

# Factors contributing to the prevalence of malaria among pregnant women in Burundi. A cross-sectional study of Prince Louis Gwagasore Clinic and Kamenge Military Hospital.

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## Abstract

### Background:

Malaria infection during pregnancy is a major public health concern in tropical and subtropical countries with significant risk for the pregnant woman and her fetus. It has been reported that in sub-Saharan Africa malaria can cause as many as 10,000 cases of malaria-related deaths in pregnancy per year, usually due to severe maternal anemia. Besides, each year, malaria in pregnancy is responsible for 20% of stillbirths and 11% of all newborn deaths in sub-Saharan Africa. The aim of the study was to investigate the factors contributing to the prevalence of malaria among pregnant women in Burundi country.

### Methodology:

The study employed a cross-sectional descriptive survey design to collect information from three hundred and twenty-six pregnant women from the two hospitals enrolled in the study sample using the systematic sampling technique following obtaining consent to participate and data were collected using a validated questionnaire and analyzed using the computer-assisted software statistical; package for social sciences (SPSS) version 20 to generate frequency distribution of responses.

### Results:

Climate change, stagnant water around the house, visits of community health workers, source of information, health care staff, mosquito net provided, education (nonformal, primary), and employment status (agriculture, civil servant) were the factors contributing the prevalence of malaria among pregnant women in Burundi.

A significant relationship existed between factors contributing to the prevalence of malaria and pregnant women in Burundi, Bujumbura District. This implied that on all these objectives, more efforts are needed to improve the welfare of pregnancy and decrease the prevalence to ensure the protection of the mother and the healthy child.

### Conclusion:

A significant relationship existed between factors contributing to the prevalence of malaria and pregnant women in Burundi, Bujumbura District. This implied that on all these objectives, more efforts are needed to improve the welfare of pregnancy and decrease the prevalence to ensure the protection of the mother and the healthy child.

### Recommendation:

The Ministry of public health, could strengthen the IEC to improve the health of pregnant women by using correctly mosquito nets from the first antenatal consultation.

*Keywords:* Malaria infection, Pregnant women, Burundi, Submitted: 2022-09-24 Accepted: 2023-02-13

## 1. Introduction

According to the findings in Lagos, where the prevalence rate of malaria was 7.7% among pregnant women attending antenatal clinics for the first time during their current pregnancy was reported (Agomo,2019). Nigeria accounts for one-fourth  $\frac{1}{4}$  of all malaria cases in the 45 endemic countries in Africa and 11% of maternal deaths in the country are attributed to malaria (Sani Abdullahi Fana, et., al,2015).

According to the statistics institute and ministry of public health in Burundi, the high prevalence rate of malaria was the second leading cause of mortality and morbidity with a prevalence rate of 84.9% and it accounted for 61.65% of the reasons for general consultation recorded in the health centers and was responsible for 39.8% of hospital deaths among the leading causes of death, for 40% of reasons for consultation in health centers; and then it was the first cause of hospital mortality in a proportion of 39.8% (MPLS,2016). Over 5.7 million people in Burundi almost half of the total population were infected by malaria since the start of 2017(NPLP,2017).

However, with the support of the Government of Burundi and its partners, the national plan strategy of malaria subscribed to the key malaria priorities and activities of universal coverage, improved diagnostics through rapid diagnostic test (RDT) use, increased communication activities, provision of free, first-line malaria treatment, and free case management of severe malaria for pregnant women and children under five years of age. Thus, Intermittent preventive treatment for pregnant women (IPTp) has been scaled up by the Government to new provinces progressively, since being launched in 2018. This new intervention is a complement to the distribution of insecticide-treated nets (ITNs) to pregnant women, providing a more comprehensive package of malaria prevention tools to this vulnerable population. The aim is for all pregnant women to receive at least three doses of SP during antenatal care

clinic (ANC) visits, with doses being administered under direct observation of the health worker, as frequently as monthly intervals, starting in the second trimester, up to the day of delivery (NMCP,2017). Therefore, the study aims at finding out the factors contributing to the prevalence of malaria among pregnant women in Burundi, Bujumbura District

## 2. Materials and methods

The cross-sectional descriptive survey was pointed to the pregnant women in Burundi at the Prince Louis Gwagasore Clinic and Kamenge Military Hospital - Bujumbura District, which was a national referral hospital. The study population consisted of pregnant women at these hospitals during my period of the study and a systematic sampling approach was employed in selecting the respondents (326) to represent the hospitals. The main criteria for inclusion in the study were that all pregnant women who came to benefit healthcare at prince louis Gwagasore clinic and Kamenge military hospital during my investigation period. To obtain a small representative sample for the study the standard error of the mean formula was applied. Hence,  $N = \frac{Z\alpha 2P}{(1-P) \cdot D^2}$

Where; N = required sample size, Z = Value corresponding to 95% confidence interval, P = prevalence of malaria reported in a previous study (30.6%), Q = (1-P), D = the required precision of the estimate (which is 5% accuracy).  $N = 1.962 \times 0.306 (1-0.306) / 0.052^2$

Data was collected by interviewing participants using an interviewer-administered questionnaire and analyzed employing a computer-assisted statistical package for social science version 20 into descriptive percentages and frequencies and chi-square inferential statistics.

## 3. Results

The study revealed the marital status that the majority of respondents were married with 206 (63.2%), 42(12.9) were single, 30 (9.2%) were

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monogamous and 48(14.7%) divorced. On the level of education; 120 (36.8%) reported being attended primary school while 99(30.4%) were non-formal and other groups like groups of university with 25(7.7%) and post-university 5(1.5%). The majority with 98(30.1%) on employment status reported being in agriculture while others as self-employment 79(24.2%), civil servants 20(6.1), wife house 62(19%), and health workers with 18(5.5%).

The majority of respondents 192(59.5%) reported not having electricity against 239(73.3%) without ventilation and among them, 102(31.3%) declared that the wall of their houses has wood while 49(%) of participants accepted that their houses were covered by thatch. The majority with 149(49.7%) of respondents got an amount of money between 5000-10000 per month.

**Table 1. Frequency Distributions on socioeconomic variables**

Variables	Respondents in this study N= 326	
	Frequency (N)	Percentage%
<b>Marital status:</b>		
-Monogamy	30	9.2
-Single	42	12.9
-Married	206	63.2
-divorced	48	14.7
<b>Level of education attainment:</b>		
-Primary	120	36.8
-Secondary	77	23.6
-University	25	7.7
-Post university	5	1.5
-Non-formal	99	30.4
<b>Employment status:</b>		
-Employed	49	15
-Self-employed	79	24.2
-Wife house	62	19
-Health worker	18	5.5
-Agriculture	98	30.1
-Civil servant	20	6.1
<b>Housing conditions:</b>		
-Electricity	132	40.5
Yes		
Yes	194	59.5
no	87	26.7
-Ventilation		
Yes:		
No:	239	73.3
-Roof with tiles	152	46.6
-Roof with ceiling	125	38.3
-Roof with thatch	49	15
-Wall with cement	136	41.7
-Wall with wood	102	31.3
<b>Level of income:</b>		
5000-10000	149	45.7
20000-50000	125	38.3
50000-150000	37	11.5

### 3.1. Findings on the Health system factors

The results from this study showed that the majority 174) (53.4%) answered negatively to the item requiring that they were always not being attended to by nurses or doctors in the hospital which could make them to be sick. Of the 326 that

participated, the majority 206(63.2%) correctly responded that the cost of treating themselves for malaria is not affordable which could be a result of severe malaria to them while 178(53.4%) of them responded that the clinic was not located so far from their homes, 185 (56.7%) of participants answered correctly that they get information about preventing

From malaria from the clinic while 209(64.1%) reported that they heard about malaria from health workers in the community and majority of respondent 247(75.8%) accepted that health centers distributed to them mosquito nets to the prevention of malaria. (See Table 2).

**Table 2 Findings on the Health system factors**

Statement for consideration	Respondents in this study N= 326	
	Frequency (N)	Percentage%
<b>I am always being attended to by nurses/doctors in the hospital</b>		
• Yes	152	46.6
• No	174	53.4
<b>The cost of treating myself for malaria is not affordable:</b>		
• Yes	206	63.2
• No	1	3.26
<b>The clinic is not far from where I reside:</b>		
• Yes	148	45.4
• No	178	54.6
<b>I get information about preventing myself from malaria from the clinic:</b>		
• Yes	185	56.7
• No	141	43.3
<b>The health centers do not distribute mosquito nets:</b>		
• Yes	247	75.8
• No	79	24.2
<b>I heard about malaria from health workers in my community:</b>		
• Yes	209	64.1
• No	116	35.6

### 3.2. Frequency distribution of environmental factors associated with malaria prevalence among respondents in the study.

The Result presented here showed that the majority 218 (66.9%) claimed that they were exposed to malaria because the climatic condition in their areas was cold, 204(62.9%) were worried about cutting the grasses (vegetation)in their surroundings since they were not disturbed or affected and, 200 (61.5%) claimed that their residences were accommodated by stagnant water anytime it rains. (See Table 3).

Table 3: Frequency distribution of environmental factors associated with malaria prevalence among respondents in the study.

Statement for consideration	Respondents in this study N= 326	
	Frequency(N)	Percentage%
<b>You are not exposed to malaria because of the climatic condition in your area is cold:</b>		
• Strongly Agree	58	17.8
• Agree	160	49.1
• Strongly Disagree	95	29.1
• Disagree	13	4
<b>You are not worried about cutting the grasses (vegetation)in your surroundings since you are not disturbed or affected</b>		
• Strongly Agree	63	19.4
• Agree	141	43.5
• Strongly Disagree	106	32.7
• Disagree	16	4.9
<b>Your residence is accommodated by stagnant water anytime it rains:</b>		
• Strongly Agree	55	16.9
• Agree	145	44.6
• Strongly Disagree	96	29.5
• Disagree	30	9.2

The Result provided here by the ANOVA showed that in the socioeconomic factors, four measurements (constructs) level of education, employment status, electricity, and the amount of money got per month were significant to be a cause of the prevalence of malaria according to the results found where F-value is less than P-value; in the environmental factors, two constructs like climatic conditions and stagnant water around the house when it was raining were considered as factors which could cause malaria after analysis where F-value is less than P-value and then the following independent variable was health system factors where constructs as being attended to by nurses/doctors in the hospital, cost of treating yourself for malaria is not affordable, health centers do not distribute mosquito nets were significant to cause malaria because after having analyzed them, the F-value was less than P-value, then the Ho was accepted. (See Table 4).

Relationship between independent variables and the prevalence of malaria (dependent variable).

Prevalence of malaria	Wald	df	Sig. (p)	Exp(B) (OR)	95% C.I. for EXP(B) Lower Upper	C.I. for N=326
<b>Socioeconomic factors</b>						
-Level of education	1.02	1	.03	2.27	1.643	0.765
-Employment status	0.42	1	.001	2.011	1.034	7.012
-Characteristic's house	2.01	1	1.03	1.064	0.057	0.076
-Marital status	6.32	1	0.08	0.23	1.432	26.52
Chi square: 1.564; P=0.003>0.05						

Socioeconomic factor in terms of measurement of variable(constructs) were significantly associ-

ated with prevalence of malaria among pregnant women with (Chi X<sup>2</sup>=1.564, p=0.003 < 0.05)malaria among pregnant women in Burundi.

Prevalence of malaria	Wald	df	Sig. (p)	Exp(B) (OR)	95% C.I. for EXP(B) Lower Upper
<b>Health system factors:</b>					
-I am always being attended to by nurses/doctors in the hospital	1.564	1	.008	0.03	.0028 1.763
-The cost of treating yourself for	4.675	1	.002	1.34	.062 2.08
-The clinic is not far from where I reside	2.231	1	.004	0.86	.533 1.47
-I get information about preventing myself from malaria from the clinic	11.101	1	.07	0.012	1.08 0.18
-The health centers do not distribute mosquito nets	0.203	1	.002	1.05	0.36 1.74
-I heard about malaria from health workers in my community	6.083	1	.004	.929	.44 1.94
Chi square: 15.115; p=0.0061<0.05					

Women were more unlikely to be accessible to the treatment due to insufficient money (OR=1.340, 95%CI [0.062-2.083], p=0.0021<0.05). Furthermore, the health center was significant or associated with the prevalence of malaria about not distributing mosquito nets with (OR=1.054, 95%CI [0.362-1.740], p=0.002<0.05). In addition, there was a significance between the prevalence of malaria and the hearing about malaria from the community towards women with (OR=0.929, 95%CI [0.444-1.941], p=0.004<0.05).

This, therefore, implied that the health system factors were significantly associated with the prevalence of malaria, that's meant to support them due to the need of respondents at (Chi X<sup>2</sup>=15.115, p< 0.05).

#### 4. Discussion:

Although Socioeconomic factors revealed that the majority of respondents were married with 206 (63.2%), 42(12.9) were single, 30 (9.2%) were monogamous, and 48(14.7%) were divorced. On the level of education; 120 (36.8%) reported being attended primary school while 99(30.4%) were nonformal and other groups like groups of university with 25(7.7%) and post-university 5(1.5%).

The majority with 98(30.1%) on employment status reported being in agriculture while others as self-employment 79(24.2%), civil servants 20(6.1), wife house 62(19%), and health workers with 18(5.5%). The majority of respondents 192(59.5%) reported not having electricity against 239(73.3%) without ventilation and among them, 102(31.3%) declared that the wall of their houses has wood while 49(%) of participants accepted that their houses were covered by thatch. The majority with 149(49.7%) of respondents got an amount of money between 5000-10000 per month. Socioeconomic factors in terms of measurement of the variable(constructs) were significantly associated with the prevalence of malaria among pregnant women with (Chi X<sup>2</sup>=1.564, p=0.003 < 0.05, with a prevalence of 46.3%. In this study, getting information about malaria preventive methods from the clinic was not significantly chi-square 11.101, pv= 0.07, with odds 0.012[1.08-0.18] of not developing malaria infection during pregnancy, findings in the study of Fana SA et...al,2015 on the prevalence and risk of malaria among pregnant women in Northwestern in Nigeria, the level of education was found to have an influence on the prevention of malaria in pregnancy. The majority of the malaria-parasitized subjects had no formal education (48.3%), this is followed by those who attained secondary level education (30%) then followed by women educated to primary education (13%) and tertiary level education (8.3%) of the subjects. This finding is consistent with previous reports in Karachi, India, Maiduguri, Kebbi Sate, and Ondo State Nigeria respectively (Osaro E. 2019). In contrast, in Maiduguri where a prevalence of 22.1% was reported among pregnant women [Sani Abdullahi Fana, et..., al (2015)]. This high rate of malaria among pregnant women in the area urgently calls for the need to review the observed that non-educated pregnant women had the highest prevalence rate, while those with a tertiary level of education had the lowest. (Sani Abdullahi Fana, et..., al (2015) However, a previous study conducted in Lagos indicated that education was in his study, malaria prevalence in women with no education was 63.0%, while in those with primary,

secondary, and tertiary education, it was 45.3%, 32.7%, and 27.3% respectively significantly associated with malaria infection among pregnant women with ( $\chi^2 = 20.9, p = 0.000 < 0.05$ ) [Fana, et .al ,2015].The finding on health system factors showed that 174 (53.4%) answered negatively to the item requiring that they were always not being attended to by nurses or doctors in the hospital which could make them at risk of the 326 that participated, the majority 206(63.2%) correctly responded that the cost of treating themselves for malaria is not affordable which could be as a result of severe malaria to them while 178(53.4%) of them responded that the clinic was not located so far from their homes, 185 (56.7%) of participants answered correctly that they get information about preventing from malaria from the clinic while 209(64.1%) reported that they heard about malaria from health workers in the community and majority of respondent 247(75.8%) accepted that health centers distributed to them mosquito nets to the prevention of malaria, X<sup>2</sup>=15.115; p=0.0061<0.05, OR=4.22[ 1.354-8.635]. where the prevalence of pregnant women attending hospital was 12.9%, low-cost of treatment was 46% and distribution of mosquito net 62%. The results showed that environmental factors based on the fact that respondents were not exposed to malaria because the climatic condition in their area was cold with chi-square 9.33,p-value= 0.002 was significant with F-V of 0.51 and P-V of 0.67, while participants that they were not worried about cutting the grasses (vegetation)in their surroundings since they were are not disturbed or effect was not significant with chi-square 0.54, p-value 0.06, in contrast, accommodation by stagnant water around the residence anytime it rained was significant with Chi-square of 6.405,p<0.05, F-V(0.174), P-V(0.32).The results of the study were in line with a study conducted by [Yuliarta Mararu et...al,2018] in the “determinant Factors Affecting Malaria Occurrence among Pregnant Women in the Wania Puskesmas, District of Mimika “that there were work environment factors that influenced malaria incidence in pregnant women related to climate change with (p-value = 0,001) with a chance of malaria inci-

dence 5,022 times bigger than a pregnant woman with non-climate change environment. This study showed that there was an influence of house distance with the breeding place with malaria incidence in pregnant women with (p-value = 0,002) with malaria incidence 4,571 times compared to a pregnant woman without house distance with the breeding place with (P-value=0.07) [Yuliarta Mararu et. . al,2018.

## 5. Conclusion

The study concluded that there was some adequate correlation between factors contributing to the prevalence of malaria among pregnant women after having based on the specific objectives findings of the study.

## 6. Recommendations

At the end of this study, some suggestions for the various stakeholders to set up strategies to significantly reduce the prevalence of malaria among pregnant women were formulated:

1. The Ministry of public health could strengthen the IEC to improve the health of pregnant women by using correct mosquito nets from the first antenatal consultation,
2. Establish a good healthcare staff in each hospital to develop key health education messages, especially among pregnant women aimed at reducing cases of the prevalence of malaria;
3. Inform pregnant women to consult nurses immediately from hospitals when they feel that they have symptoms of malaria and to respect the advice given by health personnel and community health workers.
4. Motivate community health workers to improve health promotion in reducing the prevalence of malaria and other diseases.
5. Manage stagnant water around the house which can attract mosquito bites.
6. Enforcement of education is very key to getting high knowledge in preventing malaria because persons who were educated were

likely to have some knowledge about how malaria was transmitted, as well as prevention and control measures.

## 7. Conflict of interest:

There was no conflict of interest while carrying out this study.

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This study was not funded.

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### **Author biography**

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