



Determinants of Non-Use of Insecticide-Treated Mosquito Nets among Pregnant Women and Children under Five Years Old at the Dikungu General Reference Hospital

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Abstract

Objective: The main objective of this study is to identify the determinants of non-use of insecticide-treated mosquito nets among pregnant women and children under five years old at the Dikungu General Reference Hospital.

Methods: For this study, we used the cross-sectional correlational method, through an interview questionnaire among pregnant women and children under five years old at the Dikungu HGR. Data analysis was carried out using SPSS Version 25 software. **Results:** This study found the following results: A predominance (58.1%) of the female sex, married women were in the majority (38.7%), 24% had a secondary education level, while female employees presented 26.7%, the majority (71.3%) were Catholic, 32.7% did not use the insecticide-treated mosquito net and 59.2% said the insecticide-treated mosquito net was unavailable; the most obvious reason (51.7%) is that they don't like it, the majority (94%) accepted having received information on the importance of insecticide-treated mosquito net, and the most frequent channel (64.1%) was community relays. Finally, a statistically significant difference was revealed between the use of insecticide-treated mosquito net and the level of education ($\chi^2 = 10.9$; $p < 0.03$), and a statistically significant link between the use of insecticide-treated mosquito net and information on the importance of insecticide-treated mosquito net ($\chi^2 = 20$; $p < 0.000$). **Conclusion:** The following determinants of non-use of insecticide-treated mosquito nets were identified: Low level of education and insufficient information on the usefulness of insecticide-treated mosquito nets. Promoting the education of pregnant women and mothers of children under five years old is essential in resolving the problem of non-use of insecticide-treated mosquito nets at the

Dikungu HGR.

Subject Areas

Food Science & Technology, Neurology

Keywords

Determinants, Mosquito Net, Pregnant Women and Children, Dikungu HGR, DRC

1. Background

Malaria (or malaria) is a febrile and haemolysing erythrocytopathy caused by a hematozoan: The female *Anopheles* of the Culicidae family and the *Anopheles* genus [1].

Today, malaria is the leading parasitic disease worldwide and a public health problem that threatens more than 2.4 billion people, or nearly 40% of the world's population [2].

Malaria infection during pregnancy is one of the most dangerous forms of malaria and threatens pregnant women living in all tropical and subtropical regions. Some 50 million pregnant women are exposed to malaria each year, at least 60% of them in Africa, and falciparum malaria infection during pregnancy causes more than 500,000 infant deaths per year [3].

In Africa, malaria accounts for the vast majority of deaths, south of the Sahara, where this disease also poses a serious obstacle to economic and social development. It is estimated that more than 12 billion dollars are lost annually due to malaria, although a fraction of this sum would be enough to control it. There are at least 300,000 million acute cases of malaria each year. About 90% of deaths occur in Africa, mainly among young children under five years (20%) and it represents 10% of the total disease burden [4] [5].

In the Democratic Republic of Congo (DRC), every year, malaria claims many victims. Much more than a public health problem, malaria constitutes a significant socio-economic burden in our country, while a large part of the population is deprived. As a result, it contributes to the process of impoverishment of populations but also and above all reduces and deprives productivity and by depriving communities of the means allocated to the care of patients. Malaria kills 180,000 people each year in the DRC and affects nearly a third of the population.

Despite this worrying panorama, it has taken a long time for a global initiative to be concerned with reducing malaria. Politicians have long remained deaf to the calls of experts who deplored the high mortality, especially before the age of five and the impact of the disease on pregnant women: mortality, abortion, anemia, low birth weight of children, etc. [6] [7].

Since then, the insecticide-impregnated mosquito net has been a simple mechanical protection, very effectively limiting human-vector contact, and there-

fore transmission when it is at its maximum, that is to say at night. Despite the inconvenience that it can represent in hot and humid regions, its effectiveness has long been recognized, even if it does not prevent all contact between the mosquito and the sleeper, particularly in the event of misuse and tearing. However, an intact mosquito net forces the mosquito to seek its meal elsewhere, most often at home and sometimes on a different host [8].

The Dikungu General Reference Hospital is among the places where malaria is very high, accentuated by the socio-economic crisis having a negative impact on the lives of its inhabitants.

To this end, we have noticed on the one hand the frequent cases of malaria, anemia, high morbidity in children under five years of age, abortions, situations that can be avoided by promoting the use of mosquito nets and On the other hand, the non-use of mosquito nets in certain families. This is why for this study we set ourselves the objective of identifying the determinants of non-use of mosquito nets among pregnant women and children under five years old at the Dikungu General Reference Hospital. To achieve this, the following specific objectives were defined: determine the rates of availability and use of insecticide-treated mosquito nets among pregnant women and children under five years of age, identify the factors associated with non-use of mosquito nets impregnated with insecticide at the General Reference Hospital of Dikungu and make some suggestions with a view to improving the situation of use of mosquito nets impregnated with insecticide.

The framework of this paper has four points. The first, the introduction, which demonstrates the interest and objectives of the study, the second, explains the material used and the methodology followed, the third presents the results of the survey carried out in the field, the fourth finally, engages a discussion with a view to making the data in this field of study intelligible. A brief conclusion ends this study.

2. Material and Methods

2.1. Study Framework

The Dikungu General Reference Hospital (Dikungu HGR) is located in the Dikungu Reference Health Zone in the Katako-Kombe territory, Sankuru province, in the Democratic Republic of Congo (DRC). This leper colony was created in 1979 by Belgian missionaries. In 1989, that is to say 10 years after its creation, it became the Dikungu HGR in the Dikungu Health Zone. Since its creation in 1979, it was prohibited to treat other categories of diseases apart from leprosy, tuberculosis, and trypanosomiasis. From 1988 the Zairian State ceded the management of the latter to a Non-profit Association (ASBL) called "Health for the Well-being of Sankuru (SABSA)" for a renewable 4-year mandate and in the hands of the Catholic Church since 1992 to the present day [9].

2.2. Type and Period of Study

The present study was cross-sectional and took place from March 6 to July 28, 2023.

2.3. Study Population

The population for this study consisted of all pregnant women and children under five years old served by the Dikungu HGR and living in the Dikungu Health Zone.

2.4. Sampling

For this study, we opted for the exhaustive sampling technique which consists of counting all individuals meeting the selection criteria. For this study, the sample size was 150 respondents, including 64 pregnant women and 86 children under five years old.

2.5. Collection of Data

The data for this study were collected by a group of 4 nurses from the Dikungu HGR who were previously trained using the data collection instrument. The following variables were taken into account: sex for children, age, level of education, marital status, economic situation, religion, use of insecticide-treated mosquito net, reasons for unavailability of insecticide-treated mosquito net, information on the importance of insecticide-treated mosquito net, the information channel, and other reasons.

2.6. Statistical Analysis

The data collected from this study were entered and analyzed using SPSS Version 25 software. For the search for links between the dependent variable (the use of insecticide-treated mosquito net) and the independent variables, the Pearson Chi-square test has been used.

For each binary variable retained, the relative risk (RR) with its 95% confidence interval was calculated. The value $p < 5\%$ was at the threshold of statistical significance. * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$; NS = not significant [10] [11].

2.7. Ethical Considerations

For this study, the confidentiality of the responses or information was guaranteed, to reassure that the information was anonymous, we did not provide for the transcription of the names of the respondents on the survey questionnaire, however, an identification number was given to each copy of the survey questionnaire.

3. Results

We recall here once again, this study included a total of 150 respondents including 64 pregnant women and 86 children. Below, we present the results of the determinants of non-use of insecticide-treated mosquito nets at the Dikungu General Reference Hospital. It appears from these results that the median age of the respondents was 12.58 years with the extremes of 1 to 45 years.

The analysis made in **Table 1** shows among the children, a predominance (58.1%) of the female sex, married women were the majority (38.7%) among the women surveyed.

Reading **Table 2**, it is revealed that 24% of the respondents had a secondary level of education, while the employed presented a proportion of 26.7%, finally the majority of the respondents (71.3%) were Catholics.

Table 1. Distribution of respondents according to socio-demographic characteristics.

Variables	n (%)
1. Gender (child)	
- Male	36 (41.9)
- Female	50 (58.1)
Total	86 (100.0)
2. Civil status	
- Single	6 (4.0)
- Married	58 (38.7)
- Children	86 (57.3)
Total	150 (100.0)

Table 2. Distribution of respondents according to economic and cultural characteristics.

Variables	n (%)
1. Level of education	
- None	2 (1.3)
- Primary	7 (4.7)
- Secondary	36 (24.0)
- Academic	19 (12.7)
- Child	86 (57.3)
Total	150 (100.0)
Profession	
- Unemployed	34 (16.0)
- Employed	40 (26.7)
- Child	86 (57.3)
Total	150 (100.0)
3. Religion	
- Catholic	107 (71.3)
- Protestant	30 (20.0)
- Kimbanguiste	1 (0.7)
- Others	12 (8.0)
Total	150 (100.0)

Table 3 indicates that 32.7% of respondents did not use the insecticide-treated mosquito net and 59.2% of them said that the insecticide-treated mosquito net was unavailable. The most obvious reason (51.7%) is that they don't like it.

The analysis carried out in **Table 4** reveals that the majority (94%) of respondents accepted having received information on the importance of insecticide-treated mosquito net, and the most frequent channel (64.1%) was the community relays.

It appears from **Table 5** that there is a statistically significant difference between the use of insecticide-treated mosquito net and the level of studies ($\chi^2 = 10.9$; $p < 0.03$), it is also established a statistically significant link between the use of insecticide-treated mosquito net and information on the importance of insecticide-treated mosquito net ($\chi^2 = 20$; $p < 0.000$).

Table 3. Distribution of respondents according to the determinants of non-use of insecticide-treated mosquito net.

Variables	n (%)
1. Use of insecticide-treated mosquito net	
- Yes	101 (67.3)
- No	49 (32.7)
Total	150 (100.0)
2. Reasons for not using insecticide-treated mosquito net	
- insecticide-treated mosquito net unavailable	29 (59.2)
- insecticide-treated mosquito net available	20 (40.8)
Total	49 (100.0)
3. Reasons for the unavailability of insecticide-treated mosquito net	
- Lack of resources	4 (13.8)
- Does not like insecticide-treated mosquito net	15 (51.7)
- Did not receive during distribution	7 (24.1)
- Without reason	1 (3.5)
- Other reasons	2 (6.9)
Total	29 (100.0)

Table 4. Distribution of respondents according to the determinants linked to information on insecticide-treated mosquito net.

Variables	n (%)
1. Information on the importance of insecticide-treated mosquito net	
- Yes	60 (94.0)
- No	4 (6.0)
Total	64 (100.0)
2. Information channel	
- Media	3 (4.7)

Continued

- Community relay	41 (64.1)
- Health structure	16 (25.0)
- Other channel	4 (6.2)
Total	64 (100.0)
3. Other reasons for not using insecticide-treated mosquito net	
- Tight room	15 (30.0)
- Discomfort	8 (16.3)
- Without pattern	4 (8.2)
- Other reasons	22 (44.9)
Total	49 (100.0)

Table 5. Relationship between insecticide-treated mosquito net use and other variables.

Variables	The use of insecticide-treated mosquito net						
	Yes	No	RR	IC [95%]	χ^2	p<	S
1. Level of education							
- none	5	6					
- Primary	6	5			10.9	0.03	*
- Secondary	17	4					
- Academic	15	4					
Total	43	23					
2. Information on the importance of insecticide-treated mosquito net							
- Yes	90	40					
-			1.22	[1.07 - 1.39]	20	0.000	***
- No	11	9					
Total	101	49					

4. Discussion

Resistance against malaria remains a worldwide concern. For this purpose, the mosquito net impregnated with insecticide occupies a noble place, especially among pregnant women and children under five years old.

This study was carried out at the HGR of Dikungu in the Lokombe Sector, Katako-Kombe territory, in the Democratic Republic of Congo. It affected children under five years old and pregnant women. A total of 150 respondents include 64 pregnant women and 86 children under five years old.

4.1. Economic and Cultural Characteristics

In this study it was revealed in **Table 2** that 24% of the respondents had a secondary level of education and that employees presented a proportion of 26.7% and the majority of these respondents (71.3%) were Catholics.

These results are not surprising because, in the DRC, the population has a

precarious economic situation, the majority of the population strives to have at least a state diploma (secondary education). Few people have the means to complete their studies at university level. The majority of Catholics could be explained by the fact that the Catholic Church was the first church to emerge in the DRC, and as there were no other churches, the majority of the population who wanted to worship God did not should only be done by the Catholic Church. These results are contrary to those obtained by Soumaïla Abolou Maïga (2004), stating that Mali is a developing country with a population level of education that still remains low, particularly with regard to women. During his study, it emerged that mothers or caregivers of children under five years old were mainly illiterate with 66.9%. This illiteracy rate is lower than that obtained by Maïga in the Banolangara circle, respectively 92.5% and Saffe, 83% in the Sikasso circle [12]. These results are confirmed by other authors [13] [14].

This difference could easily be explained by the level of reasoning that in the DRC, many people do not have access to the country's wealth and therefore to be almost balanced, one must go to school. The Dikungu HGR is in the center which is full of many primary and secondary schools. But above all by the free primary education in the DRC where everyone is supposed to have completed primary studies, to approach secondary studies which currently cost less and less, whereas in Mali these studies would be expensive compared to our study environment.

4.2. Determinants Linked to Non-Use of Insecticide-Treated Mosquito Net

The analysis made in **Table 3** showed that 32.7% of respondents do not use the insecticide-treated mosquito net, 59.2% of them affirmed that the insecticide-treated mosquito net was unavailable and 51.7% did not appreciate its use. These results show why some people in the Dikungu Health Zone are wary of using insecticide-treated mosquito net; this is due to insufficient awareness among this population of the importance of insecticide-treated mosquito net in the fight against malaria.

These results are almost contrary to those of Mohamed Seydou Cisse (2009), during his study, he found that 90.7% of children under five years old would have a mosquito net impregnated with insecticide. We did not find reasons for unavailability in 37.5%, however 31.2% indicated that they did not like mosquito nets impregnated with insecticide and 18.8% cited a lack of resources [15].

This wide availability could be explained by the Government's policy which consisted of distributing insecticide-treated mosquito nets free of charge to children under five years old during the vaccination campaign, and to pregnant women during prenatal consultations.

4.3. Relationship between the Use of Insecticide-Treated Mosquito Nets and Other Variables

Here, it was revealed in **Table 5**, that there is a statistically significant difference

between the use of insecticide-treated mosquito net and the level of education ($\chi^2 = 10.9$; $p < 0.03$), a statistically significant link is also established between the use of insecticide-treated mosquito nets and the importance of information on the usefulness of insecticide-treated mosquito nets ($\chi^2 = 20$; $p < 0.000$).

These results could be explained by the fact that if people do not have information on the usefulness of insecticide-treated mosquito net, they would be resistant to using it, on the other hand good awareness would be useful to persuade the population of the Dikungu Health Zone to make good use of it. A low level of education would be a determining factor in the non-use of insecticide-treated mosquito nets. The illiterate person would not know the importance of IBD, and is supposed to blame the occurrence of the disease on bad luck or witchcraft.

These results are entirely consistent with those of Ulrich Thomas Bakedeck (2011), having shown that the level of education is significantly associated with the non-use of insecticide-treated mosquito nets. We note that the prevalence of non-use of insecticide-treated mosquito nets is higher among pregnant women with no education level (92.7%), followed by those with primary education (87%), and finally, secondary level and above (83.7%). To explain this differential, one could think that women without a level of education are less open to modernity, they attend health facilities less for prenatal consultations, and they are less informed about the healthy behaviors to adopt during pregnancy to prevent malaria [2].

5. Conclusions

The results of this study show that some pregnant women and children do not use the insecticide-treated mosquito net. The determinants identified for the non-use of insecticide-treated mosquito nets in this study are: low level of education, and insufficient information on the usefulness of insecticide-treated mosquito nets.

The intensification of well-planned and adapted communication sessions for behavior change, the development of literacy programs intended for pregnant women with emphasis on health education which would enable them to adopt behaviors favorable to their survival and that of their children are appropriate measures to overcome the situation of non-use of insecticide-treated mosquito nets.

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Authors' Contributions

DIKOKE OLEKO DJAMBA Antoine the designer of the study, PENGOLONGO

OKITOKAKO Nicolas, DIKOMAKI OHANDJO Louise, MILAMBO OKONGEMA Oscar, all scientific staff from the Higher Institute of Medical Techniques of Tshumbe working at the General Reference Hospital of dikungu participated in data collection and each gave a critical opinion on the content of the study. NGOY KANKIENZA Nestor participated in the analysis of the data and in giving the meaning of the results found.

Conflicts of Interest

The authors declare no conflicts of interest.

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