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Intermittent Preventive Therapy Adherence Amongst Women in the Luwero District of Uganda and Relevant

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ABSTRACT

Background: Malaria infection poses a significant threat to pregnant women and their unborn children, and can result in severe developmental deficiencies. In high-transmission areas, malaria prevalence during pregnancy can reach up to 50% and remains a key area of concern for the Uganda Ministry of Health. Although women are encouraged to receive three doses of intermittent preventative therapy for pregnancy (IPTp), adherence to this recommendation remains low with only 56% of women receiving IPTp3, failing to meet Uganda's target of 66% and the WHO's target of 85%.
Methods: In-person interviews were conducted using a structured questionnaire to collect data on IPTp adherence. Cross-sectional data were collected from a convenience sample of women from four villages in the Luwero District of Uganda.
Results: Among women interviewed, 91% reported receiving one dose of IPT during their last pregnancy. Only 58% of the respondents received three or more doses of IPTp. Additionally, 42% of respondents reported contracting malaria during their last pregnancy.
Conclusion: Although IPTp3+ adherence appears to have increased amongst women in Uganda since the last nationwide study, it remains inadequate.

KEY WORDS Intermittent preventive therapy in pregnancy, malaria, C-IPTp, antenatal

INTRODUCTION

The risk posed by malaria in pregnancy (MiP) persists as a serious public health threat across Africa and the world at large. MiP puts both mother and child at an increased risk of complications. Pregnant women are three times more likely to develop severe malaria, with higher levels of parasitemia compared to non-pregnant women (Rogerson et al., 2007; Schantz-Dunn et al., 2009). A malaria infection also puts the unborn children at risk. A congenital infection increases the risk of fetal anemia by 4.7 times and low birth weight two times–a key indicator of infant health and survival (Guyatt and Snow, 2004; Fitri et al., 2014).

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In Uganda, malaria remains the leading cause of morbidity and the primary cause of death of children under 5 (Roberts and Matthews, 2016). Malaria's impact on the Uganda economy is substantial, extracting a cost of over $500 million USD from the Ugandan economy with 19.1 million confirmed cases in 2022 (Target Malaria, 2025; WHO, 2023a). Uganda experiences extremely high levels of malaria endemicity with malaria prevalence amongst pregnant women exceeding 50% in high-transmission areas (Mangusho et al., 2023).

In response to the threat posed by MiP, the WHO introduced Intermittent Preventive Therapy for malaria using the antibiotic Sulfadoxine-pyrimethamine (SP) in the late 1990's (Figueroa-Romero et al., 2022). As of 2012 the WHO recommends a minimum of three doses of IPTp (IPTp3+), with one dose administered a month apart starting during the second trimester of the pregnancy. Adherence to IPTp3+ is pivotal to ensure effectiveness, as dose dependent effects are correlated with increased birth weights and decreased rates of fetal anemia and parental anemia. Receiving at least three doses of SP is correlated with a reduction in the likelihood of LBW in newborns by 66% and malaria-related anemia in mothers by 57% (Agyeman et al., 2021; Mlugu et al., 2020). The expansion of adherence from IPTp2 to 3+ is crucial, demonstrating a 50% reduction in the prevalence of congenital malaria (Maiga et al., 2011). While significant progress has been made, increasing IPTp3+ adherence from 2.5% in 2017 to 56% in 2024, levels remain far below the WHO's objective of 80% (WHO, 2023b; Kobusinge et al., 2025).

Incidence of MiP has continued to increase in Uganda over the past decade reaching 21% in 2023 (Mutesi, 2024). High transmissions zones, like the Luwero District, experience the greatest burden from MiP and represent a priority for IPTp implementation and tracking. An increased resolution of IPTp adherence in these areas would allow for more targeted campaigns to stimulate uptake. The rural environment of many high transmission areas and the incomplete nature of published literature regarding local IPTp rates makes potential local campaigns challenging. The current study intends to act as a pilot, enhancing coverage of local IPTp adherence in Luwero's rural region.

METHODS

Data were gathered via in person interviews using a structured questionnaire. The data for this cross-sectional survey study was collected as part of a larger research study which is found in the appendix. The questions being analyzed were created for this study. Data were collected from a convenience sample of 66 women in four villages in the Luwero District of Uganda. A convenience sampling method was selected to align with resource constraints and practicality. This sample size aligns with typical pilot study conventions and serves as a precursor to a full-scale survey targeting around 500 individuals. Data collection lasted for three weeks in June 2023. A research team of at least one public health student from the US university and 4-5 social work students from the Ugandan university completing their fieldwork were assigned to each village. Before data collection started the teams were introduced to the village chairperson who introduced them to other key gatekeepers. During the introductions, the teams provided an overview of the nature and scope of the research study to the chairperson and the gatekeepers.

Recruitment and Consent

Community members were recruited at their homes. The research team explained the purpose of the study and that they were being asked to participate in a one-time interview as part of a research study. Then a prepared informed consent script was read to the community member and a verbal confirmation of their agreement to participate was recorded. Participants were asked if they had any questions and if they wanted to participate in the study. Upon completion of the questionnaire, participants were provided with a contact card for the principal investigator, whom they could contact if they had questions or concerns.

Inclusion Criteria

Participants needed to be at least 18 years of age, a resident of the community, and living in the household visited. Only one person per household was interviewed. Potential participants who did not live in the household or did not meet the other inclusion criteria were not included.

Data Collection Procedures

After receiving informed consent from participants, the interview began. Questions were read out loud in English, and if requested translated into Luganda. Respondents' answers were recorded, either on paper forms or electronically using a tablet. Data recorded on paper forms were entered into Qualtrics at the end of the day by the US student research assistant.

Data Management

All electronic data was collected and stored in Qualtrics. Data entry from paper forms was done at the end of the day and the forms returned to the principal investigator (PI) where they were stored in a locked cabinet. Qualtrics and electronic data were stored on university password protected tablets or computers on university servers. Electronic data were only accessible to the US research team. Paper forms and electronic data will be stored by the PI as required by the institutional review board once the study is complete.

Data Analysis

Descriptive statistics for demographic variables were reported as counts and percentages. Total counts may differ between variables because of non-response. Descriptive statistics were also calculated for key variables, including mode of transportation to a healthcare facility, travel distance, IPTp use, malaria infection during pregnancy, and concern about malaria infection during pregnancy.

Correlations were run to examine relationships between key independent variables and use of IPT during pregnancy and concern of getting malaria during pregnancy. A Spearman's correlational test was run to measure if education is correlated with the IPTp use during pregnancy and concern with contracting malaria during pregnancy. A Pearsons's correlation was run to examine whether there is a relationship between age and the number of doses of SP/Fansidar taken during pregnancy.

Ethical Considerations

This research study was approved by the Institutional Review Board (IRB) of the US university, study H23-0682. The Ugandan university's research office reviewed the study protocol and accepted the US institution's IRB approval. The study was anonymous, no personally identifiable information was collected.

RESULTS

Sample Demographics

The mean age of respondents was 37 years old; the oldest respondent was 92, the youngest was 18. On average there were 5 people living in a house; the most residents were 12, the least was 1. Most residents had completed secondary school (n=33, 53%), as depicted below.

Measure	Count	Percentage (%)
Education		
Primary	24	38.7
Secondary	33	53.2
Higher	5	8.1
Age		
18 and ≤ 25	14	25.0
>26 and ≤ 35	22	39.3
>36 and ≤ 45	7	12.5
45 or above	13	23.2
Community		
Gunda	21	31.8
Kisoba	22	33.3
Kitwalauni	17	25.7
Ndejje-Kabuye	6	9.0

TABLE 1. SAMPLE DEMOGRAPHICS

Descriptive Statistics

When traveling to their antenatal care appointments 70% reported having to walk to appointments with an average travel time of 67 minutes. Amongst women who took three or more doses of IPT 37% contracted malaria during their pregnancy while 46% of women who received less than three doses of IPT contracted malaria. As seen in Figure 1, 58% of women received at least three doses of IPT while 93% attended at least one antenatal care visit. When asked if they were concerned about contracting malaria during their last pregnancy 67% of women either strongly agreed or agreed. During their previous pregnancy 42% of women reported having contracted malaria. Mothers interviewed in this survey traveled to IPT treatments either on foot or using a boda boda, 70% and 30% respectively. Those who reported walking traveled on average 67 minutes to reach their appointment. Correlational tests revealed no significance between demographic variables and IPT adherence.

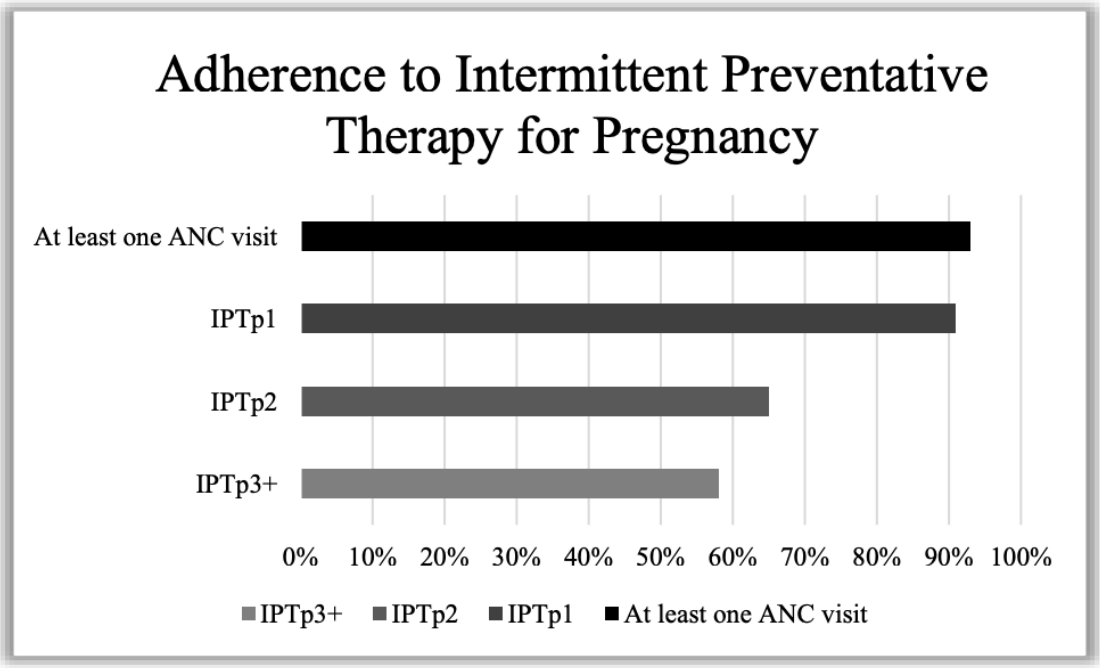

FIGURE 1. ADHERENCE TO INTERMITTENT PREVENTSTIVE THERAPY FOR PREGNANCY

Note. Adherence rates for 1-3 doses of intermittent preventative therapy for pregnancy and attendance of at least one antenatal care visit.

DISCUSSION

Amongst the current studies participants 58% received three doses of IPTp during their last pregnancy, aligning with recent reporting. Data on IPTp3+ in Uganda was last comprehensively compiled with the Malaria Indicator Survey (MIS) between 2006 - 2019. Research since 2019 while less complete has shown an increase in the number of women receiving adequate IPT. Mutoro et al. found, amongst a sample of 396 women from the Kasese district, 51.5% adherence to IPTp3+ while the Uganda Ministry of Health most recent estimates have shown 56% adherence nationwide (Kobusinge et al., 2025; Mutoro et al., 2024). While the WHO has recommended 85% coverage of IPTp3 as its target the Uganda ministry of health has repeatedly shifted its target which currently sits at 66%. In both cases it is clear that rates of IPTp3 remain below the stated targets.

Incomplete accounting of IPTp also obscures a dimension of MiP which may provide a metric of management efforts and success. In this study, the prevalence of malaria infection amongst women during their last pregnancy was 42%. Infection during pregnancy is associated with higher odds of stillbirths and miscarriages, a burden of MiP minimized by optimal IPT practices. Effectively managing MiP with IPT will assist in decreasing the number of unmet Leading Health Indicators; maternal mortality, neonatal mortality, and under-5 mortality. When traveling to antenatal cares visits to receive IPTp, 70% of women reported having to walk an average of 67 minutes to reach their appointments. With a recommended three IPT appointments with more, if possible, these trips can put an immense amount of physical and psychological stress on pregnant women. Barriers to care have continued to stifle adherence including extended travel times to antenatal care sites, stockouts, affordability and misinformation. For rural Ugandans accessing treatments like IPT may mean sacrificing a full day's work,

traveling to and waiting for care without the assurance that the facility will have the necessary testing supplies or medications.

Amongst the study's participants 33% reported they were not concerned about contracting malaria during their pregnancy. While a high level of understanding of malaria's effects on pregnancy was observed in peri urban regions of Uganda this may suggest a poorer understanding in rural communities (Mbonye et al., 2016). This discrepancy may arise from less comprehensive health education in the region or risk normalization amongst the population. Long travel times and poor public health communication amongst mothers can both contribute to delayed antenatal care; identified by Uganda's National Malaria Control Program as playing a significant role in unmet IPTp targets (MoH, 2018). The current study while offering a very local understanding of IPTp that should not be generalized to the district level, provides a resolution of data that is important to understanding where public health measures are lagging behind.

Recommendations

Expanding awareness, acceptance, and accessibility to IPT is critical, all of which have the potential to be addressed by the involvement of Community Health Workers (CHWs) in the process. While the current study is only a pilot an adherence rate similar to the national estimate was observed and at 58% lagged behind even the Ugandan MoH most conservative target of 66%. The rural nature of the Luwero district provides the key human resource, CHWs, who are stationed through Uganda's rural communities. CHWs in Uganda, operating as a part of Village Health Teams (VHTs) are unpaid village residents who receive general health training and act as a first point of contact for basic medical needs and referral. Since the late 2000's research has demonstrated the potential for CHWs to augment IPT distribution. Nearly two decades of research have demonstrated that the preparation of IPT by CHWs increases adherence, Gutman et al observed a 16.1% increase in IPTp1 and a 11.3% increase in IPTp2 (2020). Additionally, Gutman et al found the usage of a community-based modality for IPT resulted in a 17.6% increase in IPTp3 and a median dosage increase from 1.8 to 2.8.

Experimental implementations of this kind of community based intermitted preventative therapy (C-IPT) have demonstrated its potential to enhance IPT uptake and a high acceptance rate by CHWs and community members (Burke et al., 2021). Using CHW to administer IPTp greatly decreases the travel time for residents and allows pregnant women to meet with local community members who they have a closer relationship with and may feel more comfortable go to. To facilitate the introduction of C-IPTp the WHO has published the *Community Deployment of Intermittent Preventive Treatment of Malaria in Pregnancy with Sulfadoxine-pyrimethamine: a Field Guide* (WHO, 2024). This guide outlines definitions, planning and implementation of C-IPTp which aligns with the WHO current preventive strategy recommendations. The Ugandan MoH could introduce this program, first in a location with a robust CHW network to determine effectiveness and resource requirements. If this pilot test of C-IPTp is successful, allocation of resources and logistical organization could be implemented into subsequent malaria reduction plans. Importantly a forecast for human and monetary resource allocation that ensures continued funding and support would be necessary for the implementation's success.

Limitations

The use of a convenience sample could have contributed to incomplete representativeness of the surrounding populations, while different communities were investigated, roader generalization may be inaccurate. The size of the pilot study population potentially influenced inferential results; these tests may be repeated in a future large-scale study to clarify the currents study's results. As a result of resource and time constraints of the current study, this data is likely only representative of the local community. Self-reporting as used in the current study can result in acquiescence or social desirability bias, potentially leading respondents to report more doses of IPT than actually received.

CONCLUSION

Strides have been made in the last two decades in Uganda to decrease the burden of malaria. With consideration of increased risks in pregnancy and in children, comprehensive IPTp reporting becomes vital. Rural communities have historically lagged behind the remainder of the country in health indicators—the current study and published literature suggest that this remains true for IPT. A community-based approach has been proven to be effective in other African countries at increasing adherence to IPTp3+. While this study represents a pilot study limited by available resources, increased targeted campaign reporting of local IPTp rates offers the chance to reach national IPTp adherence goals.

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APPENDIX

Survey Questions

1. Household #
2. Interviewer Name
3. Total # of people in the household
4. Total # of children 5 years old and under
5. Have you or anyone in the household been diagnosed with malaria in the last month?
    - Yes
    - No
2. Does your household have any mosquito nets?
    - Yes
    - No
2. How many nets does your household have?
3. Where did you get the net?
    - Government Health Facility
    - Government Net Distribution campaign in community
    - Trading Center/Shop/Market
    - Family or Friend
    - Private Health Facility
4. Is the net being used?
    - Yes
    - No
5. Did anyone sleep under the bed net last night?
    - Yes
    - No
6. Who slept under the net last night?
7. Which people need special protection from malaria?
8. Should all pregnant women receive malaria treatment even if healthy?
9. How do you personally protect yourself from mosquito bites?
10. Do you think bed nets are safe for children?
11. Do you think bed nets are safe for pregnant women?
12. In the past two weeks, has anyone in your household been diagnosed with malaria by blood test?
13. Days of work missed in past 6 months due to malaria?
14. Days of school missed by children in past 6 months due to malaria?
15. I was concerned about getting malaria during my last pregnancy.
    - Yes

    - No
16. Do you know where the nearest healthcare facility is?
    - Yes
    - No
17. How long does it take to reach the facility?
18. How do you usually get to the healthcare facility?
19. How old were you at your last birthday?
20. Have you ever attended school?
21. What is the highest level of school you attended?
22. What is the highest grade you completed at that level?
23. Did you see anyone for prenatal care?
24. Whom did you see?
25. Did you get info about malaria risks while pregnant?
    - Yes
    - No

26. Whom did you get this information from?
27. Did you take SP/Fansidar to prevent malaria?
    - Yes
    - No
28. How many times did you take SP/Fansidar?
29. Where did you get the SP/Fansidar?
30. During this pregnancy did you get malaria?
    - Yes
    - No