

Factors Influencing Utilization of Intermittent Preventive Treatment and Long Lasting Insecticide Treated Bed Nets by Pregnant Women in Anambra State, Nigeria

Ijeoma Okoronkwo¹ and Helen Okoye²

¹ Department of Health Administration and Management, University of Nigeria, Enugu Campus, Enugu State, Nigeria

² Department of Nursing Sciences, University of Nigeria, Enugu Campus, Enugu State, Nigeria

Abstract

Malaria is a global public health problem and continues to be a leading cause of death and disease in developing countries. The study investigated factors influencing utilization of Intermittent Preventive Treatment (IPTp) and Long Lasting Insecticide Treated Bed Nets (LLINs) for prevention of malaria in pregnancy. Cross sectional descriptive survey design, probability sampling, researcher developed questionnaire, descriptive statistic, chi square and Principal Component Analysis were used for the study. The findings revealed that 46.4% of the respondents had slept under LLINs and 59% took drug for IPTp in the index pregnancy, 43.7% slept under LLINs night before the survey. Knowledge about LLINs (64%) and IPTp (76%) and availability of LLINs (42.7%) were the major factors that influenced use. Many of the respondents had poor knowledge of adverse effects of malaria in pregnancy to the mother and her unborn baby but this did not significantly influence use ($p>0.05$). No significant socio economic difference was found in the use of IPTp and LLINs ($p>0.05$). Fear of adverse effects did not significantly influence IPTp and LLINs use ($P>0.05$). The study concluded that the use of LLINs and drug for IPTp were still low

in Anambra State due to non availability and poor knowledge.

Keywords: *Factors, Utilization, Intermittent Preventive Treatment, Long Lasting Insecticide Treated Bed Nets, Pregnant Women*

1. Introduction

Malaria remains one of the major causes of morbidity and mortality in sub-Saharan Africa. The favourable and conducive environment of the region sustains the population of the parasite and

the vector. The pregnant woman is more prone to malaria than her none pregnant counterpart with grave consequences for both mother and baby. In sub Saharan Africa, malaria in pregnancy reportedly accounts for 400,00 cases of severe maternal anaemia (26% of severe maternal anaemia), 10, 000 maternal deaths are due to malaria related anaemia, and up to 200,000 infant mortality annually due to low birth weight (Exavery, Mbaraku, Selemani, Makemba, Kinyonge & kweka, 2013). Malaria and pregnancy are said to be mutually

aggravating conditions. This is because the physiological changes of pregnancy and the pathological changes due to malaria have a synergistic effect on the course of each other, thus making life difficult for the mother and the child (Malhotra, 2013). Pregnancy reduces a woman's immunity to malaria making her more susceptible to malaria infection and increased risk of illness, severe anaemia and death. It has also been documented that pregnancy quadruples a woman's risk of malaria illness and doubles her risk of death (Federal Ministry of Health, FMOH, 2011). Thus, malaria in pregnancy poses substantial risk to the mother, her fetus and the new born.

For the unborn child, maternal malaria increases the risk of spontaneous abortion, stillbirth, premature delivery and low birth weight – a leading cause of child mortality (Akinleye, Falade & Ajayi, 2009). Nigeria is the first among the six highest burden countries in the WHO African Region (WHO, 2012). Available evidence in Nigeria indicates that malaria is highly endemic, exerts a significant health and economic burden on Nigerians and is the most common cause of hospital attendance in all age groups. According to the statistics of the Nigerian National Malaria Control Program, it is responsible for 60% of outpatient visits to health facilities, 30% of childhood deaths, 25% of infant deaths and 11% of maternal death; and an estimated annual loss of 132 billion Naira, in the form of treatment and prevention costs, and loss of man-hours, amongst other losses (FMOH, 2009).

In order to prevent the deleterious effects of malaria during pregnancy in areas of stable transmission, WHO recommended Intermittent Preventive Treatment of malaria in pregnancy (IPTp), use of Long Lasting Insecticide Treated Bed nets (LLINs) and prompt and effective case management of malaria as a three-pronged approach for the prevention and control of malaria during pregnancy (WHO, 2004). The current recommendation is to give at least two doses of a safe and effective anti malarial drug, (currently sulphadoxine and pyrimethamine, SP) to all pregnant women living in these areas (WHO, 2003). Antenatal clinics are considered important entry point to target the women as 60-70% of women attend antenatal clinic at least once during any pregnancy in Nigeria (FMOH, 2009).

During the African summit on Roll Back Malaria (RBM) held in Abuja, Nigeria, the Heads of State and

Governments of 53 African Countries resolved that by 2010 at least 90% of pregnant women especially those in their first pregnancies will have access to intermittent Preventive Treatment (IPTp) and at least 80% of those at risk for malaria particularly children under age five and pregnant women sleep under LLIN (FMOH, 2011). Efforts geared towards achieving these targets in Nigeria have led to the distribution of IPT drugs and LLINs in public health facilities by the federal and state governments through the Malaria Control Programme. Despite these efforts, a number of studies have shown low utilization of IPTp and LLINs among pregnant women in Nigeria (Fawole & Onyeaso, 2008; Akinleye, Falade, & Ajayi, 2009; Abassiattai, Etukumana & Umoyiyoho, 2009; Ankomah, Adebayo, Arogundale, Anyanti, Nwokolo, Ladipo & Meremikwu, 2012; Onoka, Hanson & Onwujekwe, 2012). Also the Nigerian National Demographic and Health Survey (NDHS) of 2013 recorded only 18% use of Insecticide Treated Bed nets by pregnant (NDHS, 2013; Mbachu, Onwujekwe, Uzochukwu, Uchebgu, Oranuba & Amobi, 2012).

Also incidences of malaria in pregnancy are still being recorded in health facilities in Anambra State. The information obtained from the Health Information Management Units in health facilities in Anambra state showed that between 2010 and 2012, 256 cases of malaria in pregnancy were diagnosed at Nnamdi Azikiwe University Teaching Hospital, Nnewi, 175 cases at Onitsha General Hospital and 281 cases at Amaku General Hospital, Awka

The aim of the study was to assess the level of utilization of IPT drugs and LLINs and associated constraints to their use by pregnant women in Anambra State, Nigeria.

2. Materials and Methods

2.1 Design

Cross sectional descriptive design was adopted for the study.

2.2 Setting

The study was conducted in selected public health care facilities in Anambra State which is one of the five states that make up the south eastern Nigeria. The four public health facilities selected out of the ten facilities that met the inclusion criteria were; Anambra State

University Teaching Hospital, Amaku, Awka, Nnamdi Azikiwe University Teaching Hospital, Nnewi, General Hospital Onitsha and General Hospital Enugwu Ukwu.

2.3 Population

The target population of the study comprised all the pregnant women who attended antenatal clinics in public health facilities in Anambra State. The antenatal clinic attendees for the month prior to data collection were used to estimate a total population of 1,506.

2.4 Sample

The minimum sample size of 246 was calculated using the formula: $n = Z^2 \times P(1-P)/D^2$ (Nwachukwu, 2011; Creative Research System, 2012) Where: n = sample size, Z = standard deviation that is 1.96 at 95% confidence interval, P = proportion or prevalence, D = acceptable margin of error that is 0.05. 1 = a constant

The sample size was adjusted for attrition and non response to give a final sample size of 308

2.5 Sampling Procedure

Simple random sampling technique was used to select the health facilities. Pregnant women were selected from the antenatal clinic attendees using proportionate stratified sampling procedure (Sample size/ population x number in each group). Systematic sampling was used to select the study subjects using predetermined sampling interval.

2.6 Instrument for data Collection

A researcher developed validated questionnaire was used for data collection. The questionnaire was constructed in English Language for literate respondents and translated in Igbo Language for illiterate respondents. Face and content validity of the questionnaire were established by experts. The instrument was pre tested using test-retest method. Two results were obtained at two weekly intervals and results were correlated and the reliability coefficient was determined using Pearson Product Moment correlation formula.

2.7 Ethical Considerations

Ethical approval for the study was obtained from the Ethical Review Board of Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State. Permission to carry out the study was obtained from the Chief Medical Directors of health facilities. Written informed consent was obtained from the respondents. Confidentiality of the information given was assured as no personal identifying information was required from the respondents.

2.8 Procedure for Data Collection

The copies of the questionnaire were administered to the study subjects with the aid of six research assistants. The literate respondents filled the questionnaire by themselves while the Igbo version of the questionnaire was used as interview guide for the illiterate respondents and their responses were entered into the questionnaire. Data collection was done on antenatal clinic days and lasted for 2 consecutive weeks from 8:30am before the commencement of antenatal clinic on each day. The filled questionnaire was collected back on the same day. Out of the 308 copies of the questionnaire administered, 293 were properly filled and valid for analysis giving a return rate of 95%.

2.9 Method of Data Analysis

Descriptive statistics including mean, standard deviation and percentages were used to analyze data on socio-demographic characteristics. Contingency Tables were prepared and Chi-square test was used to determine significant associations between dependent variables and categorical independent variables of the study. The level of significance was 0.05. Data was entered into Statistical Software for the Social Sciences (SPSS) version 18 for computer analysis. An asset based socio economic status (SES) index was developed using Principal Component Analysis (PCP) which was used to examine socio economic differences in the variables. Data on SES was entered into STATA statistical software (version 10).

3. Results

3.1 Socio- demographic Characteristics of the Respondents

The results revealed that 160 (54.8%) of the respondents were below 30, 121 (41.4%) were between 30 and 39 years and only 11 (3.8%) of the respondents were aged 40 years and above. The mean age of the respondents was 28.4. Almost all the respondents 277 (94.5%) were married, a good number of the women 209 (71.3%) had a source of income, only 46 (15.7%) were unemployed and 38 (13%) were students. Responses on level of education showed that almost all the respondents 289 (98.6%) attended school. However, about half of the women 149 (51%) stopped at secondary school. Majority of the respondents 268 (91.5%) had between 1 and 4 pregnancies while only 25 (8.5%) had 5 pregnancies and above. A good number of the women 176 (62.2%) booked between 1 and 4 months gestation with a mean gestational age of 1.42 (Table 1).

Table1: Socio-demographic Profile of the Respondents

Variable	Frequency	Percentage (%)	Mean
Age			28.4 ±
15-24	70	24	
25-29	91	31	18.4
30-34	88	30	
34-39	33	11.2	
40 and above	11	3.8	
Total	293	100	
Marital Status			
Married	277	94.5	
Single	9	3.1	
Divorced	3	1.0	
Widowed	4	1.4	
Total	293	100	
Employment			
Source of Income	247	84.3	
No source of Income	46	15.7	
Total	283	100	
Level of Education			
Primary	10	3.4	
Secondary	14	51.0	
OND/NCE	53	18.0	
HND/Bsc	74	25.2	
Masters/PHD	7	2.4	
No of Pregnancies			
1 – 4	268	91.5	
5 and above	25	8.5	
Age of pregnancy at first booking			1.42 ±
1 – 4 months	176	62.2	0.567
5 – 7 months	96	33.9	
8 months and above	11	3.9	

3.2 Level of Utilization of IPTp and LLINs

Data collected on level of utilization of IPTp and LLINs showed that 136 (46.4%) of the pregnant women perceive malaria as a serious illness in pregnancy and have slept under LLINs in the index pregnancy, however, only 128 (43.7%) of the respondents slept under LLINs night before the study and 173 (59%) of the respondents took drug for IPTp in the current pregnancy (fig 1)

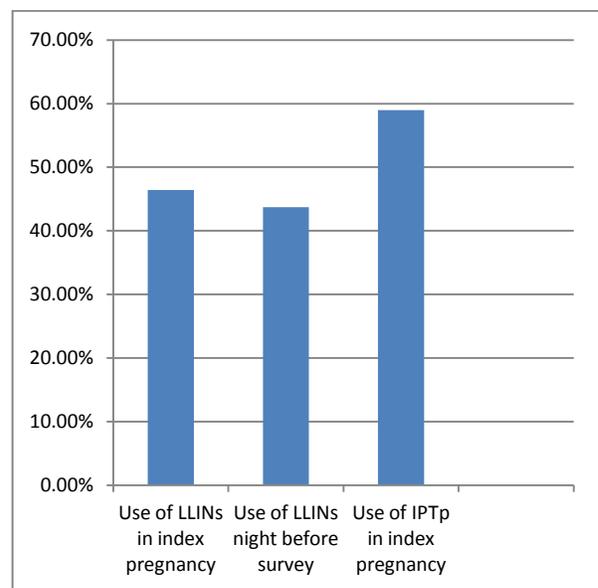


Figure I: Level of utilization of LLINs and IPTp

3.3 Health Facility Factors Influencing Utilization of LLINs

Data collected revealed that out of the 157 women who did not sleep under LLINs in the current pregnancy, 67 (42.7%) indicated that LLINs availability was the major reason for none use, 23 (14.7%) said that do not know about LLINs and 32 (20.4%) did not know how to use the net and 30 (19%) hung the net in windows and doors of their houses. The least number of the respondents 5 (3.2%) indicated that they did not like the colour of the nets provided (Table 2)

Table 2: Health Facility Factors Influencing Use of LLINs

Reason For Not Using LLINs	Frequency	Percentage
LLINs are not Available	67	42.7
Do not know about LLINs	23	14.7
Do Not Know How to Use the Net	32	20.4
Hang LLINs in Windows and Doors	30	19
Do Not Like the Colour of the LLINs Provided	5	3.2
Total	127	100

3.4 Health Facility Factors Influencing Utilization of IPTp Drugs

The findings revealed that out of the 104 women that gave reasons for not using IPTp drugs, more did not know where to get the drugs, 36 (34.6%), 29 (27.9%), did not know how to take the drugs, 25 (24%) said that drugs were not available at the facility and only few 14 (11.7%) said that they have not heard about the drugs (Table 3)

Table 3: Health Facility Factors Influencing Use of IPTp Drugs

Reasons for not Using IPTp Drugs	Frequency	Percentage
Do not know where to get the drugs	36	34.6
Do not know how to take the drugs	29	27.9
Drugs are not Available	25	24
Have not Heard about the Drugs	14	13.5
Total	104	100

3.5 Fear of Adverse Effects Influencing use of LLINs

A total of 72 respondents expressed fear of adverse effects, out of this number, 45 (58.5%) said that they feel hot when sleeping under the net, 12 (16.7%) said they had bad dreams and 15 (20.8%) expressed fear that the chemical used in the net may affect them and their unborn babies (Fig. 2)

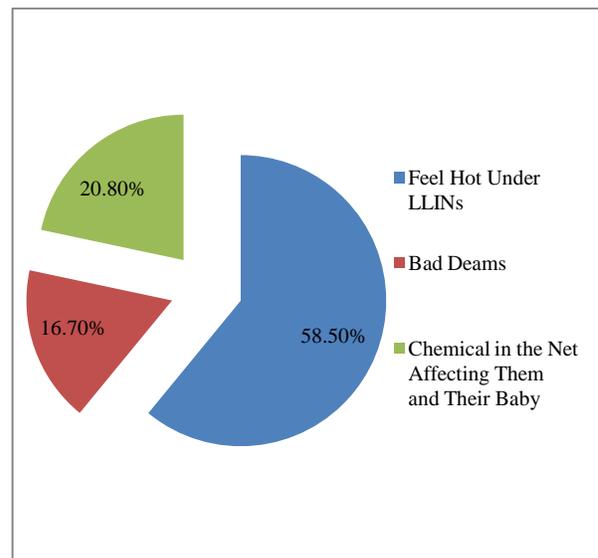


Fig. 2: Fear of Adverse Effects Influencing the Use of LLINs

3.6 Fear of Adverse Effects Influencing Use of IPTp Drugs

The findings revealed that out of the 120 pregnant women that have not taken IPTp drugs, only 39 expressed fear of adverse effect on them and their unborn baby. Out of the 39 women, 26 (66.7%) were afraid that the drug may affect their unborn child while 13 women (33.3%) were afraid that the drug may affect them (Fig.3).

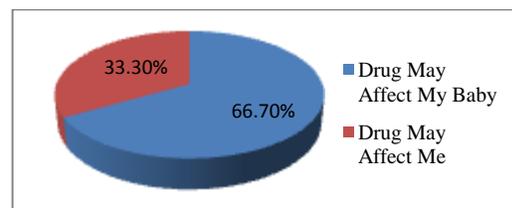


Fig 3: Fear of Adverse Effects Influencing Use of IPTp Drugs

3.7 Socioeconomic Influence on Use of LLINs

Data collected on how LLINs was paid for showed that out of the 136 pregnant women who were using LLINs, majority 97(71.3%) got it free of cost from the health facility, while 13 (9.6%) bought the LLINs. The findings revealed that for the women that paid for the net, the minimum cost was ₦ 100 and the Maximum was ₦ 2, 500 (0.002\$ – 10\$) with a mean cost of ₦ 1138.46.

Table 4: Socioeconomic Influence on Use of LLINs

How LLINs was Paid for	Frequency	Percentage
Free of Cost from Health facility	97	71.3
My Husband Bought for Me	19	14
Health Insurance Coverage	7	5.1
I bought it Myself		
Cost of IPTp Drug N20 – N1,900	13	9.6
Mean cost N578. 24		

3.8 Socioeconomic Influence on Use of IPTp

The results showed that out of the 157 respondents who took IPTp drug in the index pregnancy, 58 (36.8%) got it free of cost from the health facility, 50 (31.8%) said that their husbands bought for them, while 37 (23.6% bought the drug by themselves. Only 12 (7.7%) were under Health Insurance coverage Table 5).

Table 5: Socioeconomic Influence on Use of IPTp

How IPTp was Paid for	Frequency	Percentage
Free of Cost from Health facility	58	36.9
My Husband Bought for Me	50	31.8
Health Insurance Coverage	12	7.7
I bought it Myself		
Cost N100 – N2,599	37	23.6
Mean cost N1138.46		

3.9 Socioeconomic Status of Respondents and Influence on Use of LLINs

The findings showed that the respondents were almost evenly distributed across the various socioeconomic groups in the use of LLINs, Poorest, 32 (25%), very poor 25 (19.5%), poor 37 (28.9%) and least poor 34

(26.6%). Socioeconomic status did not significantly influence use ($P > 0.05$). (Table 6)

Table 6: Socioeconomic Status of Respondents and Influence on Use of LLINs

Socioeconomic Status of the Respondents	Slept under LLIN Night Before Survey		Chi square/ P value
	Frequency	%	
Poorest	32	25	4.215 (0.239)*
Very Poor	25	19.5	
Poor	37	28.9	
Least Poor	34	26.6	
Total	128	100	

* $p > 0.05$

3.10 Socioeconomic Status of Respondents and Influence on Use of IPTp Drugs

Data collected on influence of socioeconomic status of the women on the use of IPTp showed that the use of IPTp drug in the index pregnancy as Poorest, 42 (24.3%), very poor 36 (20.8%), poor 47 (27.2%) and least poor 48 (27.7%). The p value of 0.014 indicate a significant Socioeconomic influence on use of IPTp ($P < 0.05$). (Table 7)

Table 7: Socioeconomic Status of Respondents and Influence on Use of IPTp Drugs

Socioeconomic Status of the Respondents	Use of IPTp Drug in Current Pregnancy		Chi square/ P value
	Frequency	%	
Poorest	42	24.3	20.750 (0.014)*
Very Poor	36	20.8	
Poor	47	27.2	
Least Poor	48	27.7	
Total	173	100	

* $P < 0.05$

3.11 Knowledge of adverse effects of malaria in pregnancy and influence on use of LLINs

The results showed that out of the 293 pregnant women studied, 8 (2.8%) had no knowledge of adverse effect of malaria in pregnancy on the pregnant woman

and slept under LLIN, 109 (37.2%) had poor knowledge and slept under the net and 11 (3.8%) had good knowledge and slept under the net. The findings on knowledge of adverse effect of malaria in pregnancy and sleeping under LLINs revealed that 19 respondents (6.5%) had no knowledge of adverse effect of malaria in pregnancy to the unborn baby and slept under the net, 103 (35.2%) had poor knowledge but still slept under the net and 6 respondents (2.1%) had good knowledge and slept under the net. No significant association was found between knowledge of adverse effects of malaria in pregnancy and sleeping under LLIN ($p > 0.05$)

Table 8: Knowledge of adverse effects of malaria in pregnancy and influence on use of LLINs

Knowledge of adverse effects of malaria in pregnancy to the mother	Slept under LLIN night before survey		Chi square/ P value
	Frequency	%	
No knowledge	8	2.8	2.413 (0.369)
Poor knowledge	109	37.2	
Good knowledge	11	3.8	
Knowledge of adverse effects of malaria in pregnancy to the unborn child			2.649 (0.339)
No knowledge	19	6.5	
Poor knowledge	103	35.2	
Good knowledge	6	2.1	

$P > 0.05$

3.12 Knowledge of adverse effects of malaria in pregnancy and influence on use of IPTp

Data collected on knowledge of adverse effects of malaria in pregnancy and its influence on use of IPTp showed that 16 women (5.5%) had no knowledge of the adverse effects of malaria in pregnancy to the mother and yet took IPTp drugs, 161 (55%) had poor knowledge and took IPTp drugs and 12 (4.1%) had good knowledge and took drug for IPTp. The findings also showed that 39 (13.3%) respondents did not know the adverse effects of malaria in pregnancy to the unborn child and yet took drug for IPTp, 156 (53.2%) had poor knowledge, yet took IPTp drug, while 4 (had good knowledge and took IPTp drugs. However, knowledge of adverse effects of malaria in pregnancy did not significantly influence use ($P > 0.05$)

Table 9: Knowledge of adverse effects of malaria in pregnancy and influence on use of IPTp

Knowledge of adverse effects of malaria in pregnancy to the mother	Took IPTp drugs		Chi square/ P value
	Frequency	%	
No knowledge	16	5.5	2.083 (0.495)
Poor knowledge	161	55	
Good knowledge	12	4.1	
Knowledge of adverse effects of malaria in pregnancy to the unborn child			
No knowledge	39	13.3	2.083 (0.323)
Poor knowledge	156	53.2	
Good knowledge	4	1.4	

$P > 0.05$

4. Discussion

More than half of the respondents had taken drug for IPTp in the index pregnancy. It can be deduced from the findings that this was because a good number booked early for antenatal care. Low utilization of LLINs could be due to the women not perceiving malaria as a serious illness in pregnancy.

However the level of utilization of IPTp and LLINs still fall below target of 90% of pregnant women taking IPTp and sleeping under LLINs by 2010 as projected by the Roll Back Malaria Partnership (WHO, 2005). This finding agrees with the findings of Ankomah et al. (2012) and Auta (2012) who also found less than 50% utilization of LLINs. The finding contradicts the finding of Ye et al. who found higher utilization after a mass campaign. The findings agree with other researchers who found low utilization of IPTp drugs (Onoka et al. 2012; Iwashitta et al. 2010; Abasiattai et al. 2009; Akinleye et al. 2009).

Major health facility factors that affected utilization of LLINs included net availability and poor knowledge of how to use the net, such that some hung the net on windows and doors. The poor usage of LLINs among pregnant women is of great concern as documented evidences have shown that use of LLINs improves maternal – fetal outcomes (Akinleye, Falade & Ajayi, 2009; World Malaria Report, 2012). Non availability of LLINs negates the WHO guidelines that LLINs and drug for IPTp should be provided free of

cost or at highly subsidized rate to vulnerable groups (WHO, 2011). Musa, Saludeen and Jimoh (2009) also found scarcity of new nets as reason for not using LLINs and Singh et al (2013) observed that supply was a major barrier to use of LLINs.

. The findings of the study agree with that of other researchers who also found a number of factors that constituted barriers to utilization of LLINs and IPTp drugs (Singh et al. 2013; Onoka et al. 2012; Idowu et al. 2010; Akinleye et al. 2009). However Nduka and Wogu (2012) found high utilization of LLINs.

Majority of the respondents were not afraid of adverse effects of LLINs and IPTp drug, although a good number gave reasons for not using them. However, fear of adverse effects did not significantly affect LLINs and IPTp use. Feeling hot inside the net could be a factor that affect use of LLINs considering that most nets are made with nylon material hence pregnant women may feel hot when sleeping under the net. This finding is in line with other researchers who also observed that perception of chemicals used to treat nets as having dangerous effects on pregnant women and heat experienced while sleeping and concern about possible adverse effects of IPTp drug on their pregnancies were factors that limit use of LLINs and IPTp (Akinleye et al. 2009; Chukwuocha et al. 2010 & Idowu et al. 2010). However the results contradict the finding of Onoka, Hanson & Onwujekwe (2012) who noted that pregnant women did not have many concerns about side effects of LLINs.

Majority of the respondents who were using LLINs and IPTp got them free of charge from the health facilities. Some respondents still bought the net and the drugs by themselves with the mean cost for the net and drug being N1138.46 and N578.24 respectively. This cost may be on the high side for the respondents as majority of the respondents fall into the poorest and very poor socioeconomic status. Chukwuocha et al (2011) observed that high cost and affordability affected use of bed nets among pregnant women. WHO (2005) observed that women often lack access to and control over resources including economic resources. However there was no significant association found among the different socio economic groups in the use of LLINs and IPTp. This finding is in agreement with the finding of Ye et al (2012), who did not find any statistically significant difference in use among different socio economic status. The finding contradicts Auta (2012) who observed that wealth quintiles of households were associated with net use.

Also, Mbonye et al (2005) and Singh et al (2013) found that high cost affected use of LLINs.

Majority of the respondents had poor knowledge of the adverse effects of malaria in pregnancy to the mother and her unborn baby. This could be the reason why the respondents did not perceive malaria as a serious illness in pregnancy. However knowledge of the adverse effects of malaria did not significantly influence use of LLINs and IPTp drugs in the facilities studied (P value > 0.05). The poor knowledge of the adverse effects may have accounted for the low number of pregnant women that have used LLINs and slept under the net the night before the survey. The finding of the study contradicts the findings by Idowu, Samuobo, Oluwole and Adediran (2010) who found that malaria was considered dangerous by almost all the respondents.

5. Conclusions

The study assessed the utilization of Intermittent Preventive Treatment (IPTp) and Long Lasting Insecticide Treated Bed Nets (LLINs) by pregnant women in Anambra State, Nigeria. The findings have revealed the level of utilization of IPTp, LLINs and factors influencing their use among pregnant women in Anambra State. This information can be used to plan health education program to create awareness on the adverse effects of malaria in pregnancy and the importance of IPTp and LLINs. This will motivate more pregnant women in Anambra State to utilize these malaria preventive strategies.

The Anambra State Government will be guided by the findings of the study in assessing the progress made towards prevention of malaria in pregnancy in the State.

The findings from the study have added to the evidence needed by the RBM partnership to assess progress made towards achieving its goals and targets.

The Federal Ministry of Health and Anambra State government and other stakeholders will be guided by the findings of the study in planning, resource allocation and manpower distribution for distribution of IPTp drugs and LLINs.

The findings have also added to the body of existing knowledge on the extent of use of IPTp and LLINs by pregnant women.

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