

Health Promotion to Promote Use of Prophylactic Anti-Malaria Agents in Rural Enugu State, Nigeria: Dislodging the Malaria-Typhoid Concurrency Myth

Marychristiana Ejindu Uzochukwu¹, Otitodilichukwu Josephine Okoh²,
JaneFrances Ngozi Ugwuoke³

¹School of Nursing, College of Health and Human Sciences, North Carolina Agricultural and Technical State University (NCA&T SU), Greensboro, NC, USA

²College of Medicine, University of Nigeria, Enugu, Nigeria

³Independent Statistician and Researcher, Enugu, Nigeria

Email: mcuzochu@ncat.edu, otitodilichukwuj@gmail.com, janefrancesngozi68@gmail.com

How to cite this paper: Uzochukwu, M.E., Okoh, O.J. and Ugwuoke, J.N. (2025) Health Promotion to Promote Use of Prophylactic Anti-Malaria Agents in Rural Enugu State, Nigeria: Dislodging the Malaria-Typhoid Concurrency Myth. *Journal of Biosciences and Medicines*, 13, 303-311. <https://doi.org/10.4236/jbm.2025.1311021>

Received: October 17, 2025

Accepted: November 14, 2025

Published: November 17, 2025

Copyright © 2025 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Malaria remains a significant public health threat in Nigeria, disproportionately affecting rural communities in Enugu State. Persistent misconceptions, such as the belief that malaria and typhoid fever invariably co-occur, undermine accurate diagnosis and prevention. This article presents a community-focused health promotion framework to enhance uptake of prophylactic anti-malarial interventions (e.g., IPTp and ITNs) and correct misinformation regarding malaria-typhoid co-infection. Using reports from studies conducted in Southeastern Nigeria and Nigeria, we identify the main challenges and suggest practical strategies that involve the community, leverage the trusted influence of religious leaders, male partner involvement, strengthen the healthcare system, and promote positive behavioral change. By integrating faith-based engagement with evidence-informed practices, these strategies could help reduce malaria cases, dismantle persistent myths, and improve maternal and child health outcomes in rural settings.

Keywords

Prophylactic, Health Promotion, Anti-Malaria Agents, Insecticide-Treated Nets (ITNs), Intermittent-Preventive Treatment, Malaria-Typhoid Co-Infection Myth, Public Health Intervention

1. Introduction

In 2020, malaria caused numerous deaths worldwide, and about 27% of all these deaths happened in Nigeria, with rural areas having a higher share of malaria cases and deaths compared to their population [1]. Malaria remains highly prevalent in Enugu State, especially among pregnant women and children under five [2]. While interventions such as insecticide-treated nets (ITNs), intermittent preventive treatment in pregnancy (IPTp), and indoor residual spraying (IRS) have been proven effective, their uptake remains low in rural communities [3] [4]. Many people incorrectly believe malaria and typhoid always co-occur. This misconception leads to frequent misdiagnosis, often using the unreliable Widal test, which drives unnecessary antibiotic use and reduces focus on preventive measures [5].

This article outlines a comprehensive health promotion strategy to strengthen the use of prophylactic anti-malaria agents and dismantle the malaria-typhoid concurrency myth in rural Enugu State.

2. Aim and Objectives

Aim

To promote effective use of prophylactic anti-malarial interventions and correct misconceptions in rural Enugu communities.

Specific Objectives

- Enhance community understanding of the true relationship between malaria and typhoid fever.
- Increase uptake of IPTp, ITNs, and related preventive measures.
- Address socio-cultural and healthcare-related barriers undermining trust in evidence-based malaria prevention.

2.1. Background and Literature Review/Malaria in Pregnancy and IPTp Uptake

Recent data confirm persistently low IPTp uptake in Southeast Nigeria. In Ebonyi State, only 24.0% of pregnant women received the recommended three or more doses of IPTp-SP [6]. In a rural Abia State study, 80.8% of women were aware of IPTp, but just 26.3% completed the full regimen [7]. Furthermore, a study found that increased IPTp uptake significantly improves birth outcomes, such as higher birth weights and reduced neonatal mortality [8].

2.2. Socioeconomic Disparities

Analysis of the 2018 Nigeria DHS reveals notable inequalities: while wealthier women are more likely to receive three or more IPTp doses, rural areas exhibit a pro-poor pattern, indicating complexity beyond simple wealth gradients [9]. This means that malaria prevention is not determined by income alone. Other factors such as education, distance to health facilities, women's decision-making power, and cultural beliefs also influence whether a woman receives preventive treatment during pregnancy [6] [10] [11]. For example, a woman who lives far from a clinic

or depends on her husband to approve medical visits may miss IPTp doses even if the drugs are free [4]. Poor road networks, limited transport, and low awareness about malaria prevention make the problem worse, especially in isolated rural communities [12]. Recognizing this complexity, the proposed framework emphasizes community and faith-based engagement to ensure preventive interventions reach women across all social and economic groups [13].

2.3. Misdiagnosis via Widal Test

Although the Widal test is still widely used in Nigeria's rural settings, it has notoriously poor diagnostic accuracy. For instance, a study from a tertiary hospital found the test's sensitivity to be only 35% and specificity at 51%, with a low positive predictive value (17%), meaning it frequently produces false positives and falsely classifies non-typhoid cases as typhoid, especially in malaria-prevalent contexts [14]. This inaccuracy contributes to misdiagnoses, unnecessary antibiotic use, and ongoing confusion over malaria-typhoid co-infection. Blood culture remains the reference standard for confirming typhoid fever, as it directly detects *Salmonella Typhi* [15]. Nevertheless, newer rapid diagnostic assays, such as Typhi-dot and TUBEX-TF, have demonstrated greater accuracy and reliability than the traditional Widal test in several studies [5] [14].

2.4. Addressing Health Beliefs via Promotion

Recent literature emphasizes the importance of community engagement, improved diagnostics, and targeted behavioral interventions to counteract misbeliefs like malaria-typhoid co-infection and to enhance IPTp uptake and preventive behavior [6] [9].

3. Health Promotion Strategies and Implementation Framework

We base our approach on the Health Belief Model (HBM), which explains how people's beliefs influence their health behaviors [16] [17]. By applying this model, health promotion activities can be tailored to address the reasons why pregnant women and rural households either adopt or fail to adopt preventive malaria measures. The adapted HBM framework for malaria prevention in rural Enugu is provided in Appendix (Figure A1).

- **Perceived Susceptibility & Severity**

This aims to make people aware of their risk of contracting malaria and how serious the disease can be. For example, women are reminded that pregnancy weakens immunity, making them more likely to suffer complications from malaria, such as miscarriage, stillbirth, or severe anemia [13]. Similarly, communities are educated on the fact that children under five face a higher risk of death if they contract malaria [12]. This creates a sense of urgency for prevention.

- **Perceived Benefits**

Here, the strategy emphasizes what people gain from preventive actions. Health

workers highlight that taking Intermittent Preventive Treatment in pregnancy (IPTp) with SP (sulfadoxine-pyrimethamine) and using Insecticide-Treated Nets (ITNs) can drastically reduce malaria cases, improve pregnancy outcomes, and protect both mothers and babies [13]. Linking prevention to tangible benefits such as fewer hospital visits, lower costs, and healthier children helps motivate adoption.

- **Perceived Barriers**

Even when people know prevention is important, barriers such as fear of side effects from IPTp, poor access to drugs, myths about “malaria-typhoid co-infection,” or distrust in public health facilities often stop them from acting. The strategy directly addresses these concerns. For example, community dialogues clarify that IPTp is safe, health campaigns explain the ineffectiveness of Widal tests, and health workers are trained to improve service delivery.

- **Self-Efficacy & Cues to Action**

Building self-efficacy and providing consistent cues to action are essential for encouraging sustained malaria prevention in rural Enugu. Pregnant women are empowered to confidently request IPTp during antenatal visits, reinforcing the belief that prevention is within their reach. Community-based reminders such as Igbo-language radio jingles, posters, and village meetings serve as practical triggers that keep malaria prevention at the forefront of women’s daily lives. Trusted community figures, including village leaders, women’s associations, and Traditional Birth Attendants (TBAs), act as role models and motivators, showing that every woman has the ability to protect herself and her baby [18].

Faith-based platforms add a powerful layer of reinforcement. Church announcements reminding women to attend ANC or collect IPTp, as well as religious gatherings used for health talks, poster distribution, and even ITN sharing, ensure that preventive messages are consistently echoed by respected spiritual leaders [19] [20]. These approach linking community and faith-based cues creates a supportive environment where women not only know what to do but also feel motivated, capable, and encouraged to take action.

The HBM-based framework makes malaria prevention personal, beneficial, feasible, and actionable, ensuring that strategies not only spread information but also change behavior.

Key Strategy Components

- **Community Dialogues**

This involves holding structured discussions with village leaders, women’s groups, traditional birth attendants (TBAs), and church leaders, who play central roles in shaping community opinions. Since pastors and priests are respected voices of authority in rural Enugu, involving them in dispelling the malaria-typhoid concurrency myth ensures that accurate information is trusted and widely shared [19]. In addition, men and husbands will be actively encouraged to participate in malaria prevention activities. Through community meetings and faith-based programs, they can learn about the importance of IPTp, regular ANC visits,

and the dangers of self-medication. Their involvement supports women in attending clinics, taking preventive drugs, and following health advice without delay.

○ **Integration with ANC Services**

Antenatal clinics (ANC) remain the primary platform for delivering malaria prevention measures such as IPTp, while also providing opportunities to educate pregnant women about malaria and dispel myths. In remote areas, community health workers (CHWs) can extend this service using models like TIPTOP, which has proven effective in neighboring Ebonyi State [3] [14], ensuring that even women far from health centers receive preventive care. To further enhance uptake, collaboration with faith-based groups is encouraged. Religious leaders can motivate women to attend ANC, provide reassurance about preventive measures, and even organize transportation or offer encouragement during church services, thereby reinforcing medical advice with trusted religious endorsement.

○ **Behavior Change Communication (BCC)**

Behavior Change Communication (BCC) uses culturally appropriate tools to influence knowledge, attitudes, and practices. In rural Enugu, interventions include Igbo-language radio messages, community dramas, and posters that clarify misconceptions about malaria-typhoid co-infection and promote preventive behaviors, such as ITN use and adherence to IPTp schedules. These campaigns are further strengthened by the involvement of faith leaders, who use pulpits, crusades, and women's fellowships to reinforce prevention messages, encourage ITN use, and discourage reliance on the unreliable Widal test. Religious dramas and songs in Igbo during church events also serve as powerful reinforcements, ensuring that malaria-prevention messages are not only culturally relevant but also delivered through trusted community voices [18].

○ **Training Health Workers and Faith Leaders**

Capacity building is central to improving malaria prevention and diagnosis in rural Enugu. Healthcare providers are trained to prioritize rapid diagnostic tests (RDTs) over the unreliable Widal test for malaria-typhoid diagnosis, and to counsel patients accurately on prevention, the proper use of IPTp, and the correct interpretation of test results. At the same time, faith leaders are given basic training on malaria prevention messages so they can reinforce accurate information within their congregations and communities. Evidence shows that when church leaders are directly engaged alongside trained health workers, communities are more likely to adopt preventive behaviors and reduce reliance on ineffective practices [20].

○ **Monitoring & Evaluation Indicators**

To track the effectiveness of the interventions, measurable indicators are used. These include:

- The proportion of pregnant women receiving at least three IPTp doses.
- Reduction in the number of cases labeled as “malaria-typhoid” in health facilities.
- Increases in community knowledge scores regarding malaria prevention practices.

4. Expected Outcomes

- **Increased IPTp uptake among pregnant women in rural Enugu**

Through improved ANC integration, provider training, and community engagement, we expect a measurable rise in IPTp coverage. Specifically, at least 60% - 70% of pregnant women should receive the recommended three or more doses within two years of implementation.

- **Decreased misdiagnoses of malaria, typhoid, and associated antibiotic misuse**

By discouraging the use of the Widal test and strengthening RDT-based malaria diagnosis, we anticipate a 40% - 50% reduction in malaria-typhoid co-diagnoses in rural health facilities. This should be accompanied by a significant drop in inappropriate antibiotic prescriptions, especially among pregnant women.

- **Improved maternal and neonatal health outcomes**

With increased IPTp uptake, maternal anemia is expected to decline by 15% - 20%, while adverse outcomes, including low birth weight, preterm births, and neonatal mortality, are projected to decrease by at least 10% - 15%, consistent with evidence from similar interventions in sub-Saharan Africa.

- **Greater trust in health systems through improved diagnostic practices**

As communities experience more accurate diagnoses and observe better health outcomes, confidence in formal health services is expected to increase. This trust should be reflected in higher antenatal clinic attendance (by $\geq 20\%$) and greater rates of facility-based deliveries, thereby strengthening overall maternal and child health service utilization.

Although this framework focuses on rural Enugu State, it recognizes that communities within the state differ in culture, beliefs, and access to health services. Therefore, its implementation may require small local adjustments to fit each community's unique context. These local differences also influence how easily the framework can be applied in practice, as discussed below.

4.1. Implementation Challenges and Limitations

While the proposed health promotion framework is practical, some challenges may affect its success. Limited funds, few health workers, and poor roads in rural Enugu could make outreach difficult. Some community or faith leaders may resist new ideas because of cultural beliefs or mistrust. Getting husbands to take part may also be hard, as traditional gender roles often limit men's involvement in maternal health. Sustaining the program after the initial phase could also be difficult without local and government support.

4.2. Recommendations

To overcome these issues, the framework promotes early engagement of community leaders, use of existing local structures, and integration into primary health care programs for long-term success. To make the impact last, the framework encourages communities to take ownership of activities. Trained faith leaders, health

workers, and volunteers can keep sharing malaria-prevention messages during church events and local meetings. By using existing health and community systems, the program can continue even after outside support ends

5. Conclusion

Rural Enugu faces a dual challenge of high malaria burden and persistent misconceptions about malaria-typhoid co-infection. An evidence-based health promotion framework built on community dialogue, ANC integration, behavior change communication, provider training, and community health worker engagement is essential. The active involvement of religious leaders will provide a unique opportunity to reinforce accurate health messages, dismantle harmful myths, and motivate preventive action among rural households. If implemented effectively, this strategy has the potential to advance maternal and child health outcomes while contributing to Nigeria's progress toward the Sustainable Development Goals on health and well-being.

Conflicts of Interest

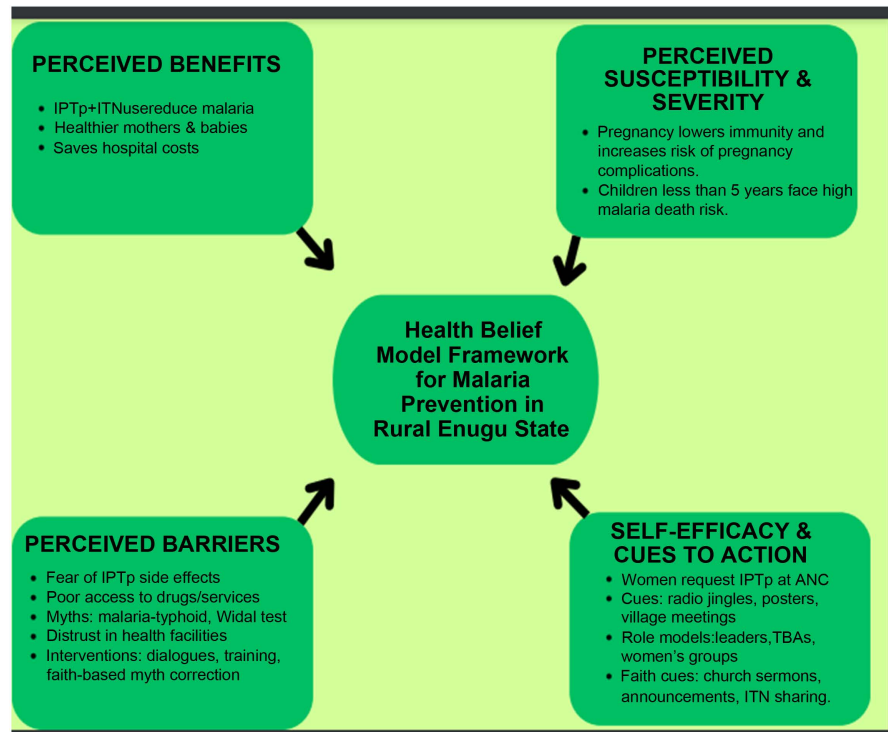
The authors declare no conflicts of interest regarding publication of this paper.

References

- [1] World Health Organization (2022) World Malaria Report 2022. WHO. <https://www.who.int/publications/i/item/9789240064898>
- [2] Nwankwocha, D., Umeh, R. and Chukwu, O. (2025) Malaria Prevalence among Pregnant Women and Children under Five in Enugu State, Nigeria: A Cross-Sectional Study. *African Journal of Public Health Research*, **12**, 45-54.
- [3] World Health Organization (2016) Preventing Malaria in Pregnancy in Remote African Communities. World Health Organization. <https://www.who.int/news-room/feature-stories/detail/preventing-malaria-in-pregnancy-in-remote-african-communities>
- [4] Ugwu, E.C., Anozie, O. and Okeke, T. (2010) Uptake of Malaria Preventive Measures among Pregnant Women in Rural Nigeria. *Nigerian Journal of Medicine*, **19**, 167-173.
- [5] Ohanu, M.E., Iroezindu, M.O., Maduakor, U.M., Onodugo, O.D. and Gugnani, H.C. (2019) Typhoid Fever among Febrile Nigerian Patients: Prevalence, Diagnostic Performance of the Widal Test and Antibiotic Multi-Drug Resistance. *Malawi Medical Journal*, **31**, 184-192. <https://doi.org/10.4314/mmj.v31i3.4>
- [6] Deyanju, O., Tubeuf, S. and Ensor, T. (2022) Socio-Economic Inequalities in Access to Intermittent Preventive Treatment for Malaria in Pregnancy among Women in Selected Communities of Ebonyi State, Nigeria. *PLOS ONE*, **17**, e0269232.
- [7] Akwuruoha, E.M., Ezirim, E.O., Onyemereze, C.O., Abali, I.O. and Airaodion, A.I. (2025) Awareness and Level of Usage of Intermittent Preventive Treatment for Malaria among Pregnant Women Attending Antenatal Clinics in Rural Communities in Abia State, Nigeria. *International Journal of Research and Reports in Gynaecology*, **8**, 81-93. <https://doi.org/10.9734/ijrrgy/2025/v8i1121>
- [8] Ezirim, E.O., Akwuruoha, E.M., Onyemereze, C.O., Abali, I.O. and Airaodion, A.I. (2025) Association between IPTp Uptake and Pregnancy Outcomes in Nigeria: A

- Case Study of Rural Communities of Abia State. *Journal of Nursing Science Practice, Research and Advancements*, **7**, 19-30.
<https://matjournals.net/nursing/index.php/JNSPRA/article/view/406>
- [9] Okoli, C.I., Hajizadeh, M., Rahman, M.M. and Khanam, R. (2021) Decomposition of Socioeconomic Inequalities in the Uptake of Intermittent Preventive Treatment of Malaria in Pregnancy in Nigeria: Evidence from Demographic Health Survey. *Malaria Journal*, **20**, Article No. 300. <https://doi.org/10.1186/s12936-021-03834-8>
- [10] Aregbeshola, B.S. and Khan, S.M. (2017) Impact of Health Facilities on Malaria Control Interventions among Children under Five Years of Age and Pregnant Women in Nigeria. *South East Asia Journal of Public Health*, **7**, 35-41.
<https://doi.org/10.3329/seajph.v7i1.34677>
- [11] Adedokun, S.T. and Uthman, O.A. (2019) Women's Empowerment and the Uptake of Intermittent Preventive Treatment for Malaria in Pregnancy in Sub-Saharan Africa: A Multilevel Analysis of Demographic and Health Surveys (2010-2018). *Tropical Medicine & International Health*, **24**, 494-507.
- [12] UNICEF (2023) Malaria and Children: Progress and Interventions. UNICEF.
<https://data.unicef.org/topic/child-health/malaria/>
- [13] World Health Organization (WHO) (2023) World Malaria Report 2023. WHO.
<https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2023>
- [14] Akinyemi, O.O. and Solankeye, O.E. (2016) Typhoid Fever in a Tertiary Hospital in Nigeria: Another Look at the Widal Agglutination Test as a Preferred Option for Diagnosis. *Annals of African Medicine*, **15**, 87-93.
- [15] World Health Organization (2018) Vaccine-Preventable Diseases Surveillance Standards: Typhoid (WHO/IVB/17.06).
https://cdn.who.int/media/docs/default-source/immunization/vpd_surveillance/vpd-surveillance-standards-publication/who-surveillancevaccinepreventable-21-typhoid-r2.pdf?download=true&sfvrsn=993904a6_10
- [16] Rosenstock, I.M. (1974) Historical Origins of the Health Belief Model. *Health Education Monographs*, **2**, 328-335. <https://doi.org/10.1177/109019817400200403>
- [17] Glanz, K., Rimer, B.K. and Viswanath, K. (2008) Health Behavior and Health Education: Theory, Research, and Practice. 4th Edition, Jossey-Bass.
- [18] Ebimgbo, S.O., Atumah, O.N. and Okoye, U.O. (2018) Church-Based Organisations and Their Role in the Support of Older Adults in Nnewi, South-East Nigeria. *African Population Studies*, **32**, 2400-2413. <https://doi.org/10.11564/32-2-1193>
- [19] Campbell, M.K., Hudson, M.A., Resnicow, K., Blakeney, N., Paxton, A. and Baskin, M. (2007) Church-Based Health Promotion Interventions: Evidence and Lessons Learned. *Public Health Reports*, **122**, 320-328.
- [20] Christian Connections for International Health (CCIH) (2021) Faith-Based Organizations Providing Health Care in Nigeria.
<https://www.ccih.org/faith-based-organizations-providing-health-care-in-nigeria>

Appendix



Designed with canvas by Author # 3.

Figure A1. Health belief model framework diagram.