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Knowledge and Practice of Malaria Control Measures among Women Attending Antenatal Clinics in Abakaliki, Nigeria

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Abstract

Background: *Pregnant women, children and immune-compromised persons are highly vulnerable to malaria morbidity and mortality. Malaria accounts for about 50% of all clinic attendance in Nigeria and contributes significantly to anaemia in pregnancy, low birth weight, preterm births, still births and perinatal mortality. It is therefore imperative that these highly susceptible groups of people are adequately informed and supported for prevention of malaria at all times. This study assessed the knowledge and practice of malaria control measures among Antenatal Care attendees in Abakaliki.*

Methods: *A descriptive cross-sectional study was conducted in the two biggest hospitals in Abakiliki, among 400 Antenatal Care attendees selected using systematic sampling technique. Data was collected using interviewer administered questionnaire and analyzed using Statistical Package for Social Sciences version 22. Chi-square was used to test for associations between independent and dependent variables. The significance level was set at $p< 0.05$.*

Results: *The mean age of respondents was 29.2 ± 4.1 years. Majority correctly identified methods of diagnosis of malaria in pregnancy. Although 375(93.7%) of the women constantly owned a long-lasting insecticide treated net, only 187(49.9%) of them always slept under it. While 363(90.7%) of the respondents cleared their surrounding bushes, only 130 (32.5) regularly used in-door insecticide spray and 153(38.3%) always used anti-malaria prophylaxis in the index pregnancy.*

Conclusion: *Knowledge about malarial control measures was high but use of Long-Lasting Insecticide Treated Net with drug prophylaxis was suboptimal. It is therefore recommended that health education on malaria prevention practice be intensified during Antenatal clinic visits.*

Keywords: *Knowledge; practice; malaria control measures; ANC attendees; Abakaliki*

Introduction

Malaria is a preventable systemic protozoan infection. It accounts for 1.5 – 2.7 million deaths globally per annum and exerts enormous socio-economic burden in many developing countries.[1] In 2018, about 228 million cases of malaria and 405,000 deaths from the disease occurred worldwide, and the total funding by governments of malaria endemic countries and international partners was US$ 2.7 billion for its control and elimination efforts.[2] Most malaria cases (213 million or 93%) and deaths (94%) in 2018 occurred in the World Health Organization (WHO) African Region.[2]

Malaria infection during pregnancy (MIP) is a significant public health problem, with substantial risks for the pregnant woman, her fetus and the newborn child. Pregnant women are three times more likely to develop severe malaria disease than non-pregnant women acquiring infections from the same area. While the mechanism is poorly understood, pregnant women have a reduced immune response and therefore less effectively clear malaria infections. In addition, malaria parasites sequester and replicate in the placenta.[3] Maternal anaemia, a consequence of MIP, puts the mother at increased risk of miscarriage, death before and after childbirth and leads to preterm births and children of low weight at birth, causing problems with child growth and cognitive development, as well as being major risk factors for perinatal, neonatal and infant mortality.[1,3]

To avert the consequences of malaria infections to pregnant women, fetuses, infants and children, WHO recommends the use of Intermittent Preventive Treatment in pregnancy (IPTp) with sulfadoxine-pyrimethamine (SP), in combination with vector control and prompt diagnosis and effective treatment of malaria, as part of antenatal care (ANC) in areas of moderate to high transmission in sub-Saharan Africa.[2] By 2018, about 30% of pregnant women received three doses of IPTp[2] compared with 13% of pregnant women who received at least two doses of SP during antenatal consultations in 2010 and 5% who did so in 2008.[1] The WHO in 2012 reported that between 2008 and 2010, 31% of children under-five years and 36% of pregnant women in rural areas nationwide used Long Lasting Insecticide Treated Net (LLIN) the night before the survey, representing a six and nine fold increase respectively.[4]

In Nigeria, the ecological conditions, poor socio-economic factors and lack of access to effective preventive and curative health care delivery services compound malaria burden. The disease is transmitted throughout the country, with 76% of the population living in high transmission areas.[5] In 2018, Nigeria accounted for 25% of the global malaria cases and 24% of global deaths from the disease.[2] The National Malaria Strategic Plan (NMSP 2014-2020) targets for MIP include that at least 80% of pregnant women would sleep inside Insecticide Treated Nets (ITNs) by 2020, all eligible pregnant women attending ANC received at least three doses of SP-IPTp by 2020 and that by 2017, 80% of pregnant women with fever and malaria received appropriate and timely treatment according to the national treatment guidelines, and 100 percent received appropriate and timely treatment according to the national treatment guidelines by 2020.[5] Success in the control of malaria in the country is dependent in part on the knowledge and practices of the populations in the affected areas and on the past and present national policies on the treatment and control of malaria.[6] This study therefore assessed the knowledge and practice of malaria control measures

among ANC attendees in the two biggest hospitals in Abakaliki, Nigeria.

Methods

A descriptive cross-sectional study was conducted among antenatal care attendees in Abakaliki between October and November 2019. The minimum sample size was determined using the formula for single proportion[7] to get 384 but rounded-up to 400, and selection was by systematic sampling technique using serially numbered cardboard papers given to the women by the nurses on their arrival at the clinics. The ANC clinics are run on Mondays to Fridays with over 90 women in attendance each day. Using sampling interval of three (based on the average daily clinic attendance of 90 and estimated 30 respondents per day) with the starting point determined by balloting between one and three, about thirty participants were selected each day over a four-week period. Those that did not give consent were replaced by the next available person without altering the original sampling interval flow. Only those that had had at least one previous ANC attendance were sampled.

Data was collected using a pre tested, semi-structured interviewer administered questionnaire. Good knowledge of control measures was assessed by the proportion of respondents who correctly answered 50% of the knowledge questions. Practice was assessed by the proportion of respondents who answered correctly the questions on practice. Statistical Package for Social Sciences (SPSS) version 22 was used for analysis. Chi-squared was used to test for associations between independent (age, marital status, level of education and occupation) and dependent (ownership of LLIN, sleeping under LLIN, clearing bushes and stagnant water, and use of in-door insecticide spray) variables with significance level set at $p< 0.05$. Ethical approval was obtained from the Research and Ethics Committee (reference No. FETHA/REC/Vol.1/2014/205) of the Federal University Teaching Hospital Abakaliki (FETHA) , Ebonyi State, Nigeria. Informed consent was obtained from the ANC attendees after full explanation of the study to them. Only those who gave their consent by signing the informed consent form participated in the study.

Results

A total of 414 women were approached but 400 gave consent and were interviewed, giving a response rate of 96.6%. The mean age of respondents was 29.2 ± 4.1 years with majority; 320(80.1%) being within 25-34 years age group. A large proportion of them; 160(40.0%) attained tertiary education, and they were predominantly; 178(44.5%) civil servants. Table 1.

In Table 2, large proportions; 359(89.7%) and 283 (70.7%) of the respondents correctly identified that MIP can be diagnosed by either testing for malaria parasite in the laboratory or by use of rapid diagnostic test respectively. Also 241(60.3%) of the respondents agreed that MIP can be diagnosed by the symptoms felt by the patients. However, a large proportion of respondents; 362(90.5%) erroneously thought that regular attendance of ANC alone is adequate to prevent MIP rather than administration of SP and practice of IPT. Only 71(17.8%) of the respondents knew that only ACT is currently recommended for the treatment of malaria in pregnancy rather than chloroquine or herbal medicine.

Table 3 shows that almost all the respondents knew that malaria can be controlled by sleeping regularly under insecticide treated nets; 389(97.2%), clearing of surrounding bushes; 383(95.7%) and emptying stagnant water

in containers and drainages; 382(95.5%). In Table 4, most of the respondent; 375(93.7%) always owned a long-lasting insecticide net but only about half; 187(49.9%) of them always sleep under it. Majority; 363(90.7%) of the respondents cleared their surrounding bushes, while only 130(32.5%) always used in-door insecticide spray, and few 78(19.5%) always used anti-malaria prophylaxis prescribed in the index pregnancy.

In Table 5, ownership of LLIN was highest; 306(82.7%) in the 25-34 years age-group but fewer of them; 147(48.7%) always slept under the nets, while out of the 26(7.0%) of those that owned LLIN in the 15-24 years age-group greater proportion, 21(80.8%) always slept under the nets. These differences were statistically significant ($P \leq 0.001$ and $p = 0.001$ respectively). Most; 356(96.2%) of the married respondents owned LLIN and about half; 181(50.8%) slept under them. More, 10(62.5%) of those that slept under their LLIN had primary education compared to those with tertiary level, a difference that was statistically significant ($P = \leq 0.001$). In Table 6, there was statistically significant association ($P \leq 0.001$) between marital status and clearing of bushes/stagnant water with majority of the married participants; 341(95.3%) always clearing bushes/stagnant water compared to their single and separated counterparts. There was also a statistically significant association between occupation and use of in-door insecticide as it was predominantly the civil servants; 68(52.3%) and teachers; 29(22.3%) who practiced indoor insecticide spraying ($p \leq 0.001$).

Table 1: Socio-demographic characteristics of the respondents

Variables	Freq.(n=400)	Percentage
Age group (in years)		
15-24	35	8.8
25-34	320	80.0
35-44	45	11.2
Marital status		
Married	373	93.3
Divorced or widowed	14	3.5
Single	13	3.2
Religion		
Christianity	329	82.3
Islam	71	17.7
Ethnicity		
Igbo	253	63.2
Hausa	95	23.8
Yoruba	52	13.0
Educational status		
Tertiary	160	40.0
Post-secondary	120	30.0
Secondary	97	24..3
Primary or below	23	5.7
Husband's level of education		
Tertiary	260	65.0
Post-secondary	100	25.0
Secondary	33	8.2
Primary or below	7	1.8
Occupation of respondent		
Civil servant	178	44.5
Trader	129	32.3
Teacher	59	14.7
Other (Farmer and Artisan)	34	8.5

Table 2: Knowledge about diagnosis, prevention and treatment of malaria in pregnancy

Variable	Yes Freq (%)	No Freq (%)	Don't Know Freq (%)
Malaria in pregnancy is diagnosed by:			
Testing for malaria parasite (MP) in the lab	359 (89.7)	10 (2.5)	31 (7.8)
Rapid diagnostic test (RDT)	283 (70.7)	14 (3.5)	103 (25.8)
Symptoms felt by the pregnant woman	241 (60.3)	25 (6.2)	134 (33.5)
Malaria in Pregnancy can be prevented by:			
Regular attendance of ANC only	362 (90.5)	9 (2.3)	29 (7.2)
Administration SP drugs during pregnancy	337 (84.3)	8 (2.0)	55 (13.7)
Intermittent presumptive treatment (IPT)	78 (19.5)	42 (10.5)	280 (70.0)
Malaria in pregnancy can be treated by:			
Use of chloroquine	83 (20.8)	37 (9.2)	280 (70.0)
Use of ACT (Artemisin Combination Therapy)	71 (17.8)	72 (18.0)	257 (64.2)
Use of traditional/Herbal Medicine	62 (15.5)	193 (48.3)	145 (36.2)

Table 3: Knowledge about control of the vector that transmits malaria among the respondents

Variable	Yes Freq (%)	No Freq (%)
Vector that transmits malaria can be controlled by:		
Sleeping regularly under insecticide treated net	389 (97.2)	11 (2.8)
Clearing bushes in our surroundings	383 (95.7)	17 (4.3)
Emptying stagnant water in containers and drainages	382 (95.5)	18 (4.5)
Putting door and window nets in our houses	380 (95.0)	20 (5.0)
Use of in-door insecticide spray/repellants to kill the vector	378 (94.5)	22 (5.5)

Table 4: Practice of malaria control measures among respondents

Variables	Always Freq (%)	Sometimes Freq (%)	Rarely Freq (%)
Ownership of Long -Lasting Insecticide Net (LLIN)	375 (93.7)	0 (0.0%)	25 (6.3)
Sleeping under LLIN during pregnancy (n=375)	187 (49.9)	181 (48.3)	7 (1.8)
Clearing bushes in the surroundings	363 (90.7)	29 (7.3)	8 (2.0)
Emptying stagnant water in the surroundings	360 (90.0)	32 (8.0)	8 (2.0)
Use of in-door insecticide spray	130 (32.5)	239 (59.8)	31 (7.7)
Used anti -malaria prophylaxis (IPT/SP) prescribed in this pregnancy:	78 (19.5)	153 (38.3)	169 (42.2)

Table 5: Association of socio-demographic characteristics with ownership and use of long-lasting insecticide nets among the respondents

Variables	Ownership of LLIN			Always sleep under LLIN		
	Yes Freq (%)	No Freq (%)	χ^2 P-value	Yes Freq (%)	No Freq (%)	χ^2 P-value
Age group						
15-24	26 (7.0)	9 (30.0)		21 (80.8)	5 (19.2)	
25-34	306 (82.7)	14 (46.7)	2.451 (≤ **0.00 1)**	147(48.0)	159(52.0)	12.854 (**0.001)**
35-44	38 (10.3)	7 (23.3)		14 (36.8)	24 (63.2)	
Marital status						
Single	5 (1.4)	8 (26.7)		2 (40.0)	3 (60.0)	
Married	356 (96.2)	17 (56.7)	21.752 (≤ **0.00 1)**	181 (50.8)	175 (49.2)	0.369 (≤**0.00 1)**
Separated	9 (2.4)	5 (16.6)		4 (44.4)	5 (55.6)	
Level of education						
Tertiary	148 (40.4)	12 (35.3)		56 (37.8)	92 (62.2)	
Post -secondary	112 (30.6)	8 (23.5)		69 (61.6)	43 (38.4)	
Secondary.	90 (24.6)	7 (20.6)	15.158 (**0.001)**	50 (55.6)	40 (44.4)	16.862 (≤**0.00 1)**
Primary or below	16 (4.4)	7 (20.6)		10 (62.5)	6 (37.5)	
Occupation						
Civil servant	162(45.4)	16 (37.2)		66 (40.7)	96 (59.3)	
Teacher	48 (13.4)	11 (25.6)	9.752 (**0.021)**	30 (62.5)	18 (37.5)	12.682 (**0.005)**
Trader	120(33.6)	9 (20.9)		70 (58.3)	50 (41.7)	
Others (Farmer or Artisan)	27 (7.6)	7 (16.3)		16 (59.3)	50 (41.7)	

Table 6: Association of socio-demographic characteristics with practice of malaria control measures among the respondents

Variables	Always clear bushes and stagnant water			Use in-door insecticide spray		
	Yes Freq (%)	No Freq (%)	χ^2(P-value)	Yes Freq (%)	No Freq (%)	χ^2(P-value)
Age group						
15-24	30 (8.4)	5 (11.4)		11 (8.5)	24 (8.9)	
25-34	291(81.8)	29 (65.9)		100(76.9)	220(81.5)	
35-44	35 (9.8)	10 (22.7)	7.402 (**0.025)**	19 (14.6)	26 (9.6)	2.185 (**0.335)**
Marital status						
Single	8 (2.2)	5 (11.9)		7 (5.1)	6 (2.3)	
Married	341(95.3)	32 (76.2)		124(91.2)	249(94.3)	
Separated	9 (2.5)	5 (11.9)	75.439(≤**0.001)**	5 (3.7)	9 (3.4)	1.649 (**0.648)**
Level of education						
Tertiary	148(40.9)	12 (31.6)		62 (46.3)	98 (36.8)	
Post-secondary	108(29.8)	12 (31.6)		43 (32.1)	77 (29.0)	
Secondary	88 (24.3)	9 (23.7)		22 (16.4)	75 (28.2)	
Primary or below	18 (5.0)	5 (13.1)	4.792 (**0.188)**	7 (5.2)	16 (6.0)	7.467 (**0.058)**
Occupation						
Civil servant	154(44.6)	24 (43.6)		68 (52.3)	110 (40.7)	
Teacher	50 (14.5)	9 (16.4)		29 (22.3)	30 (11.1)	
Trader	116(33.6)	13 (23.6)	6.229 (**0.101)**	26 (20.0)	103 (38.2)	21.257(≤**0.001)**
Others (Farmer or Artisan)	25 (7.3)	9 (16.4)		7 (5.4)	27 (10.0)	

Discussion

The mean age found in this study is similar to the mean age of respondents reported in previous similar studies in Ibadan. [8-10] This is expected in view of the fact that pregnancy and attendance at antenatal care occur among women of reproductive age (15-45 years). A significantly large proportion of respondents had good knowledge about mosquito bite as means of malaria transmission in this study. This is in agreement with the figure obtained among residents in southern Ethiopia[11] but at variance with that found in northern Ethiopia.[12] The lower value obtained in this study despite the time lag compared with that of southern Ethiopia could be due to a possible difference in knowledge between mixed residents and a cohort of pregnant women.

A large proportion of respondents had good knowledge about correct diagnostic procedure for malaria in this study as it relates to laboratory testing for malaria parasite (MP) which is the gold standard despite the fact that rapid diagnostic test (RDT) has gained popularity due to the relative ease of performance and availability of result in few minutes. However, it is surprising that more than half of the respondents still believed that malaria is diagnosed only with the symptoms felt by the pregnant women. Their erroneous belief could be influenced by the earlier practice of using symptomatic diagnosis of malaria due to the challenges associated with laboratory testing for MP before the advent of RDT. This change in guideline should be emphasized in health education messages during ANC. Also, a significantly large proportion of respondents erroneously thought that regular ANC attendance alone was adequate to prevent MIP. Only a small proportion of the respondents knew that only ACT is currently recommended for the treatment of malaria in pregnancy rather than chloroquine or herbal medicine, and that IPT is the current strategy for prevention of malaria during pregnancy. The knowledge about IPT was far below the knowledge levels reported 7 years ago in Uyo.[13] This large difference could be due to different methods of facility-based health worker and client physical interactions during ANC visits in those locations. The knowledge about use of ACT for treatment of MIP in this study was very poor considering massive awareness campaigns on radio stations in this region recently. However, this underscores the need for intensified targeted interactive physical awareness campaigns and health education that would permit question and answer periods rather than the one-way radio communications.

Knowledge about vector control measures against malaria was generally good among respondents in this study but this did not translate into corresponding good practice. For instance, a large proportion of respondents knew that sleeping under LLIN is effective in the prevention of malaria but only half of respondents who owned the nets always slept under it. Similarly, knowledge of ITN was also good but its ownership and usage during pregnancy were poor among pregnant women in a study done in Abuja.[14] However in Ibadan, knowledge of ITN and possession of it were very good [10] and its use in prevention of malaria was also relatively good . The proportion that always slept under LLIN in this study was an improvement over what was earlier found in Abeokuta[15] and Uyo.[13] It is equally above the WHO 2010 national value[1] and those from Ibadan[8] and Lagos[16] but lower than that found in Enugu.[17] The progressive increase over the years is a reflection of positive effect of increased awareness

programs. Also, the variation in knowledge and use of ITN among these respondents could reflect regional discrepancies in the frequency and effectiveness of awareness campaigns and this calls for review of campaign strategies in every part of the country. Efforts should be made to sustain the trend through intensified information and communication and distribution of insecticide treated nets.

A large proportion of respondents knew about the use of indoor insecticide spray in malaria prevention but only three-quarters of the respondents always used it. Also, a large proportion of respondents adopted clearing of surrounding bushes and emptying stagnant water in containers and drainages as strategies for malaria control and prevention. These findings are important for effective malaria control measures. Ownership of, and always sleeping under ITN/LLIN were significantly associated with age, while usage was more in the younger age group (15-24 years). Level of education had direct association with ownership of LLIN but always sleeping under the net took an inverse relationship except for those with post-secondary education. In a previous study, a significant relationship was reported between women's knowledge and their practice of malaria prevention.[18] The lower level of sleeping under the LLINs among the highly educated women may also be connected with higher practices of bush and stagnant water clearing and use of in-door insecticide (found in this study). This kills the mosquitoes and makes the use of LLIN appear unnecessary. It could therefore be implied that environmental cleanliness and use of insecticide would reduce the need for sleeping under bed nets. This study also showed statistically significant association between ownership and always sleeping under LLIN by civil servants and traders. Ownership of LLIN and always sleeping under it increased significantly with increasing number of pregnancies in this study. This could result from ability to retain nets distributed previously and acclimatization to some discomforts associated with the nets, or an expression of beneficial effects of the nets from experience. Sleeping under LLIN declined slightly with increasing gestational age (GA) at booking for the index pregnancy. This could be influenced by reinforcement of health talks during subsequent ANC visits.

Conclusion

Knowledge about malarial control measures was high among the respondents. Practice on the environmental components of malarial control measures was also good. However, use of LLIN and IPT by the respondents as preventive measures was suboptimal. It is therefore imperative for intensified health education and awareness creation during ANC visits.

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