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Pregnant Women's Malaria Knowledge in Ebonyi State, South-East Nigeria

Lois N. Omaka-Omari, PhD* Ignatius O. Nwimo, PhD

Department of Human Kinetics and Health Education, Ebonyi State University, PMB 53, Abakaliki, Ebonyi State, Nigeria.

* E-mail:nnennaomaka@gmail.com

Abstract
The study aimed at investigating knowledge of malaria among pregnant women in Ebonyi state, South-east Nigeria. The cross-sectional survey research design was adopted in the study. Stratified sampling technique was used in selecting 504 pregnant women attending antenatal clinic in 12 hospitals in the state. A face validated, self constructed questionnaire which was subjected to a reliability test using Kuder Richardson Formula 20 (K-R 20) yielded a reliability value of 0.94. Percentages were used for analysis for the purpose of describing the data and chi-square statistic was used for the purpose of testing hypotheses. Results of the study showed that pregnant women had high (64.90%) level of knowledge regarding malaria. However, a good proportion of the pregnant women specifically had misconception about the cause of malaria and its mode of transmission. The pregnant women significantly differed in the knowledge of malaria with those having post secondary education (70.70%) showing better knowledge, followed by those with secondary (66.10%), primary (63.09%) and non-formal (55.70%) education. Location of residence was significantly associated with knowledge of malaria with those living in the urban area demonstrating better knowledge than those in the rural area. The high level of malaria knowledge among the women should be sustained through constant malaria health education interventions for pregnant women in the state. Intervention efforts should focus on rural pregnant women and formulated to accommodate the less educated members of this group as well as address misconceptions about the cause of malaria.
Keywords: Malaria, Knowledge, Pregnant women, Ebonyi state

1. Introduction

Malaria remains a major health challenge to mankind all over the world. This is tied to the report that over three billion people in the world stand the risk of having malaria (World Health Organization-WHO, 2013). Despite local and international efforts towards the prevention of the disease, the rate at which people become sick and eventually die as a result of malaria is yet to be desired (Adebayo, Akinyemi, & Cadmus, 2015). In 2010 alone it was reported that about 216 million cases of malaria occurred all over the world, out of which 655,000 deaths were recorded. This report further revealed that 81% of the occurrence and 91% of those that died were recorded from sub-Saharan Africa (WHO, 2011).

Malaria is a major killer disease especially in sub-Sahara Africa where the most deadly of the species, plasmodium falciparum, dwells (WHO, 2014). Nigeria is one of the countries in Africa where the disease is endemic with the number of episode equal to 25% of all reported cases of malaria in the 45 countries of Africa where the disease is most prevalent (WHO, 2008). The incidence of malaria and associated deaths in Nigeria is reportedly far more than those of any country in the world. This statement was underscored by the report that about 97% of people in Nigerian stand the risk of having malaria; and that an estimated 100 million cases and 300, 000 deaths of malaria occur every year in the country (United States Embassy in Nigeria, 2011).

Malaria which is described as a febrile illness (WHO, 2003) can affect everyone, but pregnant women are known to have higher risk for the disease with more grievous consequences. Malaria during pregnancy is accountable for an approximately 11% of maternal mortality in Nigeria (United States Embassy in Nigeria, 2011). Despite the serious health consequences and high rate of the disease in most developing countries, Society for Youth Awareness and Health Development (SYAHD, 2003) observed that there was lack of adequate knowledge of malaria especially in regions where the prevalence of the disease is high.

Knowledge is one of the important elements in any effort targeted towards the reduction of disease burden such as malaria (Minnesota Health Improvement Partnership Social Conditions and Health Action Team, 2010). Tyagi, Roy, and Malhotra (2005) reported that the failure to establish the level of knowledge of community members regarding malaria appeared to be responsible for the inability of intervention programmes to achieve sustainable control. Consequently, every woman is expected to possess an appreciable level of knowledge of the

cause, breeding sources, and mode of transmission, symptoms, consequences and prevention for successful eradication of the disease in any given community. This is because women have been recognized as the closest members of the family responsible for the health care of children and other members of the family. They have been referred to as key persons and managers of the home. It is therefore necessary women to possess adequate knowledge about diseases including malaria in order to protect the family members from the scourge of the disease.

Some socio-demographic factors are known to influence the understanding of malaria in women who are pregnant. The factors which are likely to influence the understanding of malaria among pregnant women include education and location where the women live (Sharma, Bhasin & Chaturvedi, 2007). High level of formal education is known to increase the level of general knowledge and hence may positively influence healthy behaviour (Antwi, 2010). Similarly some cultural beliefs and myths about illness perception often prevalent in many rural settings are likely to influence knowledge of malaria among rural dwellers. Evidence (Sharma, Bhasin & Chaturvedi, 2007) has shown that urban residents are significantly more knowledgeable than slum and rural residents. In Ebonyi state there are both rural and urban settlements, a comparison between urban and rural dwellers might offer valuable facts in years to come for planning, designing and executing programmes aimed at malaria prevention which, according to Ogbodo, Nwagha, Okaka, Ogenyi, Okoko and Nwagha (2009), is already a serious health challenge in the state.

Most Ebonyi people, including women are highly involved in agricultural activities, which encourage the breeding of mosquitoes and consequently malaria infection. It is not an over statement to state that malaria has numerous negative outcomes which may include huge financial involvement translating into poor standard of life, hospital visitations as well as low productivity and lost of income (Erhun, Agbani, & Adesanya, 2005). Sequel to this, the Ebonyi State Government in collaboration with Roll Back Malaria (RBM) in February 2011 took positive steps to reduce the spread of malaria in the state. The action involved house to house distribution of Insecticide Treated Nets (ITNs) to mothers. However, after the distribution of the nets, a casual discussion with some of the recipients revealed that the act of distributing the net was seen as a political programme, and the nets were seen as gifts from politicians rather than a malaria prevention venture. A few of discussants also indicated they would keep the nets until rainy season before using them. This observation made on the women tend to suggest a possible gap in malaria knowledge, which according to Sharma, Bhasin and Chaturvedi (2007), plays an important role in the overall success of any malaria control and prevention programme. Inferring from the observation there was, therefore, need to establish the local knowledge about malaria in order to appropriately carry out traditionally acceptable, enduring and efficacious malaria programmes in the state. To the best of the researchers' knowledge, study on knowledge of malaria among the target population has not been established and thus formed the locus for the present research endeavour.

The discussion of issues concerning malaria as in this study like any other communicable disease could be conveniently guided by the basic epidemiological format essentially for understanding of communicable disease. Benensen (1975) presented this format as consisting of the definition or meaning of the disease, the causative agent or organism, the manifestations or signs and symptoms, the mode of transmission and the preventive and control measures. This format was adapted in this study in determining the level of knowledge of the pregnant mothers regarding malaria. The adaptation was based on the removal of meaning of malaria and the inclusion of breeding sources and consequences of malaria. This adaptation was necessary considering the locale the research was conducted.

The study, therefore, determined the level of knowledge of malaria possessed by pregnant women in Ebonyi state, South-east Nigeria. Two null hypotheses were tested as follows:

1. There is no significant difference between the level of knowledge possessed by urban and rural pregnant women in Ebonyi state.
2. There is no significant difference between the level of knowledge possessed by the pregnant women in relation to level of education.

2. Description of Ebonyi State

Ebonyi State was formerly part of old Enugu and Abia states. The state was created in 1996 with a land mass of 5,932sq.km and lies approximately $7^0$3'N longitudes 54'E and 645'E (Ebonyi State House of Assembly, 2006). It is boarded in the East by Cross River state, in the North by Benue state, in the West by Enugu state and in the South by Abia state. Ebonyi state has a population of about three million people going by the 2006 population census (Ebonyi State Government, 2011). The state is richly blessed with savannah and semi tropical

vegetations; humid, sandy and dotted marshy soil. Ebonyi State grows different types of cash and food crops like yam, rice, cassava, cocoyam, oranges, mango and pear, among others (Ebonyi State Government, 2011). Agriculture is the main stay of the economy and women just like the men are essentially farmers with relatively fewer civil servants, industrialists, students and business women (Ebonyi State House of Assembly, 2006). The state is also highly dominated by rural settings, while Abakaliki the state capital, Onueke and Afikpo are the only urban centres. Ebonyi State has thirteen local government areas. Each of the local government areas has at least one general hospital.

It is worthy to note that the high agricultural activities among the people coupled with humid environment may have accounted for the reported high prevalence of malaria in the state. Furthermore, the estimated few civil servants and industrialists suggest that the state possibly has more women who are not educated than the educated which may likely affect their knowledge of malaria. These facts underscore the need for the present study and the selection of Ebonyi State as the area of study.

3. Methods

The cross-sectional survey research design was adopted for the study which was carried out in Ebonyi State, Nigeria. The population for the study comprised a total of 1278 pregnant women, who registered for antenatal clinics per week at the fourteen government-owned and three mission-owned hospitals in the state for the month of February, 2013. The government owned hospitals included general hospitals in Owutu Edda, Okposi, Onicha, Itimukwu, Ishiagu, Iboko, Ezzamgbo, Odomoke and Elunwobvu. Others are Agba, Igboji-Ikwo, Umuezeoka, Onueke and Federal Teaching Hospital Abakaliki (FETHA). The three mission hospitals were Marter Mesericordia Hospital Afikpo, Mile Four Hospital Abakaliki, and Presbyterian Joint Hospital, Uburu. However sampling was conducted using the stratified sampling technique. The 17 hospitals were grouped into urban and rural location using stratified sampling technique. Due to the limited number of urban settings and consequently few general hospitals in the urban area, the four hospitals in the urban were selected for the study while simple random sampling technique was used to select eight (70%) government hospitals in the rural area. Finally, stochastic sampling was used to select the first 42 pregnant women in attendance for antenatal supervision on the day of data collection in each of the sampled hospitals. Thus from each of the 12 selected hospitals, 42 pregnant women were chosen and this resulted in a total sample of 504 pregnant women

3.1 Instrument

The researchers used a self-developed questionnaire, the knowledge of malaria questionnaire (KMQ), which consisted of 39 items arranged in two sections; A and B. Section A, contained two questions about the level of education and location of residence of the participants. Section B, consisted of 37 true or false option items on knowledge of malaria of which 7 enquired about causes of malaria, 6 enquired about breeding sources, 4 enquired about mode of transmission, 5 enquired about symptoms, 6 enquired about consequences and 9 enquired about prevention of malaria.

Five experts in health education from Ebonyi State University were used for validating the KMQ. Thirty pregnant women attending antenatal clinic at a Community Health Center in a neighboring Enugu state were used for test of reliability. The data yielded a Kuder Richardson Formula 20 (K-R 20) reliability coefficient of 0.94. The reliability coefficient was higher than Ogbazi and Okpala's (1994) criteria of 0.60 acceptable for good instruments.

3.2 Data Collection

Approval gained from hospital authorities helped the researchers gain access to the respondents and to personally administer the questionnaire to 504 pregnant women. In order to ensure that the women responded willingly, a brief note of consent soliciting their compliance accompanied the questionnaire. The researchers employed fifteen research assistants who were helpful in the administration of the KMQ and interpretation of the instrument to the women in their local dialects. Administration of the questionnaire by the assistants was closely supervised by the researchers and completed copies of the questionnaire were collected on the spot.

3.3 Data Analysis

The completed copies of the KMQ were examined for completeness of responses. Out of 504 copies of the KMQ administered, 100% return rate was achieved and used for analysis of data. In describing the participants'

knowledge of malaria, a proportion of less than 20% correct responses was considered 'very low' level of knowledge; 21-39%, 'low'; 40-59%, 'moderate'; 60-80%, 'high', and above 80%, 'very high' level of knowledge (Ashur, 1977; Okafor, 1997). Chi-square statistic was used to analyze data in order to ascertain the differences in knowledge of malaria with level of education and location of residence as independent variables. An alpha level of 0.05 was set for chi-square test. All data analyses were done with Statistical Package for Social Sciences (SPSS) Version 20.0 for Windows.

4. Results

Table 1: Description of level of malaria knowledge among pregnant women in Ebonyi state

S/N	Variables	% Correct Responses	Decision
	Causes		
1	Witchcraft/evil spirit	64.68	High
2	Taking much of oily food	47.82	Average
3	Poisoned food	55.36	Average
4	Plasmodium parasite	78.97	High
5	Exposure to sun light	35.12	Low
6	Taking much of egusi (melon) soup	44.05	Average
7	Malaria has no known cause	74.01	High
	Mean %	**57.14**	**Average**
	Breeding sources		
8	Empty containers	59.52	Average
9	Dirty places like gutters	79.76	High
10	Stagnant water	77.98	High
11	Bushes	79.76	High
12	Irrigation	63.49	High
13	Mosquito has no special breeding site	58.73	Average
	Mean %	**69.87**	**High**
	Mode of transmission		
14	Drinking of contaminated water	41.27	Average
15	Mosquito bite	78.77	High
16	Mother to unborn baby	75.20	High
17	Blood transfusion.	59.13	Average
	Mean %	**63.59**	**High**
	Symptoms		
18	Severe head ache	77.58	High
19	Fever	79.96	High
20	Body ache	69.84	High
21	Vomiting	69.44	High
22	Pain in the joints	61.31	High
	Mean %	**71.63**	**High**

	Consequences		
23	Maternal anaemia	68.65	High
24	Low birth weight babies	72.62	High
25	Jaundice in new born babies	64.88	High
26	Abortion	61.11	High
27	Death of the mother	64.88	High
28	Malaria has no consequence	41.48	Average
	Mean %	**62.27**	**High**
	Prevention		
29	Clearing of stagnant water	68.85	High
30	Sprinkling of kerosene	41.87	Average
31	Use of ITN.	80.19	Very High
32	Receiving IPT	70.44	High
33	Effective malaria treatment	78.96	High
34	Using anti-mosquito spray	74.80	High
35	Clearing of empty cans	65.28	High
36	Taking of herbal drugs	48.21	Average
37	Malaria has no preventive measures	56.55	Average
	Mean %	**65.02**	**High**
	Overall Percentage Mean	**64.90**	**High**

Table 1 shows that while pregnant women have average (57.14%) knowledge of the causes of malaria, their knowledge was high (69.87%) with respect to breeding sources, mode of transmission (63.59%), symptoms (71.63%), consequences (62.27%) and prevention (65.02%). As regards specific aspects of malaria components, women demonstrated 'average' to 'very high' levels of knowledge in all the variables concerning signs/symptoms, mode of transmission, consequences and prevention of malaria. However, a good proportion of the pregnant women have misconceptions about the cause and mode of transmission of malaria. Some of the notable misconceptions are that sunlight (63.5%), poisoned food (45.2%), egusi (melon) soup (44.6), and oily food (52.8%) cause malaria. About 58.7% of them believe that malaria can be transmitted through drinking contaminated water.

Table 2: Chi-square analysis on malaria knowledge among pregnant women based on level of education

S/N	**Variables**	**NFE (n = 79) % correct**	**PE (n = 141) % correct**	**SE (n = 181) % correct**	**PSE (n = 103) % correct**	χ^2-cal	**p-value**
1	Causes	57.14	52.58	53.59	69.63	78.11	0.000
2	Breeding Sources	56.75	68.56	71.45	78.96	11.25	0.735
3	Mode of Transmission	50.00	61.52	68.92	67.48	20.56	0.015
4	Symptoms	55.44	73.76	77.90	70.10	19.94	0.068
5	Consequences	54.01	59.81	65.84	65.69	48.68	0.000
6	Prevention	57.67	65.09	64.70	71.09	55.66	0.002

Key: NFE = No formal education, PE = Primary education, SE = Secondary education, PSE = Post secondary education

Table 2 shows that the level of knowledge possessed by women of different levels of education differs significantly with regard to causes of malaria, breeding sources, symptoms, consequences and prevention of malaria but does not differ significantly ($p > 0.05$) with regard to mode of transmission of malaria.

Table 3: Chi-square analysis on malaria knowledge among urban and rural pregnant women

S/N	Variables	Urban (n = 171) % correct	Rural (n = 333) % correct	χ^2-cal	p-value
1	Causes	66.58	54.65	4.39	0.625
2	Breeding Sources	67.84	70.07	3.66	0.599
3	Mode of Transmission	62.87	63.29	4.52	0.211
4	Symptoms	73.80	72.49	0.812	0.937
5	Consequences	64.81	62.21	11.09	0.05
6	Prevention	67.97	63.43	21.98	0.000

Table 3 shows that the level of knowledge possessed by women living in the urban and rural areas differs significantly with regard to consequences and prevention but does not differ significantly with regard to causes of malaria, breeding sources and mode of transmission of melanin.

5. Discussion

The overall high level of malaria knowledge recorded among the pregnant women was encouraging. This result indicated that the knowledge of pregnant women about malaria has improved tremendously over the years compared to the low levels of malaria awareness among pregnant women in Ebonyi State (Agu & Nwojiji, 2005). This improvement in knowledge could be attributed to the Radio-Malaria Information Programme organized by the Ebonyi State Ministry of Health which accompanied the house to house distribution of Insecticide Treated Bed Nets (ITN) in 2011. This finding is consistent with those of previous studies (Andargie, Abraham & Berhanu, 2013; Obol, Lagoro, & Garimoi, 2011; Akabi, Otubu, Agida, & Onafowo, 2013). Results from these studies indicated that women's level of malaria knowledge was very good, high and adequate respectively. Andargie, Abraham and Berhanu (2013) in a cross-sectional survey conducted in 2011 reported that understanding of the aetiology, mode of spread and avoidance actions of malaria was high among the study group. Although this study did not strictly involve pregnant women, it is obvious that pregnant women form part of any community, hence their import could be attributed the appreciable understanding of malaria indicated in the study. Akabi, Otubu, Agida, and Onafowokan (2013) which investigated the knowledge and utilization of malaria preventive measures among pregnant women at a tertiary hospital in Nigeria's Federal Capital Territory (FCT) reported that pregnant women's knowledge of malaria and its preventive measures was 71.5% indicating high level of knowledge.

The findings of the present study did not agree with those of Sabin, Rizal, Brooks, Singh, Tuchman, Wylie, Joyce, Yeboah-Antwi, Singh and Hamer (2010); Jombo, Araoye, and Akpare, (2011). Sabin, Rizal, Brooks, Singh Tuchman, Wylie, Joyce, Yeboah-Antwi, Singh and Hamer (2010) reported that women had partial understanding regarding mode of transmission, prevention and consequences of malaria. Jombo, Araoye, and Akpare (2011) in a one year malaria knowledge survey conducted in West Africa reported that malaria knowledge was low among their respondents. The low level of malaria knowledge they reported was attributed to low literacy level among the study population. In contrast, the improved government attention towards education in Ebonyi State may have increased the quality of education and number of educated members of the State with the consequent positive impact on malaria knowledge as reported in the present study.

Despite the high level of knowledge recorded in this study, the level of misconceptions about the cause and mode of transmission of malaria demonstrated by the women is an indication that knowledge gap about these elements of malaria still exists among pregnant women in Ebonyi State like in other malaria endemic countries of Africa. For example findings from other related studies reported that pregnant women misconceived the cause

of malaria to include cold weather, cold food (Obol, Lagoro, & Garimoi, 2011), breathing bad air and sleeping with a malaria patient (Wagkari & Ahmed, 2009), hunger, and chewing maize stalk (Andargie, Abraham & Berhanu, 2013). This suggests that there could be need for women to have clear understanding that plasmodium parasite transmitted by the female anopheles is the only cause of malaria. This is imperative since women's knowledge about the cause of malaria has significant role to play on practice of malaria preventive measures (Nuwaha, 2002). Akaba, Otubu, Agida and Onafowokan (2013) observed that misconceptions are capable of engendering negative influence on malaria control efforts as energy and resources targeted towards malaria control and prevention could be channelled in the wrong direction by misconceived individuals. It is also likely to cause lack of willingness to accept malaria preventive measures and practices on the part of such persons.

Furthermore, the overall significant association of education on level of knowledge of malaria as observed in the present study suggests greater need for even more specialized malaria education for pregnant women of lower education levels in the state. This report is consistence with most studies on malaria carried out in other parts of Africa (Mazigo, Obasy, Mauka, Manyiri, Zinga, Kweka, Mnyone, & Hackleback, 2010; Akinleye & Ajayi, 2011; Akaba, Otubu, Agida, & Onafowokan, 2013). In these studies significant association between knowledge of malaria and educational status was reported. Women with higher level of education showed better cognition of various aspects of malaria. Result of the present study therefore supports the assertion of Tresserras, Canela, Alvarez, (1992) that high literacy level is needed to function adequately in the society and that literacy level empowers people to accept health-related information or ideas.

The overall significant difference observed in the study with respect to malaria knowledge among urban and rural pregnant women indicated that rural pregnant women still have need for higher malaria education, prevention and control programmes. This result was rather surprising as the researchers expected a no significant difference among urban and rural women. The reason being that the distribution of ITNs and malaria education intervention programmes in the State started in the rural areas years before the general distribution and radio programme in 2011. Thus, there was a relatively higher level of attention of the State Government and ministry of health towards those in the rural areas in relation to malaria eradication programmes. It was therefore, expected that these interventions could have adequately improved malaria knowledge among rural women in the state. However, the result of the present study is not misleading as this differing level of knowledge could be attributed to beliefs and myths about illness perception which Sharma, Bhasin, and Chaturvedi (2007) opined could influence malaria knowledge and practices among rural dwellers. In deed most of the misconceptions about the cause of malaria in this study was observed more among the rural women, indicating strong influence of cultural beliefs and myths. Besides, the high educational levels associated with urban dwellers, may have also contributed to the superior knowledge as demonstrated by urban pregnant women in the study.

6. Conclusion

Generally, knowledge of women about malaria in the study was high. This is quite interesting as it suggests the positive effect of the malaria education programme given to the masses through the radio malaria programme. It also underscores the gains of the combined efforts of the RBM Initiative and the state government towards malaria eradication in the state. However the moderate level of knowledge with respect to the cause of malaria and the subtle existence of misconceptions about the cause and mode of transmission of malaria as seen among the pregnant women apparently remain a threat to malaria prevention and eradication in the state. This situation if not addressed might continue to hinder preventive efforts. This implies that instead of pregnant women to concentrate on scientifically approved means of preventing malaria, efforts will be geared towards fighting witch craft, avoidance of egusi (melon) soup and exposure to the sun. There is therefore the need for a more effective malaria education programme which should aim at addressing these misconceptions as well as emphasize the true cause of malaria. Health education is paramount to this effect. Health education is an important aspect in disease control efforts, especially for malaria, which could be avoided and remedied (Susanta, Rajan, Satyanaranyuan, & Aditya, 2006). Further, the significant association of both education and location on knowledge of malaria indicates the need for an improved malaria health education intervention package which should focus on enhancing the knowledge of women in the rural areas as well as those with lower level of education.

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