2022

Community directed approaches to promote uptake of Sulfadoxine Pyrimethamine for intermittent preventive treatment of malaria in pregnancy: Baseline findings from Kisumu and Migori counties

Dennis Matanda
Population Council

Wilson Liambila
Population Council

Beth Kangwana
Population Council

REVIVE IPTp
PREVENTING MALARIA IN PREGNANCY

COMMUNITY DIRECTED APPROACHES TO PROMOTE UPTAKE OF SULFADOXINE-PYRIMETHAMINE FOR INTERMITTENT PREVENTIVE TREATMENT OF MALARIA IN PREGNANCY

Baseline Findings from Kisumu and Migori Counties

This project is part of the EDCTP2 programme supported by the European Union

EDCTP

POPULATION COUNCIL KENYA
Ideas. Evidence. Impact.

COMMUNITY DIRECTED APPROACHES TO PROMOTE UPTAKE OF SULFADOXINE-PYRIMETHAMINE FOR INTERMITTENT PREVENTIVE TREATMENT OF MALARIA IN PREGNANCY

Baseline Findings from Kisumu and Migori Counties

Dennis Matanda
Wilson Liambila
Beth Kangwana

Suggested Citation: Matanda Dennis, Liambila Wilson & Kangwana Beth. 2022. "Community Directed Approaches to Promote Uptake of Sulfadoxine-Pyrimethamine for Intermittent Preventive Treatment of Malaria in Pregnancy: Baseline Findings from Kisumu and Migori Counties." Nairobi: Population Council, Kenya.

This project is part of the EDCTP2 programme supported by the European Union

The Revive IPTp programme supports intermittent preventive treatment of malaria in pregnant women to improve health and reduce mortality for mothers and infants. Revive IPTp is led by Population Council Kenya in collaboration with the Kisumu Medical and Education Trust (KMET) and the Midwives Association of Kenya (MAK) and is implemented in partnership with the Kenya County Health Management Teams of the Malaria Control Program and the Reproductive Maternal and Newborn Health Unit.

POPULATION COUNCIL KENYA
Ideas. Evidence. Impact.

Population Council Kenya (PC Kenya) seeks to improve the well-being and health of current and future generations and to help achieve a humane, equitable, and sustainable balance between people and resources. We develop sustainable programme solutions that respond to girls' educational needs and build their social, economic, and health assets; improve sexual and reproductive health and rights; reduce HIV transmission; prevent and respond to sexual and gender-based violence (SGBV); assess various service-integration models; and strengthen evidence for programmes related to unintended pregnancy. Since 1993, we have given voice and visibility to the most vulnerable by increasing awareness of the problems they face and offering evidence-based solutions and innovations that respond to local social context. PC Kenya is a locally registered entity and is an affiliate of Population Council, Inc., a global leader in high-quality programme-relevant research. www.popcouncil.org/country/kenya/

EDCTP

This publication was produced by Revive IPTp which is part of the EDCTP2 programme supported by the European Union (grant number CSA2018HS-2521). The views and opinions of authors expressed herein do not necessarily state or reflect those of EDCTP.

Table of Contents

List of Acronyms

ANC	Ante-Natal Care
CHMT	County Health Management Team
CHV	Community Health Volunteer
COVID-19	Coronavirus Disease 2019
DNMP	Division of National Malaria Programme
DOT	Direct Observation Therapy
EDTCP	European and Developing Countries Clinical Trials
FGD	Focus Group Discussion
HBM	Health Belief Model
IFAS	Iron and Folic Acid Supplementation
IDI	In-Depth Interview
IPTp	Intermittent Preventive Treatment of Malaria during Pregnancy
ITN	Insecticide Treated Net
KDHS	Kenya Demographic and Health Survey
KII	Key Informant Interview
KMET	Kisumu Medical and Education Trust
KMS	Kenya Malaria Strategy
KNBS	Kenya National Bureau of Statistics
LBW	Low Birth Weight
MAK	Midwives Association of Kenya
MiP	Malaria in Pregnancy
MOPHS	Ministry of Public Health and Sanitation
PHC	Primary Health Care
SCHMT	Sub-County Health Management Team
SCT	Social Cognitive Theory
SMS	Short Message Service
SP	Sulfadoxine-Pyrimethamine
SSA	Sub-Saharan Africa
TPB	Theory of Planned Behaviour
WHO	World Health Organization

Acknowledgements

The study received valuable intellectual and editorial contributions from Dr Francis Obare of Population Council, Kenya who was involved in the design and execution of the study. Many thanks to Prof. Feiko ter Kuile of Liverpool School of Tropical Medicine (LSTM) and Kenya Medical Research Institute (KEMRI) Centre for Global Health Research for his reviews. We are grateful to the county governments of Kisumu and Migori, non-governmental organisations and community-based organisations working on malaria in the two counties. They all contributed immensely during data collection and towards the successful completion of the study.

We are indebted to our study respondents who spared their invaluable time and volunteered to participate in the study. We are very appreciative of the industrious team of research assistants who traversed the two counties to collect data. Through field supervision, Oscar Okoth, Brenda Achieng and Joshua Adhola of Kisumu Medical and Education Trust (KMET) played a critical role in ensuring that data collected was of high quality. Special thanks to the data analysis team that included Daniel Mwanga, Daniel Lango, Florence Thungu, Lilack Achieng Odhiambo, and Teresa Atieno Bange. The authors acknowledge the support of Janet Munyasya and the rest of the Finance and Administration team of Population Council, Kenya who facilitated the logistics for the study.

The Revive IPTp programme supports intermittent preventive treatment of malaria in pregnant women to improve health and reduce mortality for mothers and infants. Revive IPTp is led by Population Council, Kenya in collaboration with KMET and the Midwives Association of Kenya (MAK) and is implemented in partnership with the County Health Management Teams of the Malaria Control Program and the Reproductive Maternal and Newborn Health Unit.

The study was funded through the Revive IPTp programme which is part of the EDCTP2 programme supported by the European Union (grant number CSA2018HS-2521). The views and opinions of authors expressed herein do not necessarily state or reflect those of EDCTP.

REVIVE IPTp
PREVENTING MALARIA IN PREGNANCY

Executive Summary

Background

Malaria infection during pregnancy has a devastating impact on health outcomes for mothers and infants. Uptake of Sulfadoxine-Pyrimethamine (SP) for Intermittent Preventive Treatment of Malaria during Pregnancy (IPTp) is a safe and clinically proven medical intervention for the prevention of Malaria in Pregnancy (MiP). Despite Kenya's adoption of this intervention in its national policies and guidelines, uptake of IPTp for MiP has been persistently low. To realise effective coverage of IPTp, the Population Council, Kenya in collaboration with Kisumu Medical and Education Trust (KMET) and County Governments, are implementing the Revive IPTp project in Kisumu and Migori counties. The project seeks to increase community engagement on IPTp and promote self-care by pregnant women. The main objective of this study was to generate baseline evidence to inform the design, monitoring and evaluation of interventions to improve IPTp-SP uptake in two malaria endemic counties in Kenya.

Methods

This study used a cross-sectional design to determine baseline indicators that would be used to inform intervention activities and monitor progress towards improving IPTp-SP uptake. A mixed methods approach was used to collect data in Kisumu and Migori counties. This included: (i) a household survey involving structured interviews that targeted 4080 women aged 15-49 years who had had a pregnancy and had given birth to a live baby within the last two years preceding the survey; (ii) 24 in-depth interviews with healthcare providers, community health volunteers, and pharmaceutical providers; (iii) 16 key informant interviews with policymakers, programme managers, sub-county malaria/reproductive health coordinators and community leaders; and (iv) 16 focus group discussions with women aged 15-49 years who had had a pregnancy and given birth to a live baby within the last two years preceding the survey.

Results

Uptake of SP for IPTp

Majority of pregnant women in Kisumu (82%) and Migori (82%) counties received the first dose of IPTp-SP, but the proportion substantially reduced in the subsequent doses. The uptake of the recommended 3+ doses of SP was 51% in Kisumu County and 42% in Migori County, with wide variations in uptake across sub-counties (ranging from 26% in Uriri sub-county in Migori County to 63% in Kisumu West sub-county in Kisumu County). Across the two counties, women with no/incomplete primary education had consistently lower uptake of 3+ doses of SP compared to those who had attained higher levels of education.

Administration of SP for intermittent preventive treatment of malaria in pregnancy

More than half (58%) of women in Kisumu County who were asked to state the number of SP tablets they took each time IPTp was administered reported taking the recommended three tablets. In Migori County, 45% of mothers reported taking the recommended three tablets. In both counties, women from poor households and those aged 15-19 years had the lowest uptake of the recommended three tablets.

Coverage of antenatal care (ANC)

Most women in Kisumu County (72%) and Migori County (61%) attended four or more ANC visits with substantial differences in ANC visits at the sub-county level (ranging from 30% in Nyakach sub-county in Kisumu County to 79% in Suna East sub-county in Migori County).

Malaria morbidity during pregnancy

31% of women in Kisumu and 28% of those in Migori who tested for malaria when they were pregnant reported positive results. There were considerable differences in malaria morbidity across sub-counties (ranging from 22% in Kuria West sub-county in Migori County to 48% in Nyando sub-county in Kisumu County).

Knowledge of malaria prevention approaches during pregnancy

Most women in Kisumu (99%) and Migori (92%) were knowledgeable about sleeping under an insecticide-treated bednet as a malaria preventive approach. Nonetheless, there was limited knowledge of other MiP preventive measures such as taking SP (27% in Kisumu and 31% in Migori) and indoor residual spraying (5% in Kisumu and 9% in Migori).

Knowledge of when to begin taking SP during pregnancy

Only 36% of women in Kisumu County and 35% of those in Migori County correctly mentioned that SP should be taken at the beginning of the second trimester.

Knowledge of the recommended dosage of SP for IPTp

Only 36% of women in Kisumu and 35% of those in Migori were knowledgeable about the recommended 3+ doses of IPTp-SP. Women who were single and those from the youngest age group (15-19 years) had very low knowledge of the recommended doses of SP.

Feasibility and acceptability of community-directed approaches to the provision of IPTp services and information to pregnant women

Most participants in qualitative interviews in both Kisumu and Migori counties considered the use of trained community-based health workers (nurses/midwives) to provide IPTp services, and the use of local media and short message service (SMS) to provide information on IPTp to be feasible and acceptable. However, most study participants in both counties were not supportive of using local pharmacies to provide SP to pregnant women.

Challenges pregnant women face in accessing health services

Insights from qualitative interviews showed that women in Kisumu and Migori counties face numerous challenges in their quest to access health services. Key challenges include negative provider attitudes, long distances to health facilities, unaffordable user fees, perceived side effects of SP, and periodic stockouts of medicines in public health facilities.

Conclusion

Uptake of the recommended 3+ doses of SP for malaria prevention by women in both Kisumu and Migori counties was below the national target of 80% that Kenya aims to achieve by 2025. Low uptake of 3+ doses of SP coupled with limited knowledge of other malaria preventive measures such as taking SP, indoor residual spraying as well as limited awareness about timing of SP uptake is likely to exacerbate malaria morbidity among pregnant women in the two counties. The high ANC coverage and uptake of at least one dose of IPTp-SP is an indication that there is an opportunity to engage women early in their pregnancy with the aim of improving their knowledge and optimizing uptake of the recommended doses of SP. Qualitative findings point to potential feasibility and acceptability of community-directed approaches such as the use of community nurses/midwives, SMS, and local media platforms to improve uptake of ANC services, including IPTp-SP.

Next steps

- Test the effectiveness of the identified community directed approaches (use of community nurses/midwives, mobile-phone messaging, and local media platforms) in increasing uptake of ANC services, including IPTp-SP. Midline and endline surveys will be conducted to assess the effectiveness of these interventions in improving uptake of IPTp-SP from baseline values.
- Conduct detailed analyses using the baseline data with the aim of publishing manuscripts in international peer reviewed journals. This will involve, for example, undertaking a regression analysis to determine correlates of uptake of 3+ IPTp-SP considering other variables not included in the current analysis such as women empowerment and decision-making power.

REVIVE IPTp
PREVENTING MALARIA IN PREGNANCY

Introduction

Background

An estimated **15% of maternal deaths globally, mainly in sub-Saharan Africa (SSA), are attributed to malaria in pregnancy** (MiP) (Maternal Health Task Force, 2018). Nearly a third of Kenya's 47.5 million people (KNBS, 2019) live in malaria-endemic zones with millions more exposed to the seasonal transmission of the disease. Malaria is one of the leading causes of morbidity and mortality in Kenya (Ministry of Medical Services (Kenya), 2010), accounting for 31% of outpatient cases (National Malaria Control Programme, Ministry of Health, 2016). Pregnant women are especially susceptible to malaria infection - about 1.8 million pregnant women in Kenya are at risk for malaria, with about one-third of them (500,000) being from Malaria endemic zones (Ministry of Public Health and Sanitation (MOPHS), 2009). Malaria in pregnancy (MiP) is one of the most common causes of spontaneous abortion, has a devasting impact on health outcomes for mothers and infants, and leads to severe maternal anaemia, low infant birth weight (LBW), preterm delivery, and stillbirth (WHO, 2019). Proven interventions to prevent and manage MiP include Sulfadoxine-Pyrimethamine for intermittent preventive treatment (IPTp-SP), appropriate case management, the distribution and promotion of insecticide-treated nets (ITNs) as part of routine antenatal care (ANC), and indoor residual spraying (IRS).

IPTp-SP is a clinically proven safe, cost-effective, life-saving medical intervention for the prevention and management of MiP. It is an intervention that can significantly reduce the risks of the negative health outcomes attributable to MiP, yet efforts to scale-up this intervention have been declining (Eisele et al., 2012). Though originally introduced for malaria prophylaxis and treatment for the general population, the decline in efficacy of SP for these purposes led to its re-designation as the only effective drug for IPTp for pregnant women living in areas of sustained malaria transmission.

Even when one accounts for SP resistance, the provision of IPTp-SP to all pregnant women has a sizeable impact on maternal and neonatal health in malaria-endemic settings (WHO, 2013). A 2012 meta-analysis of seven IPTp-SP studies showed that three or more doses of IPTp-SP given at least one month apart were associated with higher mean birth weight, fewer cases of low birth weight (LBW) and less placental malaria compared to two doses of IPTp-SP (WHO, 2013). Drawing from this evidence, the World Health Organisation (WHO) updated the guidelines (KNBS & ICF International, 2014) on IPTp stating that all HIV-negative pregnant women in areas of moderate-to-high transmission in SSA receive SP. Ideally, SP should be administered by directly observed therapy (DOT), at each ANC visit beginning in the second trimester. The most recent available evidence shows that IPTp-SP remains effective in preventing the adverse consequences of malaria on maternal and foetal outcomes even in settings where mutations linked to SP resistance are prevalent (Desai et al., 2018; Kajubi et al., 2019; Kimani et al., 2016; Mlugu et al., 2020; Roh et al., 2020; Walker et al., 2017; WHO, 2019).

Kenya adopted its first IPTp national policy in 1998 which was updated in 2012. IPTp-SP is recommended for all 14 malaria endemic counties in the country (areas around Lake Victoria in Western Kenya and the coastal region of the country). However, since the adoption of the MiP strategy, more than 16 years ago, IPTp coverage has remained well below the national target of 80% for three doses. The widespread implementation of this intervention has stagnated—only 25% of pregnant women in Malaria endemic regions receive two or more doses of IPTp-SP despite high ANC attendance (96% overall; 58% 4+ANC visits) and wide availability of SP in the country at an average cost of 30 Kenyan Shilling or 0.27 Euro (WHO, 2016). ANC has been the central platform for delivering and achieving IPTp targets. WHO's current ANC guidelines increased the number of contacts a pregnant woman has with a health provider throughout her pregnancy from four to eight (WHO, 2016).

Despite this, studies of IPTp coverage through ANC continue to report poor adherence by health workers to IPTp guidelines, which in turn leads to the low effectiveness of IPTp as part of ANC (Hodgins & D'Agostino, 2014; Rassi et al., 2016). Providers still question SP's treatment advantages and remain confused about the recommended number of IPTp-SP doses.

In Kenya, ANC as an integrated platform for IPTp has been weak. The current ANC guidelines include over 30 interventions related to nutrition, maternal and foetal assessments, preventative measures, and interventions for common physiologic symptoms. Women's late presentation for ANC delays the start of malaria prevention and treatment in pregnancy and subsequently the number of IPTp doses that a woman will receive.

In addition to the challenge of late and infrequent ANC attendance, IPTp-SP provision during ANC visits remains low due to poor provider capacity and the competing checklist of elements to be covered (Thiam et al., 2013).

While women will typically accept IPTp if encouraged by a health worker, service delivery barriers including long distances from health facilities, long waiting times and poor quality of care limit access to health services especially among women in rural communities (Mubyazi & Bloch, 2014). IPTp uptake in Kenya is further constrained by poor knowledge, attitudes, and practices among pregnant women. A majority of social and behaviour change communication efforts targeting pregnant women are dependent upon their seeking of ANC services or making health facility visits, meaning that many women only end up receiving a single dose of SP. Pregnant women in the region have shown a lack of awareness of pregnancy-related health risks, have a tendency to initiate ANC late, while some never use ANC services at all (Newman et al., 2006).

Community-directed approaches can provide a complementary model to strengthening the health system's ability to provide IPTp to pregnant women in rural areas of Kenya by making IPTp interventions accessible at the community level—which is an important element of primary health care (PHC); and building the capacity of, and empowering women to help themselves and in doing so expand access to this critical intervention.

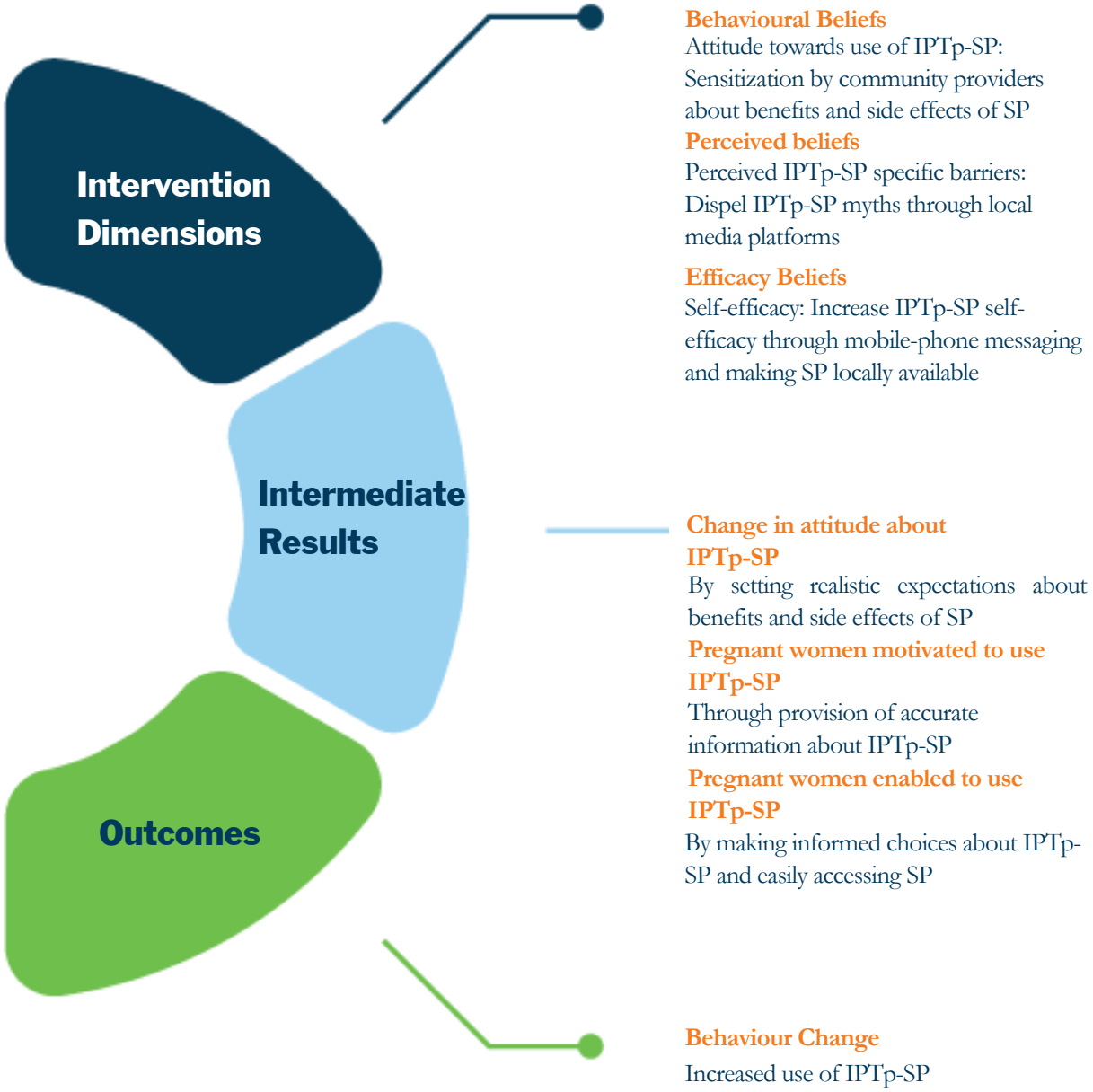
In 2018, the National Malaria Control Program (NMCP) in Kenya conducted a Malaria Programme Review (MPR) of its performance and achievements. The new Kenya Malaria Strategy (KMS) 2019-2023 includes a recommendation to increase uptake of IPTp during ANC through community health structures (National Malaria Control Programme, 2019). Evidence from this study therefore supports initiatives to improve the uptake of IPTp as part of the KMS in malaria endemic counties. It further responds to WHO's recommendation on using midwife-led interventions to reach communities in remote settings.

Intervention Description and Theoretical Framework

Population Council, Kenya in collaboration with Kisumu Medical and Education Trust (KMET) and County Health Management Teams (CHMT) plans to implement a combination of IPTp delivery models that include: (a) recruiting and deploying newly graduated community nurses and midwives to work in partnership with community health volunteers (CHVs) to sensitize and educate pregnant women on the importance of IPTp and distribute SP; (b) fostering SP availability and visibility in private outlets by promoting the provision of SP in IPTp by local private pharmacy providers; and, (c) promoting self-care of IPTp through mobile-phone messaging and local radio educational programmes to provide information on the prevention of MiP using IPTp, how to access IPTp and the recommended dosage. These delivery models will be refined based on baseline findings and input from key stakeholders in the malaria sector.

Figure 1 summarises the theoretical framework underpinning the three community-based intervention approaches geared towards increasing uptake of IPTp-SP. The interventions are guided by the Theory of Planned Behaviour (TPB) (Ajzen, 1991), the Health Belief Model (HBM) (Green & Murphy, 2014) and the Social Cognitive Theory (SCT) (Bandura, 2001). In this framework, we hypothesize that: (i) Based on TPB, behavioural beliefs can be altered by changing the attitude of pregnant women towards IPTp-SP use through community education and sensitization by community health providers and setting realistic expectations of benefits and side effects of SP; (ii) Based on HBM, perceived beliefs about myths and misconceptions concerning IPTp-SP can be dispelled through provision of accurate information using local media platforms such as radio educational programmes on MiP and IPTp-SP; and (iii) Based on SCT, efficacy beliefs can be improved by empowering pregnant women through mobile-phone messaging on the prevention of MiP using SP, how to access SP and the recommended dosage; and making SP locally available and accessible to pregnant women through distribution by community health providers and local retailers.

Figure 1. Integrated theoretical framework guiding community-based delivery of IPTp-SP that promote self-care among pregnant women [adapted from (Dev et al., 2019)]



A key limitation of the above framework is that it focuses on the user but ignores the health systems issues that may influence uptake even if women are willing to use IPTp-SP for MiP. Such health systems issues include availability of SP, and knowledge and willingness of providers to offer it. To address some of these challenges, our interventions will involve working with sub-county health management teams (SCHMTs) and CHMTs to conduct training of health providers, conduct supportive supervision, and support strategies to ensure availability of SP.

Study Objectives

The main objective of this study was to generate baseline evidence to inform the design, monitoring and evaluation of interventions to improve IPTp-SP uptake in two malaria-endemic counties in Kenya. The specific objectives of the study were:

- To determine baseline estimates of key project outcome indicators including women's attitude, knowledge and uptake of IPTp-SP and ANC services in Kisumu and Migori Counties of Kenya.
- To assess the perceptions of women, health care providers and decision-makers regarding the feasibility and acceptability of community-directed approaches that promote IPTp self-care for pregnant women.

REVIVE IPTp
PREVENTING MALARIA IN PREGNANCY

Methods

Study Design

The study used a cross-sectional design to generate data on women's knowledge of IPTp, their attitudes and practices regarding malaria in pregnancy prevention, their willingness to use IPTp-SP, and uptake of IPTp-SP during recent pregnancy in Kisumu and Migori counties. Data was also collected to assess the acceptability and feasibility of the proposed community-based IPTp-SP delivery models. A mixed methods approach was used to collect baseline data in Kisumu and Migori counties. This included: 1) a household survey involving structured interviews with women aged 15-49 years who had had a pregnancy and given birth to a live baby within the last two years preceding the survey; 2) in-depth interviews (IDIs) with healthcare providers, community health volunteers, and pharmaceutical providers; 3) key informant interviews (KIIs) with policymakers, programme managers, sub-county malaria/reproductive health coordinators, and community leaders; and 4) focus group discussions (FGDs) with women aged 15-49 years who had a pregnancy and gave birth to a live baby within the last two years.

Study Sites

The study was conducted in two malaria endemic counties - Migori and Kisumu, with low coverage of IPTp (USAID, 2019). Migori and Kisumu counties have a total population of 2.27 million people (KNBS, 2019). An estimated 52% of the population are women, half of whom are women of reproductive age (15-49 years). Despite being IPTp-focus counties, the 2014 Kenya Demographic and Health Survey (KDHS) showed that only 6% and 13% of pregnant women in Kisumu and Migori counties respectively received three or more doses of IPTp-SP (KNBS & ICF International, 2014). Recent estimates from the 2020 malaria indicator survey showed an improvement in the uptake of three or more doses of IPTp-SP in the Lake endemic zone (encompassing Kisumu, Migori and other counties near Lake Victoria) from 35% in 2015 to 49% in 2020 (DNMP and ICF, 2021).

Instruments

Study tools were adapted from the Kenya demographic and health survey, the Kenya malaria indicator survey, the WHO malaria in pregnancy guidelines for measuring key monitoring and evaluation indicators, and the WHO programme reporting standards for sexual, reproductive, maternal, new-born, child and adolescent health (KNBS & ICF International, 2014; National Malaria Control Programme (NMCP) et al., 2016; WHO, 2007, 2017). Prior to fieldwork, all study tools were pretested and adapted to the local context.

Procedures

In conducting the household survey, we used the 2019 national census data to generate a list of all sub-locations (the smallest administrative unit) in each county. A total of 40 sub-locations (16 in Kisumu and 24 in Migori) were randomly sampled, and a research team deployed to conduct listing of all households to generate the sampling frame. Eligible study participants were randomly sampled from the sampling frame.

A household was considered eligible if it had a woman aged 15-49 years who had had a pregnancy and given birth to a live baby within the last two years preceding the survey. In households where there was more than one woman eligible for the interview, only one woman was interviewed. The research team worked with community gatekeepers (village elders and community health volunteers) to identify and access households in the sampled sub-locations, and to contact individuals sampled for interview.

For qualitative interviews, key informants were purposively selected, with input from the County Health Management Teams (CHMT), based on their roles in programme design and execution, administrative oversight and/or community representation in health activities. Regarding IDIs, health providers were purposively selected with the help of sub-county malaria coordinators based on their participation (potential or actual) in IPTp provision.

Participants in FGDs were purposively identified in the community with the help of CHVs and sub-county malaria coordinators, with approximately 8-10 participants per group.

Data Collection

Data collection took place in the months of June to August 2021. The data collection exercise was conducted by trained research assistants with social science background and prior experience in conducting similar interviews for the quantitative component or with sociology or anthropology background with experience in conducting qualitative interviews. For the quantitative survey, a total of 4,080 women (2,470 in Migori and 1,610 in Kisumu) aged 15-49 years who had had a pregnancy and given birth to a live baby within the last two years preceding the survey were targeted for inclusion in the study.

The sample size was powered to detect at least a 5-percentage point increase in the proportion of women taking three or more doses of IPTp at follow-up at 95% confidence level and 80% power, taking into account homogeneity among participants sampled from the same clusters and 25% non-response. The following formula was used in the calculation of the desired sample size in each county:

$$n = \frac{[Z_{1-\alpha}\sqrt{2\bar{P}\bar{Q}} + Z_{1-\beta}\sqrt{P_1Q_1 + P_2Q_2}]^2}{(P_2 - P_1)^2} \times D$$

where:

- n Desired sample size
- D Design effect (set at 2.0) to account for homogeneity among respondents sampled from the same sub-locations
- $Z_{1-\alpha}$ Z-score corresponding to the probability with which it is desired to be able to conclude that the observed increase did not occur by chance (one-tailed; Z1-α is 1.645 at 95% confidence level)
- $Z_{1-\beta}$ Z-score corresponding to the degree of confidence (power) with which it is desired to be certain that the difference actually occurred (at 80% power, Z1-β is 1.282 for one-sided test)
- P_1 Proportion of mothers taking three or more doses of IPTp during pregnancy at baseline in each county (15% in Migori and 8% in Kisumu)
- P_2 Proportion of mothers taking three or more doses of IPTp during pregnancy at follow-up in each county (20% in Migori and 13% in Kisumu)
- $\bar{P}$ Average of P1 and P2
- Q_1 $1-P_1$
- Q_1 $1-P_2$
- $\bar{Q}$ Average of Q1 and Q2

The quantitative survey generated data on uptake of IPTp, administration of IPTp, ANC attendance, malaria morbidity during pregnancy, knowledge about malaria prevention approaches during pregnancy, and the feasibility and acceptability of rolling out community-directed approaches to promote IPTp. Information on IPTp uptake was captured by asking mothers about their ANC cards and extracting the information from there. Mothers without ANC cards were asked to remember if they took SP for malaria prevention when they were pregnant. For the qualitative component, data was collected through: (i) in-depth interviews with providers (nurses, midwives, CHVs, and pharmaceutical distributors) and key informants (policy makers, programme managers, sub-county Malaria/ Reproductive Health (RH) coordinators, and community leaders) to assess their opinions on the need for community-based delivery of IPTp, scope, and feasibility of self-care among pregnant women; and (ii) focus group discussions with women aged 15-49 years who had had a pregnancy and given birth to a live baby within the last two years preceding data collection to understand their perceptions of and preference for community-based delivery of IPTp-SP and self-care in order to inform the design of the interventions.

Table 1 presents the distribution of participants in the qualitative interviews. Across the two counties, a total of 16 KIIs were conducted with policymakers, programme managers, sub-county malaria/reproductive health coordinators, and community leaders; 24 IDIs with healthcare providers, community health volunteers, and pharmaceutical providers; and 16 FGDs with women aged 15-49 years who had had a pregnancy and given birth to a live baby within the last two years preceding the survey.

Table 1. Participants in qualitative interviews

Category	Kisumu County	Migori County
Key informant interviews		
Policymakers	2	2
Programme managers	2	2
Sub-county malaria/RH coordinators	2	2
Community leaders	2	2
In-depth interviews		
Healthcare providers	4	4
Community health volunteers	4	4
Private pharmaceutical providers	4	4
Focus group discussions (number of groups)		
Women aged 15-24 years	4	4
Women aged 25-49 years	4	4

Data Analysis

Quantitative interviews with women aged 15-49 who had given birth to a live baby in the last two years preceding the survey were conducted using tablets and electronically submitted to a central server where they were downloaded and exported to Stata for analysis. During data collection, high frequency checks and back check surveys were conducted as part of data quality assurance. High frequency checks involved scripts to flag data for any obvious errors, data entry mistakes, and duplicates. Back check surveys involved reinterviewing respondents by a new enumerator using a shortened version of the original survey. The responses to the back-checked survey were then compared to the respondent's original responses to detect discrepancies using a back check analysis script.

Analysis of the quantitative data focused on point estimates of key indicators. For accurate estimation of IPTp uptake, only mothers with ANC cards were included in the final analysis. Data analysis entailed generating descriptive statistics (frequencies and percentages) of key indicators by socio-demographic characteristics of respondents. All the analyses were conducted using Stata with all estimates weighted to take account of the multi-stage sampling approach and to generate representative estimates at the county level. Key indicator findings are presented by county.

Regarding qualitative data, audio recordings of KIIs, IDIs and FGDs were transcribed verbatim, typed in Microsoft Word and analysed for content using NVivo version 11 software. Interviews conducted in Kiswahili or local language (Dholuo) were directly translated and transcribed into English. There was, however, no back-translation of interviews to determine if some meanings were lost in the process.
Inductive analysis was used to identify themes and patterns across the various interview groups. First, data analysts coded the same transcript and compared codes to ensure consistency of the coding between the coders. Intercoder reliability tests were conducted to ensure consistency in coding between the two coders.

Codes corresponding to themes and constructs were entered into the database and used to organise data for refined analysis. Data analysts involved a team approach to both creating data summaries and identifying themes in an effort to improve the reliability of the analysis. Team members independently identified topics and patterns, and then met regularly to discuss the interpretation of emerging themes and identify exemplar quotes from the transcripts that illustrated a certain theme.

Ethical Considerations

The study was reviewed and approved by the Population Council's Institutional Review Board (Protocol 962) and AMREF Ethics and Scientific Review Committee (AMREF-ESRC P886/2020). The study was granted administrative permission to conduct the research by the Kenya National Commission for Science, Technology, and Innovation (NACOSTI/P/21/8778). During data collection, written informed consent was obtained from all participants before conducting the interviews. Those who could not write were asked to nominate someone to sign on their behalf. For minors aged below 18 years, parent/guardian consent was obtained followed by individual assent.

REVIVE IPTp
PREVENTING MALARIA IN PREGNANCY

Results

Table 2 summarises the background characteristics of women interviewed during the household survey conducted in Kisumu and Migori counties. In Kisumu, the household survey targeted to interview 1610 women who had had a pregnancy and given birth to a live baby within the last two years preceding the survey. Out of the 1610 women who were targeted, 1340 (83%) were successfully interviewed. Most of the respondents were aged between 20-29 years (58%), had secondary education (38%), were married (80%), were protestant/other Christians (74%), and were unemployed (39%). In Migori County, the survey targeted to interview 2470 women out of whom 2121 (86%) were successfully interviewed. Majority of respondents in Migori were aged between 20-29 years (60%), had no/incomplete primary level education (38%), were married (85%), were protestant/other Christians (81%), and were unemployed (35%).

Table 2. Background characteristics of survey respondents

Category	Kisumu County		Migori County	
	%	n	%	n
	Maternal age*			
15-19 years	7.0	94	11.5	244
20-29 years	58.4	782	59.8	1266
30-39 years	31.4	421	21.2	533
40-49 years	3.2	43	3.6	76
	Education level			
None or primary incomplete	20.0	268	37.6	796
Primary	26.1	350	23.5	498
Secondary	37.5	503	29.5	625
Post-secondary	16.3	219	9.4	200
	Marital Status			
Never married	15.6	209	11.7	247
Married	80.3	1076	84.9	1798
Divorced/Separated/Widowed	4.1	55	3.5	74
	Religion			
Catholic	15.0	201	13.2	280
Protestant/other Christian	73.7	987	81.3	1724
African traditional	10.3	138	5.0	105
Muslim/Other/No religion	1.0	14	0.6	12
	Main Occupation			
Unemployed/housewife	38.7	519	35.2	746
Informal sector/domestic/casual/other	20.4	274	21.2	450
Formal sector employed	6.9	93	4.5	96
Self-employed formal sector	28.0	375	31.8	673
Student	5.9	79	7.3	154
Total	100	1340	100	2121

**Refers to the age of the respondent at the time of the interview*

1. Uptake of SP for Intermittent Preventive Treatment of Malaria in Pregnancy

Table 3 presents the uptake of IPTp-SP in Kisumu County. The results show that ***most of the pregnant women received the first dose of IPTp-SP (82%), but the proportion substantially reduced in the subsequent doses***, with 68% receiving two or more doses and 51% receiving three or more doses. This pattern was consistent across all sociodemographic groups.

Half (51%) of the women had 3+ doses of SP although there were substantial variations across sub-counties. Nyando, Kisumu Central and Seme sub-counties had less than 50% of women taking 3+ doses throughout their pregnancy. There were also differences in uptake across other sociodemographic groups. Women with no/incomplete primary education (44%), women from households in the middle wealth quintile (34%), single mothers (32%) and mothers aged 40-49 years (35%) had the lowest uptake of 3+ doses of SP (Table 3).

Table 3. Use of SP for intermittent preventive treatment of malaria in pregnancy, Kisumu County

Background characteristics	% who received 1 or more doses of SP	% who received 2 or more doses of SP	% who received 3 or more doses of SP	% IPTp uptake not indicated on ANC card	Number of women*
County	82.3	67.5	50.7	17.7	1107
Maternal age¥					
15-19 years	96.1	75.3	52.5	3.9	78
20-29 years	81.1	68.9	49.7	18.9	647
30-39 years	82.6	66.0	53.3	17.4	351
40-49 years	95.7	37.1	34.8	4.3	31

Background characteristics	% who received 1 or more doses of SP	% who received 2 or more doses of SP	% who received 3 or more doses of SP	% IPTp uptake not indicated on ANC card	Number of women*
Sub-counties					
Kisumu Central	78.0	58.9	46.7	22.0	89
Kisumu East	89.0	79.8	55.4	11.0	150
Kisumu West	85.2	75.6	62.7	14.8	160
Muhoroni	81.5	66.3	50.4	18.5	142
Nyakach	82.6	69.8	56.3	17.4	176
Nyando	68.0	54.1	39.5	32.0	153
Seme	80.6	65.4	49.1	19.4	237
Education level					
None or primary incomplete	72.6	65.5	44.2	27.4	220
Primary	87.4	83.4	57.9	12.6	293
Secondary	83.7	68.5	51.6	16.3	414
Post-secondary	80.2	57.7	47.2	19.8	180

Background characteristics	% who received 1 or more doses of SP	% who received 2 or more doses of SP	% who received 3 or more doses of SP	% IPTp uptake not indicated on ANC card	Number of women*
Wealth quintile					
Lowest	76.8	63.0	48.3	23.2	213
Second	93.1	86.0	52.9	6.9	224
Middle	75.7	69.1	34.4	24.3	227
Fourth	88.9	73.0	50.8	11.1	222
Highest	80.7	64.9	52.1	19.3	221
Marital status					
Single	77.1	51.2	31.6	22.9	168
Married	83.6	70.4	53.2	16.4	899
Divorced/ separated/ widowed	77.8	71.1	70.1	22.2	40

**Refers to women with a live birth in the 2 years preceding the survey and had ANC booklet; ¥ Refers to the age of the respondent at the time of the interview*

The uptake of IPTp-SP in Migori County (Table 4) was almost similar to the patterns observed in Kisumu County. ***Most of the pregnant women received the first dose of IPTp-SP (82%), with a substantial reduction in uptake in the subsequent doses (65% received 2+ doses and 42% received 3+ doses). Similar to Kisumu, this pattern was consistent across all sociodemographic groups.***

At the county level, 42% of women received 3+ doses of SP, with considerable variations across sub-counties. Less than 40% of pregnant women in Uriri, Suna West and Nyatike sub-counties received 3+ doses of SP during their pregnancy. The results further showed that women with no/incomplete primary education (38%), women from poor (second wealth quintile) households (37%), those who were divorced/separated/widowed (27%), and those aged 15-19 years (33%), had the lowest uptake of 3+ doses of SP.

Table 4. Use of SP for intermittent preventive treatment of malaria in pregnancy, Migori County

Background characteristics	% who received 1 or more doses of SP	% who received 2 or more doses of SP	% who received 3 or more doses of SP	% SP uptake not indicated on ANC card	Number of women*
County	81.9	64.5	42.3	18.1	1796
Maternal age¥					
15-19 years	83.0	59.8	32.9	17.0	200
20-29 years	83.4	64.7	42.7	16.6	1090
30-39 years	78.8	67.0	44.6	21.2	445
40-49 years	74.1	56.6	42.0	25.9	61
Sub-counties					
Awendo	73.8	53.0	40.3	26.2	179
Kuria East	84.5	74.7	51.8	15.5	238
Kuria West	93.7	75.9	50.3	6.3x	239
Nyatike	79.7	63.0	32.2	20.3	231
Rongo	70.0	58.8	44.1	30.0	227
Suna East	79.4	63.6	47.8	20.6	223
Suna West	76.2	55.1	29.9	23.8	225
Uriri	65.8	44.1	25.9	34.2	234
Education level					
None or primary incomplete	80.9	61.9	37.6	19.1	684
Primary	78.3	59.4	40.9	21.7	434
Secondary	85.5	71.0	44.6	14.5	518

Background characteristics	% who received 1 or more doses of SP	% who received 2 or more doses of SP	% who received 3 or more doses of SP	% IPTp uptake not indicated on ANC card	Number of women*
Post-secondary	81.3	63.4	53.0	18.7	160
Wealth quintile					
Lowest	82.8	66.1	41.7	17.2	399
Second	82.4	61.1	36.7	17.6	341
Middle	77.7	59.5	38.5	22.3	363
Fourth	74.8	56.2	38.1	48.6	349
Highest	86.3	71.9	48.6	13.7	343
Marital status					
Single	82.9	54.7	28.1	17.1	196
Married	82.2	66.1	44.6	17.8	1541
Divorced/ separated/ widowed	70.7	55.2	26.7	29.3	59

**Refers to women with a live birth in the 2 years preceding the survey and had ANC booklet; ¥ Refers to the age of the respondent at the time of the interview*

2. Administration of SP for Intermittent Preventive Treatment of Malaria in Pregnancy

Pregnant women living in malaria endemic zones are expected to take three tablets of SP per dose for prevention of malaria. To assess adherence to this recommendation, women interviewed were asked to state the number of SP tablets they took at each time IPTp was dispensed. Table 5 shows that *in Kisumu County, 58% of mothers reported taking the recommended three tablets per dose during the last pregnancy.* There were, however, variations at the sub-county level, with less than half of mothers in Nyando (44%) and Kisumu West (48%) reporting taking the recommended three tablets. Other sub-groups that had fewer women taking the recommended number of tablets of SP per dose included those with no/incomplete primary education (50%), those from households in the second wealth quintile (41%), those divorced/separated/widowed (31%) and younger women aged 15-19 years (41%).

Table 5. Number of SP tablets taken at each time during last pregnancy, Kisumu County

Background characteristics	% who took 1 tablet	% who took 2 tablets	% who took 3 tablets	% who took 4 or more tablets	Number of women*
County	4.3	16.7	57.9	20.9	1107
Maternal age¥					
15-19 years	29.9	21.3	40.7	8.1	78
20-29 years	4.8	21.9	49.9	23.0	647
30-39 years	1.4	8.1	71.1	19.4	351
40-49 years	0.0	7.3	81.8	10.9	31
Sub-counties					
Kisumu Central	0.8	11.8	60.8	26.2	89
Kisumu East	8.9	24.3	55.1	11.8	150
Kisumu West	8.4	21.9	48.3	21.5	160
Muhoroni	8.4	23.7	51.3	16.6	142
Nyakach	7.7	13.2	54.9	24.2	176
Nyando	7.4	15.6	44.2	32.7	153
Seme	1.8	7.5	62.7	28.0	237
Education level					
None or primary incomplete	7.0	5.9	49.9	37.2	220
Primary	5.4	31.7	50.2	12.8	293
Secondary	5.8	18.6	59.9	15.2	414

Background characteristics	% who took 1 tablet	% who took 2 tablets	% who took 3 tablets	% who took 4 or more tablets	Number of women*
Post-secondary	1.7	9.8	62.1	26.4	180
Wealth quintile					
Lowest	7.1	17.0	45.9	30.0	213
Second	4.1	44.6	40.5	10.8	224
Middle	3.1	22.5	58.7	15.7	227
Fourth	12.5	23.9	46.5	17.0	222
Highest	2.0	12.6	62.3	22.8	221
Marital status					
Single	6.6	17.3	38.9	37.3	168
Married	4.0	14.0	64.0	17.7	899
Divorced/ separated/ widowed	0.9	53.0	30.5	15.6	40

*****_Refers to women with a live birth in the 2 years preceding the survey and took SP; ¥ Refers to the age of the respondent at the time of the interview_

In Migori County, only 45% of mothers interviewed reported taking the recommended three tablets of SP for IPTp per dose during their last pregnancy (Table 6). At the sub-county level, less than 40% of mothers in Rongo, Suna East, Awendo and Suna West took the recommended three tablets. Results stratified by educational attainment, household wealth index, marital status and maternal age showed that women with secondary education (40%), those from households in the second wealth quintile (35%), single women (32%) and those aged 15-19 years (34%) had the lowest proportions of women who took the recommended three tablets.

Table 6. Number of SP tablets taken at each time during last pregnancy, Migori County

Background characteristics	% who took 1 tablet	% who took 2 tablets	% who took 3 tablets	% who took 4 or more tablets	Number of women*
County	7.6	25.3	44.7	22.3	1796
Maternal age¥					
15-19 years	3.6	36.4	34.1	25.8	200
20-29 years	9.1	27.3	43.4	20.2	1090
30-39 years	5.0	16.9	51.4	26.6	445
40-49 years	9.8	22.5	47.1	20.6	61

Background characteristics	% who took 1 tablet	% who took 2 tablets	% who took 3 tablets	% who took 4 or more tablets	Number of women*
Sub-counties					
Awendo	12.2	22.1	37.2	28.6	179
Kuria East	4.2	16.3	60.0	19.5	238
Kuria West	7.3	24.2	54.8	13.6	239
Nyatike	9.9	21.6	47.8	20.8	231
Rongo	11.2	24.3	31.9	32.4	227
Suna East	5.7	28.1	36.6	29.7	223
Suna West	5.3	31.8	38.1	24.7	225
Uriri	7.2	20.2	41.8	30.8	234
Education level					
None or primary incomplete	8.4	24.7	45.5	21.4	684
Primary	5.6	18.9	51.4	24.2	434
Secondary	9.1	29.3	40.3	21.2	518
Post-secondary	5.1	28.3	42.0	24.6	160

Background characteristics	% who took 1 tablet	% who took 2 tablets	% who took 3 tablets	% who took 4 or more tablets	Number of women*
Wealth quintile					
Lowest	8.4	29.5	42.1	20.0	399
Second	7.8	32.8	35.1	24.2	341
Middle	4.0	16.4	48.7	31.0	363
Fourth	7.6	30.8	36.6	25.0	349
Highest	8.8	21.7	51.6	17.9	343
Marital status					
Single	9.1	30.0	32.2	28.6	196
Married	7.4	25.3	46.1	21.2	1541
Divorced/ separated/ widowed	7.5	12.5	51.5	28.5	59

**Refers to women with a live birth in the 2 years preceding the survey and took SP; ¥ Refers to the age of the respondent at the time of the interview*

3. Coverage of Antenatal Care (ANC)

Table 7 presents the number of ANC visits a pregnant woman had for the last birth in the two years preceding the survey in Kisumu County. ***The results showed that majority of women in Kisumu County made four or more ANC visits (72%) with only 4% making one visit, 11% making two visits and 13% making 3 visits.*** There were very few women who had eight or more visits/contacts to make any meaningful analysis based on this indicator. There were differences in ANC visits at the sub-county level, with the proportion of women making four or more ANC visits in Nyakach (30%), Muhoroni (57%), Kisumu West (58%) and Nyando (70%) being lower than the county average. Differences across other sociodemographic groups showed that women with no education (59%), women from households in the middle wealth quintile (65%), those who were single (57%) and those aged 15-19 years (16%) were less likely to make four or more ANC visits compared to other socio-demographic groups.

Table 7. Antenatal care attendance, Kisumu County

Background characteristics	% who attended 1 ANC visit	% who attended 2 ANC visits	% who attended 3 ANC visits	% who attended 4 or more ANC visits	Number of women*
County	4.2	10.7	12.9	72.2	479
Maternal age¥					
15-19 years	1.3	78.2	4.4	16.2	35
20-29 years	3.8	5.1	9.7	81.4	280
30-39 years	5.5	11.6	20.3	62.6	151
40-49 years	0.7	72.5	4.6	22.2	13
Sub-counties					
Kisumu Central	6.3	8.4	12.7	72.6	64
Kisumu East	0.1	15.2	12.1	72.7	66
Kisumu West	1.0	24.5	16.7	57.8	40
Muhoroni	2.2	15.7	24.8	57.3	84
Nyakach	20.2	27.6	22.4	29.9	23
Nyando	3.3	4.9	22.3	69.5	72
Seme	3.0	5.3	17.1	74.5	130

Background characteristics	% who took 1 tablet	% who took 2 tablets	% who took 3 tablets	% who took 4 or more tablets	Number of women*
Education level					
None or primary incomplete	0.7	25.8	14.7	58.7	86
Primary	2.0	8.4	9.1	80.5	139
Secondary	0.2	12.9	11.5	75.4	176
Post-secondary	9.7	7.3	16.0	67.1	78
Wealth quintile					
Lowest	4.5	9.4	17.8	68.3	80
Second	0.9	3.6	8.6	86.9	92
Middle	1.1	27.0	7.3	64.6	98
Fourth	0.2	20.6	1.7	77.5	95
Highest	5.3	8.2	15.5	70.9	114
Marital status					
Single	3.0	12.8	27.2	57.0	74
Married	4.6	10.8	10.2	74.4	391
Divorced/ separated/ widowed	1.4	0.0	11.9	86.6	14

**Refers to women with a live birth in the 2 years preceding the survey and attended ANC; ¥ Refers to the age of the respondent at the time of the interview*

Table 8 presents results on ANC coverage for Migori County. ***Majority (61%) of women made four or more ANC visits, 29% made three visits, 8% made two visits and 2% made only one visit during their pregnancy.*** At the sub-county level, Kuria West (50%) and Nyatike (54%) sub-counties had the lowest proportions of women making four or more ANC visits. The results further showed that women with only primary education (52%), women from households in the highest wealth quintile (54%), those who were divorced/separated/widowed (48%) and those aged 30-39 years (59%) had the lowest likelihood of making four or more ANC visits.

Table 8. Antenatal care attendance, Migori County

Background characteristics	% who attended 1 ANC visit	% who attended 2 ANC visits	% who attended 3 ANC visits	% who attended 4 or more ANC visits	Number of women*
County	1.5	8.3	29.0	61.1	622
Maternal age¥					
15-19 years	1.7	9.6	22.0	66.8	64
20-29 years	2.3	9.5	27.1	60.8	371
30-39 years	0.0	5.6	35.6	58.8	168
40-49 years	0.0	5.3	26.7	67.9	19
Sub-counties					
Awendo	4.3	8.7	17.4	69.6	32
Kuria East	1.3	8.7	19.6	70.4	57
Kuria West	4.5	2.1	43.5	49.9	93
Nyatike	0.7	9.6	35.0	53.9	101
Rongo	1.5	11.9	21.8	64.8	112
Suna East	0.0	8.6	12.0	79.4	89

Background characteristics	% who took 1 tablet	% who took 2 tablets	% who took 3 tablets	% who took 4 or more tablets	Number of women*
Suna West	0.0	11.9	27.6	60.5	104
Uriri	2.9	8.6	17.1	71.4	34
Education level					
None or primary incomplete	1.0	10.2	31.8	57.0	213
Primary	0.2	11.3	36.2	51.7	154
Secondary	0.4	6.8	20.3	72.6	191
Post-secondary	8.9	0.4	29.7	61.0	64
Wealth quintile					
Lowest	0.0	11.1	26.3	62.6	123
Second	0.4	18.3	19.0	62.2	102
Middle	1.0	8.2	22.7	68.0	129
Fourth	0.6	5.7	28.7	64.5	136
Highest	3.4	5.5	37.3	53.9	131
Wealth quintile					
Single	1.5	4.2	20.5	73.8	66
Married	1.6	9.2	29.0	60.0	534
Divorced/ separated/ widowed	0.0	0.0	52.0	48.0	22

**Refers to women with a live birth in the 2 years preceding the survey and attended ANC; ¥ Refers to the age of the respondent at the time of the interview*

4. Malaria Morbidity During Pregnancy

To assess cases of malaria infection in pregnancy, respondents were asked whether at any point during their last pregnancy in the two years preceding the survey they had tested for malaria and if yes, what the outcome of the test was. Table 9 shows results of reported malaria morbidity during pregnancy in Kisumu County. About a third ***(31%) of women who tested for malaria when they were pregnant returned a positive result*** although there were substantial differences across sub-counties. For example, Nyando (48%), Seme (44%), Muhoroni (42%) and Kisumu West (41%) sub-counties had higher proportions of women reporting positive malaria test results compared to the county average. Data disaggregated by education, household wealth index, marital status and maternal age showed that women with only primary education (45%), those from households in the second wealth quintile (46%), women who were divorced/separated/widowed (68%) and those aged 20-29 years (33%) were most affected with malaria compared to other women.

Table 9. Reported test results for malaria during pregnancy, Kisumu County

Background characteristics	% who tested positive for malaria	% who tested negative for malaria	% who did not know their test results for malaria	Number of women*
County	30.6	68.7	0.8	1154
Maternal age¥				
15-19 years	21.5	76.4	2.1	83
20-29 years	32.5	66.5	1.1	669
30-39 years	28.7	71.1	0.2	359
40-49 years	23.9	75.8	0.3	43

Background characteristics	% who tested positive for malaria	% who tested negative for malaria	% who did not know their test results for malaria	Number of women*
Sub-counties				
Kisumu Central	26.3	73.7	0.0	86
Kisumu East	32.9	65.6	1.5	159
Kisumu West	41.4	57.2	1.4	164
Muhoroni	42.1	55.5	2.5	156
Nyakach	35.3	63.7	1.1	183
Nyando	48.2	49.2	2.6	167
Seme	44.2	52.7	3.1	239
Education level				
None or primary incomplete	26.7	72.3	1.0	227
Primary	44.9	55.0	0.1	310
Secondary	34.8	63.4	1.8	430
Post-secondary	18.9	81.0	0.2	187
Wealth quintile				
Lowest	39.8	58.4	1.9	232
Second	45.7	53.2	1.1	226

Background characteristics	% who tested positive for malaria	% who tested negative for malaria	% who did not know their test results for malaria	Number of women*
Middle	43.2	55.2	1.6	235
Fourth	38.2	59.1	2.8	234
Highest	25.8	74.2	0.0	227
Marital status				
Single	23.8	76.1	0.2	183
Married	29.3	69.7	1.0	927
Divorced/separated/widowed	68.1	31.9	0.0	44

**Refers to women with a live birth in the 2 years preceding the survey and tested for malaria during pregnancy; ¥ Refers to the age of the respondent at the time of the interview*

In Migori County, 28% of women who tested for malaria when they were pregnant had positive results (Table 10). ***There were considerable differences in malaria morbidity across sub-counties, with 41% of women in Kuria East, 34% in Awendo and 30% in Nyatike testing positive for malaria.*** There were also differences in malaria morbidity across other sociodemographic groups. Women with no/incomplete primary education (32%), those from households in the fourth wealth quintile (32%), women who were single (28%) and those in the youngest age category (30%) were more likely to report positive cases of malaria compared to those from other sociodemographic groups.

Table 10. Reported test results for malaria during pregnancy, Migori County

Background characteristics	% who tested positive for malaria	% who tested negative for malaria	% who did not know their test results for malaria	Number of women*
County	27.5	69.2	3.3	1792
Maternal age¥				
15-19 years	30.1	68.3	1.6	200
20-29 years	28.4	68.7	2.9	1075
30-39 years	24.3	71.0	4.7	449
40-49 years	27.0	68.6	4.4	68
Sub-counties				
Awendo	34.2	62.1	3.7	183
Kuria East	41.4	55.5	3.1	232
Kuria West	21.7	74.0	4.4	233
Nyatike	30.1	68.5	1.4	246
Rongo	26.8	68.1	5.1	226
Suna East	29.0	68.6	2.4	220
Suna West	29.1	68.6	2.3	224
Uriri	24.8	69.5	5.7	228

Background characteristics	% who tested positive for malaria	% who tested negative for malaria	% who did not know their test results for malaria	Number of women*
Education level				
None or primary incomplete	31.5	63.9	4.6	682
Primary	28.7	68.6	2.7	429
Secondary	22.5	74.2	3.3	508
Post-secondary	26.8	72.6	0.5	173
Wealth quintile				
Lowest	25.8	71.7	2.4	396
Second	26.6	66.2	7.3	324
Middle	29.2	68.0	2.9	363
Fourth	32.0	65.1	2.8	356
Highest	24.8	72.5	2.7	352
Marital status				
Single	27.9	71.9	0.2	200
Married	27.5	68.8	3.7	1532
Divorced/separated/widowed	24.8	71.5	3.7	60

**Refers to women with a live birth in the 2 years preceding the survey and tested for malaria during pregnancy; ¥ Refers to the age of the respondent at the time of the interview*

5. Knowledge of Malaria Prevention Approaches During Pregnancy

To assess women's knowledge of malaria prevention approaches during pregnancy, respondents were asked to name some of the approaches they were aware of. ***Nearly all (99%) women in Kisumu County were knowledgeable about sleeping under an insecticide-treated bednet as a malaria preventive approach when pregnant*** (Table 11). There was also very high knowledge about insecticide-treated bednet across sub-counties, ranging from 97% in Nyakach sub-county to almost 100% in Kisumu Central sub-county. However, there was limited knowledge on taking SP (27%) and indoor residual spraying (5%) as approaches to prevent malaria in pregnancy. Results further showed a general low knowledge of SP and even lower knowledge of indoor residual spraying across other sociodemographic groups.

Table 11. Knowledge of approaches used for preventing malaria in pregnancy, Kisumu County

Background characteristics	% who mentioned sleeping under an insecticide-treated bednet	% who mentioned taking SP	% who mentioned indoor residual spraying	Number of women*
County	99.1	27.1	5.2	1340
Maternal age¥				
15-19 years	98.9	19.7	0.6	94
20-29 years	99.0	23.6	3.6	782
30-39 years	99.3	32.2	8.7	421
40-49 years	100.0	46.0	1.3	43
Sub-counties				
Kisumu Central	99.6	33.0	7.8	109
Kisumu East	98.7	19.4	1.4	176
Kisumu West	98.0	26.2	4.9	191

Background characteristics	% who mentioned sleeping under an insecticide-treated bednet	% who mentioned taking SP	% who mentioned indoor residual spraying	Number of women*
Muhoroni	98.3	16.5	6.0	176
Nyakach	96.7	21.0	4.3	214
Nyando	99.0	16.1	5.4	190
Seme	98.1	21.2	2.4	284
Education level				
None or primary incomplete	99.6	18.8	1.7	268
Primary	97.7	15.6	0.5	350
Secondary	98.8	26.0	0.6	503
Post-secondary	100.0	36.1	12.5	219
Wealth quintile				
Lowest	95.5	13.2	5.3	268
Second	88.3	27.1	1.3	268
Middle	99.1	17.4	3.0	268
Fourth	99.8	21.8	0.2	268
Highest	99.7	29.9	7.0	268

Background characteristics	% who mentioned sleeping under an insecticide-treated bednet	% who mentioned taking SP	% who mentioned indoor residual spraying	Number of women*
Marital status				
Single	99.3	16.2	1.4	209
Married	99.3	31.1	6.4	1076
Divorced/separated/ widowed	96.0	5.0	0.2	55

**Refers to women with a live birth in the 2 years preceding the survey; ¥ Refers to the age of the respondent at the time of the interview*

Table 12. Knowledge of approaches used for preventing malaria in pregnancy, Migori County

Background characteristics	% who mentioned sleeping under an insecticide-treated bednet	% who mentioned taking SP	% who mentioned indoor residual spraying	Number of women*
County	91.9	31.2	9.4	2119
Maternal age¥				
15-19 years	87.1	19.1	6.0	244
20-29 years	91.9	34.0	9.8	1266
30-39 years	92.6	30.4	8.9	533
40-49 years	96.5	19.5	13.9	76
Sub-counties				
Awendo	91.7	44.5	20.5	211
Kuria East	86.8	33.3	4.6	264
Kuria West	93.0	43.8	7.4	279
Nyatike	93.0	18.0	8.5	286
Rongo	92.2	13.3	6.7	268
Suna East	88.8	25.7	7.9	265
Suna West	92.1	24.9	12.0	273
Uriri	95.2	11.8	8.0	273

Background characteristics	% who mentioned sleeping under an insecticide-treated bednet	% who mentioned taking SP	% who mentioned indoor residual spraying	Number of women*
Education level				
None or primary incomplete	86.3	24.6	6.4	796
Primary	91.9	29.3	15.2	498
Secondary	95.6	28.3	7.0	625
Post-secondary	97.0	64.0	14.7	200
Wealth quintile				
Lowest	87.1	17.4	8.3	462
Second	82.2	19.7	3.7	394
Middle	93.8	24.5	10.6	424
Fourth	90.2	33.8	8.5	414
Highest	96.7	40.8	11.8	424
Marital status				
Single	85.5	23.3	7.0	247
Married	92.6	32.4	9.6	1798
Divorced/separated/widowed	92.7	28.4	12.8	74

**Refers to women with a live birth in the 2 years preceding the survey; ¥ Refers to the age of the respondent at the time of the interview*

6. Knowledge of When to Begin Taking SP During Pregnancy

Pregnant women living in malaria endemic areas are expected to begin taking the first dose of IPTp-SP in the second trimester with subsequent doses given at least one month apart. Table 13 presents women's knowledge of the stage in a woman's pregnancy when one should start taking SP for Kisumu County. ***Results showed there was limited knowledge of the stage at which a pregnant woman should start taking SP at the county level, with only 36% of women correctly mentioning that SP should be taken beginning the second trimester.*** There was generally low knowledge of when to initiate SP across the various sub-counties, ranging from 23% in Nyakach to 39% in Kisumu Central. Results by educational attainment, wealth, marital status and maternal age showed that women with post-secondary education (39%), those living in households in the highest wealth quintile (40%), those divorced/separated/widowed (67%) and women aged 40-49 years (47%) had higher knowledge of when to begin taking SP during pregnancy compared to other sociodemographic groups. Notably, there was a substantial proportion of women across the various sociodemographic groups who did not know when to begin taking SP when pregnant.

Table 13. Knowledge of the stage in pregnancy when a woman is expected to begin taking SP, Kisumu County

Background characteristics	% who mentioned during second trimester	% who provided other responses than during second trimester	% who don't know	Number of women*
County	35.6	19.3	45.1	1205
Maternal age¥				
15-19 years	6.4	8.0	85.5	88
20-29 years	31.1	19.5	49.3	729
30-39 years	45.4	20.7	33.8	350
40-49 years	47.2	12.2	40.6	38

Background characteristics	% who mentioned during second trimester	% who provided other responses than during second trimester	% who don't know	Number of women*
Sub-counties				
Kisumu Central	38.6	21.5	39.9	101
Kisumu East	32.8	14.7	52.5	166
Kisumu West	35.0	25.7	39.3	166
Maharani	26.3	28.8	44.9	162
Nyakach	22.5	24.5	53.0	192
Nyando	26.4	21.7	51.9	165
Seme	31.0	20.6	48.4	253
Education level				
None or primary incomplete	29.7	17.1	53.1	223
Primary	31.5	12.7	55.8	299
Secondary	35.8	20.0	44.2	471
Post-secondary	38.9	22.7	38.4	212
Wealth quintile				
Lowest	26.9	27.2	45.9	222

Background characteristics	% who mentioned during second trimester	% who provided other responses than during second trimester	% who don't know	Number of women*
Second	34.7	27.4	37.9	243
Middle	23.6	7.0	69.4	244
Fourth	26.6	17.3	56.1	243
Highest	39.6	20.3	40.1	253
Marital status				
Single	27.8	24.8	47.4	191
Married	35.0	19.1	45.9	966
Divorced/separated/ widowed	67.3	7.3	25.4	48

**Refers to women with a live birth in the 2 years preceding the survey; ¥ Refers to the age of the respondent at the time of the interview*

Similar to what was observed in Kisumu County, there was limited knowledge of the stage at which a pregnant woman should start taking SP in Migori County (Table 14). ***At the county level, 35% of women interviewed correctly mentioned that SP should be taken beginning the second trimester.*** Across the sub-counties, such knowledge ranged from 21% in Suna West to 51% in Awendo. Results by other sociodemographic characteristics showed that women with post-secondary education (57%), those from households in the middle wealth quintile (38%), those who were married (36%) and women aged 20-29 years (39%) had comparatively higher knowledge of when to begin taking SP during pregnancy compared to other sociodemographic groups. Similar to Kisumu County, a considerable proportion of women across the various sociodemographic groups in Migori did not know when to begin taking SP when pregnant.

Table 14. Knowledge of the stage in pregnancy when a woman is expected to begin taking SP, Migori County

Background characteristics	% who mentioned during second trimester	% who provided other responses than during second trimester	% who don't know	Number of women*
County	34.9	14.1	51.0	1942
Maternal age¥				
15-19 years	24.7	13.3	62.1	234
20-29 years	39.3	14.2	46.5	1179
30-39 years	28.4	13.7	58.0	460
40-49 years	27.2	17.1	55.7	69
Sub-counties				
Awendo	50.9	3.4	45.7	187
Kuria East	36.5	14.7	48.8	258
Kuria West	36.2	12.4	51.4	274
Nyatike	26.2	23.0	50.8	258
Rongo	29.5	18.7	51.7	236
Suna East	48.2	15.8	36.0	245
Suna West	21.2	12.8	66.0	246
Uriri	25.7	9.5	64.8	238

Background characteristics	% who mentioned during second trimester	% who provided other responses than during second trimester	% who don't know	Number of women*
Education level				
None or primary incomplete	30.5	15.1	54.5	718
Primary	30.6	11.3	58.0	451
Secondary	34.4	16.5	49.1	583
Post-secondary	57.3	9.1	33.6	190
Wealth quintile				
Lowest	33.6	13.5	52.9	428
Second	31.1	19.4	49.5	356
Middle	37.7	11.6	50.7	389
Fourth	30.9	14.6	54.5	383
Highest	36.9	13.3	49.8	385
Marital status				
Single	31.0	14.7	54.3	234
Married	36.3	14.0	49.7	1647
Divorced/separated /widowed	15.1	14.3	70.6	61

**Refers to women with a live birth in the 2 years preceding the survey; ¥ Refers to the age of the respondent at the time of the interview*

7. Knowledge of the Recommended Dosage of SP for Intermittent Preventive Treatment of Malaria in Pregnancy

It is recommended that pregnant women living in malaria endemic areas start taking the first dose of IPTp-SP in the second trimester with the objective of ensuring that at least three doses of SP are received during the pregnancy. Table 15 shows women's knowledge of the recommended doses of IPTp-SP in Kisumu County. ***The results showed that 36% of women in the county had limited knowledge of the recommended uptake of three or more doses of SP during the pregnancy.*** There was variability at the sub-county level, with women in Nyando (29%), Nyakach (29%) and Kisumu East (29%) having lower knowledge of the recommended doses than the county average. **Knowledge of the recommended IPTp-SP doses was lowest among women who had secondary education (31%),** those from households in the middle wealth quintile (24%), those who were single (32%) and those aged 15-19 years (12%). There was also a substantial proportion of women who did not know the recommended dosage of SP for IPTp across the various sociodemographic groups.

Table 15. Knowledge of the recommended doses of SP that a woman is expected to take during her pregnancy, Kisumu County

Background characteristics	% who mentioned 3 or more doses	% who provided other responses than 3 or more doses	% who don't know	Number of women*
County	36.3	5.0	58.7	1205
Maternal age¥				
15-19 years	11.5	1.0	87.6	88
20-29 years	32.3	7.6	60.1	729
30-39 years	47.2	0.5	52.3	350
40-49 years	22.9	7.7	69.4	38
Sub-counties				
Kisumu Central	40.8	1.8	57.4	101

Background characteristics	% who mentioned 3 or more doses	% who provided other responses than 3 or more doses	% who don't know	Number of women*
Kisumu East	29.1	9.1	61.8	166
Kisumu West	43.0	9.8	47.1	166
Muhoroni	33.5	6.0	60.5	162
Nyakach	28.5	4.4	67.2	192
Nyando	28.5	3.6	68.0	165
Seme	42.8	7.2	50.0	253
Education level				
None or primary incomplete	42.4	7.6	49.9	223
Primary	40.5	3.4	56.1	299
Secondary	31.1	7.6	61.3	471
Post-secondary	37.4	3.1	59.5	212
Wealth quintile				
Lowest	38.9	6.7	54.4	222
Second	55.8	3.7	40.6	243
Middle	23.5	18.2	58.3	244
Fourth	31.5	8.5	59.9	243

Background characteristics	% who mentioned 3 or more doses	% who provided other responses than 3 or more doses	% who don't know	Number of women*
Highest	37.5	2.9	59.6	253
Marital status				
Single	31.8	7.4	60.8	191
Married	36.9	4.3	58.8	966
Divorced/separated /widowed	39.9	9.8	50.2	48

**Refers to women with a live birth in the 2 years preceding the survey; ¥ Refers to the age of the respondent at the time of the interview*

There was equally limited knowledge of the recommended doses of SP for IPTp in Migori County (Table 16). At the county level, only 35% of women interviewed correctly mentioned the recommended three doses of SP while 57% reported that they did not know the recommended doses. Women from sub-counties such as Uriri (20%), Suna West (22%), Nyatike (23%) and Rongo (24%) had very low knowledge of the recommended doses of SP for IPTp, way below the county average. Limited knowledge of the recommended doses of SP for IPTp was equally evident among women with no/incomplete primary education (28%), those from households in the lowest wealth quintile (25%), women who were single (26%) and those aged 15-19 years (23%).

Table 16. Knowledge of the recommended doses of SP that a woman is expected to take during her pregnancy, Migori County

Background characteristics	% who mentioned 3 or more doses	% who provided other responses than 3 or more doses	% who don't know	Number of women*
County	35.1	7.7	57.3	1942
Maternal age¥				
15-19 years	22.7	10.6	66.7	234
20-29 years	36.7	7.8	55.5	1179
30-39 years	35.4	6.2	58.4	460
40-49 years	36.1	6.2	57.7	69
Sub-counties				
Awendo	41.7	5.4	52.9	187
Kuria East	44.8	6.1	49.1	258
Kuria West	44.7	4.6	50.8	274
Nyatike	22.6	9.7	67.7	258
Rongo	23.7	8.3	68.0	236
Suna East	39.4	11.0	49.6	245
Suna West	21.5	10.5	68.0	246
Uriri	20.3	5.4	74.3	238

Background characteristics	% who mentioned 3 or more doses	% who provided other responses than 3 or more doses	% who don't know	Number of women*
Education level				
None or primary incomplete	28.4	9.0	62.6	718
Primary	36.6	5.8	57.5	451
Secondary	33.5	8.0	58.5	583
Post-secondary	55.8	6.3	37.9	190
Wealth quintile				
Lowest	25.2	8.3	66.5	428
Second	29.8	14.0	56.3	356
Middle	33.4	8.1	58.5	389
Fourth	37.9	7.1	55.0	383
Highest	39.0	5.5	55.5	385
Marital status				
Single	26.3	5.9	67.8	234
Married	36.6	7.9	55.5	1647
Divorced/separated/widowed	27.7	6.9	65.4	61

**Refers to women with a live birth in the 2 years preceding the survey; ¥ Refers to the age of the respondent at the time of the interview*

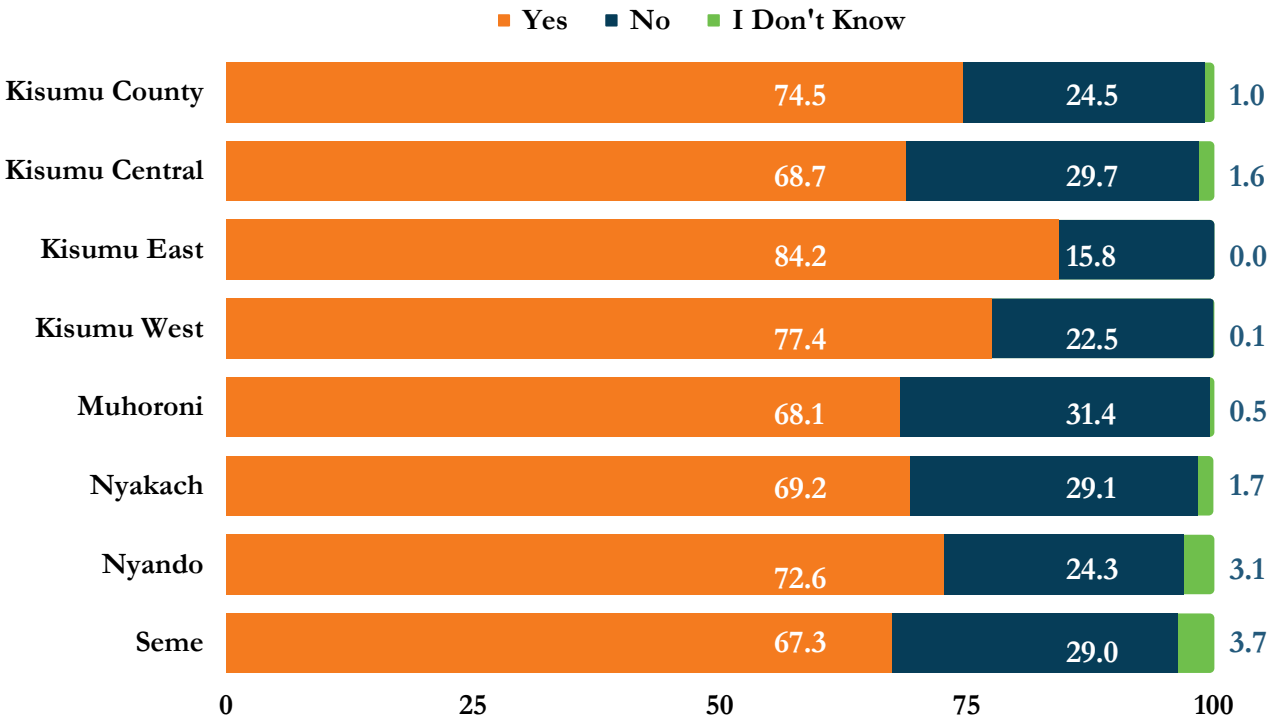
8. Feasibility and Acceptability of Rolling Out Community-Directed Approaches to Promote IPTp

Quantitative findings: feasibility and acceptability of rolling out community-directed approaches to promote IPTp

To assess the feasibility of rolling out community-directed approaches (using trained community-based health providers, local pharmacies, local media and digital SMS platforms to promote and provide IPTp-SP), women were asked whether they would consider accessing IPTp through such approaches.

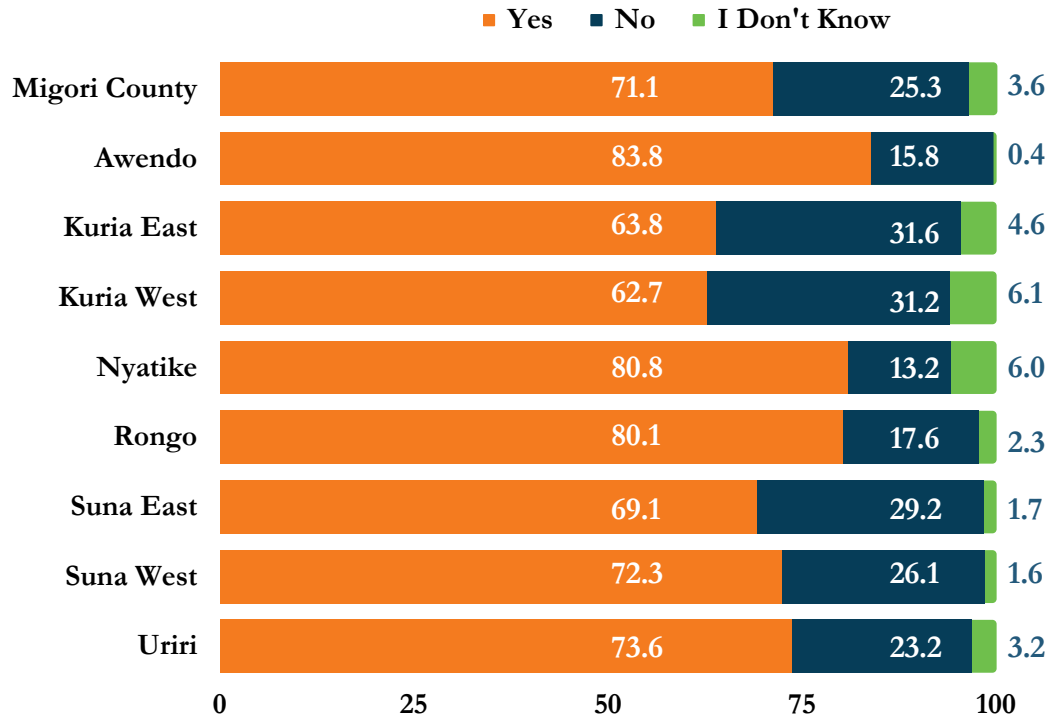
Figure 2 represents a summary of the general views of women in Kisumu County on community-directed approaches. ***Results showed that at the county level, there was high support (75%) for community directed approaches to promote uptake of SP***. Support at the sub-county level ranged from 67% in Seme to 84% in Kisumu East.

Figure 2. Whether women would consider accessing IPTp through community-based approaches if they were to have another baby, Kisumu County



Results for Migori County showed generally high support for community directed approaches to promote uptake of SP at the county level (71%). There was variability in such support at the sub-county level, ranging from 63% in Kuria West to 84% in Awendo (Figure 3).

Figure 3. Whether women would consider accessing IPTp through community-based approaches if they were to have another baby, Migori County



To assess the acceptability of community-directed approaches in promoting uptake of IPTp, women were asked during quantitative interviews whether they would recommend usage of community directed approaches to the government and organizations providing healthcare services; whether they would use SP for IPTp if they were to have another child; and whether they would recommend the use of SP for IPTp to friends or relatives.

Results from Kisumu County showed that majority of mothers (89%) would recommend that the government and other stakeholders consider using community-directed approaches to promote usage of SP (Figure 4). There was also very high willingness among women to use SP during pregnancy if they were to have another child (94%). Equally, majority of women interviewed (95%) indicated that they would recommend to friends/relatives to use SP for IPTp.

In Migori County, majority (81%) of respondents reported that they would recommend that the government and other stakeholders consider community directed approaches to promote usage of SP (Figure 5). There was near universal (96%) possibility of women using SP during pregnancy if they were to have another child. An equally very high proportion of women (96%) indicated that they would recommend to friends/relatives to use SP for prevention of malaria during pregnancy.

Figure 4. Indicators of acceptability of community-directed approaches to promote IPTp, Kisumu County

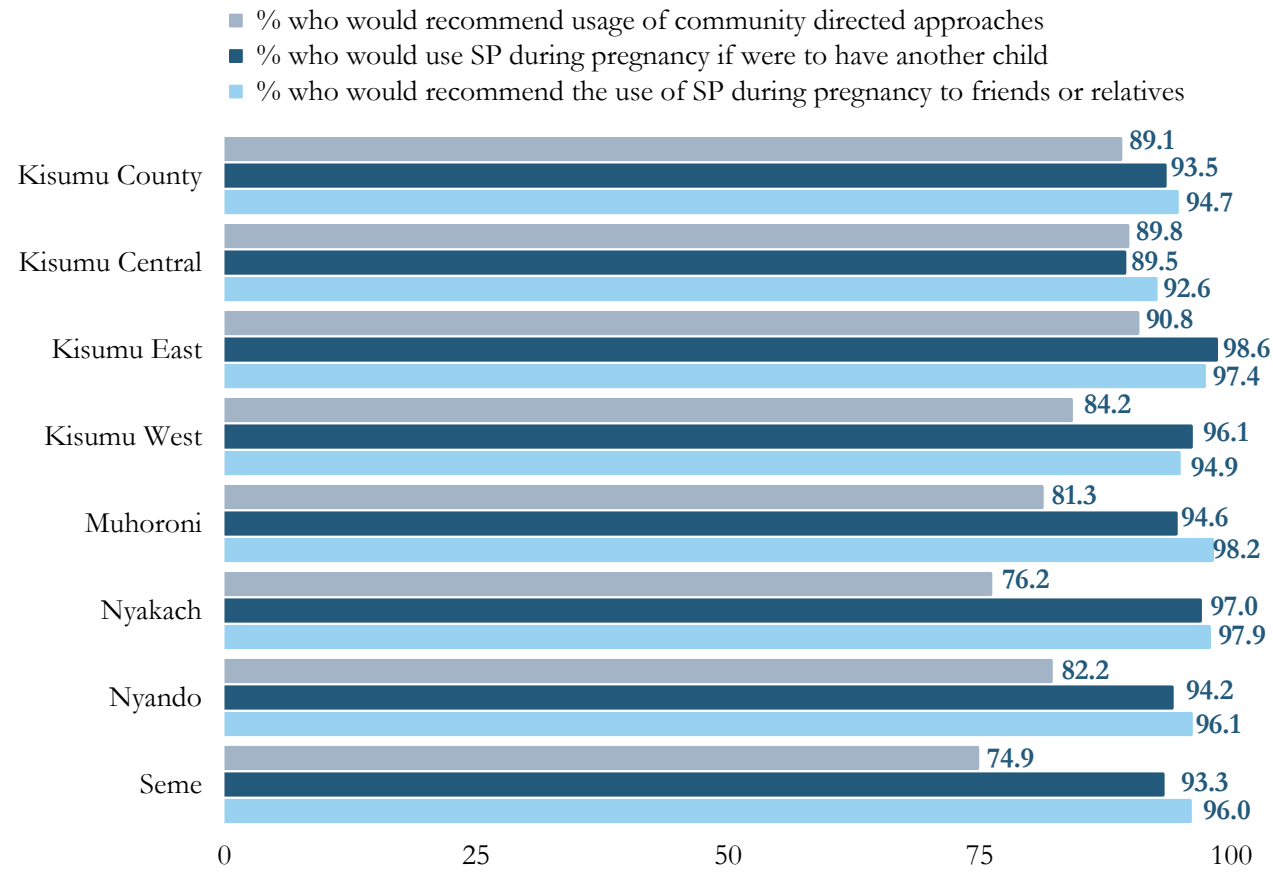
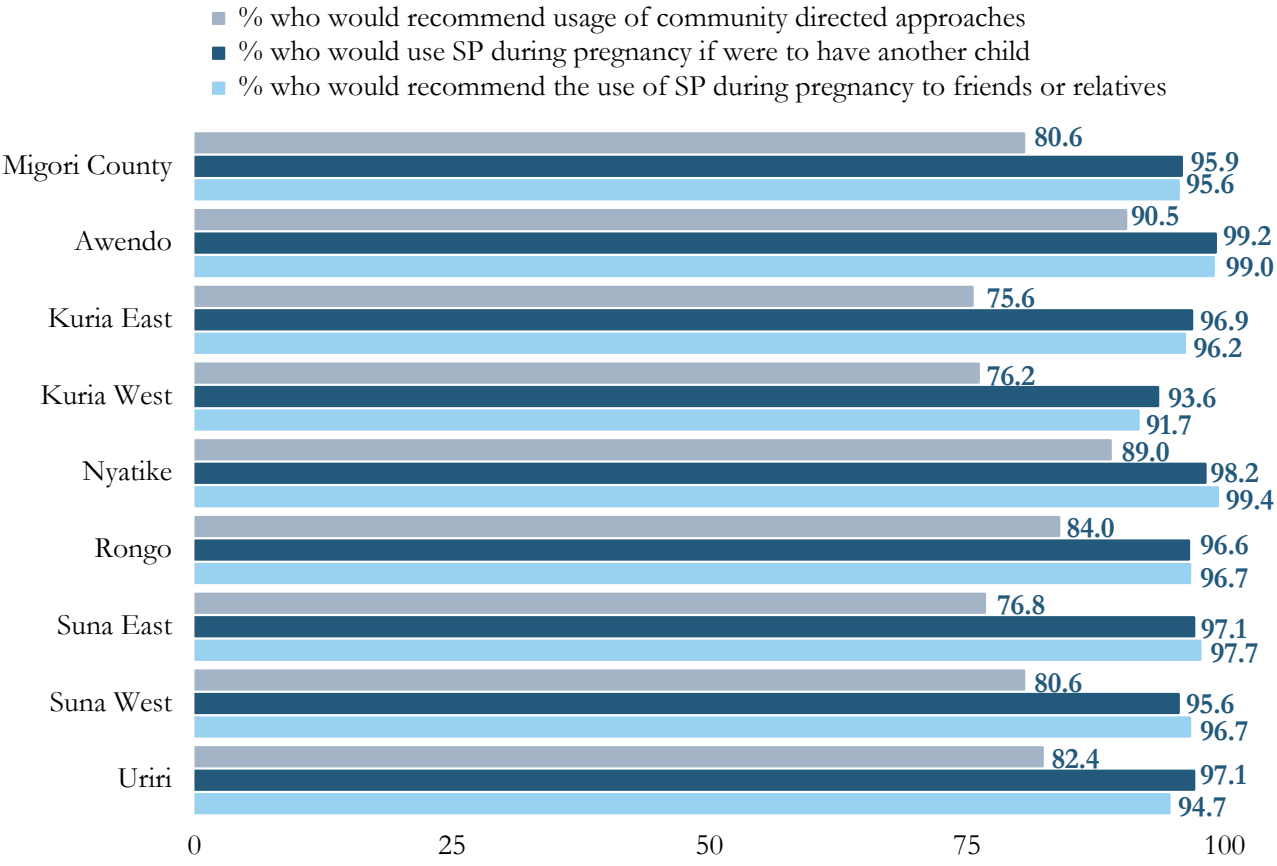


Figure 5. Indicators of acceptability of community-directed approaches to promote IPTp, Migori County



Qualitative findings: feasibility and acceptability of rolling out community-directed approaches to promote IPTp

Qualitative interviews conducted with mothers, health providers, programme implementers and policymakers provided more insight on the feasibility and acceptability of the various community-based delivery models meant to increase IPTp uptake. Qualitative findings from Kisumu and Migori counties on the feasibility and acceptability of using the various community-based delivery models are detailed as follows.

Feasibility and acceptability of using trained community-based health providers in provision of IPTp services to pregnant women

Health providers and other key informants were of the view that the use of trained community-based health providers will be feasible because of the use of an already established community structure—the partnership with CHVs who are already active and known in the community. This partnership will serve the dual purpose of passing information and at the same time ensure that access challenges such as taking many hours and covering longer distances to access SP are minimized. The use of trained and qualified providers will enhance the quality of services at the community level and address the missed opportunities due to poor ANC attendance. Use of community health providers would enhance early identification of pregnant women and early initiation into taking SP in addition to providing an opportunity for follow-up of mothers throughout their pregnancy. The deployment of nurses in the community was also highlighted as a strategy within the health system aiming to reach the hard-to-reach mothers in the community.

"Those early days there was home visiting, there was that package of home visiting in the MCH's-Maternal Child health clinics. So, you find that the services would be given in the morning, and the afternoon was left for home visits. That aspect has died off and this was really good because the healthcare providers were in touch and they would even know that in this household there are two mothers who are pregnant in this area, and we never saw this lady at the clinic in the morning… then they would make a follow up… So, I am just saying that this in a way brings back what was there before."

Reproductive health official, Kisumu

"Those pregnant women with poor clinic attendance record will find it easy to access Fansidar drug at the doorstep especially in the community...you know people prefer services that are brought closer to them, not services that they have to seek far away."

Nurse, Migori

Ok, l understand you when the nurses are deployed to the community, when they are going to do distribution, they will also help in health education teaching those mothers about preparedness, about planning, complications, the minor disorders, the danger signs. Currently the doctor gives the mother the drug, they don't know why, the reason behind it, even the complications, even the side effects l doubt if they are aware. So, if the nurses are given, I think it will be good."

Pharmacist, Kisumu

Even as most of the study participants were supportive of the approach, a few insisted that there were certain conditions that needed to be addressed to make it feasible. This included ensuring that the data on SP uptake is linked to the health facility, those handling and dispensing SP are skilled providers and are well-trained, and providing a whole package of ANC services as opposed to just focusing on IPTp. This would eliminate the potential danger posed to pregnant women if SP was to be handled and provided by less qualified service providers. For sustainability purposes, there was a proposal not to hire new health providers to be deployed in the community but rather to use existing health providers through supporting outreach activities.

"It is feasible so long as the data from the catchment area is recorded in the facility. Then follow-up with those in ANC booklets. I think they will lead to an increase…it will pick up most of the ANC mothers… they will also know the importance of early attending the clinic so at least it will reduce this thing of coming late to the clinic and it will also meet the target of general ANC attendance."

Midwife, Kisumu

"Some realize they are pregnant when it is a bit late, and they don't even attend clinic sometimes. But this time round you are using these qualified personnel to take the information to the villages. So to me it will be easy for the community to get to know what they are supposed to do. So it's important that you are now taking the information to them. Not them coming for the information."

Pharmacist, Migori

"My thinking would be not really to recruit new nurses under KMET or Population Council but rather to strengthen the already existing health care system which dictates that a pregnant mother will always be seen for her ANC services at the facility… ANC services is not only about SP…if we have a whole health workforce of nurses officers only doing a bit of ANC, then we might dilute the meaning of ANC profile… My idea is why can't we then have these nurses into our mainstream healthcare system, let them report to a facility, they can still work from the facility to follow up on referrals and also map the pregnant women in various catchment population of that facility, if they need to do home visits they can do home visits but then this must be within structure of healthcare and not a parallel structure… we do not want to increase one indicator of IPTp and kill other indicators."

Programme manager, Kisumu

Prior sensitization of the community members about the project was mentioned as a strategy that would make the approach acceptable. There were also concerns raised regarding how the drugs will be stored and how the community-based providers will keep records for accountability. A few felt that the health workers at the community may not be well equipped to handle some health matters at community level and so should offer information but refer to facility for SP, where diagnosis services are also available.

Feasibility and acceptability of using local pharmacies in provision of IPTp services to pregnant women

Most of the participants were skeptical about the feasibility and acceptability of using local pharmacies in the provision of SP to pregnant women. Main concerns included the cost of the drugs and affordability since pregnant mothers access SP for free in public health facilities, the inadequate geographical distribution of local pharmacies, barriers in relation to the referral system from linked health facilities and prescriptions for IPTp, and profit motivations by private pharmacies that could lead to abuse of the distribution and access of SP by pregnant women.

There were also concerns on the mode of administration of SP whereby it is supposed to be administered by direct observational therapy (DOT). They argued that it would be a challenge for pharmacies to implement DOT, collect data on the doses, and keep records that are expected to be linked to health facilities. Women were equally concerned about the qualifications of the providers employed in local pharmacies. They were concerned that the providers may not be qualified especially from pharmacies that are not registered and therefore may end up dispensing wrong or expired drugs, or even provide other medications in case they do not have SP in stock.

"IPTp [SP] is normally a free drug given during antenatal but for the private maybe it will come with implication of cost… that will lower the uptake. How will chemists also document it? Do they have like a documentation pad like the IFAS [Iron and Folic Acid Supplementation] given on such a such a date so that the mother can also come with it at the facility? Those are medications that need to be monitored. It's like you have gotten Covid-19 vaccine jab first dose, then you come and tell me that I got it, what is the evidence?...will they also be issuing the ANC booklet?... because someone may say, "I took it from the pharmacy" but we don't have the evidence."

Programme coordinator, Migori

"I think that it can only work in town, but not in the rural areas. This is a bit practical, If I may ask, from Chemelil town to this place, have you seen any chemist? There is only one at Kibigori junction… Now if you use that strategy, how many women will go to Kibigori junction to seek that service?"

Community health volunteer, Kisumu

"What I am worried about are the issues of availing them [SP] at the local pharmacies and within the markets…as you know this one is an observed treatment… It is DOT….So, when it is there, it is given directly…So, I don't know whether those pharmacies will also be directly observed as they [pregnant women] take SP."

Community focal person, Migori

"If you go to the chemist, they might lie to you and give you another drug because the person is out to make money. Instead of giving you the drug that prevents malaria, he can decide to give you another medicine just because he needs money. The pharmacist might say that we don't have Fansidar, but this other drug is also very good. So, you will just take thinking it is the same as Fansidar, yet you are not getting the right drug."

Mother, 15-24 years, Kisumu

The few participants who felt that the approach may be feasible and acceptable noted that pharmacies are accessible for longer hours beyond facility operational hours, they do not always charge consultation fees, they readily serve people in the community, they bring the services near to the community, and would offer alternative SP sources during stockouts at the health facilities.

When they [pregnant women] want whatever they want, they always come, and they will always get it here. Sometimes they don't pay us consultation fee, but they will always come here… we advise them. We are accessible… whatever the time."

Pharmacist, Migori

"If they are put at the pharmacy at the local centres, it will help us because you know many people go to hospital to get them because they are free and at times, we might find them out of stock, and if they are not in the hospital, you can as well get them outside."

Mother, 15-24 years, Kisumu

Feasibility and acceptability of using local media in provision of information on IPTp to pregnant women

Majority of respondents were of the view that the use of local media was feasible and acceptable as it will assist in widely disseminating information on malaria in pregnancy to households in the target community. This is because it can cover a wider geographical area and if aired repeatedly would reinforce the messages already being passed across by health workers and CHVs in the community. Other reasons for its likely success were the high access to radio in almost every household and the radio being a trusted source of information by the community.

"It will work because in most cases when things are announced on radio many people always take it seriously and everybody gets the information on air… They should use radio because it will reach many people."

Mother, 15-24 years, Kisumu

"The radio part of it is welcome. It is good because it is passing information. It could reach a wider scope if everybody had access to the radio but then we also need to know how many people have access to these radios…we are covered by radio up to eighty percent of the households or even eighty five percent of the households have access to the radios then we can be sure the information will reach home… we can go to the radio stations frequently and tell them that we have these groups of people offering these services, they are recognized by the ministry of health, they are our people on the ground…then would we would urge them to cooperate."

Malaria health official, Migori

"Radio will give information as most people listen to radios in the community. It depends on the information that is channeled in that media. If you broadcast that we are providing IPTp in the community, they will get it, the information will reach them. It really depends on the type of information and how it will reach the audience."

Nurse, Kisumu

Nonetheless, some respondents pointed out the need to ensure that the message is well packaged and that the local media that is chosen has a wide listenership. The messages would also be understood if passed in local languages. Others also suggested the possibility of using other local media channels such as television stations as most people have access to television sets. Issues such as existence of households with no radio, people who do not listen to radio, and the time the messages are aired needed to be addressed to make this approach a success. Possible solutions included airing of messages when most people are likely to be at home or not too busy, especially in the evenings to maximize on coverage. The use of radio should also supplement other strategies such as the use of CHVs and community-based providers to pass information since airtime on radio is limited due to associated costs.

"You know for radio, if used in the local language is good, but it may be biased because again not everybody has a radio, not everybody will sit down and listen to the radio and again it also depends on the time of the day that the talk is offered. Because at times you are offering the talk, but the pregnant mother is also busy doing something else."

Nurse, Migori

"Nowadays most people don't listen to radio. I don't know the last time I sat down to listen to radio was when. They watch TV…I think if you can put them on TVs, the message can be spread better but on radio, I think old women are the ones who sit down to listen to radio."

Pharmacist, Kisumu

Feasibility and acceptability of using SMS in provision of information on IPTp to pregnant women

The use of SMS was seen as feasible and acceptable for sending information on IPTp to pregnant women by almost all the participants. This was due to the fact that most of the people have access to mobile phones and previous experiences in similar campaigns indicated that the use of SMS was very effective in passing information. They were also of the opinion that the strategy will act as a reminder to pregnant women about their scheduled visits to the health facility and motivate them to use ANC services.

"It is the best… the SMS alerts…nowadays almost everybody has a mobile phone…when we were conducting the measles campaign, you get SMS alert to bring your child for immunization. When they get those SMS and they see those adverts in the form of mass media advertisement, I think it will work…it will be reminding them continuously on adherence."

Nurse, Kisumu

"Mobile messages will motivate me to use it [SP] especially when I had already developed a negative attitude about it but through such information it may help me rescind my prior decision of not using the drug and it might make me like the drug."

Mother, 15-24 years, Migori

"Use of SMS is acceptable…This is because after checking the appointment date when I'm still in the hospital, I will comeback with the book and give it to my mum…if my mother won't remind me of my appointment then I won't think of it but for the phone, it is always in my hand or next to me and when I receive a message, I will stop what I was doing to check my phone to read the message."

Mother, 15-24 years, Kisumu

Nonetheless, participants pointed out possible challenges that will need to be considered and addressed while using the SMS platform to pass information. This included the fact that not everyone in the community is literate and able to read and comprehend the message. There are also network connectivity issues whereby certain areas have weak network coverage or are entirely not covered by mobile providers.

"For the phone, the only challenge may be how many of these pregnant mothers are having a phone. That is the only challenge but if in case all of them have a phone, using a mobile phone will be like sending a reminder message you are supposed to be going to the clinic tomorrow and get your SP and may be used to provide feedback about experience with SP…it is a strategy that can increase the uptake of SP within the locality."

Community leader, Migori

"They will accept but remember most mothers do not have mobile phones; most of the time you find a household is having only one phone and that phone most of the time is owned by the husband… therefore mothers will not be able to access the information sent through mobile phone especially for such mothers who do not own phones."

Nurse, Migori

9. Challenges Pregnant Women Face in Accessing Health Services

Study participants highlighted a number of factors that prevent pregnant women from accessing health services, especially IPTp. These included negative provider attitude, distance to the health facility, costs/charges for health services, and the perceived side effects of SP. The attitude of providers was mentioned by all participants in all FGDs as one of the factors that influence whether pregnant women access health services. Particularly, younger pregnant women seemed to experience harsh treatment from providers compared to older pregnant women.

"Some nurses are so harsh. They will ask you "now that you have come to the clinic, you are how many months away? Why did you not come early?" Sometimes when you go early, they send you away that it is early to start the clinic. This annoys someone because now you don't know when to start clinic and at what month. This will also make you not to go."

Mother, 15-24 years, Kisumu

"Many times, health providers are not friendly to clients at the facility. They are sometimes rude, they are not friendly…they do not have positive attitude towards clients...You may appear there early in time, but you find the same providers are the ones who delay in providing service and this means that you will stay there on the bench until you decide to return home and only seek care when you are about to give birth."

Mother, 25-49 years, Migori

"Sometimes you can be afraid to go to the hospital because, sometimes you have not spaced giving birth, they will tell you "Why is there no spacing, use family planning." They will talk to you harshly; they can also say "you are this young and have many children" This will be so embarrassing."

Mother, 15-24 years, Kisumu

Distance to facilities was identified as another barrier to pregnant women seeking services in health facilities. This was especially a major challenge during heavy rains that would lead to flooding and hence increase the costs associated with covering long distances.

"In my area of residence there is a river passing between our home and the health centre which causes a big challenge when seeking health services from the centre especially when it floods. Sometimes the river overflows and there is a lot of mud that you can't take the risk of going to the health centre. You might fall into a puddle or into the river and for a woman like me who doesn't even have basic swimming skills, it is not a safe idea. I might just end up calling the local midwife and having her check my pregnancy and let me know in case of any areas of concern."

Mother, 25-49 years, Migori

"Transport. You see like now it is too muddy, and our roads are bad, the hospitals are also too far…due to the distance, someone might decide to get a concoction from the traditional doctors in the village not knowing she could be suffering from Malaria."

Mother, 15-24 years, Kisumu

Apart from transport costs, costs related to charges levied on ANC services were mentioned as a deterrent to pregnant women who would want to access care. These charges mostly included costs related to laboratory tests and items required for delivery.

"Sometimes you go to the hospital and do not find the medicine, so they will prescribe the medicine and again you see when going to the lab, you have to pay 50 shillings upfront, and at times you do not have transport money after paying the 50 shillings, meaning there is no way you are going to buy the medicine."

Mother, 15-24 years, Kisumu

"Lack of drugs at the facility will always hinder our efforts to receive proper care whenever we want. Failure to access drugs at the facility will force us to look for drugs somewhere else especially at the chemist. Sometimes I am sick and maybe I have no money to purchase drugs so I will have to wait until I get money even if I am feeling bad. Again you fail to find drugs especially when you visit public health facility….you still have to purchase the drugs."

Mother, 15-24 years, Migori

"The problems I had, first of all I went to two different hospitals, I went to the first, I was given a book, and even got an injection for malaria. When it got to the lab, I honestly did not have money at all, so they sent me home, and I again came back, they wanted 500 shillings. When I came back it was about 1pm, and they said that without money, there was nothing they could do to me. Again, I went back home. They told me that next time I go, I should have money, so I went back with 200 shillings and again I was sent back. It forced me to go back and stay at home till I was eight months pregnant."

Mother, 15-24 years, Kisumu

There were also concerns about women's experiences after taking SP and the perceived side effects of the medicine which made pregnant women have a negative attitude towards SP. Some of the study participants raised the issue of negative effects of SP including feeling dizzy and experiencing nausea after swallowing the drug, especially when taken on an empty stomach. This to some extent discouraged pregnant women from taking the drug.

"The reason why some women are not taking this drug is that maybe you have gone to the facility before eating anything, you have not had any breakfast, you are hungry and then you are given Fansidar on empty stomach you have not eaten anything, you will have to vomit everything including the drug…sometimes you may request that you are given the drug to swallow at home and then on reaching home, you keep the drug, or you throw it under the pot."

Mother, 25-49 years, Migori

"Personally, I used to feel dizzy when I took it [Fansidar] and the days when I used to take them, they made me feel tired, but I was just forcing myself to take them… It affects me so much when I don't take food before. So, I used to take porridge… At times when some people are given to go and take them at home they throw them, they don't take them. So, they gave us at the clinic to take them on the spot."

Mother, 15-24 years, Kisumu

"Once I swallow the drug, especially when I swallow it on the DOT while at the facility, I usually experience a lot of nausea and dizziness that I can even fall…like a typical scenario when I was carrying the pregnancy of this child, truly I fell on the road. Because you find that you go to the facility in the morning and instead of being treated and allowed to return home in time, you end up being given the drug very late like 1 pm when you are already feeling hungry…and when you swallow it at that time, you become weak and lose energy that may cause one to fall."

Mother, 15-24 years, Migori

Religious and traditional beliefs were also mentioned (mostly in Migori) as some of factors that may prevent pregnant women from visiting health facilities to receive care.

"Some people find it difficult to visit health facility due to restrictions put in place by religious doctrines. They fail to understand the benefit of going to the health facility due to fear of being rebuked by their respective religion."

Mother, 25-49 years, Migori

"Some people do not have money for transport to go to the hospital and so they prefer to take the traditional herbs from the village and stay around elderly women who advise them."

Mother, 15-24 years, Migori

Other facility level factors mentioned by participants that discourage women from seeking healthcare services included drug stockouts, long waiting time, limited operational hours, service disruptions due to health worker strikes, fear of HIV testing during ANC, and Coronavirus Disease (COVID-19) infection.

REVIVE IPTp
PREVENTING MALARIA IN PREGNANCY

Summary of Findings

This study sought to: (i) to determine baseline estimates of key project outcome indicators including women's uptake of IPTp-SP, coverage of ANC, knowledge of IPTp, attitude and practices regarding malaria in pregnancy prevention, and willingness to use IPTp-SP, and (ii) to assess participants' views on the feasibility and acceptability of community-directed approaches that promote IPTp self-care for pregnant women. The following are the key findings:

Uptake of SP for IPTp

Majority of pregnant women across the two counties received the first dose of IPTp-SP, but the proportion substantially reduced in the subsequent doses. ***The uptake of the recommended 3+ doses of SP was at 51% in Kisumu County and 42% in Migori County.*** There were substantial differences in uptake across sub-counties in the two counties, ranging from 26% in Uriri sub-county in Migori County to 63% in Kisumu West sub-county in Kisumu County. In both counties, women with no/incomplete primary education had consistently lower uptake of 3+ doses of SP compared to those who had attained higher levels of education.

Administration of SP for intermittent preventive treatment of malaria in pregnancy

Among women who were asked to state the number of SP tablets they took at each time IPTp-SP was administered, ***58% of those in Kisumu County and 45% of those in Migori County reported taking the recommended three tablets per dose during the last pregnancy.*** At the sub-county level, less than half of mothers in Nyando and Kisumu West in Kisumu County reported taking the recommended three tablets while in Migori, less than 40% of mothers in Rongo, Suna East, Awendo and Suna West sub-counties reported taking the recommended three tablets. In both counties, women from poor households and those aged 15-19 years had the lowest likelihood of taking the recommended three tablets.

Coverage of ANC

Antenatal care, which is part of the continuum of reproductive health care, serves as an important platform where health-care functions such as health promotion, screening and diagnosis, and disease prevention can be implemented. It also offers a critical opportunity to engage with and support pregnant women, their families and members of communities where they live. ***Majority of women in Kisumu (72%) and Migori (61%) counties made four or more ANC visits during pregnancy*** although there were considerable differences in ANC visits at the sub-county level. For example, in Kisumu County, the proportion of women in Nyakach (30%), Muhoroni (57%), Kisumu West (58%) and Nyando (70%) sub-counties who made four or more ANC visits during their pregnancy was lower than the county average. In Migori County, Kuria West (50%) and Nyatike (54%) sub-counties had the lowest proportions of women making four or more ANC visits.

Malaria morbidity during pregnancy

Women who tested for malaria when they were pregnant were asked to report on the outcome of the tests. ***31% percent of women in Kisumu County and 28% of those in Migori County who tested for malaria when they were pregnant reported positive results.*** There were wide variations in the proportion of pregnant women who tested positive for malaria across sub-counties. In Kisumu County, higher proportions of women in Nyando (48%), Seme (44%), Muhoroni (42%) and Kisumu West (41%) sub-counties reported positive malaria results compared to the county average. In Migori County, 41% of women in Kuria East, 34% of those in Awendo and 30% of those in Nyatike sub-counties who tested for malaria while pregnant reported positive results.

Knowledge of malaria prevention approaches during pregnancy

Most of the women in Kisumu (99%) and Migori (92%) were knowledgeable about sleeping under an insecticide-treated bednet as a malaria preventive approach. Nonetheless, there was limited knowledge in both counties of other MiP preventive measures such as taking SP (27% in Kisumu and 31% in Migori) and indoor residual spraying (5% in Kisumu and 9% in Migori). Variations by various sociodemographic characteristics showed generally low knowledge of SP and even lower knowledge of indoor residual spraying as interventions to prevent malaria in pregnancy. For example, knowledge of SP ranged from 12% in Uriri sub-county to 48% in Awendo sub-county in Migori County while knowledge of indoor residual spraying ranged from 1% in Kisumu East in Kisumu County to 21% in Awendo sub-county in Migori County.

Knowledge of when to begin taking SP during pregnancy

Across the two counties, fewer women were knowledgeable about the stage at which a pregnant woman should start taking SP. ***Only 36% of women in Kisumu County and 35% of those in Migori County correctly mentioned that SP should be taken at the beginning of the second trimester.*** There was a considerable proportion of women across various sociodemographic groups who did not know when to begin taking SP when pregnant in the two counties.

Knowledge of the recommended dosage of SP for IPTp

For women living in malaria-endemic areas, it is recommended that they receive at least three doses of SP during their pregnancy. There was limited knowledge of the recommended 3+ doses of IPTp-SP among women in both Kisumu and Migori counties. ***Only 36% of women in Kisumu County and 35% of those in Migori County were knowledgeable about the recommended 3+ doses of IPTp-SP.*** Women who were single and those in the youngest age group (15-19 years) had very low knowledge of the recommended doses of SP across the two counties. A substantial proportion of women did not know the recommended dosage of SP for IPTp across different sociodemographic groups in the two counties.

Feasibility and acceptability of using trained community-based health providers in provision of IPTp services to pregnant women

Qualitative interviews with mothers, health providers and other key informants showed that ***the use of trained community-based health providers was largely feasible and acceptable.*** This was because the use of community-based health providers improves access to information and healthcare services including SP while ensuring that access challenges such as time wastage, longer distance, and unavailability of SP are minimized. The use of trained providers also enhances the quality of services, addresses the missed opportunities due to poor ANC attendance, and enhances early identification of pregnant women and early initiation into taking SP. Nonetheless, participants reported a need to ensure that data on SP uptake is linked to the health facility, those handling and dispensing SP are skilled providers and are well trained, and a whole package of ANC services is provided as opposed to just focusing on IPTp. There were also concerns about the sustainability of using nurses/midwives given that they have to be remunerated.

Feasibility and acceptability of using local pharmacies in provision of IPTp services to pregnant women

Most of the study participants in Kisumu and Migori counties were skeptical about the feasibility and acceptability of using local pharmacies in the provision of SP to pregnant women. Key concerns included the inadequate geographical distribution of pharmacies, barriers in relation to the weak referral system and linkage between pharmacies and health facilities, as well as costs and profit motivations by private pharmacies that could limit access to SP by pregnant women. There were also concerns about existence of unqualified staff and unlicensed pharmacies which may potentially harm pregnant women, as well as challenges related to the implementation of DOT by private pharmacies. Other concerns pertained to challenges with data capture and record keeping especially on uptake of SP, linkage of the data capture systems to health facilities, and the challenge of mothers not getting comprehensive ANC services from pharmacies. The few participants who felt that the approach may be feasible and acceptable noted that pharmacies are accessible beyond facility operational hours, do not always charge consultation fees, readily serve people in the community, bring the services near to the community, and would offer alternative SP sources during stockouts at the health facilities.

Feasibility and acceptability of using local media in provision of information on IPTp services to pregnant women

The use of local media was largely considered feasible and acceptable due to the high ownership of and access to local media especially the radio in both Kisumu and Migori counties.

Radio was considered a trusted source of information by the community. It was equally likely to be successful as it was considered effective in reinforcing information on ANC that is already being passed across by health workers and CHVs. The approach was deemed effective in reaching a bigger audience and covering wider geographical areas. Apart from the positive feedback on the use of local media, participants pointed out the need to ensure that the message content was well packaged in a language understood by locals, the local media outlet chosen has a wide listenership, and messages are aired at a convenient time when most people are likely not to be busy.

Feasibility and acceptability of using SMS in provision of information on IPTp services to pregnant women

Generally, *the use of SMS in sending information on IPTp was considered feasible and acceptable* by study participants in Kisumu and Migori counties. This was based on the fact that there is increased access to mobile phones by most of community members and previous experiences with similar campaigns where use of SMS proved to be very effective in passing information. The use of SMS was equally considered feasible and acceptable as it acts as a reminder to pregnant women about their scheduled visits to the health facility and motivates them to use ANC services. Nonetheless, there were concerns about possible challenges that the SMS strategy is likely to encounter, including the likelihood of not reaching women without mobile phones and those who are illiterate and not able to read and comprehend sent messages. Some participants also raised network connectivity issues that could affect women from areas with poor network coverage.

Challenges pregnant women face in accessing health services

Women living in Kisumu and Migori counties faced similar challenges in accessing health services including IPTp. These challenges included negative provider attitudes especially towards younger pregnant women, long distances to health facilities with roads becoming impassable during rainy seasons, unaffordable user fees for health services that limit access to services by poor women, perceived and actual side effects of SP such as nausea and dizziness after swallowing the drug, and periodic stockouts of supplies including SP in health facilities.

Implications

Findings from this study have the following programmatic implications:

- Around one third of women in Kisumu and Migori counties are affected by malaria during pregnancy and yet uptake of key interventions such as the recommended 3+ doses of SP is still low. The fact that majority of pregnant women had made at least one ANC visit and taken the first dose of SP means that there is an opportunity to engage pregnant women and facilitate increased uptake of ANC services. Programme implementers should put in place measures that guarantee early identification and tracking of pregnant women within the community, for instance, through the use of CHVs. This is critical in ensuring that the needs of pregnant women and the challenges they face in accessing ANC services are appropriately addressed throughout their pregnancy.
- While women's knowledge of malaria preventive measures such as sleeping under an insecticide-treated bednet was high in both counties, there is a considerable gap regarding their knowledge of other malaria prevention strategies. Efforts should be made to intensify educational campaigns targeting pregnant women and the community at large on other malaria preventive measures such as taking SP that is freely available in public health facilities.
- Limited knowledge of when to begin taking SP when pregnant and the recommended dosage, and the variability in the number of tablets taken at each time point suggests the need for implementation of health promotion and education campaigns on the current IPTp recommendations. This will ensure that pregnant women and community members have the correct information on IPTp-SP.
- Findings on the feasibility and acceptability of selected community-directed approaches provide indications on the set of interventions that are likely to be successfully implemented in the two counties. Participants' preference for the use of community nurses/midwives, the use of mobile-phone messaging and local media platforms points to avenues that programme implementers can use to increase uptake of ANC services including IPTp-SP. There were concerns raised regarding using local pharmacies in provision of IPTp services, which makes the approach less viable.
- Efforts to increase uptake of ANC services should be sensitive to the existing challenges that women in the two counties face while accessing health services. Specifically, there is need to address poor provider attitudes towards clients especially younger pregnant women, review user fees that limit access to services by poor women, provide information on the perceived side effects of SP, and address the periodic stockouts of medicines including SP in public health facilities.

Limitations

The following caveats should be considered when interpreting findings from this study:

- **Data on IPTp-SP uptake is based on women who had ANC booklets.** Given the reported intermittent stockouts experienced in health facilities, there is a possibility that some women bought SP from private pharmacies and used it for IPTp, but this data was not captured in the ANC booklet. Nonetheless, the use of data extracted from the ANC booklet provides more accurate information that was recorded by health providers while offering ANC services.
- Data on malaria morbidity refers to reported test results that were conducted among pregnant women in the past two years preceding the survey. **There is likelihood of recall bias among women interviewed.** The estimates are therefore susceptible to either under or overestimation of cases depending on biases associated with the length of time women were expected to recall.
- The **study used a cross-sectional design, which limits inferring causal relationships**. However, the study used a mixed methods approach to triangulate quantitative and qualitative data to generate insights on the possible factors that need to be considered to improve uptake of ANC services including IPTp-SP in the two counties.

Conclusion

The findings show that there was limited uptake of the recommended three or more doses of SP for malaria prevention among pregnant women in the two counties considered. The documented high malaria morbidity, limited knowledge of malaria preventive measures such as taking SP and indoor residual spraying, and limited knowledge of the stage at which a pregnant woman should start taking SP may exacerbate poor maternal and newborn health outcomes in the two counties. The high ANC coverage and uptake of at least one dose of IPTp-SP in the two counties is an indication that there is an opportunity to engage women early in their pregnancy with the aim of improving their knowledge and optimizing uptake of ANC services, including IPTp-SP. The potential feasibility and acceptability of community-directed approaches such as the use of community nurses/midwives, and the use of mobile-phone messaging and local media platforms signifies high likelihood of success of these interventions in achieving increased uptake of ANC services including IPTp-SP in the study settings. In implementing such interventions, special focus should be given to the different sociodemographic segments of pregnant mothers such as those with limited educational attainment, those from poor households and young mothers to ensure that no one is left behind in terms of access to life-saving interventions.

Next steps

The next step for this study is to co-create and test the effectiveness of community-directed approaches (use of community nurses/midwives, mobile-phone messaging and local media platforms) in increasing uptake of ANC services including IPTp-SP. The approaches will be implemented in Kisumu Central sub-county in Kisumu County, and Suna West sub-county in Migori County. Midline and endline surveys will be conducted to assess the effectiveness of the implemented interventions compared to baseline indicators.

The other next step entails conducting a detailed analysis of the baseline data with the aim of drafting manuscripts to be submitted to international peer reviewed journals. This will involve, for example, undertaking a regression analysis to determine correlates of 3+ IPTp-SP uptake taking into account other variables not included in the present analysis, such as women empowerment and decision-making power.

REVIVE IPTp
PREVENTING MALARIA IN PREGNANCY

References

- Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211.
- Bandura, A. (2001). Social Cognitive Theory: An Agentic Perspective. Annual Review of Psychology, 52(1), 1–26. https://doi.org/10.1146/annurev.psych.52.1.1
- Desai, M., Hill, J., Fernandes, S., Walker, P., Pell, C., Gutman, J., Kayentao, K., Gonzalez, R., Webster, J., Greenwood, B., Cot, M., & ter Kuile, F. O. (2018). Prevention of malaria in pregnancy. The Lancet Infectious Diseases, 18(4), e119–e132. https://doi.org/10.1016/S1473-3099(18)30064-1
- Dev, R., Woods, N. F., Unger, J. A., Kinuthia, J., Matemo, D., Farid, S., Begnel, E. R., Kohler, P., & Drake, A. L. (2019). Acceptability, feasibility and utility of a Mobile health family planning decision aid for postpartum women in Kenya. Reproductive Health, 16(1), 97. https://doi.org/10.1186/s12978-019-0767-9
- DNMP and ICF. (2021). Kenya Malaria Indicator Survey 2020. Division of National Malaria Programme (DNMP) [Kenya] and ICF. https://dhsprogram.com/pubs/pdf/MIS36/MIS36.pdf
- Eisele, T. P., Larsen, D. A., Anglewicz, P. A., Keating, J., Yukich, J., Bennett, A., Hutchinson, P., & Steketee, R. W. (2012). Malaria prevention in pregnancy, birthweight, and neonatal mortality: A meta-analysis of 32 national cross-sectional datasets in Africa. The Lancet Infectious Diseases, 12(12), 942–949.
- Green, E. C., & Murphy, E. (2014). Health Belief Model. In The Wiley Blackwell Encyclopedia of Health, Illness, Behavior, and Society (pp. 766–769). American Cancer Society. https://doi.org/10.1002/9781118410868.wbehibs410
- Hodgins, S., & D'Agostino, A. (2014). The quality–coverage gap in antenatal care: Toward better measurement of effective coverage. Global Health: Science and Practice, 2(2), 173–181. https://doi.org/10.9745/GHSP-D-13-00176

- Kajubi, R., Ochieng, T., Kakuru, A., Jagannathan, P., Nakalembe, M., Ruel, T., Opira, B., Ochokoru, H., Ategeka, J., Nayebare, P., Clark, T. D., Havlir, D. V., Kamya, M. R., & Dorsey, G. (2019). Monthly sulfadoxine–pyrimethamine versus dihydroartemisinin–piperaquine for intermittent preventive treatment of malaria in pregnancy: A double-blind, randomised, controlled, superiority trial. The Lancet, 393(10179), 1428–1439. https://doi.org/10.1016/S0140-6736(18)32224-4
- Kimani, J., Phiri, K., Kamiza, S., Duparc, S., Ayoub, A., Rojo, R., Robbins, J., Orrico, R., & Vandenbroucke, P. (2016). Efficacy and Safety of Azithromycin-Chloroquine versus Sulfadoxine-Pyrimethamine for Intermittent Preventive Treatment of Plasmodium falciparum Malaria Infection in Pregnant Women in Africa: An Open-Label, Randomized Trial. PLOS ONE, 11(6), e0157045. https://doi.org/10.1371/journal.pone.0157045
- KNBS. (2019). 2019 Kenya Population and Housing Census: Volume 1. Kenya National Bureau of Statistics. http://housingfinanceafrica.org/app/uploads/VOLUME-I-KPHC-2019.pdf.
- KNBS, & ICF International. (2014). Kenya Demographic and Health Survey 2014. Calverton, Maryland: KNBS & ICF International.
- Maternal Health Task Force. (2018). Malaria in Pregnancy. https://www.mhtf.org/topics/malaria-in-pregnancy/
- Ministry of Medical Services (Kenya). (2010). Facts and figures: Health and health-related indicators 2010. Ministry of Medical Services.
- Ministry of Public Health and Sanitation (MOPHS). (2009). National Malaria Strategy 2009-2017. Ministry of Public Health and Sanitation.
- Mlugu, E. M., Minzi, O., Asghar, M., Färnert, A., Kamuhabwa, A. A. R., & Aklillu, E. (2020). Effectiveness of Sulfadoxine–Pyrimethamine for Intermittent Preventive Treatment of Malaria and Adverse Birth Outcomes in Pregnant Women. Pathogens, 9(3), 207. https://doi.org/10.3390/pathogens9030207
- Mubyazi, G. M., & Bloch, P. (2014). Psychosocial, behavioural and health system barriers to delivery and uptake of intermittent preventive treatment of malaria in pregnancy in Tanzania – viewpoints of service providers in Mkuranga and Mufindi districts. BMC Health Services Research, 14(1), 15. https://doi.org/10.1186/1472-6963-14-15
- National Malaria Control Programme. (2019). Towards a Malaria-free Kenya: Kenya Malaria strategy 2019-2023. National Malaria Control Programme, Ministry of Health.
- National Malaria Control Programme, Ministry of Health. (2016). The Kenya Malaria Communication Strategy 2016-2021.
- National Malaria Control Programme (NMCP), Kenya National Bureau of Statistics (KNBS), & ICF International. (2016). Kenya malaria indicator survey 2015. NMCP, KNBS, and ICF International.
- Newman, R. D., Moran, A. C., Kayentao, K., Benga-De, E., Yameogo, M., Gaye, O., Faye, O., Lo, Y., Moreira, P. M., Doumbo, O., Parise, M. E., & Steketee, R. W. (2006). Prevention of malaria during pregnancy in West Africa: Policy change and the power of subregional action. Tropical Medicine & International Health, 11(4), 462–469. https://doi.org/10.1111/j.1365-3156.2006.01593.x
- Rassi, C., Graham, K., Mufubenga, P., King, R., Meier, J., & Gudoi, S. S. (2016). Assessing supply-side barriers to uptake of intermittent preventive treatment for malaria in pregnancy: A qualitative study and document and record review in two regions of Uganda. Malaria Journal, 15(1), 341. https://doi.org/10.1186/s12936-016-1405-4

- Roh, M. E., Kuile, F. O. ter, Rerolle, F., Glymour, M. M., Shiboski, S., Gosling, R., Gutman, J., Kakuru, A., Desai, M., Kajubi, R., L'Ianziva, A., Kamya, M. R., Dorsey, G., & Chico, R. M. (2020). Overall, anti-malarial, and non-malarial effect of intermittent preventive treatment during pregnancy with sulfadoxine-pyrimethamine on birthweight: A mediation analysis. The Lancet Global Health, 8(7), e942–e953. https://doi.org/10.1016/S2214-109X(20)30119-4
- Thiam, S., Kimotho, V., & Gatonga, P. (2013). Why are IPTp coverage targets so elusive in sub-Saharan Africa? A systematic review of health system barriers. Malaria Journal, 12(1), 353. https://doi.org/10.1186/1475-2875-12-353
- USAID. (2019). President's Malaria initiative: Kenya Malaria operational plan FY 2019. USAID. https://www.pmi.gov/docs/default-source/default-document-library/malaria-operational-plans/fy19/fy-2019-kenya-malaria-operational-plan.pdf
- Walker, P. G. T., Floyd, J., Kuile, F. ter, & Cairns, M. (2017). Estimated impact on birth weight of scaling up intermittent preventive treatment of malaria in pregnancy given sulphadoxine-pyrimethamine resistance in Africa: A mathematical model. PLOS Medicine, 14(2), e1002243. https://doi.org/10.1371/journal.pmed.1002243
- WHO. (2007). Malaria in pregnancy: Guidelines for measuring key monitoring and evaluation indicators. World Health Organization.
- WHO. (2013). WHO policy brief for the implementation of intermittent preventive treatment of malaria in pregnancy using sulfadoxine-pyrimethamine (IPTp-SP). WHO Press, 1–13.
- WHO. (2016). WHO Recommendations on Antenatal Care for Positive Pregnancy Experience: Implementation of the ANC guideline and recommendations: Introducing the 2016 WHO ANC model. World Health Organization.
- WHO. (2019, October 21). Intermittent preventive treatment in pregnancy (IPTp). https://www.who.int/malaria/areas/preventive_therapies/pregnancy/en/
- WHO. (2017). Programme reporting standards for sexual, reproductive, maternal, newborn, child and adolescent health. World Health Organization.