(RESEARCH ARTICLE)

# Prevalence of gestational malaria among pregnant women attendiing anatenatal care in selected primary healthcare centres in Oluyole local government area of Ibadan, Oyo state, Nigeria

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## Abstract

This study ascertained the prevalence of gestational malaria among pregnant women attending antenatal care in selected primary healthcare centres in Oluyole Local Government Area, Ibadan, Oyo State, Nigeria. The study was a cross-sectional design which involved pregnant women and a structured questionnaire was used for data collection. Descriptive statistics and inferential statistics was used to analyze the data collected. Result showed that most (42.0%) of pregnant women fell within the age range 25-34 years and quite a large number (74.3%) of the pregnant women had tertiary education. From the finding, 72% of the pregnant women were screened for malaria during current pregnancy while 28% were not screened for malaria during current pregnancy. Out of the 72% pregnant women that were screened for malaria, 59.3% indicated that they were negative, 10.3% stated that they were positive and 2.3% specified that they cannot remember. Furthermore, 83% of the pregnant women stated that they were infected with malaria during current pregnancy while 17% specified that they were not infected with malaria during current pregnancy. The multiple regression analysis showed that age (-.091), marital status (-.100), education (-.063), and average monthly income (-.523) had negative effect while occupation (.081) and religion (.130) had positive effect with the prevalence of gestational malaria. It was recommended that malaria control measures such as administering of intermittent preventive treatment (IPTp) of malaria for pregnant women should continue to be administered to all pregnant women during antenatal visit and pregnant women should be educated on the regular-use of long-lasting insecticide-treated nets (LLINs) during pregnancy.

Keywords: Prevalence; Gestational; Malaria; Pregnant Women

## 1. Introduction

Malaria remains a foremost public health risk despite significant development on control in the past decade (WHO, 2019). In 2019, the World Health Organization (WHO) reported that cases of malaria were estimated to be 228 million and 405,000 mortalities linked to malaria in 2018, with the region of Africa bearing the brunt with about 93% of all cases (WHO, 2019). In 2020, global report estimated malaria cases to be 241 million, 200 million malaria cases and 403,000 deaths were reported in Sub-Saharan Africa, out of which 80% were children below 5 years (WHO, 2021).

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Malaria infection during pregnancy is a major public health problem, with considerable hazards for the pregnant women, her foetus as well as the newborn child (Oluwagbemiga et al., 2018). Internationally, 25 million pregnant women are at danger of malaria in a yearly basis in Sub-Saharan Africa which happens to be the most burdened region by malaria (Cohee et al., 2020). Malaria is assumed to cause a lot of 10,000 cases of malaria-related mortalities in pregnancy, primarily as a result of severe maternal anemia. Roughly 11% (100,000) of neonatal mortalities are as a result of low birth weight resulting from Plasmodium falciparum infections in pregnancy (Bauserman et al., 2019).

The signs and complications of malaria during pregnancy differ according to intensity of malaria transmission in the given geographical area, and the level of individual's acquired immunity (Diarra et al., 2019). Malaria-related maternal illness and anemia, preterm birth and low birthweight newborns are generally the result of P. falciparum infection and happens predominantly in Africa (van Eijk et al., 2019). Pregnant women infected with malaria typically have more severe symptoms and consequences with greater rates of miscarriage, intrauterine demise, low birth weight neonates, anemia, and neonatal mortality (Sánchez & Spencer, 2022).

Nigeria suffers the world's utmost malaria burden, with roughly 51 million cases and 207,000 deaths reported yearly (almost 30% of the total malaria burden in Africa), while 97% of the total population is at risk of malaria infection (Afolabi et al., 2020). Control of malaria still remains a challenge in Africa where forty-five (45) nations including Nigeria, are endemic for malaria, and around 588 million people are at risk (Akol, 2017). The protection of pregnant women living in malaria-endemic nations has been of certain interest to a lot of National Malaria Control Programmes because of their reduced immunity (Baird, 2022). During pregnancy, most malaria cases are asymptomatic and effort has been made to reduce the occurrence of malaria (Tilahun et al., 2020). Despite the numerous efforts by the Nigerian government to combat malaria, it still lingers to cause substantial mortality and morbidity due to poor utilization of services. Hence, this study would establish the prevalence of gestational malaria among pregnant women attendiing anatenatal care in selected primary healthcare centres in Oluyole Local Government Area, Ibadan, Oyo State, Nigeria.

## 2. Methodology

A cross-sectional survey research was conducted among pregnant women who were attending antenatal care at six (6) primary health care facilities in Oluyole Local Government Area, Ibadan, Oyo State, Nigeria. The selected health care facilities were Aba Ode Primary Health Clinic, Aba Nla Primary Health Clinic, Ayegun Primary Health Centre, Bare Primary Health Centre, Odo Ona kekere Primary Health Clinic, and Odo Okun Primary Health Centre. Stratified sampling method was used in selecting the health facilities while simple random sampling method was used to select the pregnant women who attended the antenatal clinic at the six (6) selected healthcare facilities in the study location. The sample size was calculated using the formula (Fisher et al., 1991);

$$n \ i = \frac{Z^2 pq}{d^2}$$

A prevalence of 22.8% reported in a study conducted in Ibadan to assess the prevalence of malaria in pregnancy was used to calculate the sample size for this study (Adesina-Adewole et al., 2021). The research was carried out in primary health care clinics in Ibadan with a confidence interval of 95%.

p = estimated proportion with the condition of interest (22.8%)

- q = 1-p
- z = 1.96 at a 95% confidence interval (CI)
- d = desired difference between observed proportion and true proportion = 5%

$$n \ = \frac{(1.96)^2 \times (0.228) \times (1 - 0.228)}{0.05^2}$$

- n = 270
- n = 300 after considering 10% to non-response rate

Structured questionnaires were used to collect data from the pregnant women. Statistical analysis was done using Statistical Package for Social Sciences (SPSS) version 26. Data collected were analyzed using descriptive statistics such as frequency and percentage; and inferential statistics such as chi-square was performed for multiple linear regression.

## 3. Results and Discussion

### 3.1. Socio-demographic characteristics of pregnant women

The socio-demographic characteristics of pregnant women as presented in Table 1. shows that most (42.0%) of the pregnant women fell within the age range 25-34 years, 24.3% were within 15-24 years while few (1.0%) were above 54 years. Result indicated that majority (86.3%) of the pregnant women were married, 7.0% were single whereas 0.7% were widowed. In terms of educational level, quite a large number (74.3%) of the pregnant women had tertiary education. Furthermore, result showed that 33.7% of the pregnant women were Civil/Public Servant, followed by petty trader (32.0%), 25.3% were unemployed and 9.0% were involved in farming. More than half (56.3%) of the pregnant women were Christians, 41.0% practiced Islam and 2.7% were traditional worshippers. Almost 60% of the pregnant women stated that their average monthly income fell within the range of ₦51,000-100,000, while 26.3% indicated that pregnant women earned less than ₦50,000 average monthly income.

**Table 1** Socio-demographic characteristics of respondents (n=300)

| Characteristics | Frequency (n) | Percent (%) |
|---|---|---|
| **Age of participant** | | |
| 15 – 24 | 73 | 24.3 |
| 25 – 34 | 126 | 42.0 |
| 35 – 44 | 69 | 23.0 |
| 45 – 54 | 29 | 9.7 |
| 55 and above | 3 | 1.0 |
| Marital status | | |
| Single | 21 | 7.0 |
| Married | 259 | 86.3 |
| Divorced | 7 | 2.3 |
| Separated | 11 | 3.7 |
| Widowed | 2 | 0.7 |
| Educational level | | |
| No education | 3 | 1.0 |
| Primary/JHS | 31 | 10.3 |
| SHS/Vocational | 43 | 14.3 |
| Tertiary | 223 | 74.3 |
| Occupation | | |
| Farming | 27 | 9.0 |
| Petty trader | 96 | 32.0 |
| Civil/Public Servant | 101 | 33.7 |
| Unemployed | 76 | 25.3 |
| Religion | | |
| Christianity | 169 | 56.3 |
| Islam | 123 | 41.0 |
| Traditional worshippers | 8 | 2.7 |

| Average monthly income (₦) | | |
|---|---|---|
| Less than 50,000 | 79 | 26.3 |
| 51,000 – 100,000 | 174 | 58.0 |
| 101,000 – 150,000 | 21 | 7.0 |
| 151,000 – 200,000 | 17 | 5.7 |
| More than 200,000 | 9 | 3.0 |
| Total | 300 | 100 |

Source: Fieldwork, (2022)

### 3.2. Prevalence of malaria among pregnant women

Figure 1 displayed pictorial representation of the percentage of pregnant women that were screened for malaria during current pregnancy. From the pie chart, 72% of the pregnant women specified that they were screened for malaria during current pregnancy while 28% stated that they were not screened for malaria during current pregnancy.
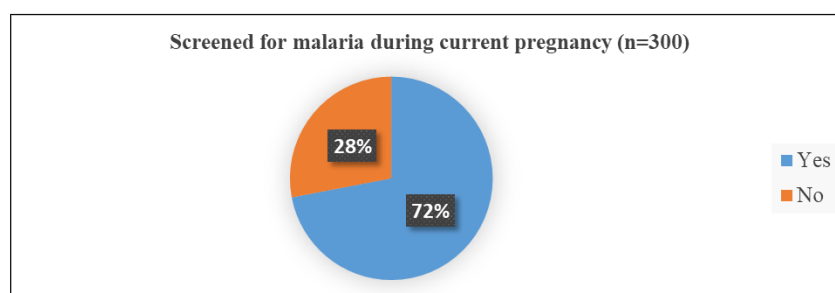


**Figure 1** Pictorial representation of pregnant women screened for malaria during current pregnancy

Figure 2 is the pictorial illustration of pregnant women that were positive to malaria after screening. Out of the 72% pregnant women that were screened for malaria, 59.3% indicated that they were negative, 10.3% stated that they were positive and 2.3% specified that they cannot remember. The finding of this study was contrary to a gestational malaria report who reported a prevalence of 4.3% among the pregnant women (Bello & Ayede, 2019). Also, the finding was relatively lower compared to the 72% prevalence reported on malaria parasite infection in their blood (Adefioye et al., 2007). Another study also reported 31.8% prevalence of malaria among pregnant women in Nigeria which was contrary to the outcome of this study (Uko et al., 1998). Furthermore, the outcome was in contrary with studies conducted in Sub-Saharan Africa between 2000 and 2011 where prevalence of malaria in pregnant women attending antenatal clinics was 29.5% in East and Southern Africa, and 35.1% in West and Central Africa (Meghna et al., 2015). The lower prevalence of malaria recorded in this study may be ascribed to the benefits of attending antenatal clinics, enhanced compliance to interventions in malaria control strategies like usage of long lasting insecticide treated nets (LLIN) or alternative intermittent prevention treatment with Pyrimethamine-sulfadoxine (SP) (Meghna et al., 2015).
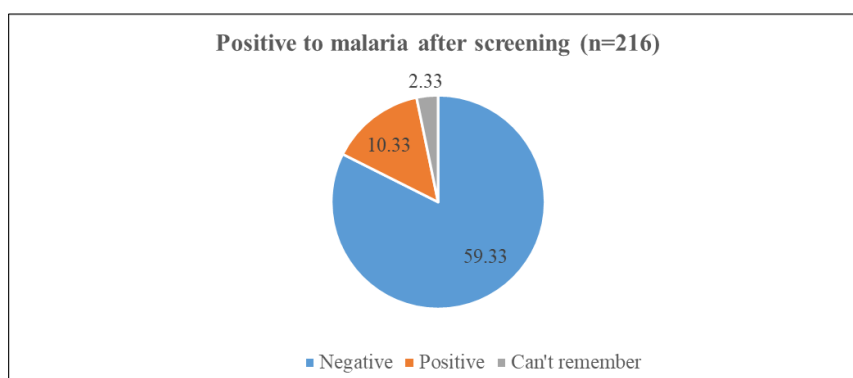


**Figure 2** Pictorial representation of pregnant women positive to malaria after screening

Figure.3 presented the pictorial illustration of pregnant women infected with malaria during current pregnancy. From the result, 83% of the pregnant women stated that they were infected with malaria during current pregnancy while 17% specified that they were not infected with malaria during current pregnancy.
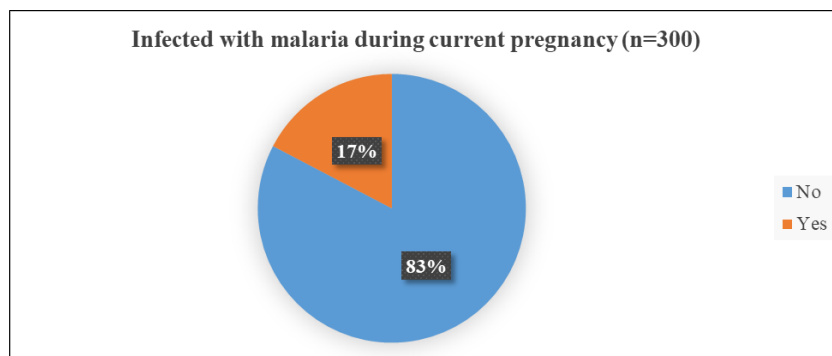


**Figure 3** Pictorial representation of infected with malaria during current pregnancy

### 3.3. Relationship between socio-economic characteristics and prevalence of gestational malaria

Table 2 Shows the relationship between socio-economic characteristics and prevalence of gestational malaria. The multiple regression analysis showed that age of the pregnant women and average monthly income had significant relationship ($p < 0.05$) with prevalence of gestational malaria among pregnant women attending antenatal care in the study location. Age of pregnant women had a significant (-.091) negative effect on the prevalence of gestational malaria among the pregnant women. This implied that a unit increase in age of pregnant women would lead to corresponding decrease in prevalence of gestational malaria among pregnant women this corroborates the finding from a study conducted in Ghana by Dwumfour et al. (2023) on prevalence and determinants of malaria infection among pregnant women attending antenatal clinic in Ejisu government hospital. Furthermore, marital status (-.100), education (-,063), and average monthly income (-.523) effect on the prevalence of gestational malaria among pregnant women. This indicated that a unit increase in marital status, educational level and average monthly income would lead to decrease in prevalence of gestational malaria among the pregnant women.

**Table 2** Socio-economic characteristics and prevalence of gestational malaria

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 1.676 | .758 | | 2.212 | .030 |
| Age | -.091 | .055 | -.120 | -1.670 | **.039*** |
| Marital status | -.100 | .086 | -.082 | -1.164 | .248 |
| Education | -.063 | .095 | -.047 | -.669 | .506 |
| Occupation | .081 | .021 | .376 | 3.782 | .063 |
| Religion | .130 | .070 | .130 | 1.853 | .067 |
| Average monthly income | -.523 | .251 | -.188 | -2.086 | **.001*** |

*Significant p<0.05
Source: Fieldwork, (2022)

## 4. Conclusion

From the finding of this study, 10.3% of pregnant women were positive to malaria infection. The study also revealed that larger percentage (83%) of the pregnant women were infected with malaria during current pregnancy. It was recommended that malaria control measures such as administering of intermittent preventive treatment of malaria for pregnant Women (IPTp) should continue to be administered to all pregnant women during antenatal visit and pregnant women should be educated on the regular-use of long-lasting insecticide-treated nets (LLINs) during pregnancy.

## Compliance with ethical standards

*Disclosure of conflict of interest*

No conflict of interest to be disclosed.

*Statement of ethical approval*

Ethical clearance to conduct this study was obtained from Oyo State Ethical Review Committee.\

*Statement of Informed consent*

Informed consent was obtained from all individual participants included in the study

## References

[1]  Adefioye, O. A., O. A. Adeyeba, W. O. Hassan, & O. A. Oyeniran (2007). Prevalence of malaria parasite infection among pregnant women in Osogbo, Southwest, Nigeria. American-Eurasian Journal of Scientific Research, 2(1): 43-45.

[2]  Adesina-Adewole, B., Olusola, F. I., Adedapo, A. D. A., & Falade, C. O. (2021). Parasite-based diagnosis of malaria in pregnant women in a tertiary hospital in southwest Nigeria. Annals of Ibadan Postgraduate Medicine, 19(1), 22-30.

[3]  Afolabi, B. M., Afolabi, T. M., Ogunwale, A., & Aiyesetenikan, A. (2020). A 2-month intervention study of preventive clothing against mosquito bites among malnourished and well-nourished children under 5 years of age living on the Atlantic Ocean Coast of Lagos, Southwest Nigeria. Malaria Journal, 19(1), 1-21.

[4]  Akol, T. (2017). Prevalence of malaria among pregnant mothers attending antenatal care at Atutur Hospital Kumi District Uganda.

[5]  Baird, J. K. (2022). African Plasmodium vivax malaria improbably rare or benign." Trends in Parasitology.

[6]  Bauserman, M., Conroy, A. L., North, K., Patterson, J., Bose, C., & Meshnick, S. (2019). An overview of malaria in pregnancy. In Seminars in perinatology, 43(5), 282-290.

[7]  Bello, F. A., & Ayede, A. I. (2019). Prevalence of malaria parasitaemia and the use of malaria prevention measures in pregnant women in Ibadan, Nigeria. Annals of Ibadan Postgraduate Medicine, 17(2), 124-129.

[8]  Cohee, L. M., Opondo, C., Clarke, S. E., Halliday, K. E., Cano, J., Shipper, A. G., Barger-Kamate, B., Djimde, A., Diarra, S., Dokras, A., & Kamya, M. R. (2020). Preventive malaria treatment among school-aged children in sub-Saharan Africa: a systematic review and meta-analyses. The Lancet Global Health, 8(12), e1499-e1511.

[9]  Diarra, S. S., Konaté, D., Diawara, S., Tall, M., Diakité, M., & Doumbia, S. (2019). Factors associated with intermittent preventive treatment of malaria during pregnancy in Mali. Journal of Parasitology 105(2), 299-302.

[10]  Dwumfour, C. K., Bam, V. B., Owusu, L. B., Poku, C. A., Kpabitey, R. D., Aboagye, P., & Ibrahim, A. S. (2023). Prevalence and determinants of malaria infection among pregnant women attending antenatal clinic in Ejisu government hospital in Ghana: A cross-sectional study. Plos one, 18(10), e0293420.

[11]  Fisher, A., Lant, J., & Stoeckel, J. (1991). Handbook for family planning operation design. Population Council.

[12]  Meghna, D., Gutman, J., L'lanziva, A., Otieno, K., Juma, E., Kariuki, S., Ouma, P. (2015). Intermittent screening and treatment or intermittent preventive treatment with dihydroartemisinin–piperaquine versus intermittent preventive treatment with sulfadoxine–pyrimethamine for the control of malaria during pregnancy in western Kenya: an open-label, three-group, randomized controlled superiority trial. The Lancet, 386(10012): 2507-2519.

[13]  Oluwagbemiga, A., Bamidele, A., Babatunde, A., Chimere, A., Medinat, S., & Olalekan, R. (2018). Prevalence of malaria in pregnant women attending antenatal clinic in primary health centres in Lagos. South West, Nigeria. Journal of Advances in Medicine and Medical Research, 25(12), 1-9.

[14]  Sánchez, K. E., & Spencer, L. M. (2022). Pregnancy-associated malaria: Effects of cytokine and chemokine expression. Travel Medicine and Infectious Disease, 102282.

[15]   Tilahun, A., Yimer, M., Gelaye, M., & Tegegne, B. (2020). Prevalence of asymptomatic Plasmodium species infection and associated factors among pregnant women attending antenatal care at Fendeka town health facilities, Jawi District, North west Ethiopia: A cross-sectional study. PLoS One, 15(4), e0231477.

[16]   Uko, E. K., A. O. Emeribe, & G. C. Ejezie, (1998). Malaria infection of the placenta and Neonatal Low Birth Weight in Calabar. J Med Lab Sci., 7: 7-20.

[17]   van Eijk, A. M., Larsen, D. A., Kayentao, K., Koshy, G., Slaughter, D. E., Roper, C., Okell, L. C., Desai, M., Gutman, J., Khairallah, C., & Rogerson, S. J. (2019). Effect of Plasmodium falciparum sulfadoxine-pyrimethamine resistance on the effectiveness of intermittent preventive therapy for malaria in pregnancy in Africa: a systematic review and meta-analysis. The Lancet Infectious Diseases, 19(5), 546-556.

[18]   World Health Organization "World malaria report 2021". World Health Organization, (2021).  Available at https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2021

[19]   World Health Organization. "World malaria report 2019". World Health Organization, "2019). Available at https://www.who.int/publications/i/item/9789241565721