

USE OF LONG-LASTING INSECTICIDES TREATED NET (LLIN) FOR MALARIA PREVENTION AMONG PREGNANT WOMEN IN LAGOS, NIGERIA.

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ABSTRACT

Observation have shown that the highest percentage (90%) of deaths from malaria occurred in Africa south of the Sahara, with pregnant women and their unborn children being particularly vulnerable to its deleterious effects such as anaemia and abortion. The study determines the use/practice of Long-Lasting Insecticide Treated Nets for malaria prevention among pregnant women in a purposively selected hospital in Lagos, Nigeria. The descriptive survey method was adopted and the target population is pregnant women. The instrument for this study is a self-developed semi-structured questionnaire. Data were analyzed using SPSS version 20 with descriptive and inferential statistics. The result of this study shows that modal age of the respondents ranges between 26-30years and majority (74.4%) have up to tertiary education. The result further reveals that the respondents are knowledgeable about malaria while the utilization of ITN/LLINS in malaria prevention by the respondents is poor. Reasons for not having or using the net are non-availability and that it generates heat. Two hypotheses are tested and findings reveals that in hypothesis 1 significant associations exists between knowledge of malaria prevention and respondents' educational level ($\chi^2 = 14.225$, $p < 0.05$) and in hypothesis 2 there is significant association between the knowledge of malaria prevention and the use of the net ($\chi^2 = 9.442$, $p < 0.05$). The study concludes that pregnant mothers should be enlightened and motivated

in the prevention of malaria through the use of insecticide-treated nets.

Keywords: Long-Lasting Insecticides Treated Net (LLIN); Malaria Prevention; Pregnant Women.

INTRODUCTION

Malaria is a life-threatening parasitic disease caused by a unicellular protozoan (Park, 2005; Obionu, 2007). They further observe that the disease is endemic in tropical areas of the world including Nigeria, due to some factors such as rainfall, temperature and humidity which is conducive for the breeding and survival of the mosquito vectors that transmit this protozoan. It may occur in epidemics in areas that experience irregular rapid increases in incidence, usually related to the season and population movements such as parts of the Indian peninsula, the Middle East, South-East Asia, North-West Africa and some noted countries in South America (WHO, 1999). Report from the World Health Organisation (WHO) indicates that ninety percent of deaths due to malaria occur in Africa south of the Sahara, with pregnant women and their unborn children being particularly vulnerable to the deleterious effects of the disease. In Nigeria, over 100 million people are at risk of malaria every year and about 50% of the adult population in Nigeria experience at least one episode yearly (FMOH, 2005). Malaria is responsible for about 60% of hospital outpatient visits in all age groups in all parts of Nigeria and constitutes a major morbidity and

mortality in pregnant women and children under five year accounting for about 30% of under-five mortality and 11% of maternal mortality (Federal Ministry of Health, 2014).

The Roll Back Malaria (RBM) partnership recommends the use of Long-lasting Insecticide-treated Nets (LLINs) as part of the measures to reduce the burden of malaria in vulnerable communities, particularly among pregnant women and children below five years of age (WHO, 1999). The Long-Lasting Insecticide-treated Nets are mosquito nets that have been permanently treated with insecticide that lasts for at least 20 washes or three years. LLINs decrease both the number of malaria cases and malaria death rates in pregnant women and their children and provide low cost and highly effective way of reducing the incidence of malaria in people who sleep under them thus reduces the need for treatment and the pressure on health care services (FMOH, 2004). However, research has shown that many households in Nigeria and other African countries, particularly in rural communities, exhibit poor knowledge of malaria and modalities for its control (Oladokun, 2011).

Studies from other African countries equally corroborate the fact that lower prevalence in knowledge of malaria and use of LLINs are more among the rural women. Some of the identified factors for poor utilization of LLINs in the rural areas are limited access and poor perception of beneficial effects of LLINs (Akinleye, 2009). Preventing and treating malaria in pregnancy can be a key intervention to improve maternal, fetal and child health globally and is directly linked to three of the Millennium Development Goals (MDG-3 Maternal Health, MDG-4 Child Health, MDG-5 Combating Infectious Disease) (Filippi, 2006).

This informs World Health Organization's recommendation of a three-pronged approach to the strategic framework for malaria

prevention and control during pregnancy in areas of stable transmission in Africa. These include the use of intermittent preventive treatment (IPTp), insecticide treated nets (ITN) and effective case management of malaria illness and anaemia. Unlike the prophylactic anti-malarial drugs that are given at less than therapeutic dose at regular interval that could encourage parasite resistance, (IPTp) using sulfadoxine- pyrimethamine (SP) employs a therapeutic dose regimen with only two doses at monthly interval during the course of pregnancy which effectively reduces parasite load. (Ter, 2013) Also, insecticide treated bed nets reduce human vector contact by physically excluding vector mosquitoes, killing them if they land on it or repel them, thereby driving them from the vicinity of the sleeper. The use of ITN is health promotion and disease prevention which is of great benefit to pregnant women, as well as, her family by reducing malaria related illnesses and deaths. These efforts are geared towards making pregnancy safe (Parise, 2008). Similarly, the use of ITN during pregnancy in stable malaria transmission zone reduces the overall risk of morbidity and mortality among pregnant women and their infants (NPC, 2013). LLINs have been shown to reduce the number of infective mosquito bites by 70-90% in a variety of ecologic settings and can provide protection to pregnant and non-pregnant women (D'Alessandro, 1996).

A trans-national survey of intra-household mosquito net use in selected sub-Saharan African countries between years 2000-2004 reveals that women of reproductive age and children under 5 were most likely to use the nets compared to adult men and older children. The study concludes that understanding intra-household net-use patterns will help malaria control programs more effectively direct their efforts to increase their public health impact (Baume, 2007). Another study in Nigeria on awareness, possession and use of insecticide-treated nets among mothers of

under-five found that level of awareness and possession of ITN as malaria preventive tool were 75.1% and 45% respectively, and they are positively and significantly influenced by high educational qualification of mothers and attendance of a public hospital for antenatal care (Idowu, 2011). A similar study on utilization of ITNs among mothers attending Maternal and Child Health/Family Planning (MCH/FP) in a district hospital in Kenya shows that nearly all the mothers are knowledgeable about ITNs. Majority of them (82.5%) use the nets for protection and 75% of them know the importance of ITNs which are for malaria prevention (Ndwiga, 2014). A related study on maternal influence on the use of impregnated (treated) bed nets in Ratchaburi Province of Thailand found that 76.4% of mothers used impregnated bed nets regularly to protect their children, while the rest use it infrequently or never use the nets. Use of impregnated bed nets is significantly based on the knowledge of malaria prevention, perception of benefits of ITN use and receipt of information from malaria workers (Sriaroon, 1988).

However, a study in Ethiopia found that despite the high knowledge of awareness of ITNs among mothers (92.4%), just 57.8% of them own ITNs. The foremost reasons for non-possession of ITNs are un-affordability and non-availability of ITNs. Their ITNs ownership is significantly associated with average monthly income but not with their educational status. The study concludes that poor attitude and practice towards the ITNs utilization is due to lack of availability and affordability (Kaliyaperumal, 2009) Another study among 1330 pregnant and newly delivered women in Ibadan, Nigeria shows that though awareness of malaria control measures is good, utilization is poor among them. The most commonly reported effective control measures against malaria are the use of insecticide spray, window nets and ITN, but only 28.2% of the women use ITNs in the index pregnancy (Oladokun, 2011). A similar study

on the use of ITNs among care givers of children under five in Kenya further shows that despite the fact that awareness of ITNs is high (88.5%), the proportion of households that own them is low as only 32.0% have at least a treated net. The main reason cited as hindrance to net utilisation is lack of treated nets in households (72.3%) (Malusha, 2009).

Ownership and use of LLINs have also been found to vary considerably among pregnant mothers of under five children. A study in Nigeria shows that 36% of pregnant women are aware of ITN in malaria prevention, but less than 27% have ever used it and only 19% are currently using it during the period of the study. Some of the difficulties encountered or experienced by the women using ITN are scarcity of new nets, difficulty in getting chemicals for re-treatment of nets, and non-availability of quality ITNs for sale (Musa, 2009). A similar study in Ethiopia found that 59% of pregnant women own at least one non-long lasting or long-lasting ITN and about 58.4% have slept under the nets during the previous night before the study. It further revealed that lack of access to ITNs (68.3%) and the perception that nets could not prevent malaria (27%) are the reasons for non-ownership of nets (Belay, 2008). The study therefore assesses the use/practice of Long-Lasting Insecticide Treated Nets for malaria prevention among pregnant women in a purposively selected hospital in Lagos, Nigeria.

RESEARCH QUESTIONS

1. What is respondents' knowledge about Malaria and its prevention among pregnant women in the General Hospital, Lagos?
2. What is the utilization level of LLIN for malaria prevention among pregnant women in General Hospital, Lagos?
3. What are the factors affecting the utilization of LLIN?

HYPOTHESES

1. There is no significant relationship between knowledge and practice of malaria prevention.
2. There is no significant relationship between level of education and knowledge of malaria prevention.

METHODOLOGY

The study employs a descriptive design to assess the practice of malaria prevention strategies among pregnant women attending the antenatal clinic. The research setting for this study is Gbagada General Hospital, Lagos. Gbagada General Hospital is a maternal and child Health (MCH) Centre. The state is located in the South-Western part of Nigeria, on the narrow plain of Bight of Benin and occupies 3,345 square kilometres. Lagos State is bounded in the North and East by Ogun State of Nigeria in the West by the Republic of Benin and stretches over 180 kilometres along the Guinea Coast of the Bight of Benin on the Atlantic Ocean. Gbagada General Hospital was selected purposefully because of the influx of pregnant women during their ANC and they have ANC three (3) times in a week. General Hospitals in Lagos State are

groups into six zones according to their Local Government area.

Gbagada general hospital is under group C and belongs to Kosofe Local Government area. The general hospital is one of the hospitals recently converted to Maternal and Child Health Centre. The centre is only for mother and child. Their monthly patronage is about 280- 350. A sample of 125 pregnant women was selected using convenient sampling technique. Data was collected with self-administered questionnaire which was designed to answer each of the research questions. The questionnaire consists of 44 sections designed to obtain the socio-demographic data of the respondents, their knowledge, utilization of LLIN for malaria prevention and affecting the utilization for malaria prevention.

Data was analyzed using the Statistical Package for Social Sciences (SPSS) software Version 20 with descriptive and inferential statistics while chi-square was used to compare proportions at a significant p-value of 0.05. Ethical approval was obtained from Hospital Ethics and Research Committee of the hospital. Informed consent was also taken from individual respondent before data collection.

RESULTS

A total of 125 respondents are included in the study and Table 1 shows that the age distribution of respondents shows 36.8% and 36% and that the respondents are between 26-30years and 31-35years respectively. Greater percentage (74.4%) of the respondents have up to tertiary education, most of them being university graduates, 22.4% have secondary school education while 3.2% have only primary education. About half (54.4%) of the

respondents are Civil servants/ Government-employed, about one-third (32.8%) are self-employed while the rest (12.8%) are unemployed. Majority of the respondents (82.4%) are Christians, while (16.0%) are Muslims. The socio-demographic characteristics of this study conclude that majority of the respondents are within 26 and 35years old with tertiary level of education and civil servants by occupation. Lastly, majority of the respondents are Christians.

TABLE 1
Socio-Demographic Characteristic of Respondents

Variables		Frequency	Percentage (%)
Age Group(Years)	15- 20	2	1.6
	21-25	12	9.6
	26-30	46	36.8
	31-35	45	36.0
	36-40	17	13.6
	41 and above	3	2.4
	Total	125	100.0
Level of education	Primary	4	3.2
	Secondary	28	22.4
	Tertiary	93	74.4
	Total	125	100.0
Occupational status	Civil servants/ Government- Employed	68	54.4
	Unemployed	16	12.8
	Self employed	41	32.8
	Total	125	100
Religion	Christianity	103	82.4
	Islam	20	16.0
	Other	2	1.6
	Total	125	100.0

Table 2 revealed the Obstetric characteristic distribution of respondents. Findings showed that a little above half (55.2%) indicate that it is their first pregnancy, while a quarter (25.6%) indicate that it is their second pregnancy. Also, more than one quarter (28.8%) of the respondents indicate that they have had miscarriages and among these, more than one quarter (28.9%) report that they have malaria at the time they have the miscarriage. Recalling

how often they have malaria in pregnancy, as much as 40.0% indicate that they have malaria monthly, another 40% said they have it seldom, 15.2 % said they have it weekly while only 4.8% claim they did not have malaria in pregnancy (Table 2). This study concludes that majority of the respondents are with their first pregnancy with no child, no abortion and seldom have malaria.

TABLE 2:
Distribution of respondents based on their Obstetric characteristic

Variable		Frequency	Percentage (%)
Frequency of pregnancy	1	69	55.2
	2	32	25.6
	3	20	16.0
	4	4	3.2
	Total	125	100.0
Number of children	None	50	40.0
	1	38	30.4
	2	19	15.2
	3	12	9.6
	4	6	4.8
Total	125	100.0	
Ever had miscarriages	Yes	36	28.8
	No	89	71.2
Total	125	100.0	
Had malaria at that time of miscarriage	Yes	11	30.5
	No	25	69.4
Total	36	100.0	
Frequency of malaria in pregnancy	None	6	4.8
	Weekly	19	15.2
	Monthly	50	40.0
	Seldom	50	40.0
	Total	125	100.0

Research question one

What is respondents' knowledge of Malaria and its prevention among pregnant women in General Hospital, Lagos?

As presented in Table 3, concerning respondents' knowledge on malaria and its prevention, majority (92.8%) of the respondents indicate that mosquito is the cause of malaria, (87.2%) identify fever as a symptom of malaria but less than half 49.6% indicate that malaria in

pregnancy can cause low birth weight babies. Larger percentage (77.6%) indicate that use of ITN is encouraged by health practitioners at ante natal clinic(s) and 80.0% suggest that pregnant women should be encouraged to use of ITN. This study indicates that barely half (49.6%) display good knowledge, 34.4% display fair knowledge while 16% demonstrate poor knowledge. In conclusion, the respondents are knowledgeable about malaria and its prevention.

TABLE 3

Distribution of respondents based on their Knowledge of Malaria and its prevention

Variables	True		False		Don't know	
	N	%	N	%	N	%
Statements on Malaria and its prevention						
Mosquito is the cause of malaria	116	92.8	2	1.6	7	5.6
Fever is a symptom of malaria	109	87.2	8	6.4	8	6.4
Malaria is dangerous to a woman's health in pregnancy	119	95.2	-	-	6	4.8
Malaria during pregnancy can cause abortion	56	44.8	12	9.6	57	45.6
Malaria in pregnancy can cause low birth weight babies	62	49.6	5	4.0	58	46.4
Malaria in pregnancy can cause still births	49	39.2	5	4.0	71	56.8
ITN is useful in the prevention of mosquito causing malaria	96	76.8	9	7.2	20	16.0
ITN is effective in the control of Malaria during pregnancy	95	76.0	2	1.6	28	22.4
Use of ITN is encouraged by Health practitioners at ante natal clinic(s)	97	77.6	-	-	28	22.4
Use of ITN should be encouraged amongst pregnant women	100	80.0	2	1.6	23	18.4

Research question two

To what extent do respondents utilize LLIN for malaria prevention among pregnant women in General Hospital, Lagos?

As presented in Table 4, the result of the study shows that 16% of the respondents strongly agree to have an insecticide treated net/ long-lasting insecticide treated nets (LLINS) and 15.2% agree while 38.8% of the respondents disagree and 32% strongly disagree. About 24.8% of the respondents strongly agree that they often use the ITN/ LLINs and 4.8% agree while 5.6% of the respondents disagree and 64.8% strongly disagree. 22.4% of the respondents strongly agree that people who use ITNs are more likely to prevent and control malaria than those who do not and 25.6% agree while 32% of the respondents disagree and 20% of them strongly disagree.

This study also reveals that 35.2% of the respondents strongly agree that the advantages of ITN use far outweighs the disadvantages / non usage and 4.8% agree, while 40% of the respondents disagree and 20% strongly disagree. 18.4% of the respondents strongly agree that they got ITN from friends and colleagues and 7.2% agree while 43.2% of the respondents disagree and 31.2% strongly disagree. 14.4% of the respondents strongly agree that they get ITN from the pharmacy or drug store and 20.8% agree while 29.6% of the respondents disagree and 35.2% strongly disagree. Also, 24% of the respondents strongly agree that they got ITN from a government antenatal clinic and 32% agree while 28% disagree and 16% strongly disagree. The result shows that the utilization of ITN/LLINS in malaria prevention by the respondents is poor.

TABLE 4

Distribution of respondents based on their utilization of ITN / LLINs in Malaria Prevention

Variables	SA	A	D	SD
Have an Insecticide Treated Net / Long-lasting Insecticide-treated Nets (LLINs)	20 (16)	19 (15.2)	46 (38.8)	40 (32)
I often do you use the ITN / LLINs	31 (24.8)	6 (4.8)	7 (5.6)	81 (64.8)
People who use ITNs are more likely to prevent and control malaria than those who do not	28 (22.4)	32 (25.6)	40 (32)	25 (20)
The advantages of ITN use far outweighs the disadvantage(s)/non usage	44 (35.2)	6 (4.8)	50 (40)	25 (20)
I got ITN from friends and colleague	23 (18.4)	9 (7.2)	54 (43.2)	39 (31.2)
I got ITN from a pharmacy or drug store	18 (14.4)	26 (20.8)	37 (29.6)	44 (35.2)
I got ITN from a government antenatal clinic	30 (24)	40 (32)	35 (28)	20 (16)
Total	22.2	15.8	31	31.3

Research question three

What are the factors affecting the utilization of LLIN?

As presented in Table 5, 20% of the respondents said the reason for not using ITN / LLINs is because it causes heat, 5.6% said it is because it cannot prevent malaria and 15.2%

said other insecticides are better. Also, 12.8% of the respondents pick the use of other preventive means as a reason for not using ITN / LLINs, 35.2% said they do not have one and 11.2% have no response. From the result, the main reasons for not using ITN / LLINs are because they do not have one and it causes heat.

TABLE 5
Factors affecting the use of LLIN

Reason(s) for not using ITN / LLINs (Sometimes /at all)	Frequency	Percentage
It causes heat	25	20%
It cannot prevent malaria	7	5.6%
Other insecticides are better	19	15.2%
I use other preventive means	16	12.8%
I do not have one	44	35.2%
No response	14	11.2%
Total	125	100

Hypothesis one

There is no significant relationship between knowledge and practice of malaria prevention. Chi-square is used to test this hypothesis and the result is presented in Table 6.

The result as presented in Table 6 shows that, (49.6%) of the respondents have good knowledge of malaria prevention, 64.8% have poor practice of malaria prevention, while less than half (35.2%) have good practice of

malaria prevention. Also, the calculated chi-square value of 9.442 is greater than the critical chi-square of 3.80 at 0.05 level of significance. Therefore, the null hypothesis which states that, there is no significant association between knowledge and practice of malaria prevention is rejected while the alternate hypothesis is upheld. Hence, there is significant association between knowledge of malaria prevention and practice of malaria prevention. ($\chi^2 = 9.442, p = 0.009$)

TABLE 6
Relationship between knowledge and practice of malaria prevention

Practice of Malaria prevention	Knowledge of Malaria and its prevention				X ²	P
	Poor	Fair	Good	Total		
Poor	16 (12.8%)	33 (26.4%)	32 (25.6%)	81 (64.8%)	9.442	0.009
Good	4 (3.2%)	10 (8.0%)	30 (24.0%)	44 (35.2%)		
Total	20 (16%)	43 (34.4%)	62 (49.6%)	125 (100%)		

p<0.05)

Hypothesis two

There is no significant relationship between the level of education and knowledge of malaria prevention. Chi-square was used to test this hypothesis and the result is presented in Table 7.

The results in Table 7 show that, the calculated chi-square value of 14.225 is greater than the critical chi-square of 3.80 at 0.05 level of significance. Therefore, the null hypothesis which states that, there is no significant

relationship between level of education and knowledge of malaria prevention is rejected while the null hypothesis is upheld. The result implies that there is significant association between level of education and knowledge of malaria prevention ($\chi^2 = 14.225$, $p = 0.007$). Also, the greatest percentage of respondents with tertiary education demonstrated better knowledge of malaria prevention than the others with lower educational level.

TABLE 7
Association between level of education and knowledge of malaria prevention

Level of education	knowledge of malaria prevention			Total	X ²	P
	Poor	Fair	Good			
Primary	2 (50.0)	2 (50.0)	0 (0.0)	4 (100)*	14.225	0.007
Secondary	8 (28.6)	12 (42.9)	8 (28.6)	28 (100)		
Tertiary	10 (10.8)	29 (31.2)	54 (58.1)	93 (100)		
Total	20 (16.0)	43 (34.4)	62 (49.6)	125 (100)		

p<0.05) *percentages written in parenthesis

DISCUSSION

This study examines the use of LLIN for malaria prevention among pregnant women in General Hospital, Lagos, Nigeria, which is in the heart beat of Lagos State. The demographic characteristics show that majority of the respondents are between 26-30 years of age, and 31-35years old. This age range falls within reproductive age. Majority of the respondents (74.4%) have tertiary education, also, majority of the respondents (54.4%) are employed and majority of the respondents (82.4%) are Christians. The obstetrics characteristics shows that majority of the respondents are with their first pregnancy with no child, no abortion and seldom has malaria.

Findings reveal that majority of respondents are knowledgeable about malaria and malaria prevention. This finding is similar to the findings of a study conducted by Omole, (2007) who reports that majority (74.2%) of the mothers know mosquito bite as the cause of malaria and

90% of them know fever as the major symptom of malaria and Desai (2012) posits that malaria makes a large but unquantifiable contribution to low birth weight in infants in the developing world, a major cause of morbidity and mortality in infants and children. This study is at variance with Oladokun (2011) who reports in his study that many households in Nigeria and other African countries, particularly in rural communities, exhibit poor knowledge of malaria and modalities for its control. Abasiattai (2009) further reveals that women in the rural areas have poor knowledge of malaria and use of LLINs when compared with their urban counterparts. Another study by Daboer (2010) also reveals a low level of knowledge of malaria among mothers and caregivers, with 49.6% of them being able to recognize the disease and only 24.9% attributing malaria to mosquito bite.

The result shows that the utilization of ITN/LLINS in malaria prevention by the respondents is poor. This study is in contrast to

Ndwiga (2014) who shows that majority of respondents attending Maternal and Child Health/Family Planning (MCH/FP) in a district hospital in Kenya (82.5%) use the nets for protection and 75% of them know the importance of ITNs. This study is similar to Kaliyaperumal, (2009) who concludes that the respondents' poor attitude and practice towards the ITNs utilization is due to lack of availability and affordability. Our study reveals that the reasons for not using ITN / LLINs by the respondents are because they do not have one and the ITN / LLINs cause heat. This study is in line with Malusha, (2009) where main reason cited by his respondents (72.3%) as hindrance to net utilisation is lack of treated nets in households. Belay, (2008) who further reveals that lack of access to ITNs (68.3%) and the perception that nets could not prevent malaria (27%) are the reasons for non-ownership of nets.

Our study also reveals that there is a significant association between knowledge of malaria prevention and level of education of respondents ($\chi^2 = 9.442$; $P < 0.05$) as respondents with tertiary education had the largest percentage (58.1%) of those with knowledge of malaria prevention. This study is similar to the study of Idowu (2011) who found that level of awareness and possession of insecticide treated nets as malaria preventive tool are 75.1% and 45% respectively, and they are positively and significantly influenced by high educational qualification of mothers in Nigeria. Our study also reports that there is a relationship between the knowledge and practice of malaria prevention among the respondents ($\chi^2 = 14.225$; $P < 0.05$). This study is in agreement with Sri-aroon (2008) that the use of impregnated bed nets is significantly related to the knowledge of malaria prevention, perception of benefits of ITN use, and receipt of information from malaria workers

CONCLUSION AND RECOMMENDATIONS

The respondents have good knowledge of malaria and its prevention, more than half (68.8) possessed the LLINs but only 24.8% of respondents use of LLIN for malaria prevention. There is a significant relationship between knowledge of malaria prevention and practice of malaria prevention and an association existed also between knowledge of malaria prevention and level of education of respondents. It is however recommended that the hospital management should endeavour to increase their effort in educating pregnant mothers on the prevention of malaria through the use of insecticide treated net while the Ministry of Health also organize a programme that would provide and necessitate the use of malaria prevention for the pregnant women. Also, adequate awareness should be created on how, why and when to use the Long – Lasting Insecticides Treated Net (LLITNs). Pregnant women should be enlightened and motivated on the prevention of malaria by the Government providing free LLITNs in primary and secondary hospitals; this will encourage pregnant women from using it as expected.

REFERENCES

- Abasiattai, A.M., Etukumana, E.A & Umoyoho, A.J (2009) Awareness and practice of malaria Prevention Strategies among pregnant women in Uyo, south-south Nigeria. *The Internet Journal of Gynae and Obst.* 11(1):1-8.
- Adebayo, A. M., Akinyemi, O. O., & Cadmus, E. O. (2015). Knowledge of malaria prevention Among pregnant women and female caregivers of under-five children in rural southwest Nigeria. *PeerJ*, 3, e792. <http://doi.org/10.7717/peerj.792>.
- Akinleye, S.O., Falade, C.O, & Ajayi, I.O (2009). Knowledge and utilization of

- intermittent Preventive treatment for malaria among pregnant women attending antenatal clinics in Primary health care centres in rural southwest, Nigeria: a cross-sectional study. *BioMed Central*. 9(1): 1-9.
- Augustincic Polec, L, Petkovic, J, Welch, V, Ueffing E, Ghogomu, E.T, Pardo J, et al (2015). Strategies to increase the ownership and use of insecticide-treated bed nets to prevent Malaria. *Cochrane Database Syst Rev*.3:CD009186.
- Baume, C.A., Marin & M.C. (2007). Intra-household mosquito net use in Ethiopia, Ghana, Mali, Nigeria, Senegal, and Zambia: are nets being used? Who in the household uses them? *American Journal of Tropical Medicine and Hygiene*. 77, (5):963-971.
- Belay, M & Deressa, W (2008). Use of insecticide treated nets by pregnant women and associated Factors in a predominantly rural population in northern Ethiopia. *Trop Med & Int Health*. 13(10): 1303-1313.
- Daboer, J.C, John, C, Jamda, A.M, Chingle, M.P, Ogbonna, C (2010). Knowledge and treatment Practices of malaria among mothers and caregivers of children in an urban slum in Jos, Nigeria. *Niger J Med*.19 (2):184–187.
- D'Alessandro, U, Langerock, P, Bennett, S, Francis, N, Cham, K & Greenwood, B.M (1996). The impact of a National impregnated bed net programme on the outcome of pregnancy in primigravidae in the Gambia. *The Trans Royal Soc Trop Med & Hyg*. 90: 487-492.
- Desai, M, ter Kuile, F.O, Nosten, F, McGready, R, Asamoah, K, Brabin, B, [et al](#) (2007). Epidemiology and burden of malaria in pregnancy. *Lancet Infect Dis*. 7(2):93-104.
- Federal Ministry of Health (2004). National guidelines and strategies for malaria prevention and control during pregnancy. A publication of the FMOH, Nigeria; Malaria control programme, Abuja.
- Filippi, V, Ronsmans, C, Campbell, O.M, Graham, W.J, Mills, A, Borghi, J, et al (2006). Maternal health in poor countries: the broader context and a call for action. *Lancet*. 368(9546):1535-41.
- FMOH (2005). Nigerian national malaria control programme; Case management and drug policy, Available at <http://www.nmcp.gov.ng/>
- Idowu, O.A, Sam-Wobo, S.O, Oluwole, A.S & Adediran, A.S (2011). Awareness, possession and use of insecticide-treated nets for prevention of malaria in children under five in Abeokuta, Nigeria. *J Paediatr Child Health*, 47(3):117–121.
- Kaliyaperumal, K, & Yesuf, D. (2009). Knowledge, attitudes and practices of local inhabitants about insecticide treated nets (ITNs) for malaria control in an endemic area of Ethiopia. *East Afr J Public Health*. 6 (2):205–210
- Malusha, J.M, Mwanzo, I, Yitambe, A & Mbugi, J.P (2009). Use of insecticide treated nets among caregivers of children under five years in Makueni district, Kenya. *East Africa Med J*. 86(7):308–313.
- Musa, O.I, Salaudeen, G.A & Jimoh, R.O. (2009). Awareness and use of Insecticide Treated Nets Among women attending ante-natal clinic in a Northern state of Nigeria. *Journal of Pakistan Medical Association*.59: 354-358.

- National Population Commission (NPC) (Nigeria) and ORC Macro. 2004. Nigeria Demographic and Health survey 2013. Calverton, Maryland: National Population Commission and ORC. Macro.pg 144-146.
- Kaliyaperumal, K & Yesuf, D (2009). Knowledge, attitudes and practices of local inhabitants about Insecticide treated nets (ITNs) for malaria control in an endemic area of Ethiopia. *East African journal of public health*, 6;(2): 205-210.
- Ndwiga, T, Kei, R.M, & Dancan, O.W (2014). Utilization of Insecticide Treated Bed Nets among Mothers Attending MCH/FP in Webuye District Hospital, Bungoma County, Kenya. *Open J Prev Med*.4 (06):470–480.
- Obionu, C (2007). Primary health care for developing countries. 2nd edition. Enugu: Delta Publications Ltd, 79-94.
- Oladokun, A, Oladokun, R.E, Adesina, O.A (2011). Knowledge and utilization of malaria control Measures by pregnant and newly delivered mothers in Ibadan, Nigeria. *African health Sciences*, 11(4): 573-7.
- Omole, M.K, Alabi, O.M & Ayoola, O.O (2007). Mother's knowledge on the cause, prevention and symptoms of malaria in a university staff clinic in an urban setting in South-Western Nigeria. *Afr J Med Sci*.36(1):49–55.
- Park, K. (2005). Epidemiology of Communicable Diseases. Parks Textbook of preventive and Social medicine. 18th edition, Jabalpur. M/s Banarsidas Bhanot. 201-211.
- Parise, M.E, Ayisi, J.G, Nahlen, B.L, Schultz, L.J, Roberts, J.M & Misore, A, et al (2008). Efficacy of sulfadoxine – pyrimethamine for prevention of placental malaria in an area of Kenya with high prevalence of malaria and human immunodeficiency virus infection. *American Journal of Tropical Medicine and Hygiene*. 59:813-822.
- Sri-aroon P. (1998). Maternal influence on the use of impregnated bednets in the protection of Infantile malaria. *Southeast Asian J Trop Med Public Health*. 29(4):702–705.
- Ter Kuile, F, Terlouw, D.J, Phillip-Haward, P.A, Haweley, W.A, Friendman, J.F, Karuiki, S.K, et al. (2013). Reduction of malaria during pregnancy by permeltrin-treated bed nets in an area of intense perennial malaria transmission in Western Kenya. *American Journal of Tropical Medicine and Hygiene*, 68(4): 50 – 60.
- World Health Organisation (2004). Roll back malaria, 2004. What is Malaria? Available at World http://rbm.who.int/cmc_upload/0/000/015/372/RBMInfosheet_1.htm.
- Health Organisation. Roll Back Malaria report, 1999. Making a difference. Available at : 49-68).