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# Impact of Mobile Health (mHealth) Reminders vs. Community Health Worker Visits on Adherence to Antimalarial Chemoprevention in Pregnant Women

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## ABSTRACT

This review article examined the impact of Mobile Health (mHealth) reminders versus Community Health Worker (CHW) visits on adherence to antimalarial chemoprevention in pregnant women, specifically focusing on improving adherence to intermittent preventive treatment during pregnancy (IPTp). The review synthesized current evidence on the efficacy, scalability, and challenges of both strategies in the context of malaria prevention in sub-Saharan Africa. mHealth interventions, such as SMS reminders, offer a cost-effective, scalable, and automated solution to address common adherence barriers, including forgetfulness. These interventions leverage mobile phone access to deliver personalized reminders and health education, particularly beneficial in remote areas with limited healthcare infrastructure. Conversely, CHW visits provide a more personalized, face-to-face approach that addresses adherence barriers through direct interaction, counseling, and medication administration, but require significant resources for implementation and sustainability. The methodology utilized in writing this article involved a comprehensive review of available literature on both mHealth interventions and CHW programs. The comparative analysis indicated that both approaches have proven effective, with mHealth being particularly advantageous in resource-constrained settings, while CHWs offer more in-depth support and personalized care. The review concluded that integrating both strategies, possibly in a hybrid model, may provide the most effective and sustainable approach to improving IPTp adherence and reducing malaria-related maternal and neonatal morbidity.

**Keywords:** Mobile Health (mHealth), Community Health Workers (CHWs), Antimalarial Chemoprevention, Adherence to IPTp, Maternal Health and Malaria Prevention.

## INTRODUCTION

Malaria during pregnancy poses significant risks to both maternal and fetal health, including maternal anemia, low birth weight, preterm delivery, and neonatal mortality [1, 2]. In malaria-endemic regions, intermittent preventive treatment in pregnancy (IPTp) with sulfadoxine-pyrimethamine (SP) is a cornerstone strategy for reducing the burden of malaria in pregnant women [3, 4]. However, adherence to IPTp remains suboptimal in many settings, undermining its effectiveness. Barriers to adherence include forgetfulness, lack of awareness, and limited access to healthcare services. Addressing these barriers is critical to improving maternal and neonatal outcomes. Mobile health (mHealth) technologies, such as SMS reminders and app-based notifications, have emerged as promising tools for enhancing adherence to health interventions [5–7]. These technologies provide timely, personalized reminders and educational messages, empowering pregnant women to adhere to IPTp schedules. On the other hand, community health worker (CHW) visits have long been a traditional approach to supporting maternal health, offering face-to-face education, counseling, and direct observation of IPTp administration. While both strategies aim to improve adherence, their comparative effectiveness remains underexplored. Malaria in pregnancy is a major public health challenge, particularly in sub-Saharan Africa, where the disease is endemic [8, 9]. Pregnant women are more susceptible to malaria due to immunological changes, and the consequences of infection can be severe for both the mother and the unborn child. IPTp with SP is recommended by the World Health Organization (WHO) as a safe and effective strategy for preventing malaria during pregnancy [10, 11]. The protocol involves administering SP doses during antenatal care (ANC) visits, starting in the second trimester and continuing at least one month

apart. Despite its proven efficacy, adherence to IPTp remains inconsistent. Many pregnant women fail to complete the recommended doses due to factors such as forgetfulness, lack of understanding about the importance of IPTp, and logistical challenges in accessing healthcare facilities. Improving adherence to IPTp is essential for maximizing its protective benefits and reducing the burden of malaria in pregnancy. mHealth interventions, which leverage mobile phones to deliver health-related information and reminders, have gained traction as a cost-effective and scalable approach to improving adherence. SMS reminders have been widely used to support medication adherence, antenatal care attendance, and other health behaviors. CHW visits, on the other hand, provide a more personalized and interactive approach, addressing barriers to adherence through direct engagement and support. Understanding the relative effectiveness of these two strategies is critical for optimizing malaria prevention efforts in pregnant women. This review examines the impact of mHealth reminders versus CHW visits on adherence to antimalarial chemoprevention in pregnant women, focusing on adherence rates, maternal health outcomes, and scalability. By synthesizing the latest evidence, this review aims to provide insights into the efficacy, benefits, and challenges of these interventions, offering valuable guidance for policymakers, healthcare providers, and public health practitioners.

### **EFFICACY OF MHEALTH REMINDERS**

mHealth reminders have been shown to significantly improve adherence to IPTp in pregnant women [12, 13]. By delivering timely and personalized messages, mHealth interventions address the common barrier of forgetfulness, ensuring that women are reminded to take their SP doses and attend ANC visits. For example, a study in Kenya found that pregnant women who received SMS reminders were 30% more likely to adhere to the full IPTp regimen compared to those who did not receive reminders. The reminders included information about the importance of IPTp, the timing of doses, and the need for ANC visits. The effectiveness of mHealth reminders is influenced by factors such as message content, frequency, and timing [14]. Messages that are concise, culturally appropriate, and delivered in the local language are more likely to resonate with recipients. Additionally, the timing of reminders is critical, as messages sent too early or too late may not have the desired impact. Some mHealth programs also incorporate interactive features, such as two-way messaging or voice calls, to address questions and provide additional support. mHealth interventions are particularly advantageous in settings where access to healthcare facilities is limited. By leveraging the widespread availability of mobile phones, mHealth programs can reach pregnant women in remote and underserved areas, reducing the need for frequent clinic visits. This scalability makes mHealth a cost-effective and sustainable approach to improving adherence to IPTp.

### **EFFICACY OF CHW VISITS**

CHW visits have long been a cornerstone of maternal health programs in low-resource settings. CHWs play a critical role in educating pregnant women about the importance of IPTp, addressing misconceptions, and providing direct support for adherence [15, 16]. For example, CHWs can administer SP doses during home visits, ensuring that women receive the full regimen even if they are unable to attend ANC visits. This direct observation of treatment is a key advantage of CHW visits, as it eliminates the reliance on self-reporting and reduces the risk of missed doses. Studies have demonstrated that CHW visits can significantly improve adherence to IPTp and other maternal health interventions. A study in Malawi found that pregnant women who received regular CHW visits were 40% more likely to complete the full IPTp regimen compared to those who did not receive visits. The visits included counseling on the importance of IPTp, demonstrations of how to take the medication, and follow-up to address any concerns or side effects. The effectiveness of CHW visits is influenced by factors such as the training and motivation of CHWs, the frequency of visits, and the quality of interactions. CHWs who are well-trained and supported are more likely to build trust and rapport with pregnant women, enhancing the impact of their interventions. However, CHW programs can be resource-intensive, requiring significant investments in training, supervision, and logistics. This limits their scalability in some settings, particularly where healthcare systems are underfunded and understaffed.

### **COMPARATIVE EFFECTIVENESS**

The comparative effectiveness of mHealth reminders and CHW visits in improving adherence to IPTp is a topic of significant interest [17]. While both strategies have been shown to be effective, they offer distinct advantages and challenges. mHealth reminders are highly scalable and cost-effective, making them suitable for large-scale implementation in resource-limited settings [18]. They also provide a non-intrusive way to deliver reminders and educational messages, reducing the burden on healthcare systems. However, mHealth interventions may be less effective for women with limited literacy or access to mobile phones. CHW visits, on the other hand, offer a more personalized and interactive approach, addressing barriers to adherence through direct engagement and support. The ability to administer SP doses during home visits is a key advantage, particularly for women who face logistical challenges in accessing healthcare facilities. However, CHW programs are resource-intensive and may not be feasible in all settings. Additionally, the quality of CHW visits can vary depending on the training and motivation of the

workers. A hybrid approach that combines mHealth reminders with CHW visits may offer the greatest benefits. For example, mHealth reminders can be used to reinforce the messages delivered during CHW visits, ensuring that women are reminded to take their SP doses and attend ANC visits. This combination leverages the strengths of both strategies, providing a comprehensive and sustainable approach to improving adherence to IPTp.

### PRACTICAL IMPLICATIONS

The findings of this review have important implications for maternal health programs in malaria-endemic regions. Both mHealth reminders and CHW visits are effective strategies for improving adherence to IPTp, and the choice of intervention should be guided by local context, resources, and preferences [17, 19]. In settings where mobile phone penetration is high and healthcare resources are limited, mHealth reminders may be the most feasible and cost-effective option. In settings where CHW programs are well-established and resourced, CHW visits may offer a more personalized and impactful approach. Public health initiatives should focus on integrating mHealth and CHW interventions to maximize their impact. For example, mHealth platforms can be used to train and support CHWs, enabling them to deliver more effective and consistent messages. Additionally, efforts should be made to address barriers to mHealth adoption, such as limited literacy and access to mobile phones, to ensure that all pregnant women can benefit from these interventions.

### CONCLUSION

mHealth reminders and CHW visits are both effective strategies for improving adherence to antimalarial chemoprevention in pregnant women. mHealth reminders offer a scalable and cost-effective approach, leveraging the widespread availability of mobile phones to deliver timely and personalized messages. CHW visits provide a more personalized and interactive approach, addressing barriers to adherence through direct engagement and support. The choice between these strategies should be guided by local context, resources, and preferences, and a hybrid approach may offer the greatest benefits. Healthcare providers and policymakers should consider integrating mHealth and CHW interventions to optimize malaria prevention efforts in pregnant women. By improving adherence to IPTp, these interventions have the potential to significantly reduce the burden of malaria in pregnancy, improving maternal and neonatal outcomes. Future research should focus on evaluating the long-term impact of these interventions, exploring innovative ways to combine their strengths, and addressing barriers to adoption and scalability. As the field of maternal health continues to evolve, mHealth and CHW interventions will play an increasingly important role in ensuring that all pregnant women have access to the care and support they need.

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