria among pregnant women to minimise misconceptions about the cause of malaria. Also, there is need for more awareness creation so that malaria signs and symptoms are well understood by pregnant women to promote early treatment for malaria as well as preventive and control efforts in the community.

Conflict of Interests

The authors declare that they have no competing interests.

Authors' Contribution

J. Henry participated in the conception, design and implementation of the study, statistical analysis, interpretation, and drafting of the paper. D. L. Kitara participated in study design, interpretation, and drafting of the paper. C. G. Orach participated in study conception, design, statistical analysis, interpretation, and drafting of the paper. All authors read and approved the final paper.

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