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Knowledge, Attitudes and Practices of Mothers with Children under 2 Years Old towards Malaria in the Niamey V Health District in Niger

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Abstract

Introduction: Malaria is a major public health problem due to the mortality it causes worldwide and in Niger in particular. The objective of this study was to study the knowledge, attitudes and practices of mothers regarding malaria. **Materials and methods:** This was a cross-sectional study of 3 months duration. The study population consisted of couples with mothers and children under 2 years old. **Results:** Mothers had an average age of 28.19 years and were not enrolled in school in 34.37% of cases. The community was the main source of information on malaria with 78.33%. Knowledge of the mode of transmission of malaria through mosquito bites was 85.13%. Those experiencing at least one sign of malaria severity were 47.98%. The majority of mothers, 76.47% considered the use of mosquito nets as a means of preventing malaria. The consultation at the health center was the most reported attitude in case of malaria signs with 82.35%. **Conclusion:** Mothers' knowledge remains insufficient in view of the threat posed by malaria.

Keywords

Knowledge, Attitudes, Practices, Malaria, Niger

1. Introduction

Malaria is the most widespread parasitic disease in the world. It is an acute febrile illness caused by the Plasmodium parasite and transmitted to humans through the bite of infected female Anopheles mosquitoes [1].

In 2023, the World Health Organization (WHO) estimated the number of ma-

laria cases and 597,000 deaths worldwide to be 263 million. The WHO African Region accounted for 94% of cases and 95% of deaths, the majority of which were children under five years of age [2].

In Niger, approximately 3 million cases of malaria were recorded in health facilities in 2019, including 4509 deaths. Children under five years of age were the most vulnerable group, with more than one million cases and approximately 3000 deaths. Infants under 2 years of age represented one of the most vulnerable groups with an increased risk of rapid disease progression, complications, and death [3] [4]. This characteristic vulnerability of infants under 2 years of age prompted this study, which aimed to assess the knowledge, attitudes, and practices of mothers regarding malaria in the Niamey V health district.

2. Materials and Methods

- **Type and period of study:** This was a cross-sectional study with descriptive and analytical aims covering a 3-month period from June 10 to September 10, 2024.
- **Study population:** It consisted of mothers with children under 2 years old seen in the Integrated Health Centers (IHC) of the Niamey V health district. The mothers of children under 2 years old saw in the integrated health centers of the Niamey V sanitary district during our visits and who agreed to answer our questions, and excluded the mothers who did not want to answer all the questions
- **Sampling:** We considered two levels of sampling
  - **Choice of IHC:** We conducted a simple random sampling of 7 IHC out of the 12 IHC that the Niamey V health district had.
  - **Choice of mothers:** We have comprehensively selected all the mothers present in the IHC of the Niamey V health district during our visits and who have accepted to answer our questions.
- **The variables studied were related to:**
  - **Sociodemographic characteristics of mothers:** age, level of education, profession;
  - **Data related to children:** age, sex, vaccination status, nutritional status and the reason for consultation;
  - **Knowledge of mothers about malaria:** the source of information on malaria, knowledge of the signs, knowledge of the mode of transmission, knowledge of a treatment, knowledge of a sign of severity and knowledge of means of prevention;
  - Attitudes and practices towards malaria: the attitude or practice of mothers in front of a child showing signs of malaria.
- **Method of data collection and analysis:** Data were collected by semi-structured interviews with mothers and the use of children's files using a printed form. They were then entered and analyzed using Epi info 7.2.2.6 software. Pearson's Chi-square statistical test at a significance level of 5% was used to

compare proportions between qualitative variables. The calculation of the Odds Ratio (OR) made it possible to assess the risk levels of the different factors. The risk was significantly increased if OR > 1 and p-value < 0.05 or CI (95%) excluding the value 1.

- **Ethical considerations:** The study was authorized by the Chief Physician of the Niamey V health district and approved by the heads of the health centers. The mothers' participation in the study was free and voluntary; verbal consent was obtained before any participation in the study. The data was collected, entered and analyzed anonymously.

3. Results

A total of 323 mother-child pairs aged 0 to 24 months were surveyed.

3.1. Sociodemographic Characteristics of Mothers

They were on average aged 28.19 years 6.76 with extremes of 16 and 50 years. They were not in school, of profession *Housewife* and of average socio-economic level in respectively 34.37%, 57.59% and 84.52% of the cases.

3.2. Data Related to Children

They were predominantly female with 50.46%. The majority, or 55.25%, were aged 1 to 5 months, the average age was 6.79 months and 5.21 months with extremes ranging from 1 to 23 months. They had up-to-date vaccination status in 93% of cases and normal nutritional status in 88% of cases.

Fever was the most frequent reason for consultation with 34.06%, followed by cough with 19.20% (Figure 1).

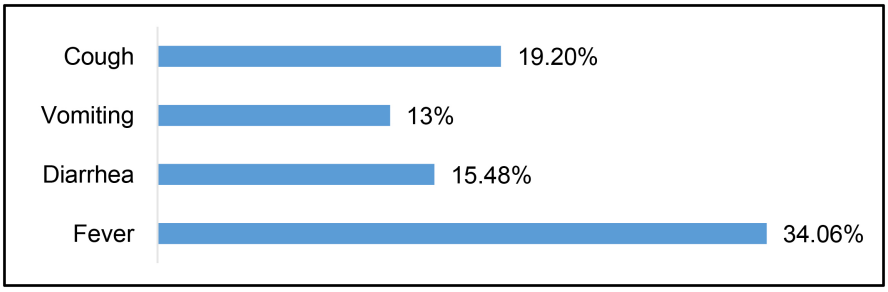

Figure 1. Distribution of children according to the reason for consultation in the Niamey V health district.

3.3. Mothers' Knowledge of Malaria

All mothers surveyed had already heard of malaria, 100%, the main source of information was community members with 78.33% (Table 1). They knew at least one sign of malaria in 95% of the cases (n = 307), fever was the main sign reported with 90.40%, followed by vomiting with 61.61%. Knowledge of the mode of transmission of malaria through mosquito bites was reported by 85.13% of mothers (n = 275); in 47.98% of cases (n = 155), they knew at least one sign of the severity of

malaria, convulsions and anemia were the known signs of the severity with respectively 41.94% and 21.39%.

Table 1. Distribution of mothers according to the source of information on malaria in the Niamey V health district.

Sources of information	Staff	Percentage
Radio	5	1.55
Social networks	10	3.10
Television	21	6.50
Awareness	34	10.53
In the community	253	78.33
Total	**323**	**100**

The majority of mothers, 76.47%, consider the use of insecticide-treated mosquito nets as an effective means of combating malaria (Figure 2).

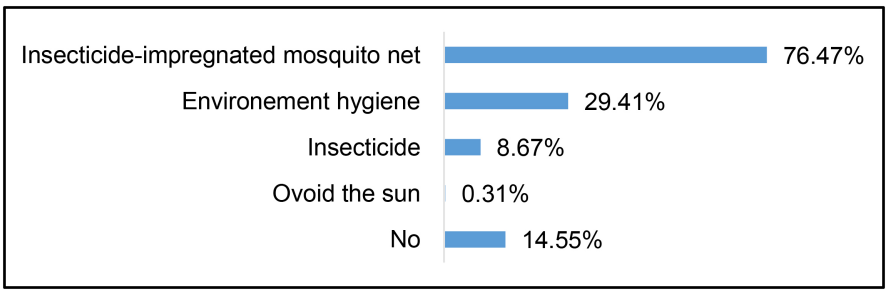

Figure 2. Distribution of mothers according to known malaria prevention methods in the Niamey V health district.

3.4. Attitudes and Practices of Mothers towards Malaria

The consultation in a health center was the attitude most reported by mothers towards a child with signs of malaria with 82.35% (Figure 3). All times, 56.53% of the mothers had already reported practicing self-medication based on traditional remedies or tranquilizers such as paracetamol.

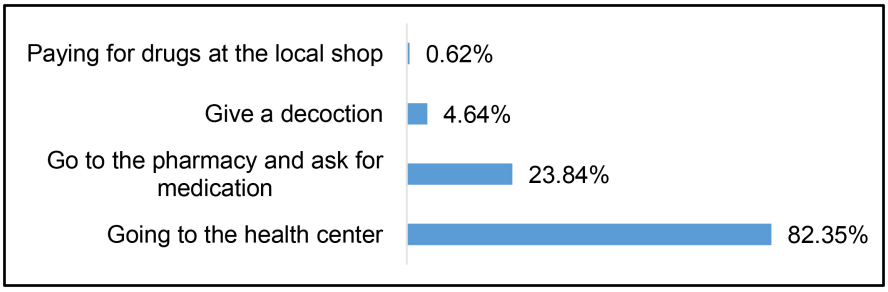

Figure 3. Distribution of mothers according to attitude towards a child showing signs of malaria in the Niamey V health district.

3.5. Bivariate Analysis

Knowledge of the mode of transmission of malaria was more observed among school-aged mothers with 69.82%; knowledge of the mode of malaria transmission was significantly associated with the mother's schooling (P < 0.05) (Table 2).

Table 2. Link between the mother's schooling and knowledge of the mode of transmission of malaria in the Niamey V health district.

Schooling of the mother	Do you know how malaria is transmitted?				
	Yes	Non	OR	IC 95% [sup-inf]	P
Schooled	192 (69.82%)	20 (41.67%)	3.23	1.72 - 6.07	<0.001
Unschooled	83 (30.18%)	28 (58.33%)	1		
Total	**275 (100%)**	**48 (100%)**			

Knowledge of the mode of transmission of malaria was more observed among mothers over 25 years old with 59.27%; knowledge of the mode of malaria transmission was significantly associated with the age of the mother (P < 0.05) (Table 3).

Table 3. Relationship between the age of the mother and knowledge the mode of transmission of malaria in the Niamey V health district.

Age of the mother (years)	Do you know how malaria is transmitted?				
	Yes	Non	OR	IC 95% [sup-inf]	P
≤25	112 (40.73%)	26 (54.17%)	1		
>25	163 (59.27%)	22 (45.83%)	0.55	0.31 - 1.07	0.04
Total	**275 (100%)**	**48 (100%)**			

Knowledge of the signs of malaria severity was more observed among educated mothers with 72.90%; knowledge of malaria severity signs was significantly associated with maternal schooling (P < 0.05) (Table 4).

Table 4. Link between the mother's schooling and knowledge of the signs of severity of malaria in the Niamey V health district.

Schooling of the mother	Do you know the signs of malaria severity?				
	Yes	Non	OR	IC 95% [sup-inf]	P
Schooled	113 (72.90%)	99 (58.93%)	1.87	1.17 - 2.99	0.004
Unschooled	42 (27.10%)	69 (41.07%)	1		
Total	**155 (100%)**	**168 (100%)**			

Knowledge of the signs of malaria severity was more observed in women over 25 years old with 63.23%; knowledge of malaria severity signs was significantly associated with the age of the mother (P < 0.05) (Table 5).

Table 5. Link between the mother's age and knowledge of the signs of malaria severity in the Niamey V health district.

Age of the mother (years)	Do you know the signs of malaria severity?				
	Yes	Non	OR	IC 95% [sup-inf]	P
≤25	57 (36.77%)	81 (48.21%)	1		
>25	98 (63.23%)	87 (51.79%)	0,62	0.40 - 0.97	0.01
Total	**155 (100%)**	**168 (100%)**			

4. Discussion

Study Limitations:

Factors such as education, age, access to health services, and cultural beliefs can influence mothers' knowledge, attitudes, and practices regarding malaria. These attitudes may also vary from region to region, depending on local malaria characteristics, and may evolve over time in response to awareness campaigns, socioeconomic changes, or shifts in malaria transmission. The sample size may also limit the quality of the results, which will not be generalized to the general population. A broad and in-depth study of the population's knowledge, attitudes, and practices will provide a better understanding of the problem and the development of effective and sustainable prevention strategies adapted to local contexts.

The average age of mothers was 28.19 years ± 6.76, this result is similar to that of Seck I *et al.* [5] in 2008 in Senegal who found an average of 28 years; this average age confirms the high reproductive activity at this period of life. Mothers were 34.37% not in school. Kiniffo IR *et al.* [6] in 2020 in Benin reported that 95% of mothers were illiterate; Gokpeya MB *et al.* [7] in 2013 in Côte d'Ivoire reported 30% of mothers not in school; Seck I *et al.* [5] reported 49.6% of mothers not in school. In these countries, the schooling of mothers, varying according to the place of residence (urban or rural), would be linked to socio-economic and cultural factors often preventing access to education. Our bivariate analysis showed that mothers' education significantly influenced their knowledge of malaria (P < 0.05). The girl's education could then facilitate their understanding of malaria prevention strategies and affect adherence to public health interventions, such as the use of insecticide-treated mosquito nets and attendance at health services. The children were predominantly female with 50.46% and had a mean age of 6.79 months, Chaka C *et al.* [8] in 2012 in Mali had also reported a female predominance with 56.5%. Differences in distribution by sex appear negligible in studies on malaria, because the disease would affect children regardless of sex. The young age of the child, on the other hand, exposes them to a risk of malaria due to a lack

of acquired immunity. Indeed, prolonged exposure to mosquito bites can allow the acquisition of partial immunity to malaria. Nutritional status was normal in 88% of children. Well-nourished children develop a better immune response, thus reducing the risk of malaria severity. In contrast, malnourished children are at increased risk of serious complications, as demonstrated by a study in Uganda, which linked malnutrition to higher mortality rates in children with malaria [9].

All mothers had already heard of malaria, community members were the main source of information with 78.33%; Drabo KM *et al.* [10] in 2003 in Burkina Faso reported that all mothers surveyed knew the name of malaria in the local language. Ndour CT *et al.* [11] in 2006 in Senegal found radio as the main source of information on malaria with 91.10%. Thus, it is important to remember the crucial role that mass media can play in understanding diseases provided that they use local languages and techniques that are simple for the population to understand. They knew at least one symptom of malaria in 95% of cases, fever was the most cited symptom with 90.40%; Abate A *et al.* [12] in 2019 in Ethiopia found that 91% of pregnant women were able to identify fever as a key symptom of malaria. We found that only 47.98% of mothers knew at least one sign of malaria severity. However, Seck I *et al.* [5] in Senegal indicated that only 7.1% of mothers knew the signs of malaria worsening. Knowledge of the mode of transmission of malaria by mosquito bites was reported by 85.13% of mothers. Léger OM *et al.* [13] in 2019 in Cameroon found in their study that in 78.6% of cases, the mosquito bites was known as the mode of transmission of malaria. Our bivariate analysis had indeed demonstrated that knowledge of both the mode of transmission and the signs of malaria severity was significantly associated with the mother's education ($P < 0.05$). These worrying situations merit that particular emphasis be placed on the education of young girls, while integrating health promotion and prevention messages into training programs, particularly in the fight against malaria. It should also be noted that knowledge of the population on the mode of transmission of a disease is an indicator that can guide efficient strategies to combat this disease [14]. Consulting a health center was the most commonly reported response by mothers when their child showed signs of malaria, at 82.35%. Mohamed D and *al.* [15] reported 92.44% in Mali in 2019; Paul NM and *al.* [16] revealed in 2020 in Rwanda that although mothers were aware of the symptoms of malaria, barriers to accessing health services, such as long distances and costs, significantly limited access to healthcare for poor populations.

5. Conclusion

Despite the efforts made by the State of Niger and its partners in the fight against malaria, mothers' knowledge, attitudes, and practices regarding malaria remain insufficient. The gaps in knowledge about the mode of transmission, means of prevention, and symptoms of malaria are worrying. It is important to place particular emphasis on the education of women and awareness-raising activities adapted to the local context. The results of this study provide a solid basis for

better defining future strategies. Further and larger-scale research will confirm these results and refine future malaria strategies.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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