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**THE UTILIZATION OF MOSQUITO NETS IN THE MAROUA
II MUNICIPALITY IN THE DIAMARE DIVISION OF THE
FAR NORTH REGION OF CAMEROON**



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THE UTILIZATION OF MOSQUITO NETS IN THE MAROUA II MUNICIPALITY IN THE DIAMARE DIVISION OF THE FAR NORTH REGION OF CAMEROON

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Abstract

Purpose

One of the highly recommended strategies to “Roll Back Malaria” was the utilization of treated mosquito nets as personal protective devices to kill or repel mosquitoes. Since the adoption of Insecticide Treated Nets (ITNs) as a key preventive tool in 2002, several campaigns of free distribution of ordinary nets and of late, long lasting insecticidal treated nets (LLINs) were conducted all over the country. The aim of this study is to show that there is a lot of misuse of mosquito nets in the Maroua II municipality.

Methodology

This research is based on both direct and indirect sources of information as 25 key informants were randomly selected and interviewed. Primary data is collected through interviews with key informants. Direct observation was also used during which, many photographs illustrating the various uses of mosquito nets were shot. Secondary data was collected from documentations with relevant information pertaining to this study. The data collection tools used were a question guide, a recorder, dicta phone, a note book, a pen and above all a field aider who assisted most of the time on the field in translating from Fulfude language to French language. Data collected from this study was analyzed by explaining and describing phenomenon with the aid of photos and tables.

Findings

In Maroua II municipality, mosquito nets have both the universal and necessary functions as it is very hard to regulate or prevent the inappropriate uses in a country where so many people are poor. While some see the treated nets as a lifesaving gift, others see them as a discomfort that provides only partial protection against a trivial illness, this is why many uses of nets have been created which means that these mosquito nets are versatile. 28% use mosquito nets for malaria prevention, 32% for economic activities, 20% for esthetics, 8% for sports and 12% had no use for the nets. 96% of the treated mosquito nets owned in Maroua II were acquired free of charge. The nets are being used for so many other purposes other than the prevention

of malaria. 72% of the respondents did not use the nets for the right purpose. Items acquired free of charge are not valued that is why these nets were used for other things rather than preventing malaria.

Recommendations

There is need for intense sensitization on the utilization of mosquito nets in the community. Mosquito nets should not be given free of charge as so many people do not value gifts. All those who use mosquito nets for other activities rather than to prevent malaria should be severely punished.

Keywords: *Treated mosquito nets, malaria prevention, economic, esthetic, sports*

Introduction

Insecticide-treated nets (ITNs) are the most powerful malaria control tool to be developed since the advent of indoor residual spraying (IRS) and chloroquine in the 1940s, and as such they have been an important component of global and national malaria control policies since the mid-1990s (1). The utilization of Insecticide treated nets are one of the highly recommended strategies to “Roll Back Malaria” as a personal protective devices or tools to kill or repel mosquitoes. Since the adoption of ITNs as a key preventive tool in 2002, several campaigns of free distribution of ordinary nets and of late, long lasting insecticides treated nets (LLINs) were conducted all over the country, with priority given to pregnant women and children below five years of age. Malaria No More which began working in partnership with Cameroon’s Ministry of Health in 2011 launched the first Universal Nets Campaign with support from the ExxonMobil Foundation and Mosquito Squad in 2011(2). These nets were freely distributed to the numerous inhabitants of Maroua II. The Government of Cameroon in partnership with Global Fund on February 2015 signed a new malaria grant agreement worth €77 million aimed at the distribution of 15.8 million mosquito nets, including a mass distribution campaign that will strive to achieve universal coverage in Cameroon (3). This was the second national universal ITN which was realized in 2016 and the inhabitants of Maroua II were still beneficiaries. These nets were used in order to orchestrate a barrier between mosquitoes and humans especially the vulnerable. The distribution of mosquito nets has to do with the sharing and access to mosquito nets and also how these nets are being used. Concerning its utilization, there is the universal and necessary use which is unique to the Maroua II Municipality. There are three types of mosquito nets used in Maroua II municipality: The first nets were Insecticide Treated Nets which needed constant retreatment every 6 to 12 months with permethrin or deltamethrin. “Deltamethrin is effective for a year; thus, re-treatment is necessary on an annual base while Permethrin lasts for six months; thus, two treatments are needed per year. Due to the process of retreatment, it was later replaced with the Long Lasting Insecticidal Nets which are conventionally treated nets which has been treated by dipping in a WHO recommended insecticide and to ensure its continuous insecticidal effect, the nets are re-treated after three washes, or at least once a year. The last type of net is the untreated nets; which are mosquito nets that have not been treated with

insecticide. This shows that expired nets are still used by some inhabitants of the Maroua II municipality. The functionalism theory by Bronislaw Malinowski was used. Malinowski actually envisioned functionalism in three main ways which includes the universal, the unitary and the necessity functions. In this study, the universal and necessary functions were most appropriate in the use of mosquito nets to prevent Malaria. The universal function, deals with the fact that, in the world at large, mosquito nets are produced for one main purpose which is, to protect against mosquitos and other insects thus preventing malaria. The necessary function shows that mosquito nets are versatile thus have so many different uses in the various communities such as the use of mosquito nets as a sieve, as a bathing sponge, as a net on a football post, as a fence and protector of crops.

Methods

The methodology selected for this study will enable the assessment of descriptive qualitative issues thereby thoroughly investigating both relative and absolute issues. In order to verify and validate certain claims, interview with key informants provided both qualitative and quantitative information of a technical nature. The research was based on both direct and indirect sources of information to present and analyze the data. The selection of respondents for this study was randomly done and there were 25 key informants in the study. Primary data is collected through interviews with key informants who include malaria patients, care givers, and those who have suffered from malaria before. The interviews were conducted on a one on one base. Since the data is qualitative, there was no time allocation per interview as the questions were open ended and gave a lot of opportunity for the respondents to give their opinion to the fullest. Direct observation was also used and it helped to clearly see how mosquito nets are used. This method speaks for itself as the data given by this technique is not adulterated or modified in any way. During observation, many photographs illustrating the various uses of mosquito nets were shot. Documentation with relevant information pertaining to this study was consulted. As far as interviews are concerned, the data collection tools used are a question guide, a recorder, dicta phone, a note book, a pen and above all a field aider who assisted most of the time on the field as some respondents were not able to express themselves very well in either English or French but in Fulfulde which is a lingua franca widely spoken in Maroua II municipality. Data collected from this study is qualitative and was analyzed by explaining and describing phenomenon with the aid of photos and tables.

Results

Studies have shown that there are a number of factors which could aid and improve decisions and health behaviors related to ownership and use of mosquito nets which includes cost, education, household income, malaria knowledge, negative perceptions about the effects of insecticides, age of child, access to health care, and location of residence. Among the multi-factorial determinants of ITN ownership and use, many people have singled out understanding local knowledge, attitudes, and practice (KAP) as vital to designing and implementing this particular malaria control program if it were to have a chance of being sustainable and

successful (4). In this study, 96% of the mosquito nets were acquired free of charge as illustrated by table I below.

Table I: Acquisition of mosquito nets

Means of acquisition of mosquito nets	Number of respondents	Percentage %
Bought nets	1	4
Gift from boss	1	4
Pre-natal consultation	5	20
SASNIM Semaine Africaine de Sante, de Nutrition Infantile et Maternelle	2	8
Massive free of charge distribution	16	64
Total	25	100

Source: Fombang 2018

From Table I above, 4% of the informants bought the mosquito net from the black market since they are not sold in the market. 4% acquired a net as a gift from the boss, 12% from pre-natal consultation, 4 % under the SASNIM program, 8% from the TPI program, 4% from CPS and 64% through the massive mosquito net campaigns in 2011 and 2016. Thus 96% of the respondents acquired the nets free of charge while 4% bought the nets.

In the Maroua II municipality, while some see the treated nets as a lifesaving gift, others see them as a discomfort that provides only partial protection against a trivial illness that is why many uses of nets have been created which means that these mosquito nets are versatile. Mosquito nets have both the universal and necessary function so, it is hard to regulate or prevent some of these uses in a country where so many people are poor. Mosquito nets were invented to serve as a barrier between man and mosquitoes that bite and infect humans with malaria. This is the function that is widely known around the world and it was due to the necessity of preventing malaria that these nets were created. To avoid malaria, people have to sleep under a mosquito net. The primary use of the ITN within the household is to sleep under it to be protected from mosquito bites and malaria (5). Cameroon government efforts of providing mosquito nets are geared towards the fight against malaria. Research has shown mosquito nets to be an extremely effective method of malaria prevention, averting approximately 663 million cases of malaria over the period 2000–2015 (6). In Maroua II municipality, mosquito nets are used for the prevention of malaria, for economic purpose, for esthetics, and for sporting activities. The environment has so much to do as far as the functions of mosquito nets are concerned. Mosquito nets are created to protect humans against

insect bites especially mosquitoes but, so many new functions of mosquito nets have been created such as, the use of nets in protecting plants and cotton against animals, rodents, insects and the wind and also for humans to prevent cold during periods of very cold weather.

Proper utilization of mosquito nets

This has to do with the utilization of mosquito nets in the prevention against mosquitoes and other insects and just 28% of the informants used these nets for the right purpose. For impregnated mosquito nets to be effective they need to be used correctly. All the informants have their own personal ways of using them despite the sensitization and demonstrations given to them when these nets were being distributed. Insecticide Treated Nets (ITN) have been found widely to be one of the most cost effective malaria prevention tools (7). When used consistently and effectively they are highly effective in preventing and reducing transmission of malaria by up to 90% (8). Insecticide-treated nets have four unique qualities, an excito-repellency property which excites mosquitoes from entering a room, and killing effect which reduces the number of mosquitoes. Finally, it inhibits the mosquitoes from feeding; making it impossible for them to feed on human blood (9). Photo I shows the proper utilization of mosquito nets.

Photo 1: Mosquito net used in preventing mosquito bites in Barmare, Maroua II



Source: Fombang (6/04/2018)

A mosquito net lowered down in the evening at the Barmare neighborhood in order to prevent mosquito and other insect bites.

On the other hand, in an assessment of impregnated mosquito net utilization in Maroua II, it was realized that these nets are not only used in the prevention of malaria but, are used for so many different purposes. Any use of mosquito nets that is not to prevent mosquito and other insect bites is inappropriate and a misuse. In a study carried out in Malawi, nets were used as follows; a blanket to keep warm, cloche, to protect growing vegetables from animals, chicken coop, shades to protect seedlings from the sun, a support to hang things

from a tree, fishing nets used for indiscriminate fishing, surfaces for drying fish, collection of chicken droppings for fertilizer, underneath a chicken coop (10). In Maroua II, mosquito nets are misused as follows;

Economic functions

32% of the mosquito nets are used for economic activities as mosquito nets were used economically for crop protection, protect piles of cotton from the wind, in producing soya beans products, in the production of bilbil, tying of wood, production of mats known as *sekko* amongst others. They are used mostly by gardeners in the protection of vegetables and tomatoes in the gardens. Instead of spraying insecticides for the protection of farm produce from insects, mosquito nets are widely used to cover the vegetables in the gardens. The mosquito nets do not only serve as protection against insects and lizards but also as a protection from animals like goats, sheep, cattle, and also from rodents and birds. The nets are also used in making fences around the farms to prevent straying animals from destroying the farm crops. A similar study in Sierra Leone shows that, mosquito nets are used to protect crops (11).

Photo 2: Mosquito net, used in protecting plants in the Baoliwol neighborhood



Source: Fombang 08/04/2018

Mosquito net used to protect plants from animals, snakes and lizards

Furthermore, mosquito nets are used in making fences to keep animals together so that they should not stray around and also to protect them from insects, snakes and lizards. In other words, they are used to make animal barns. As illustrated in photo 3.

Photo 3: Mosquito nets used to fence an animal barn at the Doualare neighborhood



Source: Fombang 04/04/2018

Mosquito nets spread along the fence of animal barn. The nets protect the animals from straying and also from insect bites.

Furthermore, mosquito nets are used as a sieve by women in the kitchen. Most business women involved in the production of soya beans products like the drink, milk, balls, and meat use mosquito nets especially that made out of cotton in sieving. Women who prepare bilbil also use the nets in sieving and also in covering the mouths of canary in order to prevent flies from getting into the drink.

Photo 4: A canary covered with a mosquito net in the Djoudandou neighborhood.



Source: Fombang 20/09/2017

The mosquito net is used in the process of bilbil production. The net is used to tie the mouth of a canary containing bilbil, it serves as a protection against flies.

Moreover, mosquito nets are used in two different ways to protect cotton which is a cash crop. The first use is as a protection from insects which feed on cotton. The second is to protect the cotton from the wind. The wind can be very destructive on cotton as cotton is

very light and can easily be carried away by wind. Mosquito nets are used to protect the cotton from being carried away by the wind.

Photo 5: Cotton under a mosquito net in Dogba in Maroua II rural area.



Source: Fombang 20/03/2018

The cotton is protected by a mosquito net from insects and the wind.

More so, mosquito nets are used as ropes in weaving straw mats and the tying of wood for sale. Grass is weaved in this municipality into locally made roofs and used in the roofing of thatched houses, as doors, ceiling of houses and fences. In the process of weaving the grass, mosquito nets are cut into long tiny ropes, twisted and used in binding the grass together. The ropes are also used in tying wood in small packs which are sold for 100f, 200f or 500f depending on the size of the bundle.

Apart from the economic function, mosquito nets are also used for esthetics by 20% of the informants in cleaning and also as a blind. Esthetic has to do with beautifying, making something good looking in the eyes. It is used as a sponge to wash cars so that they can look clean and beautiful. It is also used to wash the body so that it can be clean and look good, plates and dishes so that they can be clean. It is used in the decoration of the room when used as window curtains. Mosquito nets are used as blinds in toilets and baths. Most toilets and baths in the Maroua II Municipality are of the African traditional style and are in the open. For privacy to be respected, mosquito nets are used as blinds to cover the toilets. These nets are also used as fence to fence the toilets. Still in line with esthetics, 8 % of the informants use mosquito nets as a sponge in washing and 4% in bathing.

Photo 6: A sponge made out of a mosquito net at the Diguirwo neighborhood



Source: Fieldwork 24/03/2018

A piece of mosquito net in a soap dish with other bathing equipment which is evident that it is used for bathing

Mosquito nets and sports

Mosquito nets are used by 8% of the study population in Maroua II as a means to enhance sporting activities as children used them as goal post nets while playing football, the nets were tied at the back of the goal post whenever they played football just like the football nets tied during matches. Thus it serves as a motivating factor in the playing of football in the quarters thus enhancing sporting activities.

Photo 7: A mosquito net tied at the back of a goal post in Mayel-Ibbe neighborhood



Source: Fombang 03/4/2018

A group of children between the ages of 12 and 16 years used the mosquito net at the goal post when playing football.

Table 2: showing a statistic of the utilization of mosquito nets by the various informants

Function	Activity	Number of respondents	Percentage %
Proper use	Sleeping under a mosquito net	7	28
Economic	Soya beans products	1	4
	Bilbil production	2	8
	Protection of crops	1	4
	Animal rearing	1	4
	Protection of cotton	1	4
	Mat production	1	4
	Tying of wood	1	4
Esthetics	Bathing sponge	1	4
	Car wash	1	4
	Washing plates and dishes	1	4
	Wall cover	1	4
	As a blind	1	4
Sports	Football	2	8
Not useful	Abandoned	3	12

Discussion

A mosquito net was used in the prevention against malaria in the house of a 39-year-old community health worker in the Maroua II municipality. As a health agent, she has a good knowledge of malaria thus; she knows the importance of a mosquito net in the prevention of malaria as her entire household sleeps under mosquito nets. She lowers

the net as from 5 pm when mosquitoes start leaving their hiding places. The behavior in using mosquito nets is supported by knowledge and other factors, such as experiences, habits, culture, and family economy (12). The very high temperatures discourage the use of mosquito nets as the 28% of the respondents who make good use of mosquito nets expressed so much discomfort when used in the dry season when it is extremely hot. On the other hand, during the months of December and January when places are extremely cold there is a high utilization not only in the protection against mosquitoes but also to keep warm. There is a link between the use of LLIN and the seasons of the year, residents make use of LLINs depending on the season (13). On the other hand, the 96% who used the mosquito nets as a source of income in their economic activities, for esthetics and for sports need to be sensitized on the proper utilisation of these nets. In a previous study, out of the lot that was using LLINs, 578 (96.7 %) were actually using nets to sleep under while 20 (3.4 %) were for other activities, such as football nets, nursing seeds and wall coverings (14). The improper utilization of mosquito nets is not limited in the Maroua II municipality as economically, the use of mosquito nets for fishing is now common place across the globe, potentially occurring in over 30 countries, half of which are in Sub-Saharan Africa (15). Many of the respondents claim that they used the nets for other uses when they were bad meanwhile these nets could be taken care of by washing, torn nets could be stitched, and nets with expired chemicals could be impregnated with insecticides. When we examine some of the reasons given by the respondents as to their improper use of mosquito nets we realized that some of them have a proper knowledge of malaria and the role of mosquito nets in its prevention while others do not. Warayansa a 35-year-old local liquor producer interviewed on 20/09/2017 in Djoudandou uses a mosquito nets in the production of bilbil. She gave her reason for using a mosquito net thus

“I use a mosquito net to tie the mouth of the canary when preparing bilbil because the mosquito net is easy to have I did not buy it, it was given to me free of charge and it helps to air the hot bilbil to cool easily while protecting flies from falling into the drink. I cut them out and wash out all the poisonous chemicals and boil it before using”

From her response, she received the mosquito net free of charge that is why she did not value it and we also realized that she is aware of the fact that the mosquito nets have poisonous chemicals thus, her reason for not using it for the right purpose is not ignorance.

Interview with 38 years old Asta in Djoundandou on 20/09/2017

“I prefer mosquito nets as a sieve because it is more economical as I cut ½ meter square and use it for a long period of time until it gets bad before I cut

out another piece, it is easy to handle and very effective when used as the ½ meter square is big enough and can handle mass production and serves time as compared to a simple local sieve bought from the market which is slow.”

She prefers using a mosquito net as a sieve as it ease large production and is long lasting thus, it is more economical. When asked that Mosquito nets are impregnated with chemicals which can be dangerous in our systems when ingested, she said she puts the net in a canary and boil it for so long a time and the excessive heat will destroy the power of the chemicals, that was on the net and then spread it out on the sun to get dry before she uses them.

To 40 years David, a farmer in Dogba interviewed on 20/03/2018, who uses the net to protect cotton, he said,

“Cotton is so important to me, it is my source of income to take care of my family needs so, it’s my duty to protect it so jealously. I use a net because i did not pay for it and since I have it, I decided to cover my cotton with it as the insecticides on it will protect my cotton from being destroyed by insects and also keep it save from being carried away from the wind. The mosquito net is airy and thus the cotton will be well ventilated and will not mold or develop very bad odor and become dirty or colored”.

From the excerpt above, there is a good knowledge of mosquito net but, he prefers to protect cotton which is his main source of income rather than sleeping under. He is aware of the fact that the insecticide on the mosquito nets will prevents insects from destroying the cotton.

The use of a mosquito net as a blind to cover open toilet and baths was observed at the premises of 75-year-old Oumarou in the Doualare-Matakam neighborhood interviewed on 04/04/2017 and he responded.

“When I was growing up I never used a mosquito net yet I survived so, I do not need it for that purpose when I had a more pressing need for the net, my toilet was so expose and I had no privacy so I decided to use it, besides if these nets were so important as they claim why was it given to us free of charge?”.

To him, mosquito nets are not the only means to prevent malaria and the fact that it was given free of charge devalues it.

40 years Habiba in the Diguiwo neighborhood interviewed on 24/03/2018,

“All the soap dishes in my home have a piece of the mosquito net which is used for bathing and it is very effective as it removes dirt from the body with ease.”

The most common type of mosquito net used in bathing was the hard texture net made out of plastic as it removes the dirt with ease and is long lasting. In Uganda and Tanzania, as far as esthetic is concerned, mosquito nets are used as wedding veils (16).

25-year-old Gigla a car washer at a washing point at Zokok uses a sponge made out of mosquito net in washing cars, to him, in an interview on 25/03/2018,

“it’s very effective in the washing of cars and the sponge last for long, besides I dislike using mosquito nets as it is so uncomfortable to me, when I sleep under one it’s as if I am in another room in a room, the heat inside is unbearable so, I decided to make use of it in this way, it keeps for long and its very economical, I can use a piece for a month before it worn out.”

In a car washing point at the Zokok neighbourhood, the sponge was used in washing cars, here; it was the type made out of cotton that was used in washing the cars. He is aware of the importance of sleeping under a mosquito net but, due to the discomfort, he prefers to use it for washing cars.

13-year-old Ali interviewed at Mayel-Ibbe on 03/4/2018 notes,

“we like to play football and most of the time when the opponent scores it results to too much arguments and at times fighting and, as there was nothing to prove it so, we decided to use a mosquito net since we never had the finances to buy a football net.”

15-year-old, Adoum interviewed at Mayel-Ibbe on 03/4/2018

“Since we never had money to buy a football net I, took a mosquito net from our home which was hanging in our room and my brothers and I were not using it at night.”

Ali, Adoum and friends were perpetrators of this act and this shows that they are not the only ones who carryout this practice since they play with their friends. They were not sleeping under the nights at night and at the same time, they were always arguing and at times even go to the extent of fighting on the field and to solve this problem, since they never had money to buy a net, they had to make do with the mosquito net that was hanging in their room.

Conclusion and recommendations

One of the greatest challenges was the effective use of mosquito nets by individuals so a lot of efforts need to be made to have people sleep under them and this must extend beyond sensitization about the benefits of the use of impregnated mosquito nets and such efforts must address sociocultural, economic and other determinants of behavior. All those who use mosquito nets for other activities rather than to prevent malaria should be severely punished. It was realized that the higher the educational level of the respondent, the more regular the households were in making recommended use of impregnated mosquito nets. In carrying out this research on impregnated mosquito nets in Maroua II, there were other

points of interest that could not go unnoticed. These points include the notion that gifts are not valued, the role of education and sensitization on health, the impact of culture on health seeking behaviors. In a nutshell, mosquito nets have more of a necessary function than a universal function in the Maroua II municipality.

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