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# Prevention of Malaria in Pregnancy: Knowledge and Practical Attitudes of Pregnant Women at the Mother of the Health Reference of Kalaban Coro

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**Abstract** **Original Research Article**

The aim was to assess pregnant women's knowledge and practical attitudes towards malaria prevention. ***Materials and Methods*:** It was a prospective, cross-sectional, descriptive study over a period of 4 months from August 1, 2018 to November 30, 2018. ***The Results***: The study was carried out in 324 pregnant women aged 15 to 40 years: 45.7% were illiterate; 98.5% were married, 28.3% were Bambara. The name "Sumaya" was the local name for malaria. The pregnant women had a good knowledge of modes of transmission, means of prevention and factors favoring mosquito reproduction. The insecticide-treated mosquito net was cited by the majority of pregnant women as a preventive measure against malaria, of which 83.3% used it and 68.2% impregnated at a rate of 6 months. ***Conclusion*:** At the end of our study we understood that our pregnant women have quite satisfactory knowledge about malaria. The distribution of ITNs and MS among pregnant women showed a benefit in terms of the occurrence of gestational malaria in our study.

**Keywords:** Knowledge, attitudes, practices, prevention, malaria, pregnancy, MS, IBD, CSref of kalaban coro.

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## INTRODUCTION

Malaria is one of the few scourges that has survived the centuries without ever losing its activity. It causes febrile and hemolyzing erythrocytopathy due to the presence and development in the liver and then in the red blood cells of a hematzoan of the genus plasmodium. It is transmitted to humans by the infesting bite of the female Anopheles mosquito. Five plasmodial species are subservient to humans: plasmodium falciparum, plasmodium malariae, plasmodium ovale, plasmodium vivax and the fifth named plasmodium knowlesi, recently discovered in Malaysia [1]. Plasmodium falciparum is the most formidable species from the point of view of morbidity and mortality. Unfortunately, it is the most widespread species [2, 3]. Currently, the greater susceptibility of pregnant women to malaria infection, decreased birth weight and maternal anaemia associated with malaria

infection of the placenta justify the fact that this problem is considered a public health priority in highly endemic areas. The risk is particularly high in black Africa, where it is estimated that 24 million women are exposed each year, while less than 5% of them benefit from effective prevention measures [6]. Compared to 2010, malaria-related mortality decreased in all WHO regions in 2016, except in the Eastern Mediterranean region, where it remains virtually unchanged. The largest declines were observed in the regions of Southeast Asia (44%), Africa (37%) and America (27%). However, between 2015 and 2016, the decline in malaria-related mortality stopped in the South-East Asia, Eastern Pacific and Africa regions, and increased in the Americas and Eastern Mediterranean regions. In sub-Saharan Africa, the percentage of households with at least one ITN (insecticide-treated net) increased from 50% in 2010 to 80% in 2016. Nevertheless, the share of households with a sufficient number of ITNs (one ITN for every two household members) is still too low (43%) in 2016 [4]. In Africa, the population at risk is more likely to sleep on IBD. In 2016 the share of the population protected by this intervention was 54% against 30% in 2010. The proportion of the population at risk protected by indoor residual spraying (IRS), a preventive measure that involves spraying the interior walls of homes with insecticides, has decreased. Globally, coverage of this intervention declined from a peak of 5.8% in 2010 to 2.9% in 2016, and this trend has been observed in all WHO regions. In the Africa region, the population at risk protected by IRS increased from 80 million in 2010 to 45 million in 2016. To protect women alive in areas of moderate to high transmission, WHO recommends intermittent preventive therapy during pregnancy (IPT) with sulfadoxine-pyrimethamine. Out of 23 African countries that reported IPT coverage data in 2016, 19% of eligible pregnant women had received at least 3 doses of IPT (as recommended by WHO), compared to 18% in 2015 and 13% in 2014 [4]. In Mali, plasmodium falciparum is the predominant plasmodial species responsible for the most severe forms of malaria in humans. This disabling disease is the 3rd cause of consultation in health centers. In 2017, malaria accounted for 32% of the reasons for consultation. Health facilities in Mali recorded 2,097,797 cases of malaria, including 673,574 severe cases with 1,050 deaths, a case fatality rate of 0.5 per 1,000. The national prevalence of malaria was 35.7% with a disparity according to the regions: 59.8% in Mopti; 41.6% in Sikasso; 36.7% in Segou ; 34.8% in Koulikoro; 27.4% in Kayes and 6% in Bamako. As a result, the fight against malaria has become a priority for the Malian government [5].

The lack of data in our structure on malaria prevention in pregnant women motivated the present study, which aims to:

# OBJECTIVES

The aim was to assess pregnant women's knowledge and practical attitudes towards malaria prevention.

# MATERIALS AND METHODS

It was a prospective, cross-sectional, descriptive study over a period of 4 months from August 1, 2018 to November 30, 2018.

### Study Population

The study covered all pregnant women admitted to prenatal consultation at the Csréf maternity ward in kalaban Coro during the study period.

### Sampling

We used pregnant women according to the inclusion criteria; 324 pregnant women were collected in the study according to Schwartz's formula: the minimum sample size. Z: reduced spread = 1.96 corresponding to the risk of 5%. A precision: i = 5%; p = 26% according to the EDSM V [1], it is noted that 26% of pregnant women have not done NPC, provided by qualified personnel. q = 1 – p = 74%; then the minimum sample size. Taking 10% of this size as a possible non-response rate of 29.5 we have the minimum sample size n = 295+29= 324 <=> n: 324.

### Inclusion Criteria

Included pregnant women admitted to the CSref maternity ward of kalaban Coro, regardless of the age of pregnancy and who consented to the study.

### Non-Inclusion Criteria

Were excluded: pregnant women admitted to the maternity of the CSref of kalaban Coro but not having consented to the study, pregnant women with an ectopic pregnancy (EGG).

### Processing and Data Processing

Data capture and analysis was performed by SPSS 20.0 software. The tables were designed on Microsoft Word 2007 and Microsoft Excel 2007.

# RESULTS

With Schwartz's formula we registered 324 pregnant women who were tested in terms of knowledge, attitudes and practices in relation to malaria prevention.

### Epidemiological Aspects

The majority of our pregnant women had an age range between 20 and 25 years or 42.6% of cases. 84.3% of them came from the Kalaban coro district. The dominant ethnic group was the Bambara ethnic group, accounting for 28.3% of cases. Housewives are more represented, accounting for 55.9% of cases. The majority of schoolchildren were represented, accounting

for 54.3 per cent of cases. Married pregnant women were more represented, accounting for 98.5% of cases. More than three-quarters of pregnant women were in monogamy, or 82.7% of cases. These epidemiological aspects are presentedin Table 1.

**Table 1: Epidemiological aspects**

| **Age** | **Staff** | **Percentage (%)** |
|---|---|---|
| ≤19 | 56 | 17,3 |
| 20 – 25 | 138 | 42,6 |
| 25 – 30 | 77 | 23,8 |
| 30 – 35 | 42 | 12,9 |
| 35 – 40 | 11 | 3,4 |
| **Profession** | **Staff** | **Percentage** |
| Housewife | 181 | 55,9 |
| Public servant/employee | 19 | 5,9 |
| Student | 67 | 20,7 |
| Merchant | 49 | 15 |
| Other | 8 | 2,5 |
| **Level of education** | **Staff** | **Percentage** |
| None | 148 | 45,7 |
| Primary | 62 | 19,1 |
| Secondary | 92 | 28,4 |
| Academic | 22 | 6,8 |
| **Marital status** | **Staff** | **Percentage** |
| Bride | 319 | 98,5 |
| Bachelor | 5 | 1,5 |
| **Matrimonial property regime** | **Staff** | **Percentage** |
| Monogamy | 268 | 82,7 |
| Polygamy 1 | 44 | 13,6 |
| Polygamy 2 | 6 | 1,9 |
| Polygamy 3 | 1 | 0,3 |
| Unmarried | 5 | 1,5 |

**Knowledge Aspects**

Almost all pregnant women claimed that mosquito bites transmit malaria, accounting for 99.7% of cases. Pregnant women who claimed that standing water serves as a breeding ground for mosquitoes were more represented, accounting for 98.8% of cases. Pregnant women who claimed that the mother can transmit malaria to her child during pregnancy were prevalent, accounting for 74.1% of cases. More than half of pregnant women said that eating certain foods can lead to malaria, accounting for 56.5% of cases. Pregnant women who stated that cohabitation with one or more malarials did not transmit malaria were mostly represented, accounting for 74.1% of cases. More than half of pregnant women said that blood transfusion can transmit malaria, accounting for 51.9% of cases. 86.4% of pregnant women stated that long-acting insecticide-treated nets protect against mosquito bites. Pregnant women who claimed that taking sulfadoxine-pyrimethamine prevents malaria were mostly represented, 88.9% of cases. Pregnant women who received IEC on malaria were more represented, at 58% of cases. Pregnant women who claimed that there was an effective treatment for malaria were prevalent, accounting for 85.2% of cases. The majority of pregnant women reported that the destruction of breeding sites prevents malaria, accounting for 96.6% of cases. Pregnant women who said that wearing certain clothing does not protect against mosquito bites were mostly represented, accounting for 50.6% of cases. Tables 2 and 3 show us the knowledge aspects.

**Table 2: Knowledge aspects**

| **Mosquito bites** | **Staff** | **Percentage** |
|---|---|---|
| Yes | 323 | 99,7 |
| No | 1 | 0,3 |
| **Standing water** | **Staff** | **Percentage** |
| Yes | 320 | 98,8 |
| No | 4 | 1,2 |
| **Mother-child** | **Staff** | **Percentage** |
| Yes | 240 | 74,1 |
| No | 84 | 25,9 |
| **Food** | **Staff** | **Percentage** |
| Yes | 183 | 56,5 |
| No | 141 | 43,5 |
| **Cohabitation** | **Staff** | **Percentage** |
| Yes | 84 | 25,9 |
| No | 240 | 74,1 |
| **Blood transfusion** | **Staff** | **Percentage** |
| Yes | 168 | 51,9 |
| No | 156 | 48,1 |

**Table 3**

| **ITN** | **Staff** | **Percentage** |
|---|---|---|
| Yes | 280 | 86,4 |
| No | 44 | 13,6 |
| **Sulfadoxine-pyrimethamine** | **Staff** | **Percentage** |
| Yes | 288 | 88,9 |
| No | 36 | 11,1 |
| **Malaria Education / CPN** | **Staff** | **Percentage** |
| Yes | 188 | 58,0 |
| No | 136 | 42,0 |
| **Treatment/malaria** | **Staff** | **Percentage** |
| Yes | 276 | 85,2 |
| No | 48 | 14,8 |
| **Breeding grounds** | **Staff** | **Percentage** |
| Yes | 313 | 96,6 |
| No | 11 | 3,4 |
| **Clothing/night** | **Staff** | **Percentage** |
| Yes | 160 | 49,4 |
| No | 164 | 50,6 |

**Practical Attitudinal Aspects of the Prevention Strategy**

More than three-quarters of pregnant women used a mosquito net, or 97.8% of cases.

Pregnant women who used mosquito nets on a permanent basis were more represented, accounting for 83.3% of cases. Pregnant women who had a mosquito net in good condition were mostly represented, accounting for 90.1% of cases. Pregnant women with insecticide-treated nets were prevalent, accounting for 68.2% of cases. More than half of pregnant women had a long-acting insecticide-treated net, accounting for 56.2% of cases. Pregnant women who took sulfadoxine-pyrimethamine were predominantly represented, accounting for 82.7% of cases. Pregnant women who once took sulfadoxine-pyrimethamine were predominantly represented, accounting for 31.5% of cases. Pregnant women who use mosquito insecticides at home were more represented, accounting for 76.9% of cases. Pregnant women who did not wear clothing to protect against mosquito bites were mostly represented, 60.8% of cases. The practical attitudinal aspects are summarised in Table 4.

**Table 4: Practical attitudinal aspects**

| **Use / mosquito net** | **Staff** | **Percentage** |
|---|---|---|
| Yes | 317 | 97,8 |
| No | 7 | 2,2 |
| **Permanent use/mosquito net** | **Staff** | **Percentage** |
| Yes | 270 | 83,3 |
| No | 54 | 16,7 |
| **Condition/mosquito net** | **Staff** | **Percentage** |
| Good | 292 | 90,1 |
| Bad | 32 | 9,9 |
| **Impregnated mosquito net** | **Staff** | **Percentage** |
| Yes | 221 | 68,2 |
| No | 103 | 31,8 |
| **ITN** | **Staff** | **Percentage** |
| Yes | 182 | 56,2 |
| No | 142 | 43,8 |
| **SP Socket** | **Staff** | **Percentage** |
| Yes | 268 | 82,7 |
| No | 56 | 17,3 |
| **Number of MS doses** | **Staff** | **Percentage** |
| One catch | 102 | 31,5 |
| Two plugs | 81 | 25,0 |
| Three plugs | 61 | 18,8 |
| More than three outlets | 29 | 9,0 |
| No plug | 51 | 15,7 |

| Insecticide use/home | Staff | Percentage |
|---|---|---|
| Yes | 249 | 76,9 |
| No | 75 | 23,1 |
| **Wearing protective clothing** | **Staff** | **Percentage** |
| Yes | 127 | 39,2 |
| No | 197 | 60,8 |

# DISCUSSION

With Schwartz's formula we registered 324 pregnant women who were tested from the point of view: knowledge, attitudes and practices in relation to malaria prevention.

**Epidemiological Aspects**

The age ranged from 15-38 years and the 20-25 age group was the most represented with 42.6% and an average of 26.5 years. Sech I *et al.*, [7]: found in Senegal in 2008 that the age was 15 and 45 years with an average of 28 years. Educational level: in our study, more than half of pregnant women were illiterate, i.e. 45.7%; followed by 28.4% of secondary education; and 19.1 per cent of primary education. These results are different from those found by Coulibaly in 2012 in Mali (Bancoumana) which were 61.8% illiterate, of which 35.6% had not gone beyond primary level and 2.6% had reached secondary level. Parents do not attach importance to the education of girls so for this purpose we have found a considerable illiteracy rate. The difference between this study and Coulibaly's, where illiterate pregnant women are much higher, is explained by the fact that kalaban coro is periurban. Marital status and occupation: During our study, the majority of respondents (98.5%) were married and more than 50% (55.9%) were housewives. Sech I *et al.*, [7] found in Senegal in 2008 that 75.9% of respondents were married and 26.6% were traders. African countries share many things, in rural areas early marriage is more practiced. This is the cause of the high frequency of married mothers.

**Knowledge Aspects**

**The Births of Pregnant Womenon Malaria:** All the pregnant women surveyed commonly referred to as malaria. ‹‹SUMAYA›› (chill); this corresponds to the name of the disease in many regions of Mali. We find the same name in Burkina according to Drabo K. M *et al.*, in 2008 [9] and by Goita A in a survey conducted in Baguinéda in 2010 in Mali. Burkina Faso and Mali share a lot of local cultures and languages.

**Birthson Modes of Malaria Transmission:** Mosquito bites were cited by 99.7% of pregnant women; stagnant water 98.8%, blood transfusion 51.9%. Others cited mosquito bites associated with 1 to 3 erroneous causes: fatty foods, sunlight and humidity as possible causes of malaria. Edouard K Deti *et al.*, [8] found in Togo in 2008 that 67% cited mosquito bite as the cause of malaria and 43% of them knew the exclusive role of the mosquito. Erroneous patterns were cited: excessive oil consumption (56.5%) and cohabitation (25.9%). Sech I *et al.*, [7] found in Senegal in 2003-2004 that 67% mentioned climate-related factors: humidity, wind, sun exposure and stagnant water and 34% cited food-related causes. During these different studies the mosquito bite was cited by the majority of these pregnant women as the main cause of malaria due to the efforts of the NMCP. Knowledge of Malaria Prevention Strategies :d the present study, 86.4% of pregnant women were aware of the insecticide-treated net; 88.9% SP; destruction of empty boxes, protection of jars and containers, and weeding as a means of malaria prevention. These elements are related to the direct protection and control of larval gits. There are 90.6% of pregnant women who knew more than three means of prevention; The pregnant women therefore had a good knowledge of the means of prevention. Sech I *et al.*, [7] in Senegal in 2008 found that 61.5% cited insecticide-treated mosquito nets as a means of malaria prevention. Edouard K Deti *et al.*, [8] in Togo in 2008 found that 83% cited mosquito nets, 49% insecticides; 27% coils as means of malaria prevention. Knowledge about the factors that promote mosquito reproduction: in our study, 96.6% of pregnant women mentioned that unsanitary conditions and stagnant water (98.8%) are the factors that promote mosquito production. Edouard K Deti *et al.*, [8] in Togo in 2008 found that stagnant water was the most cited (68%), brush (45%), exposed jars (43%), empty boxes and hollow objects (36%), wetlands(14%). Our results are close to those found by Edouard K Deti *et al.*, [8] in Togo in 2008 who show that insalubrity is the real factor favoring mosquito reproduction.

**The Attitudinal and Practice Aspects of the Prevention Strategy:**

Our study showed that 97.8% of pregnant women owned a mosquito net; 68.2% of nets were impregnated; 90.1% used mosquito nets in good condition in their household; 82.7% had taken MS and 76.9% of pregnant women were using insecticides; destruction of empty boxes, protection of jars and containers and weeding. Kniffo *et al.*, [10] found in Benin in 2000 that 46% used mosquito nets in good condition in their household. The results of the EDSIV [11] in 2006 showed that 41% of mothers used the insecticide-treated mosquito net in Bamako; this rate is 53%, 49%, 33% and 3% respectively in Ségou, Timbuktu, Koulikoro and Kidal. During our study, among the 83.3% of net users, more than half (68.2%) impregnated their nets at a rate of 6 months in line with the pace requested by the NMCP. Ignorance of the rate of impregnation leads to ineffectiveness of the mosquito net if the period is not known. The right pace requested

by the NMCP is every 6 months. There is a high use of mosquito nets in our study due to the efforts of the NMCP.

## CONCLUSION

At the end of our study we understood that our pregnant women have quite satisfactory knowledge about malaria. The distribution of ITNs and MS among pregnant women showed a benefit in terms of the occurrence of gestational malaria in our study.

**Conflict of Interest:** No conflict of interest.

## REFERENCES BIBLIOGRAPHIQUES


1. Gentilini, M., & Duflos, B. (1996). Tropical Medicine, 81-83 Flammarion. *Medicine Science.*
2. Gentilini, M. (1993). Tropical medicine: in malaria. 5th edition, Paris Flammarion. *Medicine-Science*, p91-122.
3. Maubert, B., Fievet, N., Tami, G., Boudin, C., & Deloron, P. (2000). Cytoadherence of Plasmodium falciparum-infected erythrocytes in the human placenta. *Parasite immunology*, *22*(4), 191-199.
4. WHO: World Malaria Report 2017(29 November 2017).
5. NMCP (11th edition of World Malaria Week Day; 23 April 2018).
6. Adama, S. T. (2008). Association malaria and pregnancy at the reference health center of the commune I. *Medical thesis* 17-23.
7. Seck, I., Fall, I. S., Faye, A., Ba, O., & Tal, D. (2008). Women's knowledge, attitudes and practices on malaria in rural Poponguine, Senegal. *Med trop*, *68*, 629-633.
8. Edouard, K. D., Joseph, F., Theophile, Z., & Collaborators. (2008). Home management of malaria in children: proposals for action based on the results of a CAP survey conducted among mothers of children under 5 years of age in Notsé (Togo). *Cahiers santé*, *18*(3).
9. Drabo, K. M., Tarnagda, Z., Zeba, A. N., & Collaborators. Representations and practices on malaria among persons in charge of children under 5 years of age in rural areas in the province of Houet. vol 26, no 2- vol 27, no 1-July-decembre2003-January-June 2004. ISSN 1011-6028-Burkina Faso.
10. Kniffo, I. R., Agbo-ola, L., Issifou, S., & Massougbodji, A. (2000). Mothers of children under 5 and malaria in the Dangbo Valley in southeastern Benin. *Black African Medicine*, *47*(1).
11. Planning and Statistics Unit of the Ministry of Health (CPS/MS), National Directorate of Statistics and Informatics of the Ministry of Economy, Industry and Trade (DNSI/MEIC) and Macro International Inc.2007. *Mali Demographic and Health Survey 2006.* Calverton, Maryland, USA: CPS/DNSI and Macro International Inc. p 143-153.