

Prevalence and Socio-demographic Characteristics of Malaria in Pregnancy among Women Attending Antenatal Care in Fort Portal Regional Referral Hospital, Uganda

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ABSTRACT

Malaria infection during pregnancy poses significant risks to both maternal and fetal health, particularly in regions with high transmission rates such as sub-Saharan Africa. This study, conducted at Fort Portal Regional Referral Hospital in Uganda, aimed to comprehensively investigate the prevalence and socio-demographic correlates of malaria infection among pregnant women attending the Antenatal Care (ANC) clinic. Utilizing a robust descriptive cross-sectional design, data were collected from 400 participants through structured questionnaires and subjected to rigorous statistical analysis. The findings revealed a malaria prevalence rate of 7.8% among the study population. Further analysis unveiled compelling associations between malaria infection and various socio-demographic factors. Notably, women aged 24-45 years constituted the majority of malaria-positive cases, highlighting a vulnerable age group. Additionally, lower levels of education, unemployment or self-employment status, and urban residence were significantly associated with higher rates of malaria infection. Primigravida and women in the second trimester emerged as particularly susceptible subgroups, indicating heightened risk during specific stages of pregnancy. These findings underscore the urgent need for targeted interventions aimed at reducing malaria burden among pregnant women in the study area. Effective health education programs tailored to address the needs of vulnerable demographics, particularly primigravida and women in the second trimester, are imperative. Furthermore, the sustained distribution of insecticide-treated mosquito nets remains paramount in combating malaria transmission. These interventions, informed by the socio-demographic correlates identified in this study, hold the potential to mitigate the adverse impact of malaria on maternal and fetal health, contributing to improved pregnancy outcomes and overall public health in the region.

Keywords: Malaria, pregnancy, antenatal care, prevalence, socio-demographic correlates, Fort Portal Regional Referral Hospital, Uganda.

INTRODUCTION

The World Health Organisation (WHO) reported 212 million malaria cases and 429 000 deaths in 2015, with a 21% decrease in malaria incidence among populations at risk between 2010 and 2015 [1]. Malaria mortality rates decreased by 29%, and an estimated 6.8 million deaths have been averted globally since 2001. The African Region, which accounted for 90% of malaria cases and 92% of deaths, carried a disproportionately high share of the global malaria burden [2]. Pregnant women and children under five are particularly susceptible to infection, illness, and death in areas with high transmission of malaria [3, 4]. In East Africa, malaria prevalence among pregnant women is 26.3%. Malaria remains a significant disease in Uganda, causing significant morbidity, mortality, and negative socio-economic impact [5]. Children under 5 and pregnant women are at high risk due to low immunity against the disease. Hospital records

suggest that malaria is responsible for 30–50% of outpatient visits, 15–25% of admissions, and 9–14% of inpatient deaths (MUSHASHU, 2012). In 2010, malaria was reported as the leading cause of morbidity, with 95% of the population at risk and killing between 70,000 and 100,000 mothers annually [6]. Uganda has the world's highest malaria incidence, with 478 cases per 1,000 populations per year. Pregnant women attending antenatal clinics for their first visit can be a potential pragmatic sentinel group to track the intensity of malaria transmission [7].

Malaria control still remains a challenge in Africa, where 45 countries, including Uganda, are endemic for malaria and about 588 million people are at risk. The protection of pregnant women living in malaria-endemic countries has been of particular interest to many national malaria control programmes because of the reduction in immunity

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associated with pregnancy [8]. Malaria is a life-threatening, preventable, and curable disease caused by Plasmodium parasites that are spread to people through the bites of infected female Anopheles mosquitoes, called "malaria vectors." There are 5 parasite species that cause malaria in humans, and 2 of these species—*P. falciparum* and *P. vivax*—pose the greatest threat: *P. falciparum* is the most prevalent malaria parasite on the African continent and is responsible for most malaria-related deaths globally; *P. vivax* is the dominant malaria parasite in most countries outside of sub-Saharan Africa [9, 10]. It is an acute febrile illness; in a non-immune individual, symptoms usually appear 10–15 days after the infective mosquito bite. The first symptoms—fever, headache, and chills—may be mild and difficult to recognise as malaria, and if not treated within 24 hours, *P. falciparum* Malaria can progress to severe illness, often leading to death, while in malaria-endemic areas, people may develop partial immunity, allowing asymptomatic infections to occur [11]. The focus of malaria prevention during pregnancy has been the use of antimalarial chemoprophylaxis and insecticide-treated nets (ITNs). Pregnant women on antimalarial chemoprophylaxis are at a reduced risk of the harmful effects of malaria, while ITNs reduce human contact with mosquitoes, leading to a significant reduction in the incidence of malaria, severe morbidity, and mortality due to malaria, as well as helping to reduce the adverse effects of malaria during pregnancy in an area of intense malaria transmission [12]. Asymptomatic malaria increases the risk of stillbirths, spontaneous abortion, premature delivery, and low birth weight [13]. Yet it has rarely been a major research focus. The asymptomatic nature of individuals with malaria has led to difficulties in diagnosing, inconsistencies in defining, and a general lack of urgency to investigate this particular disease outcome. In some sense, asymptomatic malaria has become "neglected" malaria, although recently asymptomatic malaria has become accepted as a major hurdle for malaria elimination, as infected hosts serve as silent reservoirs. Routine treatment of asymptomatic carriers of malaria parasites as part of surveillance strategies has the potential to make a

Study Design

A descriptive cross-sectional study to assess the prevalence and socio-demographic characteristics of malaria in pregnancy among women attending ANC clinic of Fort Portal Regional Referral Hospital was conducted.

Study Site

Fort portal regional referral hospital is located in Kabarole district in fort portal municipality and is the referral hospital for the districts of Bundibugyo,

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significant contribution to the fight against malaria in endemic regions [14].

Malaria is the deadliest tropical infectious disease, disproportionately affecting pregnant women, children under five, and the poor. Malaria in pregnancy is a major public health problem in both tropical and subtropical regions of the world. Every year, millions of women become pregnant in malaria-endemic regions of Africa, and a significant proportion of individuals are asymptomatic, though with plasmodium species [6]. The World Malaria Report indicated that Africa bears the heaviest burden and the highest risk of malaria infection. Hence, about 82% of the reported malaria cases and about 90% of the reported deaths occur in Africa; the majority were children under five years old and pregnant women living in malaria-endemic regions. In 2013, there were approximately 198 million cases and 584,000 deaths. It was estimated that one death occurs every 30 seconds, or 90% of malaria deaths [15]. In 2015, the region was home to 88% of malaria cases and 90% of malaria deaths occurring in Sub-Saharan Africa, and 90% of malaria deaths were among pregnant women and children [16]. Malaria is the leading cause of morbidity in Uganda, with 95% of the population at risk; children under the age of five years and pregnant women are among the most vulnerable to malaria infection as they haven't gained immunity and also have reduced immunity, respectively [17-22]. In order to apply successful implementations to eradicate malaria, there is a continuous need to understand the prevalence and correlates of malaria in pregnancy, and despite the fact that a large number of studies done worldwide have identified a wide variety of correlates—socioeconomic, environmental, demographic, and others—associated with malaria infection in pregnancy, there is no data accessible about this subject in the study area, hence the basis of conducting this research. This study aims to determine the prevalence and socio-demographic characteristics of malaria during pregnancy among women attending Fort Portal Regional Referral Hospital's ANC clinic and describe the socio-demographic characteristics of women with malaria during pregnancy.

METHODOLOGY

Kabarole, Kamwenge, Kasese, Ntoroko and Kyenjojo. It is a public hospital, funded by the Uganda Ministry of Health and general care in the hospital is free. It is one of the 13 "Regional Referral Hospitals" in Uganda. The hospital has both out-patient and in-patient departments with approximately 400 bed capacities and a total out-patient attendance of 15,000 per year of which 10% are antenatal visits. It has departments of paediatrics, internal medicine, surgery, obstetrics and

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gynaecology and special clinics, all headed by consultants and is designated as one of the 15 "Internship Hospitals" where graduates of Ugandan medical schools can serve one year of internship under the supervision of qualified specialists and consultants.

Study Population

The study population was all women attending antenatal clinic in FPRRH during the period of study.

Inclusion Criteria

All women attending antenatal clinic in FRRH who consented to take part in the study were included.

Exclusion Criteria

All women attending antenatal clinic in FRRH who will not consent to take part in the study were excluded. All women attending ANC who were very ill requiring further immediate medical attention were also excluded.

Sample Size Determination

Using the formula Fisher et al. [18]

I.e. $N = Z^2PQ/D^2$

: Where N is the desired sample size

Z is the standard normal deviation taken as 1.96 at a confidence interval of 95%.

P is 52%, this is the percentage of women of reproductive age in Kabarole district according to ministry of health statistics of 2018.

D is the degree of accuracy = 0.05.

Q = (1-P) which is the population of under-fives who are of good nutrition status.

Therefore, $N = 1.96^2 \times 0.52 \times 0.48 / (0.05)^2 = 383.55 = 384$ respondents are the minimum

Sample size required.

Sampling Technique

A consecutive enrolment of women was used whereby all women visiting antenatal clinic on the

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days of study were consecutively enrolled into the study.

Data Collection Tools

An interviewer-administered structured questionnaire with both closed and open-ended questions were used for the study.

Study Procedure

Identification of the eligible women, explaining the procedure to them, consent and confidentiality was observed.

Quality Control

The researcher ensured quality control by pre-testing the questionnaire on 10 women whose data was not included in the final analysis. And data analysis was under the supervision of the statistician.

Data Analysis

Data was entered into Microsoft excel 2016 spread sheets and analyzed using SPSS version 17.0. Descriptive statistics was performed using absolute numbers, percentages, ranges and measures of central tendency accordingly. Data was presented in tables, graphs and charts.

Ethical Considerations

Written introductory/approval letter from KIU-IREC was sought and presented to the departmental heads in charge at FPRRH. Informed consent from the respondents was sought both verbally and in writing. Participants were assured of confidentiality and use of the information obtained only for the purpose of the research. Participation was fully out of the respondents' volition and they would reserve the right to or not to participate, or to pull out at any time, whenever they no longer feel comfortable to continue. Their choice to either participate or not did not bear any repercussions whatsoever in terms of benefits or otherwise.

RESULTS

The socio-demographic characteristics of women with malaria in pregnancy among women attending ANC clinic of Fort Portal Regional Referral Hospital

Table 1: Socio-demographic characteristics

Characteristic	Frequency	Percentage (%)
Age Distribution		
< 23	4	12.9
24 – 35	12	38.7
36 – 45	10	32.3
46 +	5	16.1
Level of Education Attained		
None	13	41.9
Primary	9	29.0
Secondary	6	19.4
Tertiary	3	9.7
Marital Status		
Married	27	87.1
Single	4	12.9
Status of Employment		
Employed	41	2.9
Unemployed	16	51.6
Self-Employed	9	29.0
Student	2	6.5
Religion		
Protestant	9	29.0
Pentecostal	6	19.3
Catholic	10	32.3
Other	6	19.3
Residence		
Urban	18	58.1
Rural	13	41.9
Gravidity		
1(PG)	21	67.7
1-3	61	9.4
4+	41	2.9
Trimester		
1 st	10	32.3
2 nd	15	48.4
3 rd	61	9.3
Mosquito nets		
Have and used	24	77.4
Have and didn't use	6	19.4
Don't have	1	3.6
House		
Temporary	8	25.8
Semi-permanent	16	51.6
Permanent	7	22.6

From Table 1 above, most of the respondents who tested positive for malaria parasites either by RDT or B/S were within the age group of 24-45 (71%), majority 22 (70.9%) had either not attained any level

of education or ended in primary level, 25 (80.6%) were either unemployed or self-employed and 27 (87.1%) of them were married. As regards to religion, most of the respondents who tested

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positive for malaria 19 (61.3%) were either Catholics or Protestants and majority 18 (58.1%) resided in urban areas. More than half 21 (67.7%) of the respondents with malaria were having their first pregnancies (prime gravidas) of which

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10 (32.3%) and 15 (48.4%) were in first and second trimester respectively. Almost all of the respondents with malaria 30 (96.8%) had mosquito nets, majority 24 (77.4) of whom had used the mosquito nets in the previous night and majority 24 (77.4) of them lived in a temporary or semi-permanent house.

The prevalence of malaria in pregnancy among women attending antenatal clinic in FPRRH.

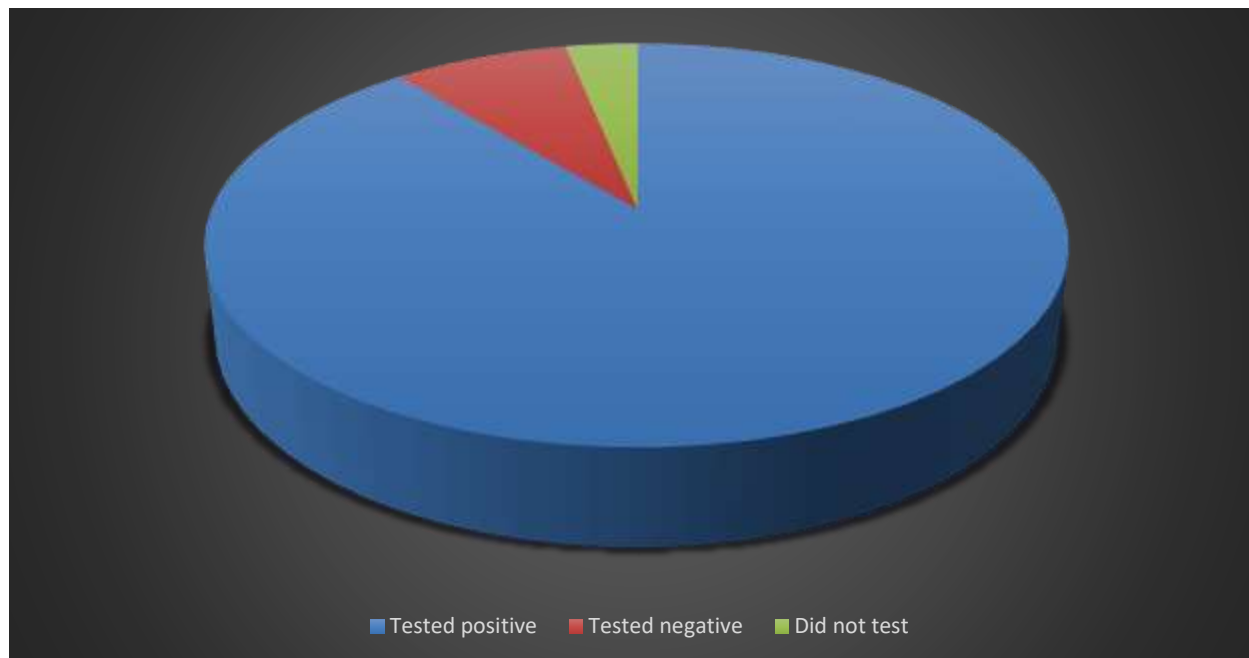


Figure 1: prevalence of malaria in pregnancy.

DISCUSSION

The prevalence of malaria in pregnancy among women attending antenatal clinics in FPRRH.

From figure 1 above, the prevalence of malaria in pregnancy among women attending ANC clinics in FPRRH was 31 (7.8%) [those who had a positive malaria test in the course of their current pregnancy]. The majority of the respondents, 356 (89%), never had a positive malaria test (tested negative) in their current pregnancy, while 13 (3.2%) never did any malaria test because they did not have any features of malaria and so had no reason for doing the test.

The socio-demographic characteristics of women with malaria in pregnancy among women attending the ANC clinic of Fort Portal Regional Referral Hospital.

From Table 1 above, most of the respondents who tested positive for malaria parasites either by RDT or B/S were within the age group of 24–45 (71%); the majority, 22 (70.9%), had either not attained any level of education or ended in primary school; 25 (80.6%) were either unemployed or self-employed; and 27 (87.1%) of them were married. As regards religion, most of the respondents who tested

positive for malaria—19 (61.3%) were either Catholics or Protestants, and the majority (18 (58.1%) resided in urban areas. More than half (67.7%) of the respondents with malaria were having their first pregnancies (primigravids), of which 10 (32.3%) and 15 (48.4%) were in the first and second trimesters, respectively. Almost all of the respondents with malaria, 30 (96.8%), had mosquito nets, the majority 24 (77.4) of whom had used the mosquito nets the previous night, and the majority 24 (77.4) of them lived in a temporary or semi-permanent house. In a similar study in Nigeria, the age of the women was significantly associated with malaria prevalence ($P = 0.010$) and parasite density ($P = 0.04$); the 15–19-year-old age group had the highest prevalence (20.5%) as well as the highest geometric mean parasite density (1,457 parasites/ μL of blood). The gravidity of the women was not associated with either malaria prevalence or mean geometric parasite density ($P > 0.05$), and the prevalence of malaria in primigravidae, secundigravidae, and multigravidae were 9.1%, 7.1%, and 6.5%, respectively ($P = 0.333$) [19]. There was no significant association between malaria and

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prevalence and either education ($P = 0.215$) or the gestational age at the time of booking ($P = 0.577$). Malaria prevalence in women with primary, secondary, and tertiary education was 11.7%, 7.6%, and 6.3%, respectively, while the prevalence in women booked in ANC at the first, second, and third trimesters was 6.8%, 8.5%, and 6.7%, respectively. However, young maternal age (<20 years) was significantly associated with an increased risk of malaria infection [19]. In western Kenyan study by Ann et al. [20], young age (< 21 years: RR 1.51, 95%

The prevalence of malaria in pregnancy among women attending the ANC clinic in Fort Portal regional referral hospital. The prevalence of malaria among women attending ANC clinics in FPRRH was high among women of 24-45 years of age, uneducated and primary school leavers, unemployed, primigravida, second trimester, and those living in temporary buildings.

Recommendation

The good work done by the health team in educating and informing the community about malaria and its prevention should be applauded and encouraged to

CONCLUSION

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CI 1.19–1.91), being a primigravida (RR 1.41, 95% CI 1.05–1.88), a periurban residence (RR 1.50, 95% CI 1.21–1.88), and Luo ethnicity (RR 1.74, 95% CI 1.35–2.24) were risk factors for malaria at delivery. These similarities and differences could be attributed to the similarities and differences in the study techniques among those studies, the knowledge and utilisation, as well as the availability of preventive resources. It could also be attributed to the socio-economic similarity of the study areas.

continue to bridge the small gap remaining in the elimination of malaria.

The hospital should design health education programmes about malaria transmission and prevention targeted at the most affected primigravida and second-trimester mothers. The treated insecticide mosquito net distribution should also continue for all primigravids. More research should be done in this area to assess the effectiveness of the interventions directed towards the prevention and control of malaria in pregnancy since the prevalence is high and the national target is to eliminate malaria infection.

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