

**FACTORS INFLUENCING THE USE OF INSECTICIDE TREATED NETS (ITNs)
AMONG PREGNANT WOMEN IN KUMBO WEST DISTRICT, NWR CAMEROON**

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Abbreviations

ANC Antenatal Clinic

CRTV	Cameroon Radio and Television
FGD	Focus Group Discussion
GMP	Global Malaria Program
IPT	Intermittent Preventive treatment
IRS	Indoor Residual Spray
ITNs	Insecticide Treated Nets
LLIN	Long lasting Insecticide Nets
MPH	Ministry of Public Health
PHCU	Primary Health Care Unit
SPSS	Statistical Package for Social Science
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

CHAPTER 1: BACKGROUND

1.1 Introduction and Literature Review

Malaria is a public health problem today in more than 90 countries inhabited by a total of some 2,400 million people which constitute 40% of the world's population. Worldwide prevalence of the disease is estimated to be in the order of 300-500 million clinical cases each year and more than 90% of all cases are in Sub – Saharan Africa (Paul, 2003).

Insecticide-treated nets (ITNs) or long-lasting insecticidal nets (LLINs) are nets impregnated with synthetic pyrethroid insecticides that cover a person in bed, and are an effective tool for vector control (Ba kote'e, 2003). People have used bed nets as protection from various pests for decades, but they have only recently been employed as a strategy for malaria control. The World Health Organization (WHO, 2010) encourages pregnant women and young children, who are most at risk from malaria to use ITNs. Several studies have confirmed their efficacy at reducing mortality and morbidity in these two population groups (Ba kote'e, 2003).

About twenty-five million pregnant women were at risk for malaria, accounting for over 10,000 maternal and 200,000 neonatal deaths per year (Roll Back Malaria, 2005). In Cameroon, malaria is endemic in the 10 regions, with an estimated prevalence of 29% (Sumo et al., 2015).

1.1.1 Influence of Socio-demographic Factors

A study carried out in Kenya showed that women and children are responsible for the uses of ITNs rather than men. Also a woman feeling that health education was targeted towards women, yet men control resources and are often the main decision makers in the households. Lack of involvement of women in health education has been linked to low utilization of nets since men are the ones who provide money to buy the nets (Chuma, 2010).

The misconception that ITNs should only be used during rainy season when mosquitoes are assumed to be high is a major drawback in the fight against malaria (Njoroge *et al*, 2007).

1.1.2 Influence of socio-cultural factors on use of ITNs

A study done by Njoroge *et al*, (2007) about socio-cultural beliefs in Kilifi Mijikenda has shown that some ethnic groups did not like the nets because they were white in colour and had a rectangular shape that resembles a coffin. The same study done on the use of insecticide treated bed nets among 220 pregnant women attending clinic in Kilifi district-Kenya, revealed that good practice on the use of ITNs was high among the Christians. From this study, there was a significant association between religion and good practice. There was low level of use among non-Christians.

1.1.3 Influence of Socio-economic Factors

Relatively high prices continue to act as a barrier to ITN use. When women as the main caretakers recognize illness but decision-making and control over resources (i.e. money for covering transport costs) are in the hands of their husbands, possibly having other priorities, perceived necessity and action do not correspond. Studies have shown that in most communities, net use is lowest among the poorest (Howard *et al*, 2003).

1.1.4 Factors related to accessibility and availability

Thousands of people around the world are showing their commitment to ending malaria deaths by 2020 by sending nets, throwing fundraisers, and spreading the buzz about malaria prevention. According to Sauber (2010) there has been large improvement in education, distribution and use of ITNs in Africa. If this trend of approach continues, many lives will be saved and many families in good health.

One of the targets set at the Abuja Summit in April 2000 was to have 60% of populations at risk sleeping under ITNs by 2005. This required 32 million mosquito nets and a similar number of insecticide re-treatments each year. To achieve this, much work still needs to be done to make ITNs affordable, widely available, and most importantly acceptable by the consumer. A variety

of different approaches are being taken to promote ITN use, reduce their cost and ensure their quality (Karen, 2010).

The Cameroon ministry of Public health pays for full cost of ITNs such that it is distributed to all pregnant women free of Charge. According to the distribution plan, households will receive a coupon from a mobile health personnel containing basic information and the number of treated mosquito bed nets allocated. On an announced date, each household will receive a treated mosquito bed net for two persons and an additional net for one extra person (CRTV, 2019). Going by 2018 statistics, 45% of persons hospitalized in 2017 suffered from malaria. As a result of government's relentless efforts to fight the disease, the country has seen malaria related deaths drop from 18.8% -12.5% within the last three years. Though after distribution, individuals will have to buy (CRTV, 2019).

1.2 Statement of the Problem

Malaria is the most common disease during pregnancy and is a major public health problem in the tropical and sub-tropical regions. Each year approximately half of the 30 million women who suffer from malaria are transmitted by plasmodium falciparum (WHO, 2007). An estimated 100,000 of pregnant women and 200,000 of their newborn die annually as a result of malaria in pregnancy in the World (WHO, 2007).

The WHO Global Malaria Programme (WHO/GMP) recommended the following three primary interventions for effective malaria control, towards achieving the Millennium Development Goals which ended in 2015: diagnosis of malaria cases and treatment with effective medicines, distribution of insecticide-treated nets (ITNs), more specifically long-lasting insecticidal nets (LLINs) to achieve full coverage of populations at risk of malaria; and indoor residual spraying (IRS) to reduce and eliminate malaria transmission.

The government of Cameroon through the Ministry of Public Health has continued distributing ITNs targeting pregnant women in Cameroon. Despite these efforts of the ministry and other agencies to educate and increase awareness on the use of ITNs among pregnant women in Cameroon, the uptake of ITNs is still very low among women in Kumbo West District according to DHS, 2018. There is need to investigate the factors contributing to the low usage especially

amongst pregnant women despite ongoing education and campaign to increase the utilisation levels of both LLINs and IRS amongst the local communities and must be continued on an annual basis, particularly as people become more informed about the need for vector control. This study therefore seeks to find out the various factors influencing the use of ITNs among Pregnant women in Kumbo West District, NWR Cameroon.

1.3 Justification

In Africa today one of the main strategies to reduce malaria infection is during pregnancy.

ITNs decrease the prevalence of malaria among pregnant women by stopping mosquito from biting and transmitting the malaria parasite. Pregnant women should be encouraged to use ITNs from as early as conception period (WHO, 2005).

Evidence from previous research suggests that, when used by pregnant women, insecticide-treated bed nets (ITNs) can reduce to half the incidence of severe malarial anemia and to a quarter the prevalence of infants with low birth weights. It is therefore a priority to increase the number of pregnant women who use these nets (Marchant, 2010).

Several efforts have been made by the Cameroon ministry of Public Health for the purpose of providing and increasing awareness especially on using ITNs among the pregnant women. Few studies have been conducted to investigate the factors influencing use of ITNs among the pregnant women in Cameroon, and none for this study area, therefore the results of this study will be submitted to the Kumbo West District Management Team for implementation of the recommendations.

1.4 Research Question

1. What is the level of knowledge about the benefits of the use of ITNs among pregnant women in Kumbo West District?
2. What factors contribute to the use of ITNs among pregnant women?
3. What is the level of ITNs coverage in Kumbo West District?

1.5 Broad Objectives

To assess the factors influencing the use of ITNs among the pregnant women visiting ANC in Kumbo West District.

1.6 Specific Objectives

- 1) To determine the level of knowledge on benefits of ITNs among pregnant women attending in ANC.
- 2) To establish the accessibility factors influencing the use of ITNs among the pregnant women in Kumbo West District.
- 3) To establish the socio-demographic factors influencing the use of ITNs among the pregnant women in Kumbo West District.
- 4) To determine socio-cultural factors that influence use of ITNs among the pregnant women

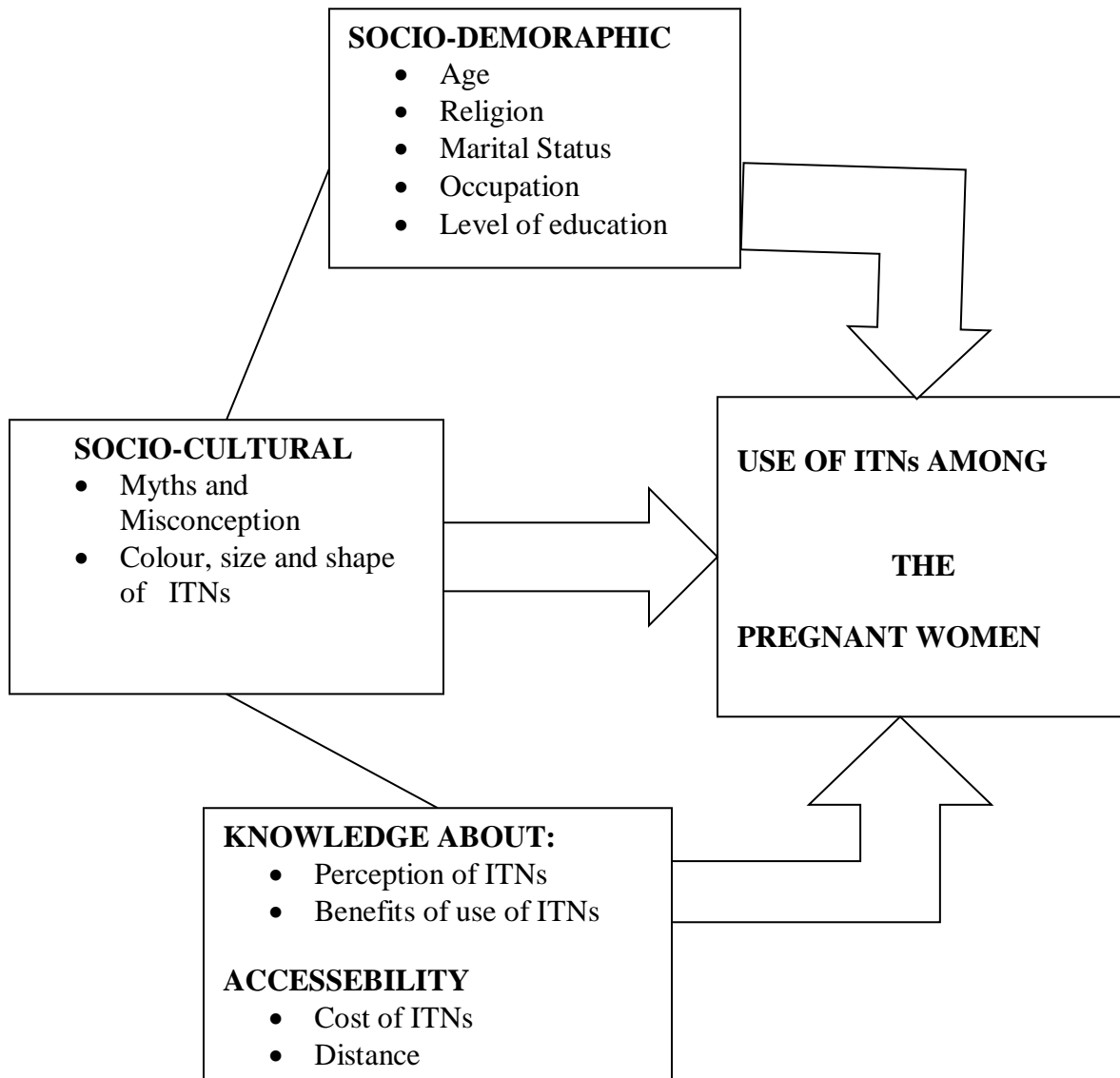
1.7 Hypothesis

There is no relationship between level of knowledge, accessibility, socio-demographic factors, and socio-cultural factors on the use of ITNs among pregnant women in Kumbo West District.

1.8 Study Variables

The study variables focus on factors influencing the use of ITNs among the pregnant women in Kumbo West District - Cameroon. The dependent variable is use of ITNs among the pregnant women while the independent variables are, knowledge about use of ITNs, accessibility, socio demographic characteristics and socio - cultural factors.

Figure 1: Conceptual Framework



1.9 Study Area

The study was conducted in Kumbo West District, NWR, Cameroon.

It was specifically carried out in six randomly selected health areas of the Kumbo west Health districts namely; Banso Baptist Hospital-BBH, Kikaikelaiki, Kitiwum, Kumbo_CMA,

Kumbo_Urban and Melim. Kumbo is the second-largest city in the North West region of Cameroon and the capital of Bui Division. Kumbo is split into three distinctive hilly settlements of Tobin, Mbveh, and Squares. The town is known for horse racing (Tobin Stadium) and traditional medicine, and also for its palace (Nso Palace), a market and two big hospitals; Shisong Catholic Hospital and Banso Baptist Hospital (Frankline et al, 2019).



Figure 2: Map of the Kumbo West Health District.

CHAPTER 2: METHODOLOGY

2.1 Study Design

A cross sectional study was done to establish the knowledge, accessibility and socio-demographic and socio-cultural factors related to the use of ITNs among the pregnant women in Kumbo West District, using both qualitative and quantitative methods.

2.2 Study population

The target population were pregnant women attending clinics in the selected health facilities including one district hospital in Kumbo West District.

2.3 Sampling Technique

Kumbo West District was purposefully selected based on the fact that this study had not been done for long in this district and also to find out factors influencing use of ITNs among pregnant women. A systematic random sampling was used to select the health facilities and simple random sampling to select pregnant women attending antenatal clinic in the health facilities of the Kumbo West District.

2.4 Sampling Size Determination

The sampling size of this study was calculated based on statistical formula for estimating population sample size.

$$n = \frac{z^2 pq}{d^2}$$

n = desired sample size of study population was equals or greater than 10,000 (> 10,000)

Z = the standard normal deviation usually set at 1.96 and corresponds to 95% confidence interval.

P = the proportion of target population estimated to have particular characteristics, in this study was 80%

$$q = 1 - p$$

d = degree of accuracy in this study was 0.05

$$n = \frac{(1.96^2 * 0.8 * 0.2)}{0.05^2} = 246$$

n = 246

The sample size was 246 pregnant women

2.5 Data collection (methods, tools)

Quantitative data was collected using structured questionnaire which was administered to the pregnant women who were available for interview irrespective of gestational age. Qualitative data was collected using focus group discussion guides moderated by the researcher.

2.6 Quality control

Training of the research assistants was conducted one day before the study to ensure they were familiar with tools. The data collection tools were pre tested before the interview. Questionnaires were checked for any omissions and mistakes at the end of each day. Interviewers were closely supervised with a daily wage for the work done.

2.7 Ethical Considerations

- The purpose of the study was explained to the local authority on arrival before starting the work.
- Verbal consent of all the subjects' i.e. pregnant women was ensured. The decision of those who decline to participate in the study was respected.

2.8 Operational definitions- measurement of key variables

Table 1.

key variables	Type of variables	Operational definition	Measures
Social demographic factors	Age	Completed age in a year at time of interview	Years continuous variable
	Religion	Religion of respondent	Nominal
	Education	Level of education of the respondent	Categorical variable
	Occupation	Type of work done	Categorical nominal

	Marital status	by the respondent for sources of income Marital status of the respondent	Categorical variable
Knowledge	ITNs	Establish any information about ITNs	Categorical nominal
	Causes of malaria	Assess knowledge on causes of malaria	Categorical nominal
	Perceived on prevention by using ITNs	Establish awareness on prevention of malaria	Categorical nominal
Accessibility	Distance	Distance of home from nearest health facility	Continuous variable
	Cost	Cost of ITNs in the health facility	Categorical variable
Socio-cultural	Myths and misconception	Beliefs myths and about ITNs	Categorical variable
	Colour	Colour of ITNs	Categorical nominal
	Shape and size	Shape and size of ITNS	Categorical nominal

2.9 Data analysis

At the end of each day the collected data was coded, entered and cleaned in order to avoid accumulating work. Final analyses was done by using statistical package for social science (SPSS) version 3. Systematic data, quality control was conducted at collecting and processing data. Descriptive method of data analysis was used including measures of central tendency. Presentation of the quantitative data will be done through graphs, tables and qualitative data from the focus group discussion was analyzed thematically based on study objectives.

2.10 Study limitations and constraints

- Data collection period of two weeks was not enough because of the socio political crisis in this part of Cameroon which resulted to not meeting the desired sample.

- The level of understanding of the respondents was low requiring translators at some points to explain the questionnaires.
- Inadequate finance was another constraint.
- Some of the information from the mothers about use of ITNs was not true which did not reveal the true picture of the problem.

CHAPTER 3: RESULTS AND DISCUSSION

Introduction

This chapter presents the results of both qualitative and quantitative findings of the study. The findings are in sections as per the objectives of the study in the form of text, tables and figures. It comprises results from five Integrated Health Centres and one referral hospital compiled and presented as a single document. This represents 29.7% out 19 health facility coverage of the whole District.

3.1 Section A: Background information

The majority 89.8% of the respondents were married and the rest were widowed, single, separated, or divorced. Nearly all 95.1% of the respondents were Muslim and the rest were Christian. About 34.1% of the respondents were unemployed, 32.9% formerly employed receiving salaries, 27.7% self employed while others were either doing business or house wife. With regard to level of education, 39.9% of the respondents acquired secondary education, 29.3% had primary education and, 16.3% were had tertiary level of education. Almost all respondent 94.3% were within the gravida of 1-7 and the rest 8-14 meanwhile gestational age was 55.3% for 3-4 months and 44.7% for 7-9 months.

The minimum age of respondent was 17 years and maximum was 58 years with a mean of 30.57, standard deviation of ± 7.25 (95% confidence interval between 29.7 - 31.5 years). The age group 25-29 constituted a greater number 28.5% out of the total 246 respondents. The younger group 15-19 had 3.3% while the older group 40 – 58 had 12.2%. Almost half 41.6% of the respondents had stayed in the same area for ≤ 7 years while 5.7% had stayed in the same area

between 25-32 years. The total duration of stay had a mean of 9.7 years and a standard deviation of ± 7 (at 95% interval lying between 8.9 – 13.0 years)

Table 2: Socio-Demographic Characteristics

Name of health facility	Frequency	Percent
District hospital (BBH)	73	29.7
Kikaikilaki Health Centre	23	9.3
Kumbo Urban	48	19.5
Kitiwum	32	13.0
Kikaikom	44	17.9
Melim	26	10.6
Total	246	100
Marital status		
Single	6	2.4
Married	221	89.8
Separated	4	1.6
Widow	12	4.9
Divorced	3	1.2
Total	246	100
Religion		
Christian	234	95.1
Muslim	12	4.9
Total	246	100
Occupational		
Employed	81	32.9
Non employed	84	34.1
Self employed	68	27.7
Business	13	5.3
Total	246	100
Education		
None	38	15.4
Primary	72	29.3

Secondary	96	39.0
College	40	56.8
Total	246	100
Gravida		
1-7	232	94.3
8-14	14	5.7
Total	246	100
Gestational age		
3-6	136	55.3
7-9	110	44.7
Total	246	100
Age of respondents		
15-19	8	3.3
20-24	34	13.8
25-29	70	28.5
30-34	58	23.6
35-39	46	18.7
40+	30	12.2
Total	246	100
Duration of living (in month)		
12-82	102	41.6%
83-153	91	37.1%
154-224	12	4.5%
225-295	27	11.0%
296-384	14	5.7%
Total	246	100%

3.2 Section B: Level of Knowledge and Accessibility

Over 97.6% of the respondents had heard of Malaria. Knowledge of the causes of Malaria was classified as follows: Female Anopheles mosquito (32.3%), dirty environment (25.5%), stagnant water (21.8%), drinking dirty water (14.1%), being rained on (5.7%). The high level of knowledge of causes of malaria reported in a study done in Tanzania by (Mubyazi et al, 2005) Whereby the participant during FGD who mentioned Female anopheles mosquitoes, dirty environment and stagnant water were also high.

Table 3: Knowledge of causes of malaria (*multiple response)

Cause of malaria	Percentage*
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Female anopheles mosquito	32.3%
Dirty environment	25.5%
Stagnant water	21.8%
Drinking of dirty water	14.1%
Being rain on	5.7%

3.2.1 Knowledge on who is most affected.

Following the responses, (34.5%) pregnant women, (30.0%) under five, (25.1%) travelers and (7.2%) aged as shown in the figure 2.

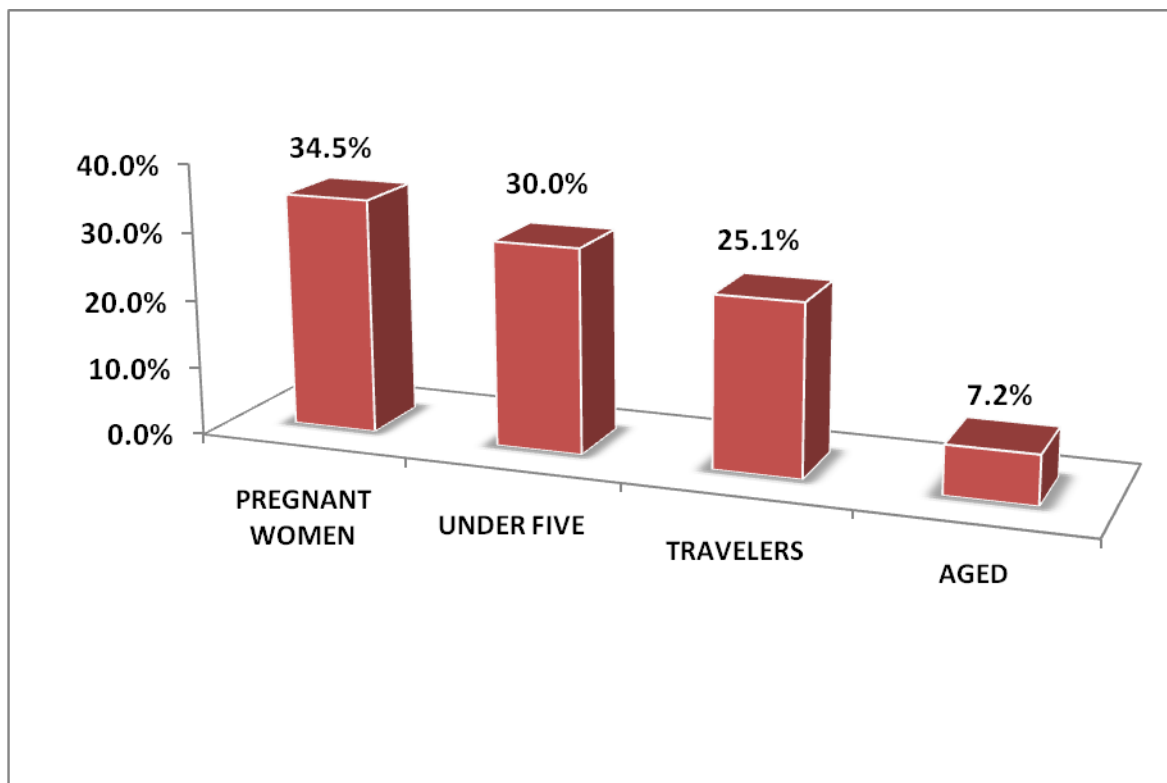


Figure 2: Knowledge on group most effected by Malaria (*multiple response)

3.2.2 Knowledge of the type of complication if pregnant woman has Malaria: About (28%) of the respondent thought that it lead to death, (27.5%) could cause abortion, (26.6%) death from

anemia and (17.4%) could lead to premature labour as shown in figure 3. Confirmation of this finding came during the focus group when one lady said “**malaria is a killer disease; you can start labour before time**”.

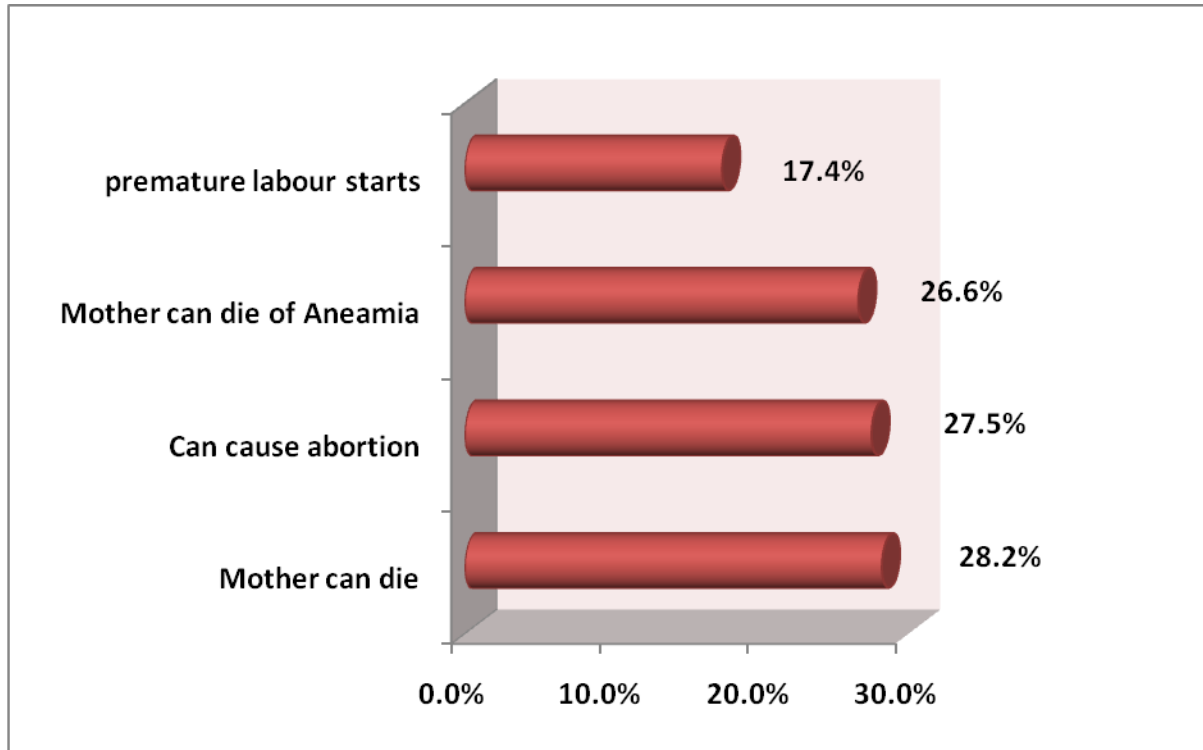


Figure 3: knowledge of type of complication if pregnant woman has severe malaria (* multiple responses)

3.2.3 Knowledge of symptoms of Malaria: all the respondents had knowledge of at least one symptoms of Malaria as shown in table 3. This indicates that there was high knowledge of the signs and symptoms of malaria for early seeking investigation and treatment in order to prevent complication for mothers and their new born baby.

Table 4: Knowledge of signs of malaria (*multiple response)

Signs of Malaria	Percentages*
Headache	15.7%
Fever	15.6%
Abdominal pain	11.4%
Vomiting	10.5%
Loss of appetite	10.4%
Shivering	9.9%
Dizziness	9.8%

Joint pain	9.1%
Body weakness	7.4%

3.2.4. Knowledge of respondent on prevention:

Most (91.4) of the respondents knew how to prevent Malaria and classification as follows: Sleeping under mosquito net (28.3%), prophylactic drug (25.5%), clean environment (24%), use of mosquito repellent (12.2%), sleeping under the net (8.1%) as shown in figure 4.

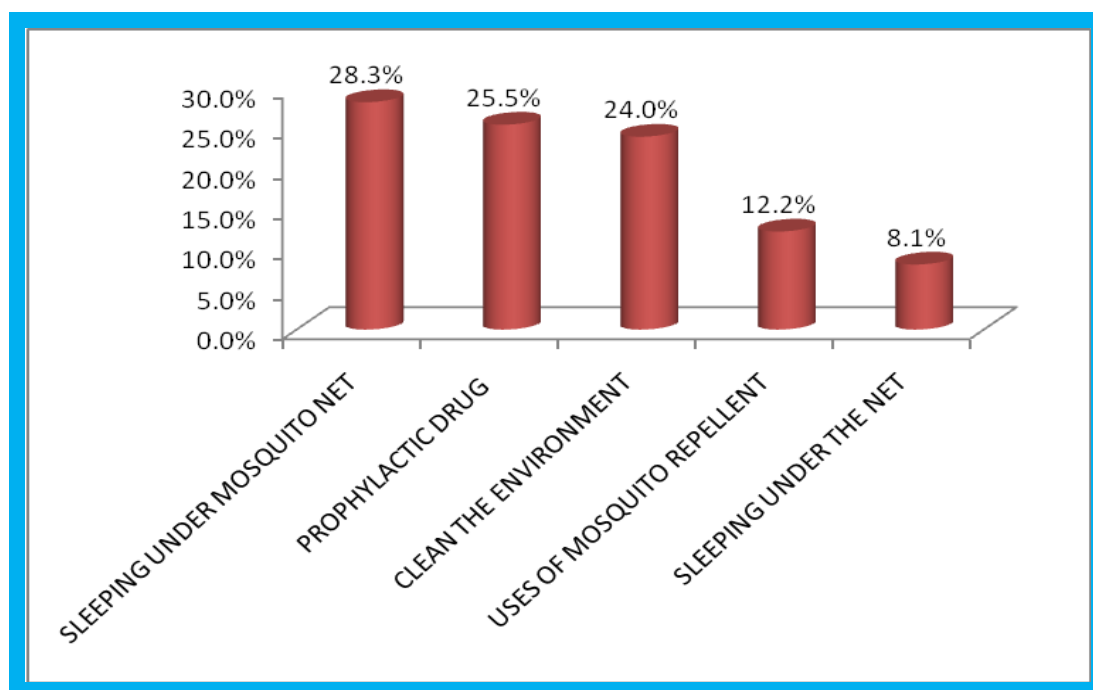


Figure 4: knowledge of Malaria prevention (multiple choice*)

3.3.0 Section C: Use of ITN

Almost all (95.1%) had seen a mosquito net and (66.7%) had slept under a mosquito net on the eve of this survey. All the respondents had used either insecticide treated net (52.5%) or Mosquito net (47.5%). Over 63.4% got the nets from the health facility, 26% bought from the market and 10.6% from NGOs. 60.2% of the respondents used nets daily, 24.4% used it seasonally while 15.4% used it only when they or someone in the family was ill. With regard to bed net use, other studies in Africa have found that pregnant women were more likely to own and use bed nets than others (Noor, 2006)

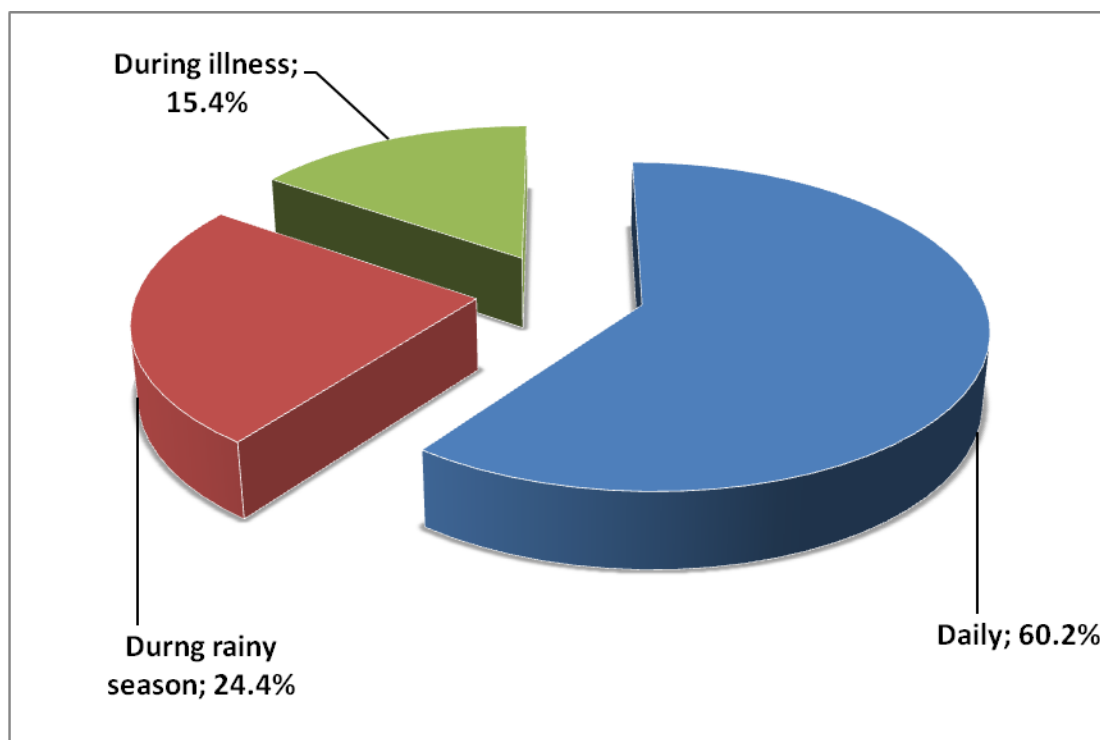


Figure 5: When nets are used by respondent

3.3.1 Price of ITN: The respondents had bought the ITNs at different prices- 65.5% (500-2500 Frs CFA), 22.8% (1501-4500), 11.7% (4501-6000). Minimum price was 500Frs and maximum was 6000Frs, a mean of 2155.17 and standard deviation of 1504.065 (95% confidence interval between 1,967.21 - 2,343.13 Frs) according to this result the price of was high and affected use of ITNs among pregnant women. During the focus group, one of the participant said **“I bought the ITN because the ministry of health stopped to give us free nets”**. Another one said **“I cannot afford to buy ITN because the price is high”**. This is supported by a study done in Nigeria which showed that cost of ITNs was an important barrier to ITN ownership for families at risk of malaria, who are among the poorest in the world, (RBM, 2010).

Majority (76%) walked to where they got mosquito net, 14.2% used Achaba and 9.8% used taxi. More than half (61%) of the respondents had ever treated their nets. Out of the 39% who could not treat their nets, 26.7% was due to in availability of the service, 47.8% because of high price, 23.3% didn't deem it necessary, 2.2% had no idea about treatment. The respondents mentioned the duration of the time period between usage and treatment of the nets as follows: 60% after three month, (25%) after one year and 14.2% after one month. Respondents also mentioned the benefits of treated nets as (41.3%) reducing Malaria, (35.4%) Kills Mosquitoes and (23.4%) Keeps Mosquitoes away. This was confirmed during the focus group when one woman said

“sleeping under the ITN is very good and if I treat my net every three months, it will take long before I am attacked by Malaria and I will surely deliver a healthy baby”.

This is not different from the study done in Swaziland (RBM, 2000) whereby the majority of the mothers (94%) were aware of the advantages of sleeping under ITNs apart from providing physical barrier against mosquito bites, ITNs are known to have mass killing effects and to protect against a wide range of vector-borne diseases and reduce childhood mortality by about 20% in Africa.

Table 5: Knowledge of benefit of treated net (*multiple response)

Benefit of net	Percentages*
Reducing malaria	41.3%
Kills of mosquitoes	35.4%
Keeps mosquito away	23.4%

3.4 Section D: Socio-cultural Factors

Over half (67.5%) of the respondents mentioned that colour is not an important determinant for using mosquito nets. (93.7%) said they would use ITNs of any color if given the chance. However 29.7% had ever refused using ITN because of colour. sixty-seven percent of the respondent (67.1%) also mentioned that the shape and size of ITN is not important and 7.6 said they had once refused to use ITN because of shape and colour. Respondents expressed their beliefs about the use of ITNs as (74%) good, (11.4%) not good for health, (6.1%) cause infertility and (5.7) illness as illustrated in figure 5. During the focus group, there was a unanimous response that **ITN is good because it prevents women from getting malaria”.**

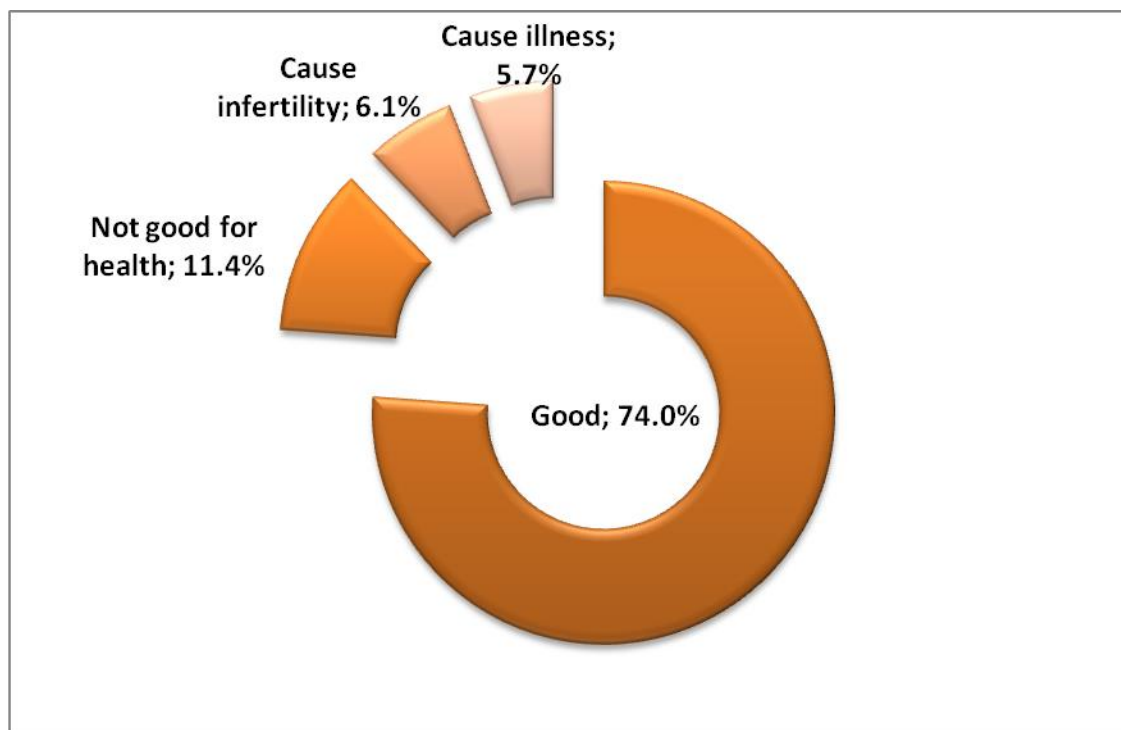


Figure 6: Belief about use of ITNs

Factors Associated with ITN use:

The table below shows the results of association tests of variables against ITN use. Different independent variables placed on rows are tested against the single dependent variable (sleeping under ITN) placed in the column. These were the only ones accepted to be tested statistically using SPSS software. The following results were displayed: There was no relationship ($P > 0.05$) between Occupation, the level of income, educational level, source of income and gestational age with sleeping under ITN. This meant that the different variables did not influence the use of ITN by women. However, there was an association between sleeping under ITN and the following variables: knowledge of malaria prevention ($p = 0.001$), where ITN was received ($p = 0.043$), ever treated net ($p = 0.00$) and belief of the respond about ITN. It therefore meant that the latter influenced the use of ITN by women of Kumbo west district in NWR.

Table 6: Measurement of associations:

INDEPENDENT VARIABLE	DEPENDENT VARIABLE		CHI SQUARE
	YES	NO	
OCCUPATION	SLEEPING UNDER ITN		$\chi^2 = 2.101$; 3df; $P = 0.552$ $P > 0.05$
	YES	NO	
Employed	34.1% (n=56)	30.5% (n=25)	
Non employed	36% (n=59)	30.5% (n=25)	
Self employed	25% (n=41)	32.9% (n=27)	
Business	4.9% (n=8)	6.1 (n=5)	

LEVEL OF EDUCATION	YES	NO	
None	65.8% (n=25)	15.2% (n=13)	$\chi^2=6.87$; 3df; P=0.076 P>0.05
Primary	55.6% (n=40)	24.4 (n=32)	
Secondary	70.8%(n=68)	29.2%(n=28)	
Professional	77.5%(n=31)	22.5%(n=9)	
SOURCE OF INCOME	YES	NO	
Employed	69.1%(n=47)	30.9%(n=21)	$\chi^2=1.43$; 3df; P=0.697 P>0.05
Farming	61.1%(n=44)	38.9% (n=28)	
Daily wage	68.6%(n=48)	31.4%(n=22)	
Husband	69.7%(n=23)	30.3%(n=10)	
GESTATIONAL AGE (months)	YES	NO	
3-6	59.1% (n=97)	47.6% (n=39)	$\chi^2=2.968$; 1df; P=0.085 P>0.05
7-9	40.9% (n=67)	52.4% (n=43)	
KNOWLEDGE ON PREVENTION	YES	NO	
YES	95.7% (n=156)	82.7% (n=67)	$\chi^2=11.607$; 1df; P=0.001 P<0.05
NO	4.3% (n=7)	17.3% (n=14)	
WHERE ITN IS RECEIVED	YES	NO	
Health Facility	60.4% (n=99)	69.5% (n=67)	$\chi^2= 6.310$; 2df; P=0.043 P<0.05
Buy	25.6% (n=42)	26.8% (n=22)	
NGOs	14.0% (n=23)	3.7% (n=3)	
EVER TREATED NET	YES	NO	
YES	82.9% (n=136)	17.1% (n=14)	$\chi^2=99.630$; 1df; P=0.00 P<0.05
NO	17.1% (n=28)	82.9% (n=69)	
BELIEF ABOUT ITN	YES	NO	
Good	75.8% (n=138)	24.2% (n=44)	$\chi^2=26.099$; 1df; P=0.00 P<0.05
Not good for health	40.6 (n=26)	59.4% (n=38)	

CONCLUSION

The respondents were predominantly Christians but religion did not influence their response nor the use of ITN. The most active and available age group was between 25-29. The overall results show that women in Kumbo have ample knowledge about malaria, the causes, symptoms and prevention. The colour and shape of ITNs had no influence on the use by woman in this district. Some women were willing to use ITN but it was not available and some could not afford to buy because the prices were high.

RECOMMENDATION

- The DHMT of Kumbo should ensure regular supply of ITN in all the facilities in the district.
- The DHMT should subsidize the price or make it free for pregnant women.

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APPENDICES

Appendix 1: Interview Schedule for Pregnant women

QUESTIONNAIRE FOR THE PREGNANT WOMAN

Starting with greeting, self introduction, explain purpose of study and ethical consideration.

Name of health facility.....

Name of the district.....

Date of Interview.....

Village.....

Number of interview.....

SECTION (A) SOCIAL DEMOGRAPHIC FACTORS

1) What is your marital status?

- 1) Single
- 2) Married
- 3) Separate
- 4) Widow
- 5) Divorced

2) What is your religion?

- 1) Christian
- 2) Muslim
- 3) Others

3) What is your occupation?

- 1) Employed
- 2) Not employed
- 3) Self employed
- 4) Baseness
- 5) Others (specify).....

4) What is your level of education?

- 1) Primary
- 2) Secondary
- 3) Professional
- 4) University
- 5) None
- 6) Others (Specify).....

5) What is your source of your income?

- 1) Employed

- 2) Selling agricultural product
 - 3) Daily wages
 - 4) Others (Specify).....
- 6) Gravidae.....
- 7) Gestational age of pregnancy.....
- 8) Age of respondent
- 9) How long have you been living here?.....

SECTION (B)

LEVEL OF KNOWLEDGE AND ACCESSIBILITY

10) Have you heard of malaria?

- 1) Yes
- 2) No

11) What causes malaria?

- 1) Mosquitoes female anopheles
- 2) Stagnant water
- 3) Drinking of dirty water
- 4) Dirty environment
- 5) Being rain on
- 6) Don't know

12) Which group of people is most effected

- 1) Aged
- 2) Under five
- 3) Pregnant women
- 4) Travelers
- 5) Don't know

13) What happen if a pregnant woman has severe malaria?

- 1) Abortion
- 2) Mother can die
- 3) Mother can have anemia
- 4) Mother can go to the labour before time
- 5) Others (specify).....

14) How do you know that you have malaria (multiple response)

- 1) Fever
- 2) Headache
- 3) Shivering
- 4) Joint pain
- 5) Vomiting
- 6) Dizziness
- 7) Loss of appetite
- 8) Abdominal pain
- 9) Body weakness

15) Do you think malaria can be prevented?

- 1) Yes
- 2) No

16) If yes, how can you prevent yourself from getting malaria?(multiple response)

- 1) Sleeping under the net
- 2) Sleeping under mosquito net
- 3) Use modern mosquito repellents
- 4) Clean the environment
- 5) Prophylactic drug
- 6) Others (specify).....

SECTION(C); USES OF ITNs

17) Have you ever seen a mosquito net?

- 1) Yes
- 2) No

17) Do you have a net?

- 1 Mosquito net
- 2 Insecticide treated net

19) Where did you get your mosquito net?

- 1 At health facility
- 2 Bought
- 2 NGOs

20) If you bought, how much in Frs CFA.....

21) Did you sleep under the mosquito treated net last night?

- 1) Yes

2) No

22) How far is a net source?

- 1) Walking distance
- 2) Use Taxi
- 3) By Achaba

23) How frequently should ITN be used by the pregnant women?

- 1) Daily
- 2) During rainy season
- 3) During the dry season
- 4) During illness

24) Have you ever treated your mosquito net?

- 1 Yes
- 2 No

25) If no Why?

- 1 Not available
- 2 Expensive
- 3 Not needed
- 4 I don't know

26) How long do you take before you treat again?

- 1 After one month
- 2 Three months
- 3 One year

27) What are the benefits of treated mosquito net?(multiple response)

- 1 Kills mosquitoes
- 2 Reduce malaria
- 3 Keeps mosquitoes away

SECTION (D); SOCIO-CULTURAL

28) How do you look at the colour of ITNs?

- 1) Important
- 2) Not important

29) If not important would you use ITNs of different colour?

- 1) Yes
- 2) No

30) Have you ever refused to use ITNs because of Colour?

- 1) Yes
- 2) No

31) How do you see the shape and size of ITNs is?

- 1) Important
- 2) Not important

31) Have you ever refuse to use ITNs because of colour and shape?

- 1) Yes
- 2) No

33) What are the common beliefs existing within the community on ITNs use?

- 1) Not good for health of the pregnant woman
- 2) Good
- 3) Cause illness
- 4) Cause infertility
- 5) None

Appendix 2: Focus group discussion guide

Name of health facility.....

FOCUS GROUP DISCUSSION (FGD)

1) Is malaria a common health problem in this area?
.....

2) Who are most affected?

3) What do people do in this community to prevent malaria?
.....

4) How do you feel about the effect of malaria in pregnancy?
.....

5) Where did you get your ITNs?

.....

6) Are the ITNs affordable?

.....

8) Are there any cultural beliefs that influence the use of ITNs among the pregnant women in this community?

.....

9) Who are those supposed to sleep under the ITNs?

.....