

## Review Article

# Pregnant Women's Utilisation of Anti-Malaria Services in Uganda

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**Abstract**

**Background:** Malaria is endemic and causes complications during 80.0% of pregnancies in Uganda.

**Objectives:** This study attempted to identify factors that influence pregnant women's utilisation of anti-malaria services in the Buikwe District of Uganda.

**Method:** Structured interviews were conducted with 400 pregnant women in the Buikwe District.

**Results:** Pregnant women, who had progressed beyond primary school level education, were more likely to take intermittent preventive treatment drugs and to use long lasting insecticide treated nets to prevent malaria. Pregnant women were more likely to implement malaria-preventive actions if they lived within five kilometres of clinics, were satisfied with available health services and were knowledgeable about the malaria preventive measures.

**Conclusion:** Although 97.9% of the interviewed pregnant women had taken intermittent preventive treatment and 84.2% of those who had received long lasting insecticide treated bed nets had utilised these nets, malaria prevention during pregnancy could be further improved. All pregnant women should attend antenatal clinics at least four times during each pregnancy, commencing during the first trimester of pregnancy to receive adequate health education and prenatal services, including the taking of two doses of intermittent preventive treatment and using long lasting insecticide treated bed nets throughout pregnancy.

**Keywords**

- Anti-malaria services
- Intermittent preventive treatment
- Long lasting insecticide-treated bed nets
- Malaria prevention in Uganda
- Prevention of malaria during pregnancy

**INTRODUCTION**

Malaria occurs in 109 countries and affects the lives of 3.3 billion people globally [1] but 89% of malaria cases occur in sub-Saharan Africa. Malaria is an important cause of fever in all tropical regions with potentially serious impacts on pregnant women and on their babies [2]. Malaria is endemic throughout Uganda and causes complications in approximately 80% all pregnancies [3]. Pregnant women experience immune suppression, to prevent rejection of the foetus, making them more susceptible to malaria and to malaria-related complications such as abortions, anaemia and maternal deaths as well as giving birth to low birth weights infants. In Uganda, *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale* and *Plasmodium malariae* are the known causes of malaria [4].

Uganda's health care services comprise 4 319 health care centres providing mostly primary health care (PHC) services, 131 district hospitals treating conditions not treatable at PHC level, 14 regional referral hospitals providing more advanced services than district hospitals and two national referral hospitals

providing specialised services [5]. In addition village health care workers provide basic health services to specific communities but do not have clinics. The current study was conducted in the central Ugandan district of Buikwe, situated on the shores of Lake Victoria. This rural district had an estimated population of 442 000 and an expected number of 20 910 pregnant women during 2013. In addition to five hospitals and 45 health centres (of which 16 provided prenatal services), the Buikwe District also had 50 health units, operating at village level [6]. Uganda is a land-locked country lying on the equator with a wet and warm tropical climate conducive for mosquitoes' breeding and survival, explaining why malaria is endemic throughout the country, including the Buikwe District. Free malaria control services are available throughout Uganda. Pregnant women should take two doses of intermittent preventive therapy (IPT), supplied at prenatal clinics free of charge. However, only 48% of pregnant women in Uganda reportedly took the first dose (IPT1) and merely 27% took the second dose (IPT2) during 2011 [5]. Only 47% of pregnant women slept under long lasting insecticide treated nets (LLITNs) to prevent mosquito bites and merely 7.2%

of the houses were treated with indoor residual spraying (IRS) to kill mosquitoes resting on houses' interior walls during 2011 [5].

The purpose of the study was to establish whether the following factors influenced Ugandan pregnant women's utilisation of anti-malaria services:

- social-demographic characteristics
- environmental and geographic aspects such as distances from health facilities and the reported quality health services
- pregnant women's personal and cognitive characteristics including malaria-related knowledge
- pregnant women's anti-malaria behaviours/health practices

## MATERIALS AND METHODS

The current study's population comprised pregnant women attending all 16 prenatal clinics in the Buikwe District during April/May, 2014, totalling 22 100 [6]. The sample size was calculated to include 400 pregnant women, 25 women at each of the 16 prenatal clinics. Each clinic's prenatal booking register was used as a sampling frame. After consenting, respondents were interviewed by four trained research assistants, fluent in both English and Luganda, the languages used predominantly in the Buikwe District.

A structured interview schedule, comprising 79 items in four sections, was designed based on an in-depth literature review and guidelines from Uganda's Ministry of Health (MoH) [7]. The first author checked the responses recorded by the research assistants soon after data collection. A data entry clerk entered the data into a computer every day. A statistician checked the data entries and compiled descriptive as well as inferential statistics, including Pearson's correlation coefficients, of potential influences on pregnant women's IPT utilisation.

### Ethical considerations

Ethical clearance was granted by the Higher Degrees Committee of the Department of Health Studies, at the University of South Africa. Uganda's health authorities also granted permission to conduct the study, including the Buikwe District Health Office and the manager in charge of each of the 16 health prenatal clinics where interviews were conducted. The right to self-determination, privacy and autonomy was ensured through obtaining voluntary informed consent from each respondent without using any coercion whatsoever. The respondents were assured that no names would be mentioned in any report and that no names would be entered on structured interview schedules, only numbers. All information would be treated confidentially. The research assistants signed a confidentiality agreement with the first author.

## RESULTS

### Respondents' social demographic characteristics

The respondents' ages ranged from 21 to 45 with an average age of 25.5 years and a median age of 24.0 years. Although most pregnant women (72.3%;  $f=289$ ) were married, 11.3% ( $f=45$ )

lived with their partners without being married, 0.8% ( $f=3$ ) were widows, 3.3% ( $f=13$ ) were separated, 1.8% ( $f=7$ ) were divorced and 10.8% ( $f=43$ ) had never been married.

Out of the 400 respondents, 48.8% ( $f=195$ ) had acquired primary school education, 5.5% ( $f=22$ ) had no schooling, 37.8% ( $f=151$ ) had obtained secondary and 8.0% ( $f=32$ ) had managed to get unspecified post-secondary education. There was a small positive correlation between education levels and previous malaria attacks during the current pregnancy of respondents with use of LLINs as shown in Table 1.

The monthly incomes of the current study's respondent ranged from less than Shs 200 000 (USD1 = Shs 3 450 during July 2014) for 80.8% ( $f=323$ ) to Shs 400 000 or more for 13.8% ( $f=55$ ). Only 8.3% ( $f=33$ ) of these respondents were in their first, 48.8% ( $f=195$ ) in their second and 43.0% ( $f=172$ ) in their third trimesters of their pregnancy. The respondents indicated that 31.0% ( $f=124$ ) were pregnant for the first time, 22.0% ( $f=88$ ) for the second time, 17.0% ( $f=68$ ) for the third time, (0.023,  $p>0.05$ ).

As many as 57.8% ( $f=231$ ) of the 400 responding pregnant women had experienced at least one episode of fever during their current pregnancies ( $p=0.018$ ). Out of the 400 respondents, 45.0% ( $f=180$ ) indicated that no child had a fever episode (implying a malaria attack) during the 12 months preceding the interviews, 27.3% ( $f=109$ ) had one child, 16.5% ( $f=66$ ) had two children and 11.3% ( $f=45$ ) had three to eight children with presumed malaria attacks during this time.

### Environmental and geographic factors' influence on pregnant women's utilisation of intermittent preventive treatment (IPT) services

Most respondents 69.3% ( $f=277$ ) lived within five kilometres from a health facility. Out of the current study's 365 respondents who were using LLINs, 74.8% ( $f=273$ ) lived within five kilometres from health facilities. Out of 35 respondents who did not use LLINs, 88.6% ( $f=31$ ) lived more than five kilometres from public health facilities. Pearson's correlation coefficient of -0.420 ( $p<0.05$ ) implied that pregnant women's LLIN utilisation correlated with the distances they lived from their nearest health facilities. Most of the current study's respondents (83.3%;  $f=333$ ) said LLINs were always available at their local health facilities. Pearson's correlation coefficient was 0.132 ( $p<0.05$ ), indicating a small positive correlation between the pregnant women's reported availability of LLINs at health facilities and IPT utilisation. Out of 400 respondents, 99.0% ( $f=396$ ) indicated that LLINs were issued free of charge (-0.011  $p>0.05$ ).

Most respondents, 72.8% ( $f=291$ ) said anti-malaria drugs were always and 26.8% ( $f=107$ ) said they were often available at health facilities (0.619,  $p<0.05$ ) but 74.0% ( $f=296$ ) indicated that anti-malaria drugs were never available from village health workers in their communities. As many as 80.8% ( $f=323$ ) of the current study's respondents considered anti-malaria drugs, supplied at their public health facilities, to be very effective (0.736,  $p<0.05$ ) and almost all (98.0%;  $f=392$ ) indicated that they did not pay for these drugs (-0.017;  $p>0.05$ ).

Most pregnant women who participated in the current study (77.3%;  $f=309$ ) considered the health services to be good but

**Table 1:** Respondents' utilisation of mosquito nets correlated with social demographic factors (N=400).

| Dependent variable                                |               | Independent variable: sleeping under mosquito nets |                                 | p-value |
|---|---------------|--|---------------------------------|---------|
|   |               | Did not sleep under LLNs<br>35 (8.8%)              | Slept under LLNs<br>365 (91.3%) |         |
| Pregnant women's ages                             | < 25 Years    | 25(71.4%)  | 199(54.5%)                      | 0.313   |
|   | > 24 Years    | 10 (28.6%)   | 166 (45.5%)                     |         |
| Education Levels                                  | Primary /none | 26 (74.3%)   | 191 (52.3%)                     | 0.038   |
|   | Above Primary | 9 (25.7%)  | 174 (47.7%)                     |         |
| Previous malaria attacks during current pregnancy | No            | 8 (22.9%)  | 161(44.1%)                      | 0.049   |
|   | Yes           | 27 (77.1%)   | 204 (55.9%)                     |         |

Table 1 refers to information presented in the D Lit et al., Phil thesis of the first author: Bbosa, RS. Factors that influence pregnant women's utilization of anti-malaria services in the Buikwe District of Uganda. University of South Africa, Pretoria. 2015. LLNs – long lasting insecticidal treated mosquito nets

22.8% ( $f=91$ ) said these services were poor. Pearson's correlation coefficient was 0.603 ( $p<0.05$ ), indicating that women were more likely to use IPT if they were satisfied health facility clients. Out of 365 respondents who used LLNs, 80.8% ( $f=295$ ) were satisfied with their prenatal care services while 19.2% ( $f=70$ ) considered these services to be poor (0.421,  $p$ -value =0.010).

Out of the current study's 400 respondents, 35.0% ( $f=140$ ) reported having used local herbs for preventing and treating malaria. These local herbs included leaves of Aloe Vera (kigagi), Vermonia Amygdaline (mululuuza), Momodic Foetida (bombo), and AlbiZia zygia (nalongo). Of those 140 who had used local herbs, 34.3% ( $f=48$ ) said malaria was cured by using local herbs.

### The influence of pregnant women's personal and cognitive characteristics on their utilisation of anti-malaria services

Most of the current study's respondents (74.5%;  $f=298$ ) said health workers while 21.5% ( $f=85$ ) said electronic media were their major sources of malaria-related information. Out of the 400 participating pregnant women, 70.5% ( $f=282$ ) knew that fever is a major symptom of malaria and 77.0% ( $f=308$ ) knew that abortion was a possible malaria-related complication during pregnancy. Of the respondents, 64.5% ( $f=258$ ) acquired information about IPT and LLNs from health education provided by health workers.

### Pregnant women's behaviour/health practices influencing their utilisation of anti-malaria services

Respondents who had at least one child (65.8%;  $f=263$ ) were more likely to use LLNs than those without children as Pearson's correlation coefficient was 0.401 ( $p<0.05$ ). Out of 263 pregnant women who had at least one child, 77.9% ( $f=205$ ) had reportedly taken the recommended two doses of IPT during their previous pregnancies (0.716 ( $p<0.05$ )).

Out of the current study's 400 respondents 57.0% ( $f=228$ ) only 32.3% ( $f=129$ ) commenced their prenatal clinic visits during the first trimester of pregnancy and only 44.5% ( $f=178$ ) had planned the four MoH<sup>9</sup> recommended prenatal clinic visits during their current pregnancies. There was also a positive correlation between respondents' number of planned prenatal clinic visits and their utilisation of LLNs (0.689,  $p<0.05$ ). Almost all respondents (97.8%;  $f=391$ ) reported having at least one LLIN at home (-0.031 ( $p>0.05$ ) and 95.1% ( $f=372$ ) of these pregnant

women reported using these bed nets (0.167,  $p<0.05$ ) and 82.9% ( $f=324$ ) said their LLNs had no holes (0.318,  $p<0.05$ ).

Most respondents, 77.5% ( $f=310$ ) had received free LLNs (0.102,  $p<0.05$ ). Out of 391 respondents with LLNs, 93.4% ( $f=365$ ) slept under these nets (0.840,  $p<0.05$ ) while 6.6% ( $f=26$ ) did not do so. These findings indicate a high utilisation rate of available bed nets by respondents. Only 13.3% ( $f=53$ ) of the current study's respondents had used indoor residual spraying (IRS) services (0.010,  $p>0.05$ ).

## DISCUSSION

### Social demographic factors' influence on respondents' utilisation of anti-malaria services

Similar to the current study's findings, De Beaudrap et al. [8], also reported that the median age of pregnant women, who participated in their Ugandan study, was 24 years and that 63.4% ( $n=453$ ) of their respondents had only attended primary school or did not go to school at all. Out of the current study's 400 respondents, 48.8% ( $f=195$ ) had acquired primary school education, 5.5% ( $f=22$ ) had no schooling, 37.8% ( $f=151$ ) had obtained secondary and 8.0% ( $f=32$ ) had managed to get unspecified post-secondary education. Although Jagannathan et al. [9], reported that 65.0% of their respondents had encountered fever episodes during their pregnancies, in the current study fewer (57.8%;  $f=231$ ) of the 400 respondents had done so.

The current study's  $p$ -values, correlating pregnant women's ages and income levels to IPT utilisation, were insignificant. Fisher's Exact Test (0.32) indicated that this study's respondents were more likely to use IPT and LLNs and less likely to have suffered fever attacks during their current pregnancies, if they had acquired secondary or post-secondary school education, than pregnant women without any schooling or with only primary schooling.

### Environmental factors' influence on pregnant women's utilisation of anti-malaria services

Most of the current study's respondents (69.3%;  $f=277$ ) lived within five kilometres of their nearest clinics. This finding is similar to reports by Makanga et al. [10], indicating that 69.7% of their respondents lived within five kilometres from clinics and the MoH [11] claiming that 72% of all Ugandans lived within a radius of five kilometres from public health facilities. The

further away the current study's respondents lived from health facilities, the less likely they were to use LLINs (-0.420,  $p < 0.05$ ). More of the current study's respondents who lived within five kilometres of a health facility had used IPT (-0.450,  $p = 0.014$ ) than respondents who lived further away from clinics. Uganda's Ministry of Health strives to provide health facilities within five kilometres of most inhabitants' residences. However, a distance of five kilometres could seem to be a vast distance for pregnant women having to walk to and from clinics in Uganda's equatorial heat. A distance exceeding five kilometres could be perceived as being unmanageable.

### **The influence of the quality of health services and peers on pregnant women's utilisation of anti-malaria services**

Pregnant women participating in the current study, who had positive perceptions about the effectiveness of the clinics' anti-malaria medicines were more likely to use IPT (0.736,  $p = 0.006$ ) than those with negative perceptions in this regard.

In the current study, women who said free LLINs were available at health facilities, were more likely to use IPT (0.132,  $p < 0.05$ ) and their satisfaction with the clinics' healthcare services also influenced their IPT utilisation positively (0.603,  $p = 0.009$ ). Respondents' perceptions about the availability of free supplies of LLINs had a significant effect on their utilisation (0.450,  $p = 0.032$ ). Reportedly, 84.2% of the current study's respondents who had access to free LLINs were sleeping under these mosquito nets as compared to 9.1% and 13.8% respectively that rarely or never accessed free nets. Wanzira et al. [12], reported that 78.3% of Ugandan households possessed at least one bed net while UBOS [5] claimed that merely 59.0% of pregnant women in Uganda had LLINs in 2012. A lower percentage (than the current study's 84.2%) of LLIN utilisation of 71.2% among LLIN owners in Uganda was reported by Wanzira et al. [12]. Although the current study's findings could not explain this apparent discrepancy, pregnant women might be more willing to sleep under LLINs than the general population and pregnant women would be more exposed to malaria-related health education at prenatal clinics than the general population of Uganda. Nevertheless, "A free bed net distribution strategy is seen as the quickest way to improve coverage of effective malaria control tools especially among poor communities" [13].

There was also a positive relationship between these women's perceptions about the availability of anti-malaria drugs at the clinics and IPT utilisation (0.619,  $p < 0.05$ ). Both De Beaudrap et al. [8], and the MoH [11] agreed that anti-malaria drugs were available free of charge at Uganda's public health facilities. Pregnant women were more likely to use IPT if they had used anti-malaria drugs from their clinics (0.706,  $p < 0.05$ ).

Many respondents, (64.8%;  $f = 259$ ) indicated that their husbands significantly influenced their health-related practices and only (12.8%;  $f = 51$ ) said health workers did so ( $p > 0.05$ ). Ediau et al. [14], reported that 80.0% ( $n = 616$ ) of their respondents' preferred source of information was health workers' malaria-related health education in Uganda.

### **The influence of pregnant women's personal and cognitive characteristics on their utilisation of anti-malaria services**

In the current study more pregnant women used IPT if they knew that mosquitoes transmitted malaria parasites than those without this knowledge (0.490,  $p < 0.05$ ). Health education thus seemed to increase these women's likelihood of IPT utilisation. The current study's findings also indicated that there was a greater likelihood of IPT utilisation among those women who knew about IRS of houses for malaria prevention than those without such knowledge (0.127,  $p < 0.05$ ). There was also a greater likelihood of IPT utilisation (0.544,  $p < 0.05$ ) among women who knew about the correct IPT doses than among those who did not have this knowledge.

The current study's respondents who knew that four prenatal clinic visits were recommended during each pregnancy were more likely to do so enhancing their chances of IPT utilisation (0.769,  $p < 0.05$ ). Furthermore, respondents who knew that COARTEM was the first line treatment for malaria, were more likely to use IPT than those without such knowledge (0.645,  $p < 0.05$ ).

In the current study, more respondents used LLINs if they knew that malaria was caused by mosquito bites (0.422,  $p < 0.05$ ). Likewise, more respondents who knew about the importance of preventing the mosquitoes' breeding to prevent malaria used LLINs than those who were ignorant about this fact (0.531,  $p < 0.05$ ).

### **The influence of pregnant women's anti-malaria behaviour/health care practices on their utilisation of anti-malaria services**

The current study's findings indicated that pregnant women who reported sleeping under LLINs were more likely to use IPT than those who did not do so (0.840,  $p < 0.05$ ). Women who had at least one child prior to their current pregnancies were more likely to use IPT than women without children (0.421,  $p < 0.05$ ). This might be attributable to improved health practices of women based on the experience gained during their previous pregnancies and also to previous exposure to malaria-related health education.

In the current study there was a positive correlation between respondents whose children were born in health facilities and their IPT utilisation (0.405,  $p < 0.05$ ). A positive correlation between respondents' number of IPT doses reportedly taken during their previous pregnancies and their IPT utilisation during their current pregnancies (0.716,  $p < 0.05$ ) indicated that women who took IPT once during their pregnancies were likely to continue doing so during their subsequent pregnancies.

As only 13.3% ( $f = 53$ ) of the current study's respondents had used IRS there was no significant correlation between IRS and IPT utilisation (0.010,  $p > 0.05$ ). This finding of the current study is similar to the reported national figure that 7.0% of all pregnant women in Uganda used this method to control malaria during 2012 [5]. Ediau et al. [14], reported that Ugandans lacked IRS knowledge and had negative attitudes toward IRS "prominent

especially among the rural and less educated individuals". The current study's findings could neither support nor negate Ediau et al. [14], findings.

## CONCLUSION

The respondents' social demographic characteristics that influenced their utilisation of anti-malaria services included that pregnant women with at least secondary schooling were more likely to use LLINs and IPT than those who attended no or only primary schools. Furthermore, those respondents who used LLINs and IPT had fewer fever attacks during their current pregnancies than their counterparts with less education.

Significant environmental and geographic findings revealed that respondents living within five kilometres from clinics were more likely to use IPT. The current study's reported IPT2 utilisation rate of 77.9% in the Buikwe District approached the Uganda ideal of 80.0%. Other Ugandan studies reported that 58.8% [15] and 72.8% [16] of their responding pregnant women had taken both IPT doses during their pregnancies.

Pregnant women who were satisfied with the quality of prenatal clinic services were more likely to use anti-malaria services than those who were dissatisfied. Respondents who perceived IPT drugs always to be available at prenatal clinics were also more likely to use IPT than those who perceived IPT drugs' availability to be inconsistent.

Concerning the respondents' personal and cognitive characteristics, those who were knowledgeable about anti-malaria services (IPT, LLINs, IRS and COARTEM) were more likely to use these services than those who lacked this knowledge. Not all pregnant women realised that they should attend prenatal clinics at least four times during each pregnancy.

Respondents who had used one type of anti-malaria action (like IPT) were likely also to use other actions (such as LLINs). The current study's participating women who had at least one child prior to their current pregnancies and who had used IPT during any previous pregnancy had higher utilisation rates of IPT and LLIN than their counterparts. Pregnant women who planned at least four prenatal clinic visits during their current pregnancies and those whose babies had been borne in health facilities were more likely to use IPT than those who had never done so.

## RECOMMENDATIONS

Women should be educated beyond the primary school level to enhance the use of anti-malaria services during pregnancy. The utilisation of IPT and LLINs should be emphasised during every prenatal clinic visit in Uganda.

Mobile clinics and enhanced utilisation of village health workers could assist more Ugandan pregnant women to use prenatal and anti-malaria services. The free distribution of IPT and LLINs at prenatal clinics should be sustained.

Ongoing audits should be conducted to identify and address pregnant women's reasons for being dissatisfied with prenatal services to enhance the utilisation of these services.

Sustained health education should emphasise the importance of IPT, LLINs, IRS and COARTEM during every prenatal clinic visit.

## LIMITATIONS OF THE STUDY

The current study was conducted only in the Buikwe District in Uganda, limiting the potential generalisation of the research findings to other districts.

Only structured interviews were conducted with 400 pregnant women. Focus group discussions could have been conducted with pregnant women, midwives, community health workers, members of village health teams, and community leaders. These interviews might have yielded richer data about the utilisation of IPT and other anti-malaria services from different perspectives.

Only pregnant women who were at least 21 years old were interviewed because they could grant legal consent for their participation in the current study. This implies that teenage pregnant women's views remained unknown.

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