

EXTENT AND PATTERNS OF UTILIZATION INSECTICIDE TREATED BED NETS AMONG ANTE-NATAL AND NURSING MOTHERS IN UDENU LOCAL GOVERNMENT OF ENUGU STATE OF NIGERIA

Peter Nnamdi Ezeh¹ & E. S. Samuel²

^{1,2}Department of Human Kinetics and Health Education
University of Nigeria, Nsukka

Abstract

The study was designed to ascertain the extent and patterns of utilization of insecticide treated bed nets (ITNs) among ante-natal and nursing in Udenu Local Government Area of Enugu State. The descriptive cross section research design was employed. The instrument for data collection was the researcher structured questionnaire. The population for the study comprised all ante-natal and nursing mothers in Udenu LGA of Enugu State attending ante-natal and post-natal clinics in the private and government health centers. A sample size of 528 subjects were selected for the study. Means were used to answer the research questions while one way ANOVA statistic was used in testing all the hypotheses at .05 level of significance. The major findings from the study revealed that: Except antenatal mothers with none formal education who utilized ITNs to a low extent, others antenatal and nursing mothers with other levels of education utilized ITNs to a moderate extent. There was no significant difference in the utilization of ITNs among ante-natal and nursing mothers based on the level of education during pregnancy; while there was significant difference in protection of their young children with ITN's based on level of education. There was no significant difference in the utilization of ITNs among ante-natal and nursing mother based on the period of the year during pregnancy, after childbirth and protection of their young children. The researcher recommended that the antenatal and nursing mothers should be adequately educated on the consequences of malaria in pregnancy and children below five years of age so that they will understand the need for early adoption and correct use of ITNs and as well as providing more ITNs to pregnant and nursing mothers.

Keywords: Extent, Patterns, Utilization, Insecticides, Bednet, Antenatal and Nursing Mothers

Introduction

Brain, Abel, Habila, George, Emmanuel, William, Els, and Frank (2006) opined that malaria remains a major public health problem in sub-Sahara Africa. Though all segments of society are afflicted, children under 5 years of age (U-5) and pregnant woman (P-W) suffer most of the morbidity and mortality. They emphasized that the World Health Organization and Roll Back malaria initiative aims to decrease the burden of malaria disease through three proven interventions. The first is concerned with the prompt management of presumed malaria cases, that is immediate investigation, diagnosis, treatment or management of persons with malaria disease. The second is the intermittent preventive treatment of pregnant women. This, according to Thomson (1996) refers to the Nigeria policy on prevention of malaria which recommends giving women of all parities two doses of chloroquine as intermittent preventive treatment (IPT) in the second and third trimester of pregnancy. It has been observed that due to plasmodium resistance to chloroquine, sulfadoxine- pyrimethamine (SP) has been used to replace chloroquine. Two doses of SP is administered during the second and third trimester (May, Serra-Casas, Sanz, Aponti, Macete, Mandomando, Puvol, Berzosa, Debano, Aide, Sacarlal, Berrito, Alonso, & Mendendez 2008). The third intervention is the wide-spread use of insecticide treated bed nets (ITNs), in which individuals especially pregnant and nursing mothers and children are encouraged to sleep under it to protect them against mosquito bites.

Guyatt and Ochala (2003) defined insecticide treated bed net as a bed net that has been treated with insecticide to protect against mosquitoes and malaria. They maintained that the provision of insecticide-treated bed nets (ITNs) is universally accepted as an efficacious and essential public health service in most parts of sub-Saharan African malaria endemic areas. On the other hand, Olusola, Moshe and Olayemi (2008) described a mosquito net as an insecticide treated net (ITN), if it was pre-factory-treated or has been dipped in insecticide within the last 6-12 months.

Kilama (2000) noted that, over the years, various attempts to reduce, control or eliminate malaria globally and at country level have not been successful because most measures instituted would not be sustained long enough to accomplish the task. Besides, the lack of fund and inability of national malaria control programmes to apply appropriate epidemiological and socio-cultural aspects to control programmes hamper efforts to control the disease. In response to the need for low-cost preventive measures, Adongo, Kirkwood and Kendall (2005) stated that renewed attention has been directed to assessing the potential benefits of insecticide treated bed nets (ITNs), which reduce man-vector contact and child mortality and morbidity. They indicated that the impressive results achieved from efficacy trials of ITNs in sub-Saharan Africa have given hope for programmes to prevent and control malaria related morbidity and mortality. Unfortunately, most people see bed nets as a nuisance reduction tool, which means that they will be used by adults instead of children to reduce nuisance caused by mosquitoes (Adongo, Kirkwood & Kendal, 2005). However, WHO, CDS and RBM (2002) stated that Roll Back Malaria global partnership promotes the use of ITNs for everyone at risk of malaria especially children and pregnant women, irrespective of extent of use.

Firefox (2010) defined extent as the point or degree to which something extends. However, the point or degree could be the coverage, range, limit, surface area or scope to which something might extend, indicating the utilization of ITNs among ante-natal and nursing mothers in Udeno Local Government Area where the present study was conducted. In this context, extent of utilization of ITNs may indicate the degree by which ITNs are being utilized at a particular period of time among nursing mothers.

Whitehurst and Jaco (1985) purported that utilization is the use or patronage of health services by the target population or by the people to whom the services are designed for. In this present study, utilization of ITNs refers to the use of ITNs by ante-natal and nursing mothers for the protection against infectious mosquitoes. Ante-natal mothers are pregnant women that are expecting to give birth to a baby and are required to obtain complete ante-natal services including ITNs and ensure good gestational period while nursing mother is a woman who feeds a baby on the breast, hold a baby or a child on the knees, clasps caressingly, and gives special care to him or her. In this study, a nursing mother is a woman who feeds a baby on the breasts, provides modern lactational services to the child such as exclusive breast feeding within the first six months of age, obtain immunization services and adequate use of ITNs especially for the under five years of age. Person (2007) stated that ante-natal care (ANC) is medical services given to women who are going to have a baby. These services include prevention and treatment of anemia; prevention, detection and treatment of malaria; service against tuberculosis, sexually transmitted infections (STIs) and HIV and tetanus toxoid immunizations. The author further emphasized that ANC is an opportunity for providers to promote the benefit of skilled attendance at birth and post-partum or post-natal care, and to discuss new borne care and optimal birth spacing. It is also an essential link where the benefits and the pattern of use of ITNs are being discussed.

Pattern is regular way in which something happens, develop or is done. Predemore, Andrew and Spivak (2003) classified patterns into three main types. These include demographic, temporal and spatial patterns (or variations). Maris (1985) and Stillion (1985) described demographic variations as patterns that is concerned with variables of age, gender, level of education, marital status, occupation, socio-economic and health status. In this study, variables of demographic variations were concerned with variables such as age, sex, marital status, occupation and education. The temporal variations are related to variables such as seasons, months, days of the week, presidential elections, public holidays, national holidays and so on (Predemore et al 2003). In this study, temporal variations were concerned with variables such as seasons, months, days of the week and period of the day. The use of time in utilization of ITNs is important because it may be morning, evening, night or during the day or rainy season, which are good periods for mosquito breeding and attack. Predemore et al (2003) described spatial variation or pattern based on geographic regions in a particular country which could be divided into economic and administrative regions or as a result of the mixture of structural and cultural factors, which may be west or eastern part of a country. In this study, spatial variations of utilization of ITNs were not utilized because Udeno Local Government is not an urban area.

Udeno Local Government Area is in guinea savanna zone. In view of this, there is tendency of presence of mosquitoes due to some fringing forest present. It is also clear that forested areas relatively harbour mosquitoes due to eat cooling effect of this area, occasioned by some elements of

evapo transpiration. Also the area lines within double maxima regime of rainfall; and this very fact, makes the area a humid region that always favour weather for mosquito breeding. It was in line with this that the investigator focused on ascertaining the extent and patterns of utilization of ITNs among ante-natal and nursing mothers in Udenu Local Government Area of Enugu State based on the following questions:

1. What is the utilization of ITNs among ante-natal and nursing mothers in Udenu Local Government Area of Enugu State based on demographic patterns?
2. What is the utilization of ITNs among ante-natal and nursing mothers in Udenu Local Government of Enugu State according to temporal pattern?

The following hypotheses were postulated and tested at .05 level of significance

1. There is no significant different in the extent of utilization of ITNs among ante-natal and nursing mothers based on level of education.
2. There is no significant difference in the extent of utilization of ITNs among ante-natal and nursing mothers based on the period of the year.

Method

In order to achieve the purpose of this study, the cross-sectional design was employed, utilizing the cross-sectional method. The sample for the study consisted of 529 ante-natal and nursing mothers drawn by using a multi-staged sampling techniques without replacement to draw the sample. The questionnaire comprised most of the statements designed to obtain information from the bio-data of the respondents, inquiring into the patterns of utilization of ITNs among ante-natal and nursing mothers.

The respondents were required to indicate the extent of utilization of ITNs as follows; high extent, moderate extent, low extent and never extent with assigned values of 4, 3, 2 and 1 respectively. Face validity of the instrument was established by five experts from University of Nigeria, Nsukka. Spearman-Brown proficiency (correction) formula statistic was used to determine the reality of (MUPTIN). Based on this, reliability coefficient of 0.60 for MUPTIN was obtained and it was considered reliable enough for the achievement of the set objectives for this study. The researchers and research assistant administered 529 copies of MUPTIN to the respondents. The 529 copies of the questionnaires were collected back from the respondents on the spot to ensure high return rate. All properly completed copies of the instrument were utilized for data analysis.

The information from the questionnaire were coded using the statistical package for social sciences (SPSS) batch system to analyze the data. In determining the extent of utilization, mean score for each item or grand mean of each dimension was used to determine whether extent was high or low. It was used to answer all the research questions. In answering the research questions, the following scales were used. A score of 3.50-4.00 was regarded as high extent, 3.00-3.49 was regarded as moderate extent, 2.00-2.99 was regarded as low extent, and 1.00-1.99 was regarded as no extent. One way ANOVA statistic was used to test all the hypotheses at .05 level of significance.

Results

Table 1

Utilization of ITNs among Ante-natal and Nursing Mothers Based on Level of Education

Items of utilization	Ante-natal mothers (n=218)						Nursing mothers (n=310)										
	None formal education (n=14)	Primary education (n=49)	Secondary education (n=99)	Tertiary education (n=56)	Non formal education (n=11)		Primary education (n=51)	Secondary education (n=163)	Tertiary education (n=85)								
	\bar{X}_1	\bar{X}_2	\bar{X}_3	\bar{X}_4	\bar{X}_1		\bar{X}_2	\bar{X}_3	\bar{X}_4								
Accepted the Use of ITNs during pregnancy	3.14	TME	3.47	TME	3.53	THE	3.45	TME	3.18	TME	3.51	THE	3.61	THE	3.58	THE	
Slept under ITNs during pregnancy	2.86	TLE	3.33	TME	3.11	TME	3.30	TME	3.00	TME	3.31	TME	3.28	ME	3.34	TME	
Re-treated ITNs during pregnancy	2.93	TLE	2.53	TLE	2.88	TLE	2.57	TLE	3.09	TME	2.92	TLE	2.88	TLE	2.82	THE	
Use ITNs during rainy seasons during pregnancy	3.00	TME	3.41	TME	3.58	THE	3.79	THE	3.09	TME	3.65	THE	3.60	THE	3.78	THE	
Use ITNs during dry seasons during pregnancy	2.71	TLE	2.69	TLE	2.87	TLE	2.79	TLE	3.00	TME	2.86	TLE	2.72	TLE	2.72	THE	
Use ITNs during day time during pregnancy	2.36	TLE	2.55	TLE	2.43	TME	2.27	TLE	3.00	TME	2.35	TLE	2.47	TLE	2.16	TLE	
Use ITNs at night during pregnancy	2.93	TLE	3.39	TME	3.58	THE	3.70	THE	3.09	TME	3.45	TME	3.60	THE	3.61	THE	
Feel hot under ITNs during pregnancy	2.43	TME	2.78	TLE	2.93	TLE	3.04	TME	2.82	TLE	3.00	TME	3.09	TME	2.91	TLE	
Accepted the use of ITNs after child birth	3.36	TME	3.45	TME	3.52	THE	3.75	THE	3.18	TME	3.49	TME	3.69	THE	3.59	THE	
Slept under ITNs after child birth	3.21	TME	3.41	TME	3.44	TME	3.55	THE	3.27	TME	3.45	TME	3.48	TME	3.41	TME	
Retreated ITNs after child birth	3.07	TME	2.45	TLE	2.87	TLE	2.71	TLE	3.27	TME	2.82	TLE	2.91	TLE	2.81	TLE	
Use ITNs during rainy season after child birth	3.00	TLE	3.55	THE	3.67	THE	3.73	THE	3.18	TME	3.71	THE	3.58	THE	3.65	THE	
Use ITNs during dry season after child birth	2.79	TLE	2.71	TLE	2.76	TLE	2.93	TLE	3.18	TME	3.00	TME	2.91	TLE	2.72	TLE	
Use ITNs in the day time after child birth	3.71	TME	2.65	TLE	2.73	TLE	2.64	TLE	2.55	TLE	2.75	TLE	2.80	TLE	2.36	TLE	
Use ITNs at night after child birth	3.29	TLE	3.39	TME	3.55	THE	3.80	THE	3.36	TME	3.59	THE	3.57	THE	3.60	THE	
Feel hot under ITNs after child birth	2.71	TME	2.86	TLM	2.64	THE	3.00	TME	2.64	THE	2.90	TLE	2.99	TLE	2.99	TLE	
Protects young children against mosquito bites	3.50	TME	3.63	THE	3.67	THE	3.70	THE	3.64	THE	3.65	THE	3.67	THE	3.71	THE	

Enlightens the older siblings on the need of ITNs use	3.07	TME	3.53	THE	3.35	TME	3.52	THE	3.55	THE	3.35	TME	3.58	THE	3.45	TME
Protects young children with ITNs during rainy season	3.43	TME	3.63	THE	3.75	THE	3.71	THE	3.09	TME	3.61	THE	3.65	THE	3.64	THE
Protects young children with ITNs during dry season	3.00	TME	2.80	TLE	2.97	TLE	2.89	TLE	3.36	TME	2.90	TLE	3.02	TME	2.93	TLE
Protects young children with ITNs during the night	3.00	TME	3.33	TME	3.64	THE	3.61	THE	3.02	TME	3.75	THE	3.53	THE	3.64	THE
The grand mean	2.98	TLE	3.13	TMI	3.21	TIME	3.26	TME	3.12	TME	3.24	TME	3.10	TME	3.21	TME

Data in Table 1 further show the pattern of ITNs utilization according to educational background. The data in table shows the grand mean value for mothers of tertiary education ($\bar{x} = 3.26$) which was slightly higher than that of mother secondary with education ($\bar{x} = 3.21$), primary education ($\bar{x} = 3.13$). These imply that ante-natal mothers of these educational levels utilized ITNs to a moderate extent. Ante-natal mothers with no formal education had grand mean value of $\bar{x} = 2.98$ value of mothers with implying that they utilized ITNs to a low extent. The table further indicates the grand mean score of primary education ($\bar{x} = 3.24$) which was slightly higher than those of tertiary education ($\bar{x} = 3.21$), non-formal educated ($\bar{x} = 3.12$) and those in secondary education ($\bar{x} = 3.10$). This implies that nursing mothers utilized ITNs to a moderate extent. The table further reveals that the mean value for mothers secondary with education ($\bar{x} = 2.73$) which was slightly higher than that of non formal education ($\bar{x} = 2.71$), primary education ($\bar{x} = 2.65$), tertiary education ($\bar{x} = 2.64$). These imply that ante-natal mothers of these levels of education utilized ITNs in the day time to a low extent. The table also indicates the mean value of mothers with secondary education ($\bar{x} = 2.80$) which was slightly higher than that mothers with primary education ($\bar{x} = 2.75$) none formal education ($\bar{x} = 2.55$) and mothers with tertiary education) ($\bar{x} = 2.36$). This indicates that nursing mothers also utilized ITNs to a low extent. The table also reveals that both ante-natal and nursing mothers of educated groups utilized ITNs to a low extent. The table also reveals that both antenatal and nursing mothers of all education levels utilized ITNs in the protection of their young children against mosquito bites (mothers with formal education $\bar{x} = 3.50$, primary education $\bar{x} = 3.63$, secondary education $\bar{x} = 3.67$, tertiary education $\bar{x} = 3.70$, nursing mothers with non-formal education = 3.64, primary education $\bar{x} = 3.65$, secondary education $\bar{x} = 3.67$ and tertiary education $\bar{x} = 3.71$) utilized ITNs to low extent. Besides these two items all other items in the table had mean value which indicated low, moderate to a high extent of utilization.

Table 2
Utilization of ITNs among Ante-natal and Nursing Mothers Based on Period of the Year

Items of utilization	Ante-natal mothers (n=218)								Nursing mothers (n=310)							
	None formal education (n=41)		Primary education (n=84)		Secondary education (n=8)		Tertiary education (n=85)		Non formal education (n=74)		Primary education (n=98)		Secondary education (n=7)		Tertiary education (n=131)	
	\bar{X}_1	THE	\bar{X}_2	TME	\bar{X}_3	TME	\bar{X}_4	TME	\bar{X}_1	THE	\bar{X}_2	THE	\bar{X}_3	TME	\bar{X}_4	THE
Accepted the Use of ITNs during pregnancy	3.56	THE	3.45	TME	3.00	TME	3.47	TME	3.55	THE	3.55	THE	3.00	TME	3.62	THE
Slept under ITNs during pregnancy	3.29	TME	3.04	TME	2.88	TLE	3.33	TME	3.54	THE	3.08	TME	2.89	TLE	3.34	TME
Re-treated ITNs during pregnancy	2.71	TLE	2.39	TLE	3.12	TME	3.02	TLE	3.22	TME	2.51	TLE	2.71	TLE	2.98	TLE
Use ITNs during rainy seasons during pregnancy	3.51	THE	3.62	THE	3.12	TME	3.55	THE	3.72	TME	3.66	THE	2.71	TLE	3.63	THE
Use ITNs during dry seasons during pregnancy	2.83	TLE	2.68	TLE	2.75	TLE	2.91	TLE	2.93	TLE	2.47	TLE	2.57	TLE	2.87	TLE
Use ITNs during day time during pregnancy	2.68	TLE	2.02	TLE	3.00	TLE	2.61	TLE	2.68	TLE	1.84	TME	1.71	TME	2.66	TLE
Use ITNs at night during pregnancy	3.44	TME	3.65	THE	2.38	TLE	3.54	THE	3.69	THE	3.64	THE	3.00	TME	3.45	TME
Feel hot under ITNs during pregnancy	2.93	TLE	2.95	TLE	2.75	TLE	2.82	TLE	3.19	TME	3.01	TME	3.00	TME	2.92	TLE
Accepted the use of ITNs after child birth	3.54	THE	3.61	THE	3.62	THE	3.49	TME	3.74	THE	3.51	THE	3.00	TME	3.65	THE
Slept under ITNs after child birth	3.39	TME	3.52	THE	3.13	TME	3.44	TME	3.62	THE	3.36	TME	3.00	TLE	3.44	TME
Retreated ITNs after child birth	2.61	TLE	2.64	TLE	3.12	TME	2.88	TLE	3.28	TME	2.48	TLE	2.86	TLE	2.95	TLE
Use ITNs during rainy season after child birth	3.41	TME	3.73	THE	3.25	TME	3.64	THE	3.73	THE	3.61	THE	2.57	TLE	3.59	THE
Use ITNs during dry season after child birth	2.71	TLE	2.79	TLE	3.00	TME	2.82	TLE	3.05	TME	2.84	TLE	2.57	TME	2.83	TLE
Use ITNs in the day time after child birth	2.78	TLE	2.46	TLE	2.50	TLE	2.88	TLE	2.84	TLE	2.38	TLE	3.00	TME	2.76	TLE
Use ITNs at night after child birth	3.44	TME	3.76	THE	2.75	TLE	3.49	TME	3.68	THE	3.59	THE	3.29	TME	3.52	THE
Feel hot under ITNs after child birth	2.88	TLE	2.74	TLE	2.25	TLE	2.84	TLE	3.05	TME	2.89	TLE	3.00	TME	2.92	THE
Protects young children against mosquito bites	3.66	THE	3.81	THE	2.50	TLE	3.61	THE	3.74	THE	3.64	THE	3.29	TME	3.69	THE
Enlightens the older siblings on the need of ITNs use	3.46	TME	3.50	THE	3.12	TME	3.34	TME	3.62	THE	3.51	THE	3.14	TME	3.45	TME
Protects young	3.59	THE	3.74	THE	3.62	THE	3.71	THE	3.68	THE	3.66	THE	3.43	TME	3.56	THE

children with ITNs during rainy season	Protects young children with ITNs during dry season	2.93	TLE	2.96	THE	2.50	TLE	2.89	TLE	3.09	TME	2.95	TLE	2.71	TLE	2.97	TLE
Protects young children with ITNs during the night		3.34	TME	3.69	THE	2.75	TLE	3.51	THE	3.64	THE	3.63	THE	3.14	TME	3.53	THE
The grand mean		2.98	TLE	3.18	TME	2.91	TIME	3.23	TME	3.39	TME	3.13	TME	2.88	TME	3.25	TME

Data in Table 2 show that the grand mean value for day and night ($\bar{x} = 3.23$) which was slightly higher than that of throughout the year ($\bar{x} = 3.18$), and during the night only ($\bar{x} = 3.18$). These means indicate that ante-natal mothers utilize ITNs to a moderate extent during the period of the year. The grand mean value for during the day only ($\bar{x} = 2.91$). This implies that the antenatal mother utilized ITNs to a low extent. The table further reveals the grand mean value of throughout the year ($\bar{x} = 3.39$) which is slightly higher than that of day and night only ($\bar{x} = 3.25$), during the night only ($\bar{x} = 3.13$), implying that nursing mothers utilized ITNs during those periods of the year to a moderate extent. The grand mean value for during the day only ($\bar{x} = 2.88$) implies that nursing mothers utilized ITNs to a low extent.

The table further indicates the mean score for day and night ($\bar{x} = 2.91$) which was slightly higher than that of throughout the year ($\bar{x} = 2.83$), during the day only ($\bar{x} = 2.75$), and during the night only ($\bar{x} = 2.68$). These imply that ante-natal mothers utilized ITNs to a low extent in the dry seasons during pregnancy within the period of the year. The table further reveals the mean values for throughout the year ($\bar{x} = 2.93$) which was slightly higher than that of day and night ($\bar{x} = 2.87$), during the day only ($\bar{x} = 2.57$) and during the night only ($\bar{x} = 2.47$). These imply that nursing mothers also utilized ITNs to a low extent. The value in the table further reveal the means value for day only ($\bar{x} = 3.00$), which indicates that the antenatal mothers utilized ITNs to a moderate extent in the day time during pregnancy. The table also indicates mean values for throughout the year ($\bar{x} = 2.68$) which was slightly higher than that of day and night ($\bar{x} = 2.61$) and during the night only ($\bar{x} = 2.02$). These imply that antenatal mothers utilized ITNs within those periods of the year to a low extent. The table further shows that the mean value for throughout the year ($\bar{x} = 2.68$) which was slightly higher than that of day and night ($\bar{x} = 2.66$). These imply that the mothers utilized ITNs in the day time during pregnancy to a low extent. The table further reveals mean value for night only ($\bar{x} = 1.84$) which was slightly higher than that of day only ($\bar{x} = 1.71$). This indicates that the nursing mothers utilized ITNs in the day time during pregnancy to no extent. Besides, these two items of utilization of ITNs during dry seasons and day time, all other items in the table indicate low, moderate to a high extent respectively.

Table 3

Summary of One Way ANOVA Testing the Difference in the Utilization of ITNs among Antenatal and Nursing Mothers based on Level of Education

Sources of variation	Period of the year	Sum of squares (SS)	Df	Mean square (MS)	F-cal	P-value	Decision
During pregnancy	Between groups	28.211	3	9.404	.594	.619	Not Significant
	Within groups	8299.031	524	15.838			
After child birth	Between groups	129.257	3	43.086	2.916	.034	Not Significant
	Within groups	7741.362	525	14.774			
Protection of their young children	Between groups	84.123	3	28.041	3.861	.009	Significant
	Within groups	3805.787	524	7.263			

Overall F-Value = 2.457, df = 3 and 524, P-value = 0.221

The Table shows an overall F-value of 2.457 with a corresponding P-value of 0.221 at 3 and 524 degrees of freedom. Since P-value is greater than .05 level of significance, the cluster null hypothesis is therefore accepted. This implies that the extent of utilization of ITNs by antenatal and nursing mothers during pregnancy, after child birth and in protecting their young children against mosquito bite is the same.

The Table 3 further indicates the calculated F-value for utilization of ITNs among antenatal and nursing mothers during pregnancy (F= 594; P = .619) with its corresponding P-value, which is greater than .05 level of significance at 3 and 524 degrees of freedom. The null hypothesis of no significance difference in the utilization of ITNs among antenatal and nursing mothers based on level of education is therefore accepted. This implies that antenatal and nursing mothers utilization of ITNs during pregnancy is the same irrespective of their educational status. The table further shows the calculated F-values for after child birth (F = 2.96, P = .034) and protection of the young children (F = 3.861, P = .009) with their corresponding P-values which are less than .05 level of significance at 3 and 524 degrees of freedom. The null hypothesis of no significant difference is therefore rejected. This implies that utilization pattern of ITNs by antenatal and nursing mothers differed according to level of education.

Table 4

Summary of One Way ANOVA Testing the Difference in the Utilization of ITNs among Antenatal and Nursing Mothers based on Temporal Pattern According to Period of the Year

Sources of variation	Period of the year	Sum of squares (SS)	Df	Mean square (MS)	F-cal	P-value	Decision
During pregnancy	Between groups	7.792	3	2.597	.164	.924	Not Significant
	Within groups	8319.4560	524	15.877			
After child birth	Between groups	19.655	3	6.552	.437	.726	Not Significant
	Within groups	7850.964	524	14.984			
Protection of their young children	Between groups	25.879	3	8.626	1.170	.321	Not significant
	Within groups	3864.030	524	7.374			

Overall F-Value = 0.590, df = 3 and 524, P-

value = 0.657

The Table shows an overall F-value of 0.590 with a corresponding P-value of 0.657 at 3 and 524 degrees of freedom. Since P-value is greater than .05 level of significance, the cluster null hypothesis is therefore accepted. This implies that the extent of utilization of ITNs by antenatal and nursing mothers during pregnancy, after child birth and in protection of their young children against mosquito bite is the same.

Table 4 shows the calculated F-values for utilization of ITNs among antenatal and nursing mothers during pregnancy (F = .164; P = .942), after child birth (F = .437; P = .726), protection of their young children (F = 1.170; P = .321) with their corresponding P-values which are greater than .05 level of significance at 3 and 524 degrees of freedom. The null hypothesis of no significance difference in the utilization of ITNs among antenatal and nursing mothers based on period of the year of ITNs use was therefore accepted. This implies that the utilization of ITNs among antenatal and nursing mothers to period of the year was the same.

Discussion

Except antenatal mothers with non-formal education who utilized ITNs to a low extent, pregnant and nursing mothers with other level of education utilized ITNs to a moderate extent (Table 1). This finding is consistent with Rachel, Hasifa, Sara, Robert and Simon (2010) opinion that the least poor and most educated were still significantly more likely to own and use bed nets than their poorer and less well educated counterparts. They further reported that usage of ITNs by school age children was also strongly associated with educational level of the household heads. Similarly, Jombo, Alao and Gyoh (2011) opined that educational and economic factors were found to significantly influence ITNs utilization in the community. The finding is also consistent with the findings of Eisele, eating, Littrell, Larsen and Macintyre (2009) who found maternal education to be an inconsistent determinant of bed net use in their study on ITNs use and maternal education across 15 African countries.

Except nursing mothers who utilized ITNs during the day to a low extent, pregnant and antenatal mothers utilized ITNs during other periods to a moderate extent (Table 2). The finding in the table indicated that both antenatal and nursing mothers utilized the ITNs throughout the year; which embraced the RBM initiatives of ITNs utilization. The finding is consistent with Laura's (2007) study on social learning behaviour. Laura revealed that once people start using a mosquito bed net, they should continue. The finding is also consistent with Binka and Adongo (1997) opinion that people could be motivated to use ITNs if they gained appreciation of the fact that although not as high as during the raining season, the risk of contracting malaria persists throughout the year. The finding contradicts with that of Rodriguez, Penilla et al (2003) finding that ITNs compliance was found to be very high in the rainy season but drops substantially in the hot dry season. Hypotheses of no significant difference in the utilization of ITNs according level of education was accepted. The reason may be that most of the mothers attended antenatal clinics where the benefits of ITNs use are discussed.

Conclusion

On the basis of the findings and discussion, the following conclusions were reached:

1. Utilization of ITNs did not vary according to level of education
2. There was not difference in the utilization of ITNs according to temporal variation.

Recommendation

Antenatal and nursing mothers should be adequately educated on the consequences of malaria in pregnancy and children below five years of age so that they will understand the need for early adoption and correct use of ITNs. Addition efforts should be intensified in the distribution of ITNs to pregnant and nursing mothers.

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