

# THE EFFECTIVENESS OF MALARIA HEALTH EDUCATION PROVIDED TO PREGNANT WOMEN BY NURSES AT A SELECTED HEALTH CENTRE IN RWANDA

**C. Nishimwe**, Bachelor of Nursing  
University of KwaZulu-Natal  
School of Nursing and Public Health

**J. Kerr**, M Cur  
University of KwaZulu-Natal  
School of Nursing and Public Health  
Corresponding author: kerrj@ukzn.ac.za

## ABSTRACT

Health education is a necessary part of prenatal health and plays an important part in reducing prenatal health problems among vulnerable populations. The purpose of this study was to evaluate the effectiveness of malaria health education given to pregnant women by nurses at one selected health centre in Rwanda.

This study used a quantitative approach, with a non-experimental, descriptive design. Non-probability convenience sampling was used to select the sample, comprising all pregnant women who attended the selected health centre during the period of the study and who consented to complete questionnaires.

Data were analysed using the Statistical Package for Social Sciences (SPSS) for Windows, Version 15. Descriptive data were analysed by means of frequencies, means, percentages and medians and the results are presented in tables. Almost half of respondents (48.6%; n=17) had received malaria information from health centres and 48.6% (n=17) from community health workers. As many as 80.0% (n=28) slept under mosquito nets and 97.1% (n=34) closed their homes' doors and windows before dusk. The results show that malaria health education, given to pregnant women by nurses, improved these women's malaria knowledge and enabled them to make effective decisions to reduce the incidence of malaria in Rwanda among pregnant women.

**Keywords:** effectiveness of malaria health education, malaria preventive practices in Rwanda, prevention of malaria among pregnant women

## **BACKGROUND INFORMATION AND LITERATURE REVIEW**

Mothers and their children are vulnerable, as a group, to diseases and death. Many of the problems affecting them can be prevented. Health education is one aspect of primary health care (PHC) which is an integral part of prenatal care services, where the intention is to provide positive perinatal outcomes for the women and their babies. The purpose of health education is to maintain good health, to promote health and to prevent health problems. In order to maintain good health, individuals must be educated, and put what they have learned into practice. One of the core ways to improve health is to promote self-care, whereby individuals take responsibility for their own health. This point of view is parallel to Orem's Self-Care Theory which is harmonious with primary health care (PHC) and the nursing process. Health education is an important role of nurses at every level of healthcare services (Pasinlioglu, 2004:101).

Pregnant women are particularly susceptible to malaria, due to their depressed immune levels during pregnancy, and its severity depends on the level of the transmission in that geographic area. In Rwanda, malaria has very serious effects on pregnancy, such as severe anaemia and premature deliveries (Van Geertruyden, Ntakirutimana, Erhart, Rwagacondo, Kabano & D'Alessandro, 2005: 681).

The World Health Organization (WHO, 2012:13) estimated that 655 000 malaria deaths occurred during 2008 and that the mortality rate per 100000 was 15 in Rwanda, 103 in Uganda, 17 in the United Republic of Tanzania, 193 in the Democratic Republic of Congo and 39 in Burundi. This report indicates that the incidence of Malaria has fallen by 50.0% between 2000 and 2010. However on-going efforts are required to sustain this reduction (WHO, 2012: 13) and to reduce the malaria mortality and morbidity figures in sub Sahara Africa (SSA) countries.

In tropical and subtropical regions throughout the world, malaria infection during pregnancy is a major public health problem. SSA accounts for 90.0% of the global malaria burden. According to the United States Agency for International Development (USAID, 2007), malaria is a serious killer disease in Africa, Asia and South America, killing 1-2 million people per year. Pregnant women and children under five are most vulnerable to malaria. Pregnant women with plasmodium falciparum malaria show evidence of poor obstetric outcomes with low birth weight babies. While malaria infection might be asymptomatic, the parasite can sequester in the placenta resulting in maternal anaemia and premature delivery. Malaria is one of the main health problems in Rwanda and is one of the reasons for frequent patient visits to healthcare facilities (Van Geertruyden et al., 2005:685).

The "counting malaria out in Rwanda for pregnant women and young children:maternal and child health integration program"(2008) states that 94.0% of pregnant women in Rwanda used antenatal care (ANC) services. It is, thus, an ideal opportunity to provide

health education to these women and to support and assist them to prevent and control malaria. As part of ANC, skilled nurses/midwives can provide information about the dangers of malaria, and the steps they can take to care for themselves, their young children and their newborn babies. These communications should address the value of practices such as continuing ANC, taking iron and folate pills to prevent and treat anaemia, sleeping under insecticide-treated bed nets (ITNs), covering arms and legs in the evening and receiving the next scheduled dose of intermittent presumptive (anti-malaria) treatment (IPTp) during pregnancy. Prevention and treatment interventions for malaria during pregnancy do not require high technology, nor is the provision limited to hospital settings. Social barriers to the use of ITNs by women and newborn babies require community interventions to promote an enabling environment that encourages women to use them. Community interventions can also make sure that the ITNs retain insecticidal effectiveness by mobilising the community to re-apply insecticides to their nets in a timely manner when long-lasting insecticide treated bed nets are not available (USAID, 2007).

## **PURPOSE OF THE STUDY**

The purpose of this study was to evaluate the effectiveness of malaria health education given to pregnant women by nurses at one selected healthcare centre in Rwanda.

## **METHODOLOGY**

### **Research design**

In this study a quantitative approach with a non-experimental descriptive design was used.

### **Research setting**

The selected health centre, in Kigali, Rwanda, was the setting of this research. The selected public hospital health centre provides ANC to an average of 233 pregnant women per month.

### **Population**

A population is an entire set of individuals having some common characteristic (Polit & Beck, 2008:761). The population of this study comprised pregnant women who attended ANC at the selected health centre. This health centre receives approximately

2796 women per year ( $n=2796$ ). A target population of 338 was calculated by using an online sample calculator ([www.surveysample.com](http://www.surveysample.com)).

## **Sample**

According to Polit and Beck (2008:765), a sample is a subset of a population, selected to participate in a study. In this study, the sample consisted of 35 respondents, which included both existing and new pregnant patients, attending the selected health centre during the period of data collection in December 2010. All pregnant women, who attended the selected health centre during the period of the study and who consented to participate, were eligible for inclusion in the sample.

## **Sampling method**

Sampling is the process used by researchers to select a portion of the population to represent the entire population (Polit & Beck, 2008:765). Non-probability convenience sampling was used, where the researcher enters available subjects into the study until the desired sample size has been reached (Burns & Grove, 2005:353). Non-probability convenience sampling includes persons in the sample because they happen to be in the right place at the right time (Brink, Van der Walt & Van Rensburg, 2006:132).

A sampling calculation, using an online sample calculator, was used to determine the size of the sample. In this study, a 95% confidence level was used for determining the sample size. According to the population size (2796 pregnant women), the sample size was calculated to be 338 by making use of the online sample calculator ([www.surveysample.com](http://www.surveysample.com)). For this study, a 10.0% proportion of the total sample was used, bringing the number to 35, due to financial and time constraints. Thus, 35 pregnant women ( $N=35$ ) participated in the study.

## **Data collection instrument**

Data were collected by using a questionnaire. A questionnaire is prepared in advance with the intention of gaining specific information from the respondents (Brink et al., 2006:143). The questionnaire for this study consisted of two sections. The first section contained questions pertaining to the demographic data of the respondents and the second section focused on behaviours pregnant women implemented to prevent malaria.

## **Validity and reliability**

According to Polit and Beck (2008:196), validity and reliability are important criteria for assessing the quality of the instruments in a study.

Validity is defined as the degree to which an instrument measures what it needs to measure (Polit & Beck, 2008:768). The development of the questionnaire was based on the literature review (Brink et al., 2006:160). Content validity was attained by linking the study objectives to specific items in the questionnaire. The study's supervisor assisted in formulating the questionnaire.

Brink, et al. (2006:207), described reliability as the consistence and dependability of the research instrument to measure a variable. According to Burns and Grove (2005:377), it is important to test the reliability of the instrument before using it in a study.

### **Data collection procedure**

Ethical clearance to conduct the study was obtained from the Ethics Committee of the Faculty of Health Sciences at the University of KwaZulu-Natal, the director of the selected district hospital and the management of the selected health centre. The researcher gained access to the pregnant women attending the antenatal clinic, and requested them to participate in the study. Those who agreed to participate signed a written informed consent form. The researcher handed a questionnaire to each respondent with a covering letter explaining the purpose of the study during December 2010. Clear and concise instructions for completing the questionnaire were included. The questionnaires were numbered and coded to facilitate data capturing and auditing of captured data and to ensure the confidentiality and anonymity of the respondents.

### **Data analysis**

Data from the questionnaires were analysed using the Statistical Package for Social Sciences (SPSS 15.0) for data analysis. Descriptive statistics were used to describe and synthesise the data. Data were numeric and frequencies and basic statistics were calculated and presented in tables.

## **RESEARCH FINDINGS**

The first section addressed demographic issues and the second section identified the health behaviours of pregnant women to prevent malaria in Rwanda.

### **Demographic data**

According to table 1, the pregnant women's ages ranged from 18 to 39 years. Of the pregnant women, 48.6% (n=17) were in their second trimester, 28.6% (n=10) were in their third trimester and 22.8% (n= 8) were in the first trimester of pregnancy. The

women had received malaria information from several resources; 22.9% (n=8) from the health centre, and 22.9% (n=8) from community health workers.

**Table 1:** Demographic data (N=35)

<b>Ages of respondents</b>	<b>Minimum :18</b>	<b>Maximum: 39</b>	<b>Mean: 26.34</b>	<b>sd:5.201</b>
Trimester of pregnancy	First 22.9% (n=8)	Second 48.6% (n=17)	Third 28.6% (n=10)	
Recent malaria episode before current pregnancy	Yes 25.7% (n=9)	No 74.2% (n=26)		
Employment status	Employed 28.6% (n=10)	Unemployed 71.4% (n=25)		
Amount of money used per day	Less than 250fwr/day 5.7% (n=2)	More than 250 fwr per day 94.2% (n=33)		
Person(s) with whom pregnant women lived	Family 20.0% (n=7)	Live alone 2.9% (n=1)	Husband 74.2% (n=26)	Partner 2.9% (n=1)
Price of insecticide treated nets	From 1500 to 3000fwr 40.0% (n=14)	3500-6000 fwr 11.4% (n=4)	Did not respond 48.6% (n=17)	
Women's sources of malaria information	Radio Television Health centre Community health workers (HWs) Neighbours Authorities Church	31.4% (n=11) 8.6% (n=3) 22.9% (n=8) 22.9% (n=8) 2.9% (n=1) 2.94% (n=1) 2.94% (n=1)		

### Pregnant women's malaria preventive behaviours

Most pregnant women (80.0%; n=28), indicated that they slept under mosquito nets. Of the women, 54.2% (n=19) indicated that they possessed long-lasting ITNs and 54.2% (n=19) which were given to them by donors. Almost all respondents (97.1%; n=34) had health insurance.

**Table 2:** Pregnant women's malaria preventive behaviours (N=35)

Malaria preventive behaviour	Yes	No	No answer		
Sleep under a mosquito net	80.0% (n=28)	17.1% (n=6)	2.9% (n=1)		
Whether they buy insecticide treated bed nets (ITNs)	51.4% (n=18)	48.6% (n=17)			
The number of insecticide treated bed nets in the home	1 40.0% (n=14)	2 14.3% (n=5)	3 17.1% (n=6)	4 5.7% (n=2)	No one 22.9% (n=8)
Possession of long-lasting insecticide-treated bed nets	54.3% (n=19)	40.0% (n=14)	5.7% (n= 2)		
The number of long-lasting, insecticide-treated bed nets in their homes	1 28.6% (n=10)	2 17.1% (n=6)	3 8.6% (n=3)	More than 3 2.9% (n=1)	Not respond 42.9% (n=15)
Insecticide-treated bed nets (ITNs) received from donors	54.3% (n=19)	45.7% (n=16)	11.4% (n=4)		
The donors of ITNs	Health Centre 34.2% (n=12)	Friend 2.9% (n=1)	Others 2.9% (n=1)	No response 60.0% (n=21)	
Health insurance	97.1% (n=34)	2.9% (n=1)			
Type of health insurance subscribed to	RAMA 2.9% (n=1)	Health mutually 91.4% (n=32)	No response 5.7% (n=2)		
Recommended medications taken during pregnancy	Iron and foliate 37.1% (n=13)	Iron and foliate/ Vermox 22.9% (n=8)	Others not stated 40.0% (n=14)		
Who prescribed the medications	CHWs 17.1% (n=6)	Nurses 31.4% (n=11)	Pharmacist 11.4% (n=4)	No response 40.0% (n=14)	

Of the pregnant women, 97.1% (n=34) reportedly closed the doors and windows early in the evenings; 91.4% (n=32) dispersed stagnating water; 94.3% (n=33) removed discarded containers that might collect water; 88.6% (n=31) practised deforestation; 40.0% (n=14) sprayed their rooms with insecticides before going to bed; 91.4% (n=32)

lived away from marshy areas; 91.4% (n=32) screened all windows and doors in their houses, or at least the rooms where people slept.

**Table 3:** Environmental malaria preventive control measures (N=35)

<b>Environmental malaria preventive measure used</b>	<b>Yes %</b>	<b>Yes (n)</b>	<b>No %</b>	<b>No (n)</b>	<b>No answer (%)</b>	<b>No answer (n)</b>
Early closure of doors and windows	97.1	34	-	-	2.9	1
Removal of discarded containers that might collect water	94.3	33	2.9	1	2.9	1
Dispersal of stagnating water	91.4	32	-	-	8.6	3
Living away from marshes	91.4	32	5.7	2	2.9	1.
Screening all windows and doors in the house, at least in rooms where people slept	91.4	32	-	-	8.6	3
Practicing deforestation	88.6	31	5.7	2	5.7	2
Clearing vegetation from banks of streams so that water flows away speedily	85.7	30	2.9	1	11.4	4
Covering of arms and legs in the evening	65.7	23	31.4	11	5.7	2
Covering water tanks with mosquito nets or lids	42.9	15	11.4	4	44.7	16
Spraying insecticide in room before going to bed	40.0	14	42.9	15	17.1	6
Using mosquito repellent coils	40.0	14	40.0	14	20.0	7
Regularly spraying breeding areas	25.7	09	40.0	14	34.3	12
Using sand to fill in pools of stagnating water	22.9	08	37.1	13	40.0	14
Applying mosquito repellents to the skin	8.6	03	68.6	24	22.9	8
Introducing special fish in ponds that eat mosquito larvae	8.6	03	45.7	16	45.7	16



## DISCUSSION OF THE FINDINGS

### Demographic data

Respondents' ages ranged from 18 to 39. Of the respondents, 48.6% (n=17) were in the second trimester of their pregnancies, 28.6% (n=10) were in the third trimester and 22.9% (n=8) were in first trimester. Van Geertruyden et al., (2005:683) also reported that in Rwanda, only 5% of their respondents attended ANC during the first trimester of their pregnancies. Bardaji, Sigauque, Bruni, Romagosa, Sanz, Mabunda, Mandomando and Aponte (2008:5) reported that in Mozambique, few women attended ANC during the first trimester of their pregnancies, and ascribed this to a low social capacity for decision making and to sociological factors, such as a lack of knowledge about the risks of being sick during pregnancy.

The current study's respondents had received information about malaria and the prevention of malaria from various sources. Of the respondents, 31.4% (n=11) indicated that CHWs had received malaria information from the radio, the health centre (22.9%; n=8), and community health workers (22.9%; n=8). Dresser and Brewer (2008:1) argued that education is a critical part of prenatal health that plays an essential part in reducing prenatal health issues among vulnerable populations. Results from a study done by Van Geertruyden et al (2005:683), showed that over two thirds of the pregnant women in their study, had received information on malaria at the health centre or through the radio or from health educators.

### Precautions taken by pregnant women to prevent malaria

Most respondents took certain precautions to prevent malaria. The majority of the respondents (80.0%; n=28) slept under mosquito nets. This is in line with results of the study done by Van Geertruyden et al (2005:686), which showed that 81.7% of their pregnant respondents knew the importance of ITN protection, and benefitted from a 94.8% protection against malaria.

However, a study conducted in Eritrea by Habtai, Ghebremeskel, Mihreteab, Mufunda, Ghebremichael (2008:42), found that only 44.6% of the under-fives and pregnant women used ITNs. In the current study 54.3% (n=19) of the respondents possessed ITNs given to them by donors, and 34.3% (n=12) had received ITNs from the health centre. A study conducted in rural Kenya by Gikandi, Noor, Gitonga, Ajanga and Snow (2008:212) found that only 16.0% of pregnant women slept under nets obtained from a free mass distribution programme targeted at children under five. They found that distribution was the main source of nets, with the ANC clinic distributing 53.0% of the nets and only 22.0% being purchased from the retail sector.

Findings indicated that 54.3% (n=19) of the respondents in the current study had long-lasting ITNs in their homes. Research done by Otten, Aregawi, Were, Karema, Medin, Bekele, Gausi, Komatsu, Korenromp, Low-Beer, and Grabowsky (2009), established that in September 2006, Rwanda's Ministry of Health conducted mass distributions of long lasting ITNs nationwide to children under five when they had their measles vaccinations, and eight months after this campaign, 60.0% of these children were still using these ITNs. According to research carried out in Kinshasa, Pettifor, Taylor, Nku, Duvall, Tabala, Mwandagalirwa, Meshnick and Behets (2009:26), estimated that approximately three long lasting ITNs were needed to cover a household of five people.

Most respondents in the current study (97.1%, n=34) had health insurance. Otten et al. (2009) found that the introduction of health insurance schemes, the resolution of civil conflict and the improvement of health services contributed to the decline of in-patient and out-patient laboratory confirmed malaria cases which occurred concurrently with increased in-patient and out-patient non-malaria cases between 2001 and 2005.

Maekawa, Aonuma, Nelson, Yoshimura, Tokunaga, Fukumoto, & Kanuka (2011:4) observed that the nocturnal blood feeding patterns of the Anopheles mosquitoes were consistently higher between 22:00 and 06:00. Findings of the current study showed that most respondents took some precautions to prevent malaria. Of the respondents 97.1% (n=34) closed doors and windows early, 94.3% (n=33) removed discarded containers that might collect water, 91.4% (n=32) dispersed stagnating water, 91.4% (n=32) lived away from marshy areas, 91.4% (n=32) screened windows and doors in their houses, or at least in rooms where people slept, 88.6% (n=31) practised deforestation, 62.9% (n=22) indicated that they covered their arms and legs in the evening, 40.0% (n= 14) used mosquito repellent coils, 25.7% (n=9) regularly sprayed mosquito breeding areas. Only 8.6% (n=3) of the pregnant women applied mosquito repellents to their skins. In the study conducted in Eritrea by Habtai et al. (2008:42), 80.0% of their respondents participated in environmental preventive control measures. Seventy-five percent (75.0%) of the respondents knew more than three measures (filling, cleaning, draining, and levelling of the breeding sites), 4.8% knew one measure, 8.0% knew two, and 12.0% did not know any environmental preventive measures. According to Osamor (2010:444), houses with open eaves and those lacking ceilings are more associated with mosquito breeding than those with closed eaves and ceilings. A study conducted in northwest Tanzania by Mazigo, Obasy, Mauka, Manyiri, Zinga, Kweka, Mnyone and Heukelbach (2010:5), found that 86.0% of their respondents accepted that indoor residual spraying (IRS) killed mosquitoes, but only 17.0% mentioned that it protects them from malaria. Enato, Okhamafe and Okpere,(2007:35) found that 63.0% of the pregnant women in their study frequently used mosquito repellents as a measure to combat malaria, which is far higher than the 8.6% reported by respondents of the current study.

## CONCLUSION

The purpose of this study was to evaluate the effectiveness of malaria health education given to pregnant women by nurses at one healthcare centre in Kigala, Rwanda.

The majority of the respondents knew which environmental strategies could reduce malaria, such as closing windows and doors early at dusk and dawn, disposing of containers which might trap water, dispersing stagnant water, living away from marshes, screening doors and windows, deforestation of vegetation especially on river banks. However only 25.7% (n=9) were aware of spraying mosquito breeding areas regularly. Personal strategies, such as the use of mosquito repellent coils and the application of insect repellent to the skin, were unfamiliar to many respondents, and these aspects should be emphasised during health education efforts. Of the respondents, 28.6% (n=10) used medications (iron, folate and vermox) provided by community health workers and 48.6% (n=17) received information about malaria from community health workers. However, malaria health education could be improved, particularly in respect of personal strategies that can be used on their skin and within their living areas, thus further promoting the health of individuals, families and the population. Although most pregnant women in the study knew about environmental strategies to prevent malaria, they require more information about personal strategies. Future health education efforts should address these aspects.

## RECOMMENDATIONS

Based on the findings of this study, recommendations will be provided pertaining to the Rwandan Ministry of Health, the health district, the healthcare centre, the pregnant women and their families as well as for future research endeavours.

### The Ministry of Health

It is recommended that Rwanda's Ministry of Health should improve strategies relating to integrated maternal and child healthcare to improve the lives of women and children by decreasing the incidence and prevalence of malaria:

- increase involvement of community health workers (CHWs) and community case management (CCM)
- address malaria prevention and control within the maternal and child health services
- increase community awareness and strengthen linkages between communities and healthcare facilities
- implement written policies to improve malaria health education messages provided to pregnant women
- implement a clear policy on the use of ITNs during pregnancy

## **Selected health district**

It is recommended that the selected health district should

- ensure that the community health workers have correct information on the prevention of malaria
- facilitate and support ongoing advocacy efforts targeting national and district level stakeholders, including policy makers, programme managers, health workers and community leaders

## **Health centre**

It is recommended that the health centre should:

- arrange visits to families in the area to ensure they all have usable ITNs because the ITNs might be torn or not be re-treated with insecticides
- provide health education to pregnant women regarding the importance of attending ANC clinics and of using ITNs for themselves and their children
- strengthen the capacity of community health workers, thus helping them to bridge the link between communities and health facilities to improve health outcomes for pregnant women and their children

## **Pregnant women and their families**

It is recommended that pregnant women should:

- improve the conditions in their houses by putting mosquito nets/gauze in doorways and windows and taking steps to prevent the breeding of mosquitoes
- sleep under ITNs
- make sure they have health insurance
- attend ANC clinic from the first semester of pregnancy
- apply insect repellent to their skin at night

## **Future research**

Future research should:

- assess knowledge, attitudes and practices of pregnant women living in malaria areas at PHC facilities and at community level
- conduct comparative studies on the effectiveness of malaria health education given to pregnant women by nurses in other countries
- conduct qualitative studies about the effectiveness of malaria health education given to pregnant women by nurses at health centres in Rwanda.
- explore other aspects, such as traditional practices, that might help prevent malaria among pregnant women

## LIMITATIONS

The findings of the study cannot be generalised as the sample size was small and only one community health centre in Rwanda participated in the study. The respondents (pregnant women) did not offer any opinions about the malaria health education they had received. This might have been possible if a mixed methods or qualitative approach had been used to collect data for the study.

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