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Research Article

Knowledge and Practices of Pregnant Women from the Heal Africa Health Area on Intermittent Preventive Treatment in Malaria Prevention

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Abstract

Context: Malaria during pregnancy is characterized by significant maternal and fetal morbidity and mortality due to non-compliance with preventive measures, particularly intermittent preventive treatment. The objective of this study is to assess the knowledge and practices of pregnant women in the HEAL Africa health area regarding intermittent preventive treatment with sulfadoxine-pyrimethamine. *Methodology:* The presentThis cross-sectional and analytical study was conducted among pregnant women in the HEAL Africa health district in Goma over a four-month period. A quantitative approach and a standardized questionnaire were used. Interviews provided information from which chi-square and Student's t-tests were performed. The determinants were identified using logistic regression with the calculation of ORs and 95% CIs. A p-value < 0.05 was considered the threshold for statistical significance. *Results:* The pregnant women, with a pregnancy of more than 16 weeks, represented 93% of the group. They were married (94%), had a secondary education (90%), and were over 20 years old (93%). They knew that malaria is transmitted by mosquito bites (91%) and understood its severity during pregnancy (99%). They understood the importance of malaria prevention for pregnant women (94%). However, only 30% knew that the first dose should be received in the second trimester, and 37% knew the interval between two doses (1 month). *Conclusion:* Pregnant women who consulted the HEAL Africa health center during the period of our survey have inadequate knowledge and irregular practice of intermittent preventive treatment.

Keywords

IPT-SP, Knowledge, Practice, Malaria, Pregnancy

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1. Introduction

Malaria during pregnancy is an obstetric, medical, social, and economic emergency. It is a cause of preventable morbidity and mortality in pregnant women [1, 2]. It is a contributing factor to 5.5 million stillbirths and neonatal deaths each year [3]. In 2007, approximately 125 million pregnant women were recorded in malaria-endemic areas. In regions with unstable or low transmission, such as Asia-Pacific, malaria affected 62%, or 77 million, of pregnant women [4].

Nearly 11 million pregnant women living in areas of moderate to high malaria transmission in sub-Saharan Africa were exposed to malaria infection, of which approximately 6 million contracted the disease and 10.000 resulted in maternal deaths. Nearly 39% of this prevalence was concentrated in the Democratic Republic of Congo and Nigeria [5].

The prevalence of malaria among pregnant women varies across different African regions. Prevalences of 5%, 28% and 68.3% have been reported in Ghana, Uganda and Nigeria respectively [6-8].

In Nigeria in 2012, malaria was the cause of 11% of maternal deaths, 3-8% of infant deaths, 8-15% of low birth weight newborns and 2-5% of maternal anemia [1, 2].

In the DRC, malaria is the leading cause of death and illness. It accounts for 40% of all outpatient consultations. In 2016, SP3 was poorly observed, averaging 34.5%, and SP2 was 69% [9].

However, to address this scourge of malaria during pregnancy, the WHO recommends two preventive actions: the use of insecticide-treated mosquito nets and intermittent preventive treatment; and a curative action which is the management of confirmed malaria [10].

Low use of intermittent preventive treatment has been observed in several sub-Saharan African countries [11].

The Democratic Republic of Congo, which set itself the objective of achieving 80% in malaria prevention among pregnant women in 2015 [12], found itself with a low compliance of 52% in Goma in 2017 [13].

Several authors note that the adoption of the ITC is a consequence of the knowledge of the ITC [1, 14-17].

We found no evidence that a study on pregnant women's knowledge and practices regarding intermittent preventive treatment had previously been conducted in our setting.

It is with the aim of filling this gap that we undertook this study which aims to evaluate the knowledge and practices of pregnant women in the HEAL Africa health area on intermittent preventive treatment in the prevention of malaria during pregnancy.

2. Method

2.1. Study Framework and Period

This study took place at the HEAL Africa health center, located in the southern part of Goma, specifically in the Goma Urban Health Zone, in the Democratic Republic of Congo. It was conducted between August 23 and December 23, 2021.

2.2. Type and Population of Study

This study is cross-sectional and analytical, conducted in the population of pregnant women receiving care at the Heal Africa Health Center in the city of Goma in the DRC.

2.3. Sample Size and Sampling

The sample size was calculated using Fischer's formula n=z2. p. (1-p)/u2. Thus, the sample size was: $(1.96)^2$ x 0.14 (1-0.14)/$(0.05)^2$ = 185.01N = 2n = 2 x 185 = 370. Given that n = sample size per site, Z = confidence level, p = prevalence, u = margin of error, N = total sample size. Using p = 0.14 as the frequency of IPT use in pregnant women (23).

2.4. Data Collection

For this study, the pregnant women included were recruited using simple random sampling. All pregnant women seen for prenatal consultations were selected using a sampling interval of 2 with a single visit to ensure an equal chance of being chosen. Therefore, pregnant women were admitted by selecting the first, third, fifth, and so on.

A standard questionnaire was used to collect data using the interview technique over 38 sessions with a trained nurse under the supervision of the study's principal correspondent.

2.5. Variables of Interest

Socio-demographic variables, knowledge and practice, and factors influencing the use of TPIs were the variables of interest in this study.

2.6. Selection Criteria

2.6.1. Inclusion Criteria

1) Being pregnant women;
2) Be between 15 and 49 years old;
3) Attend the prenatal consultation session at the HEAL Africa health center during the study period;
4) Having given written consent to participate in the study.

2.6.2. Exclusion Criteria

1) Pregnant women who did not attend prenatal consultations;
2) Pregnant women with an allergy to Fansidar or those on cotriprophylaxis;
3) Pregnant women with a mental disorder;
4) The respondents did not answer the questions.

2.7. Statistical Analyses

The data were encoded in MS Excel 2010 software and analyzed using SPSS version 20.0 software. For descriptive analyses, standard deviation, Student's t-test, and absolute frequency were used for quantitative data. A p-value < 0.05 was considered statistically significant.

2.8. Ethical Considerations

This study has received ethical approval fromInstitutional Ethics Committee of the Protestant University in Congo (UPC) referenced under No. CEUPC0090. Authorization to continue the research was also obtained from the Chief Medical Officer of the Goma Zone, reference No. 254 /ZSUG/BCZS/181/2021.

3. Results

3.1. Sociodemographic Characteristics of the Study Population

The sociodemographic characteristics of pregnant women are presented in Table 1.

Table 1. *Sociodemographic characteristics of the study population.*

Variables	All n=371	Health Area n=217	Outside the health zone n=244	P
Age				0.585
≤20 years old	23(6.2)	6(4.7)	17(7.0)	
21-34 years old	229(61.7)	82(64.6)	147(60.2)	
≥35 years old	119(32.1)	39(30.7)	80(32.8)	
Study level				0.344
None/Primary	41(11.1)	10(7.9)	31(12.7)	
Secondary	152(41.0)	52(40.9)	100(41.0)	
University	178(48.0)	65(51.2)	113(46.3)	
Religion				0.267
Catholic	115(31.0)	34(26.8)	81(33.2)	
Protestant	142(38.3)	49(38.6)	93(38.1)	
Revival Church	61(16.4)	27(21.3)	34(13.9)	
Others	53(14.3)	17(13.4)	36(14.8)	
Occupation				0.035
None	185(49.9)	67(52.8)	118(48.4)	
Informal	77(20.8)	17(13.4)	60(24.6)	
Pupil/student	109(29.4)	43(33.9)	66(27.0)	
Marital status				0.441
Bride	348(93.8)	120(94.5)	228(93.4)	
Not married	23(6.2)	7(5.5)	16(6.6)	
Parity				0.026
First-time mother	85(22.9)	24(18.9)	61(25.0)	
Paucipare	163(43.9)	68(53.5)	95(38.9)	
Multiparous	123(33.2)	35(27.6)	88(36.1)	
Gestational age				0.633
3-15 weeks	27(7.3)	8(6.3)	19(7.8)	
16-28 Weeks	93(25.1)	29(22.8)	64(26.2)	

Variables	All n=371	Health Area n=217	Outside the health zone n=244	P
>28 weeks	251(67.7)	90(70.9)	161(66.0)	

The study population consisted of 93% pregnant women with a pregnancy of more than 16 weeks, 94% married, of whom 90% had a secondary education level and 93% were over 20 years old.

3.2. Knowledge About Malaria and IPT

Table 2 illustrates the pregnant women's knowledge of malaria.

Table 2. Pregnant women's knowledge about malaria.

Knowledge about malaria about pregnancy	All n=371	Health Area n=217	Outside the health zone n=244	P
Malaria transmission				
Piqûmosquito breeding ground	339(91.4)	111(87.4)	228(93.4)	0.040
Lack of personal hygiene	19(5.1)	7(5.5)	12(4.9)	0.491
Consumption of alcoholic beverages	7(1.9)	1(0.8)	6(2.5)	0.245
NSP	17(4.6)	9(7.1)	8(3.3)	0.083
The dangers of malaria during pregnancy	367(98.9)	125(98.4)	242(99.2)	0.423
Consequences of malaria on pregnancy				
Anemia	166(44.7)	50(39.4)	116(47.5)	0.082
Abortion	214(57.7)	67(52.8)	147(60.2)	0.101
Death in utero	130(35.0)	38(29.9)	92(37.7)	0.084
Low birth weight	156(42.2)	43(33.9)	113(46.5)	0.013
Premature birth	127(34.3)	35(27.6)	92(37.9)	0.030

More than 91% of our study population know that malaria is transmitted by mosquito bites and about 99% know the seriousness of malaria in case of pregnancy.

3.3. Knowledge About Intermittent Preventive Treatment (IPT)

Table 3 presents the knowledge of pregnant women on malaria prevention and intermittent preventive treatment.

Table 3. Knowledge about malaria prevention.

Knowledge about malaria prevention	All n=371	Health Area n=217	Outside the health zone n=244	P
The importance of prevention in pregnant women	351(94.6)	118(92.9)	233(95.5)	0.209
Prevention methods				
Fansidar	275(74.3)	85(66.9)	190(78.2)	0.014
Chloroquine	43(11.6)	12(9, 4)	31(12.7)	0.226

Knowledge about malaria prevention	All n=371	Health Area n=217	Outside the health zone n=244	P
MILD	162(43.7)	48(378)	114(46.7)	0.062
Knowledge of the purpose of the Fansidar	245(66.0)	75(59.1)	170(69.7)	0.027
The number of times to receive it				0.595
0	3(1.2)	0(0.0)	3(1.8)	
1	49(20.0)	17(22.7)	32(18.8)	
2	39(15.9)	13(17.3)	26(15.3)	
3	62(25.3)	15(20.0)	47(27.6)	
4	92(37.6)	30(40.0)	62(36.5)	
The start of treatment				0.430
1st Quarter	141(38.0)	5(39.4)	91(373)	
2nd Quarter	110(29.6)	31(24.4)	79(32.4)	
3rd Quarter	18(4.9)	7(5.5)	11(4.5)	
Don't know	102(27.5)	39(30.7)	63(25.8)	
The time between two doses				0.497
1 month	138(37.2)	41(32.3)	97(398)	
2 months	32(8.6)	11(8.7)	21(8.6)	
3 months	65(17.5)	26(20.5)	39(16.0)	
Don't know	136(36.7)	49(38.6)	87(35.7)	
The dose of the TPI				0.742
Single dose	229(61.7)	74(58.3)	155(63.5)	
twice a day	34(9.2)	12(9.4)	22(9.0)	
3 times a day	15(4.0)	5(3.9)	10(4.1)	
Don't know	93(25.1)	36(28.3)	57(23.4)	

Over 94% of our study population are aware of the importance of malaria prevention in pregnant women, and 66% of respondents know the preventive purpose of the SP (sperm). Only 30% of the study population knows that the first dose should be received in the second trimester, and 37% know that the interval between two doses is 1 month.

3.4. Practices on the ITC

3.4.1. Frequency of Pregnant Women Who Used the IPT

We will be informed about the frequency of pregnant women who used intermittent preventive treatment from Figure 1.

Only 65% of our study population had already received intermittent preventive treatment.

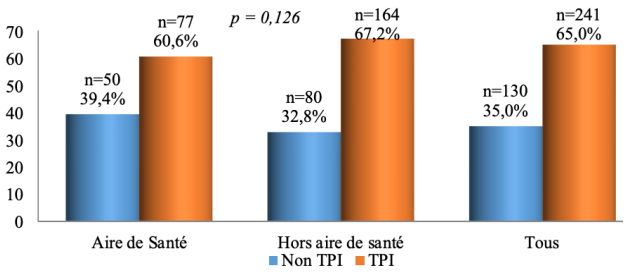


Figure 1. The frequency of pregnant women who used the TPI.

3.4.2. Characteristics of the ITP Used by Pregnant Women

The table below will show us how the TPI was used by pregnant women in the present study.

Table 4. Characteristics of the IPTp used by the pregnant woman.

Variables	All n=241	Health Area n=77	Outside the health zone n=164	p
Number of doses taken				0.315
1 time	89(36.9)	35(45.5)	54(32.9)	
twice	78(32.4)	21(27.3)	57(34.8)	
≥3 times	64(26.6)	18(23.4)	46(28.0)	
Ignore	10(4.1)	3(3.9)	7(4.3)	
Time between doses				0.198
<1 month	32(13.3)	12(15.6)	20(12.2)	
1 month	99(41.1)	30(39.0)	69(42.1)	
≥2 months	40(16.6)	8(10.4)	32(19.5)	
Ignore	70(29.0)	27(35.1)	43(26.2)	
Start of TPI				0.690
1st Quarter	84(34.9)	26(33.8)	58(35.4)	
2nd Quarter	125(51.9)	43(55.8)	82(50.0)	
3rd Quarter	15(6.2)	3(3.9)	12(7.3)	
Ignore	17(7.1)	5(6.5)	12(7.3)	
Place of seizure of TPI				0.452
at the hospital	203(84.2)	65(84.4)	138(84.1)	
at home	30(12.4)	11(14.3)	19(11.6)	
Elsewhere	8(3.3)	1(1.3)	7(4.3)	
The pregnant woman received it in front of healthcare staff.	178(89.0)	53(84.1)	125(91.2)	0.107

A rate of 26% of respondents claim to have received the optimal dose, 41% claim to have received IPT at one-month intervals, 52% confirm to have started IPT in the second trimester, 89% claim to have taken IPT in the presence of a healthcare professional.

4. Discussion

4.1. Sociodemographic Characteristic

In the present study, over 60% of the pregnant women interviewed were between 20 and 34 years old. Approximate proportions have been reported by other authors: in Nigeria, Tobin-West et al. [18], Hajira et al. [19], and Titilope et al. [20]; in Benin, Chabi et al. [21]; and in Ghana, Owusu et al. [22]. In a study conducted in Tanzania, Mkamuchwapa et al. [15] found that 82% of women were in this age group. of age.

Furthermore, in this study, over 89% of pregnant women had at least a secondary education. Similar results were found in urban Cameroon by Bertrand et al. [23], with 77% of pregnant women having this secondary level of education.

However, other studies, especially those carried out in rural African settings, have had contrary results, such as those by Owusu et al [22], Mkamuchwapa et al [15], Hill et al [24], but also the study by Titilope et al [20].

In this study, 94% of respondents were married. These proportions are similar to those of Owusu et al. [22] and Titilope et al. [20], whose respective results were 83% and 93%. These results can be explained by the fact that in Africa only married women have the right to be pregnant, and that pregnancies outside of marriage are also considered shameful.

This study reveals that 70% were pauciparous, Briand andal [4] found that approximately 60% of respondents had at most three or fewer children. The results of Chabi et al [21] were almost identical; indeed, approximately 81% of respondents had at most three children. However, Andrews et al [25] found the opposite result: approximately 23% of their participants were primiparous while 54% were multiparous.

4.2. Knowledge About Malaria During Pregnancy and Intermittent Preventive Treatment

Our study shows that 66% of pregnant women admit to knowing the preventive purpose of Fansidar. This proportion is similar to that reported by Nsibu et al. [26] in the DRC; Hajira et al. [19]; and Wanzira et al. [27], but lower than that of Akaba et al. [28] and significantly higher than that of Chukwurah et al. [29]. We conducted the study in a malaria-endemic but also urban setting where the population has multiple sources of information about malaria.

Regarding the start of intermittent preventive treatment, only 29.6% of pregnant women are aware that ITP begins in the second trimester (from the 16th week). This result is almost identical to that produced by Hajira et al [19].

In our study, only 37.2% of pregnant women were aware of the one-month interval between doses. In Nigeria, Hajira et al. [19] found 95.3%, significantly higher than our result.

Regarding pregnant women's knowledge of the number of doses, 62.9% of pregnant women in this study reported receiving three or more doses of sulfadoxine-pyrimethamine. This proportion is higher than that reported by Hajira et al. [19] in which only less than half (35%) knew that five doses were required, and in the study by Tobin-West et al. [30] where only 5% recognized that three doses are necessary for malaria prevention in pregnant women. In this same study, the majority (approximately 75%) of pregnant women recognized that SP should be taken only once during the entire pregnancy period [30].

4.3. Practical Advice on Intermittent Preventive Treatment

In our study, we found that 65% of pregnant women used at least one dose of IPT (intermittent preventive treatment), while 35% received none. In Nigeria, Tobin-West et al. [18] reported similar results (62.8%). However, in Ghana and Burkina Faso, respectively, Owusu et al. [22] and Bamba et al. [31] obtained significantly higher results. In the DRC, in the study by Nsibu et al [26], approximately 52% received intermittent preventive treatment. In North Kivu, Kapiteni [13] found that only 52.4% had received sulfadoxine-pyrimethamine. Following widespread awareness in recent years, the use of sulfadoxine-pyrimethamine has increased.

Regarding the start of intermittent preventive treatment, dIn this study, we found that 51.9% of our respondents started intermittent preventive treatment in the second trimester, 34.9% in the first trimester, 6.2% in the third trimester, and 7.1% did not know. Our results do not differ significantly from those found in Nigeria by Oluwaseum et al. [16]. This is due to the fact that awareness campaigns are in place, but are not yet satisfactory.

As for the treatment directly observed in the case of intermittent preventive treatment atsufadoxine-pyrimethamine, In the present study, 89% of respondents reported taking IPT in the presence of a healthcare professional. This contrasts with two studies conducted in Nigeria by Oluwaseum et al. [16], who noted only 35%, and Tobin-West et al. [18], who found only about 16%. This is because the patients had already been educated about this practice.

Regarding the number of intermittent preventive treatments, we found that only 26.6% took the optimal dose, i.e., three or more doses, while 36.9% and 34.2% took one and two doses, respectively. This result is on average similar to all the African results we found. In a study conducted in 7 African countries (Burkina Faso, Mali, Malawi, Kenya, Nigeria, Sierra Leone and Uganda), Yaya et al [11] found a result almost similar to ours, an overall prevalence of taking 3 doses of Sulfadoxine Pyrimethamine which was about 30%.

In 2014, in Tanzania, Exavery et al. [32] found that the proportion of women who received two or more doses was higher than that of women who received only one dose (approximately 44% versus 29%). In Burkina Faso, Bamba et al. [31] found that 39% of respondents received three doses. In Ghana, Teye et al. [33] and Dun Dery et al. [34] found that 38% and 26% of respondents, respectively, received three doses. In 2020, in their study, Tackie et al. found that 71% of respondents completed the recommended three or more doses [35]. In the DRC, in the study by Nsibu et al [27], only 27% received the second dose. These results corroborate the results of the 2016 National Malaria Control Program (NMCP), where the average SP3 was 34.5% and the average SP2 was 69% [16].

Strength of the study

Clarity of objective, with rigorous methodology and a solid sample size. A complete statistical analysis using appropriate statistical tests and a statistical significance threshold.

Weakness of the study

The study is limited to a single health center, which may reduce the general scope of the findings for other regions.

5. Conclusion

Malaria during pregnancy is a serious public health problem in sub-Saharan Africa. Intermittent preventive treatment with sulfadoxine-pyrimethamine is a cornerstone of malaria prevention during pregnancy.

This study, which aimed to evaluate the knowledge and practices of pregnant women in HEAL Africa regarding malaria prevention during pregnancy, We found inadequate knowledge and inconsistent practice of intermittent preventive treatment for women's MSpregnant women being monitored at the HEAL Africa health center.

Therefore, it is now opportune to capitalize on the awareness of pregnant women at the primary care level in order to enhance their knowledge and achieve appropriate practice.

Abbreviations

TPI	Intermittent Preventive Treatment with
SP	Sulfadoxine Pyrimethamine
OR	Odd Ratio
IC	Confidence Interval
DRC	Democratic Republic of Congo
UPC	Protestant University in Congo

Author Contributions

Muhindo Mukandirwa Jean Deogratias: Investigation, Methodology, Writing–original draft
Michael Kapitene Kamuanga: Writing–review & editing
Aliocha Natuhoyila Nkodila: Software
Masoda Nyamalyongo's Maurice: Validation
Mayala Vangu Marcel: Investigation
Lukanu Ngwala Philippe: Project administration

Conflicts of Interest

The authors declare that they have no conflict of interest.

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