

Prevalence of Malaria and utilisation of Long-lasting insecticidal nets: coverage and utilisation rate among pregnant women attending the antenatal care clinic at Butemba Health Centre IV. A cross-sectional study

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Abstract

Background:

The consequences caused by malaria in pregnancy affect both the mother and infant. Maternal complications include acute lung injury, severe hypoglycemia, miscarriage, stillbirth, and coma. The study aims to determine the prevalence of malaria and evaluate the coverage and utilisation rate of long-lasting insecticidal nets among pregnant women attending the antenatal care clinic at Butemba Health Centre IV.

Methodology:

A descriptive cross-sectional design was used, involving 80 respondents who were selected using a simple random sampling method. Data were obtained using structured questionnaires and malaria rapid diagnostic tests, for analysis using the Statistical Package for the Social Sciences.

Results:

The majority of the respondents, 55(68.8%) had tested negative for malaria; 25(31.2%) tested positive for malaria. All 25(100%) of respondents were detected with *Plasmodium falciparum*.

The majority of the respondents, 65(81.2%) had mosquito nets, 15(18.8%) never had mosquito nets. The majority of the respondents, 60(92.3%), obtained IPT from a government facility; 5(7.7%) brought it from the market. 64(98.5%) slept under a mosquito net daily, while the least, 1(1.5%), used it rarely. 40(50%) of the respondents were aged 25 – 34 years, 1(1.3%), were above 44 years. 50(62.5%) had attained primary education level

Conclusion:

Malaria remains an important health concern among pregnant women attending Butemba Health Centre IV despite relatively high ownership and utilisation of mosquito nets. The occurrence of *Plasmodium falciparum* infection indicates that existing preventive measures may not provide complete protection against malaria in pregnancy.

Recommendations:

Health workers should continue to monitor/supervise mothers while taking IPT to foster continued adherence to the medication. In addition, demonstration teaching methods on use of LLINs should be offered so as ensure appropriate use.

Keywords: Prevalence of malaria, Coverage and utilisation rate, Long-lasting insecticidal nets, Pregnant women attending the antenatal care clinic, Butemba Health Centre IV.

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Background

Pregnant women are susceptible to malaria caused by *Plasmodium falciparum*, which is both dangerous to the mother and the fetus (Habimana et al., 2020). The high susceptibility is caused by changes in the immune system during pregnancy and the placenta, which has a high affinity for malaria parasites (Darteh et al., 2021). The consequences caused by malaria in pregnancy affect both the mother and infant. Maternal complications include acute lung injury, severe hypoglycemia, miscarriage, stillbirth, and coma.

Globally, approximately 121.9 million pregnancies occur in malaria endemic regions, but only 33% of the mothers comply with recommended IPT doses and 29.8% comply with regular use of mosquito nets and other preventive

measures against malaria (Reddy et al., 2023). Efforts have been made to sensitize the masses on prevention of malaria in pregnancy, availing necessary IPT medication, and community fumigation to kill malaria parasites. However, adoption and implementation of such measures have remained insufficient due to negative attitudes and unfavourable socio-economic situations. (Roman et al., 2019). In Sub-Saharan Africa, the prevalence of asymptomatic malaria infections among pregnant mothers was 19% and 17% among symptomatic cases (Tembo et al., 2024).

At Butemba Health Centre IV, the prevalence of malaria among pregnant mothers is unknown, calling for a study on the effectiveness of long-lasting insecticidal nets (LLINs)

and intermittent preventive treatment (IPT) in reducing malaria prevalence among pregnant women attending the antenatal care clinic at Butemba Health Centre IV, Kyankwanzi District, to bridge the gaps. The study aims to determine the prevalence of malaria and evaluate the coverage and utilisation rate of long-lasting insecticidal nets (LLINs) among pregnant women attending the antenatal care clinic at Butemba Health Centre IV.

METHODOLOGY

Research Design

The study used a cross-sectional descriptive design employing quantitative methods of data collection. The study design was chosen because it offered the study the ability to easily gather information by collecting data at any one point in time.

Study area

The study was carried out at Butemba Health Centre IV, Butemba Village, Butemba Town Council, Kyankwanzi District, Central Uganda, about 158 kilometres from Kampala City Centre. It was done at the antenatal clinic, involving pregnant mothers who are cared for by clinical staff comprising clinical officers, midwives, nurses, Laboratory technicians, among others. The study area was chosen because of the rising cases of malaria among pregnant mothers.

Study population

The study population was pregnant mothers attending antenatal care at Butemba Health Centre IV.

Sample size determination

A sample size of 80 respondents was used. This was based on Yamane's formula of 1967 with a precision of 5% with confidence level of 95%

It was given by;

$$n = \frac{N}{1+N(e^2)}$$

where N is the total accessible population size, which was 100

n = required sample size

e = margin of error [0.05 = 95% confidence level]

$$n = \frac{100}{1+100(0.05^2)}$$

$$n = 80$$

Therefore, a sample size of 80 respondents was used.

Sampling procedure and rationale

The study utilized a simple random sampling technique whereby all eligible pregnant women who were available at the time of data collection had equal chances of being selected. The sample was obtained by folding 160 papers,

one written on YES (80) and another on NO (80), all placed in a box and mixed thoroughly. Respondents were allowed to select a paper, and those who selected a paper written on YES took part in the study. This method was selected because it was cheap and helped the study to collect data in the shortest time possible.

Inclusion/exclusion criteria

Inclusion criteria

The study involved pregnant mothers aged 18 years and above attending 2nd, 3rd, and 4th antenatal care at Butemba Health Centre IV. Those who voluntarily consented were enrolled in the study.

All pregnant women who were willing to consent and give their blood sample for malaria testing

Exclusion criteria

The study excluded mothers attending 1st Antenatal care at Butemba Health Centre IV.

Pregnant mothers who were too ill or mentally unstable to consent and respond to questions

Pregnant women who declined to give consent and those who had taken antimalarial drugs in the past two weeks

Study variables

Independent variables

Coverage and utilisation rate of long-lasting insecticide.

Dependent variable

Prevalence of malaria among pregnant women.

Data collection tool

Quantitative data: A structured questionnaire with closed-ended questions was used to evaluate coverage and utilisation rate of long-lasting insecticide-treated nets LLINs.

Laboratory test: Malaria rapid diagnostic test (RDT) strips were used.

Data Collection Procedures

After obtaining approval for the research proposal and an introductory letter from the University of Kisubi administration. These letters served to introduce the study to the in-charge of Butemba Health Centre IV. The in-charge then introduced the study to prospective respondents.

The study team greeted the respondents, introduced themselves, and explained the purpose of the study to each respondent. Informed consent was obtained from each participant before proceeding; confidentiality and privacy were assured during the data collection process. The study took a blood sample, and a malaria RDT was done to detect the prevalence of malaria; then, using questionnaires, every

respondent was asked questions depending on the laid-out guide, as the study filled in the corresponding answers given, involving eight respondents per day for a period of 10 days.

Data Management

Pretesting

The data collection tools were pretested among 80 pregnant mothers at Butemba HC IV.

Pilot visit

An informal visit was carried out at Butemba Health Centre IV in the week before the data collection period so that the study team could become familiar with the study setting.

Data Analysis and Presentation

Data analysis involved entry of information into Microsoft Excel after coding. This was exported to the Statistical Package for the Social Sciences (SPSS), which computed

the findings into frequencies, percentages, cross-tabulations, and p-values in the form of tables, graphs, and pie charts.

Ethical considerations

On completion of the proposal, a letter of approval was obtained from Mengo Hospital Research Ethics Committee (MH-REC) and an introductory letter from the University of Kisubi, which introduced the study to the in-charge of Butemba Health Centre IV. Once permission was granted, the purpose and objectives of the study were clearly explained to the respondents, consent was obtained, and clarification was given where issues arose. Respondents were assured of confidentiality and privacy in a strict manner; participation in the study was based on each client's ability to give informed consent, and they were assured that disagreements or discontinuation from the study had no any negative effect on the services that were provided at any time.

RESULTS

Demographic Characteristics of Respondents

Table 1: Demographic Characteristics of Respondents (n = 80)

Variable	Responses	Frequency (f)	Percentage (%)
Age	18 – 24 years	30	37.5
	25 – 34 years	40	50.0
	35 – 44 years	9	11.2
	Above 44 years	1	1.3
	Total	80	100
Education level	No formal education	11	13.7
	Primary education	50	62.5
	Secondary education	17	21.3
	Tertiary education	2	2.5
	Total	80	100
Marital status	Single	13	16.3
	Married	65	81.2
	Divorced/separated	2	2.5
	Total	80	100
Employment status	Unemployed	68	85.0
	Employed	12	15.0
	Total	80	100
Monthly income	Less than 100,000/-	71	88.8
	100,000 – 300,000/-	8	10.0
	More than 300,000/-	1	1.2
	Total	80	100

Table 1 shows that half of the respondents, 40(50%), were aged 25 – 34 years, while the least, 1(1.3%), were aged above 44 years. The majority of the respondents, 50(62.5%), had attained primary education level, while a minority, 2(2.5%), had tertiary education. Most of the respondents, 65(81.2%), were married, while the least, 2(2.5%), were

divorced. The majority of the respondents, 68(85%), were unemployed, while a minority, 12(15%) were employed. Most of the respondents, 71(88.8%) earned less than 100,000/- per month, while the least 1(1.3%) earned more than 300,000/- per month.

Prevalence of malaria among pregnant women attending antenatal care clinic at Butemba Health Centre IV, Kyankwanzi District

Figure 1: Malaria test results

n = 80

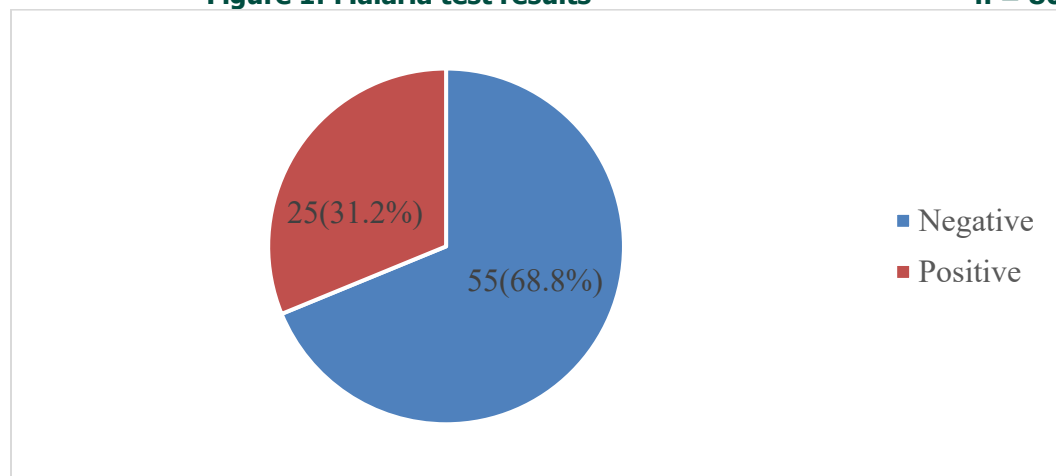


Figure 1 shows that the majority of the respondents, 55(68.8%) had tested negative for malaria, while a minority, 25(31.2%), tested positive for malaria.

Text 1: Strains of malaria detected among pregnant women (n = 55).

All 25(100%) of respondents were detected with Plasmodium falciparum.

Coverage and utilisation rate of long-lasting insecticide nets LLINs among pregnant women attending the antenatal care clinic at Butemba H/CIV, Kyankwanzi District

Figure 2: Ownership of mosquito nets, n = 80

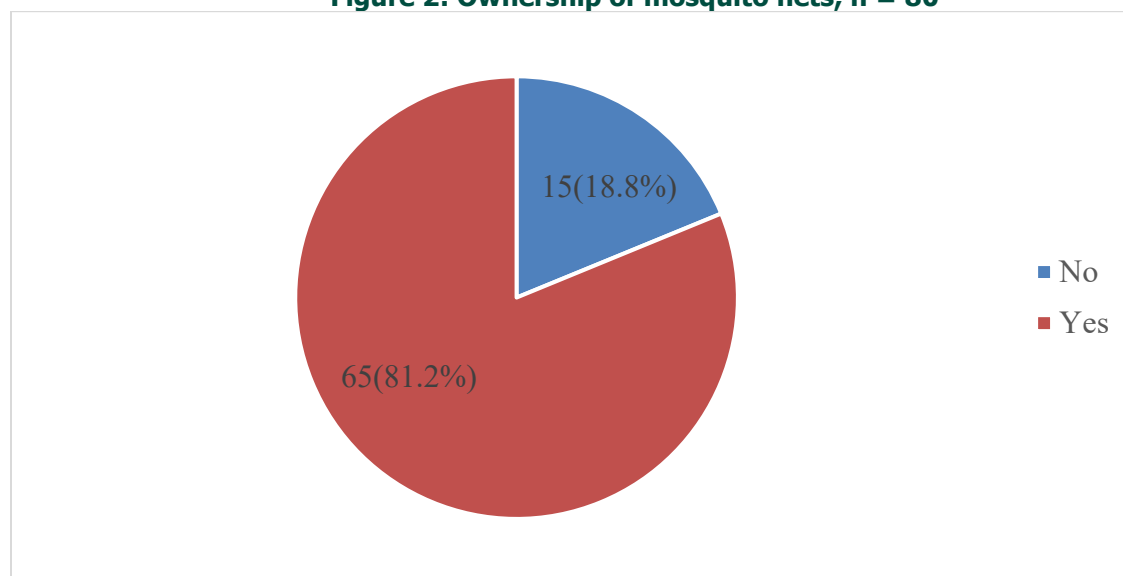


Figure 2 shows that the majority of the respondents, 65(81.2%), had mosquito nets, while a minority, 15(18.8%), never had mosquito nets.

Table 2: Source of mosquito nets and frequency of using it n = 65

Variable	Responses	Frequency (f)	Percentage (%)
Source of mosquito nets	Government facility	60	92.3
	Brought from the market	5	7.7
	Total	65	100
Frequency of using mosquito nets	Daily	64	98.5
	Sometimes	0	0
	Rarely	1	1.5
	Total	65	100

Table 2 shows that the majority of respondents, 60(92.3%), obtained IPT from government facilities, while a minority, 5(7.7%), brought it from the market. Almost all respondents, 64(98.5%), slept under a mosquito net daily, while the least, 1(1.5%), used it rarely.

Discussion

Findings of the study revealed that the majority of the respondents (31.2%) had tested positive for malaria. This was because the study was conducted in a malaria-endemic region; hence the high prevalence of malaria during pregnancy. The findings are different from those of a study by Mohamud et al. (2025), which found out that the prevalence of malaria among pregnant mothers was 59.8%. In addition, a study by Nangu et al. (2026) conducted in Nakivale Refugee Settlement, Uganda, revealed that the prevalence of malaria among pregnant mothers was reported at 19.3%.

All (100%) of respondents were detected with *Plasmodium falciparum*. This was because *Plasmodium falciparum* is the most prevalent strain within the tropical climates, for example, in the study area. This is in line with a study by Gontie et al. (2020) conducted in the Benishangul Gumuz regional state, western Ethiopia, found that 90.2% of malaria during pregnancy was caused by *Plasmodium falciparum*. In addition, a study in Somalia revealed that positivity rates for malaria in pregnancy were 91.6% due to *Plasmodium falciparum*. Mohamud et al., (2025).

Study findings showed that the majority of the respondents (81.2%) had mosquito nets. This was because they were given free mosquito nets during their antenatal care visits, thus owning personal nets. This is supported by a study by Aung et al. (2022) conducted in Myanmar revealed that 96% of pregnant women owned bed nets for sleeping. Similarly, a survey by Awunyo et al. (2025) conducted in Ghana found that 80.1% of pregnant mothers owned insecticide-treated mosquito nets.

According to the study results, the majority of the respondents (92.3%) obtained LLINs from government facilities, and (96.3%) had received IPT. This might be because they were attending antenatal care at a government facility where it was mandatory to offer mosquito nets as well as IPT to all mothers attending the antenatal care clinic. A study by Okafor and Ogbonnaya (2020) carried out in South Eastern Nigeria found that 70% of pregnant women

had obtained them from free distribution programs by the government facility.

Results of the study showed that almost all respondents (98.5%) slept under mosquito nets daily. This could be because they feared mosquito bites that would cause malaria; hence use them on a daily basis to reduce mosquito bites. This is supported by a study by Mbong et al. (2020) done in semi-urban communities of Nigeria, which found that 99% of mothers slept under insecticide-treated mosquito nets daily. Additionally, a study by Sudoi et al. (2025) carried out in Kenya found out that 86% of pregnant mothers used LLINs every night so as they could limit mosquito bites associated with malaria. On the contrary, a study by Musimenta and Mubangizi (2022) conducted in Lwengo District, Uganda, found that 76% of mothers had treated mosquito nets and 61% sometimes slept under mosquito nets.

Recommendations

Ministry of Health should assess the quality and efficacy of LLINs and IPT used in the country so as to determine the defects that give room for transmission of malaria.

Pregnant mothers who do not own mosquito nets should seek them at the health facility or private suppliers so as to enable all pregnant mothers to use them.

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Abbreviations and acronyms

IPT; Intermittent preventive treatment

LLINs; Long Lasting Insecticide Nets

VHT; Village Health Team

Source of funding

The study was not funded.

Conflict of interest

The author did not declare any conflict of interest.

Data availability

Data is available upon request.

Author contribution

Justine Naziwa: Conceptualisation, Funding acquisition, Methodology, Writing – original draft, Resources, Software.
 Dr Jacqueline Kyosiimire Lugemwa: Software, Supervision, Validation, Visualisation, Data curation, Formal analysis, Investigation, and Writing – review & editing

Habert Mabonga: Project administration and Supervision

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