

# Intermittent preventive treatment of malaria in pregnancy: a new delivery system and its effect on maternal health and pregnancy outcomes in Uganda

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**Objective** To assess whether traditional birth attendants, drug-shop vendors, community reproductive-health workers, or adolescent peer mobilizers could administer intermittent preventive treatment (IPTp) for malaria with sulfadoxine-pyrimethamine to pregnant women.

**Methods** A non-randomized community trial was implemented in 21 community clusters (intervention) and four clusters where health units provided routine IPTp (control). The primary outcome measures were access and adherence to IPTp, number of malaria episodes, prevalence of anaemia, and birth weight. Numbers of live births, abortions, still births, and maternal and child deaths were secondary endpoints.

**Findings** 1404 (67.5%) of 2081 with the new delivery system received two doses of sulfadoxine-pyrimethamine versus 281 (39.9%) of 704 with health units ( $P < 0.0001$ ). The prevalence of malaria episodes decreased from 906 (49.5%) of 1830 to 160 (17.6%) of 909 ( $P < 0.001$ ) with the new delivery system and from 161 (39.1%) of 412 to 13 (3.1%) of 99 ( $P < 0.001$ ) with health units. Anaemia was significantly less prevalent in both arms. There was a lower proportion of low birth weight 6.0% with the new delivery system versus 8.3% with health units ( $P < 0.03$ ). Few abortions and stillbirths were recorded in either arm. Fewer children and women who accessed IPTp with health units died than in the intervention group.

**Conclusion** The new approaches were associated with early access and increased adherence to IPTp. Health units were, however, more effective in reducing parasitaemia and malaria episodes. We recommend further studies to assess programming modalities linking the new approaches and health units.

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Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilitó una traducción al español. الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

## Introduction

Malaria is the leading cause of morbidity and mortality in Uganda. It mainly affects pregnant women and children age less than five years.<sup>1,2</sup> Surveillance reports show that proportionate mortality ratio (PMR) due to malaria for all ages has increased progressively from 20.2% in 1988 to 32.1% in 2004.<sup>3</sup> This increase has been attributed to high transmission of malaria in areas that were previously free of the disease, limited access to adequate treatment in the formal health-care facilities, increasing resistance to antimalaria drugs, and inadequate treatment of malaria at home where most people receive the first treatment.<sup>4</sup> The resurgence of malaria neces-

sitates intensification of treatment and preventive interventions and identification of new delivery approaches to increase access to effective interventions.

Previous studies have reported the involvement of community resource people, such as traditional birth attendants, drug-shop vendors, community reproductive-health workers, and adolescent peer mobilizers in malaria treatment and prevention. A study in Saradidi, Kenya, found volunteer village health workers effective in giving malaria treatment.<sup>5</sup> In the Gambia, chemoprophylaxis given to pregnant women by traditional birth attendants reduced malaria-related morbidity and poor pregnancy outcomes.<sup>6,7</sup> More recently, in

south-western Uganda, a study showed that community health workers can classify pneumonia, interpret the severity of the disease, and provide treatment for fevers with antimalarials.<sup>8</sup>

In this study, we tested a new delivery system of intermittent preventive treatment (IPTp) in pregnant women at a community level in Mukono district, Uganda. The study assessed delivery of IPTp with sulfadoxine-pyrimethamine (SP) to pregnant women through community resource people; these approaches constituted the intervention arm while provision of IPTp at health units was the control arm. The primary outcome measures were access and adherence to IPTp, number of malaria

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episodes, prevalence of anaemia, and birth weight; while live births, abortions, still births, and maternal and child deaths were secondary endpoints.

The new delivery system of IPTp in Uganda was conceptualized because of the persistent low use of health-service-based interventions. Only 47% of women attend four antenatal care visits as recommended by the policy, and only 42% of births have skilled attendants.<sup>9,10</sup> Low use of antenatal care limits access to malaria prevention in pregnancy and has been attributed to the high cost of services, long distances to health units, negative perceptions of SP and insecticide-treated nets, and low male involvement.<sup>11–13</sup> Malaria-control programmes that rely only on antenatal care as a delivery system are likely to have poor coverage and adherence to IPTp.<sup>14–16</sup>

## Materials and methods

### Study area and population

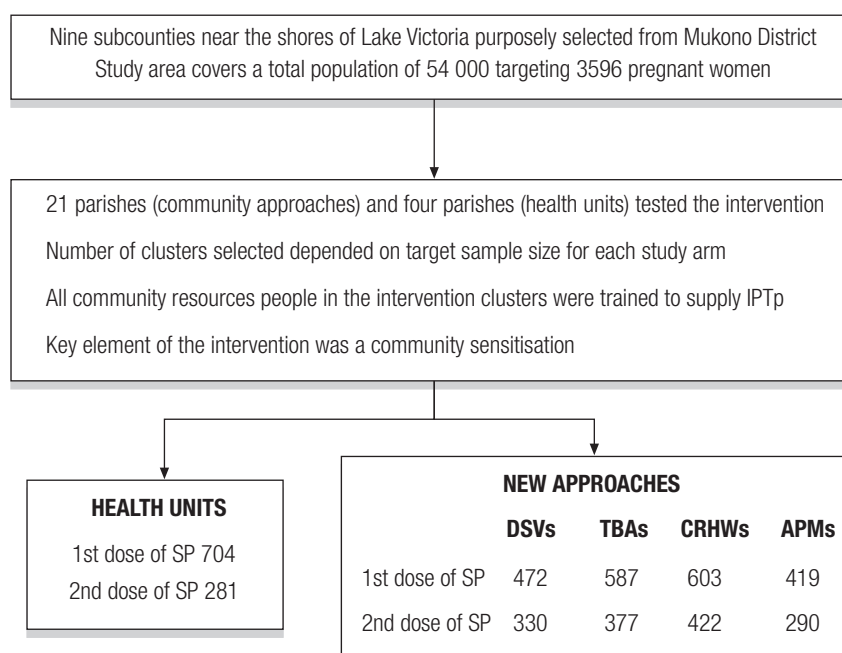
The study was done in nine subcounties near the lakeshore region of Mukono district in central Uganda. The background characteristics of the study area have been published elsewhere;<sup>13,17</sup> but briefly, the district has a rural population of 88% and is mainly inhabited by Baganda people, the largest tribe in Uganda. The area experiences high temperatures and heavy rainfall from March to May and from October to November. Most areas are endemic for malaria, whereas those on the shores of Lake Victoria are holoendemic and experience high transmission levels.<sup>18</sup>

### Intervention study

The intervention aimed to train community resource people to distribute IPTp. In Uganda, IPTp consists of two therapeutic doses of SP (three tablets of 500 mg sulfadoxine + 25 mg pyrimethamine).<sup>3</sup> Nine rural subcounties from the district that were homogeneous in terms of geography and cultural attributes were selected. Within each subcounty, at least two parishes were randomly selected.

In total, 25 parishes were selected, four tested IPTp at health units (control) while 21 tested IPTp with the new approaches (intervention; Fig. 1). The intervention was not randomized because not all the parishes were uniform in regard to the availability of

Fig. 1. Study profile



APM, adolescent peer mobilizer; CRHW, community reproductive-health worker; DSV, drug-shop vendor; SP, sulfadoxine-pyrimethamine; TBA, traditional birth attendant.

health units and people available to deliver the treatment. Some parishes had health units providing IPTp; others had both a health unit and people to deliver the treatment while others had only people who referred pregnant women to neighbouring parishes with health units for essential care. The inequitable distribution of health services in the study area and the current health-seeking behaviour influenced the design of the study. Despite this, the populations in the two study arms were comparable in terms of socioeconomic status and other background characteristics (Table 1).

We targeted all the pregnant women who lived in the study area. One of the key components of the intervention study was a community mobilization and sensitization campaign to ensure that all women received information on the intervention and where to get the SP. Because there was no register of people in this area, the number of pregnant women who accepted the first dose of SP served as the denominator for calculating the proportion of women who received the second dose of SP and other outcome variables.

Fifty-one people able to deliver treatment were identified. All these people were trained for one week. The following areas were covered: dangers

of malaria in pregnancy; malaria prevention in pregnancy; the benefits of SP and its side-effects; taking blood samples for parasite count and haemoglobin analysis; taking the baby's weight; and estimating gestational age. Recruitment of pregnant women lasted from May 2003 to February 2005; and those who consented to participate in the study were given SP as directly observed therapy during the second and third trimester as recommended by the policy in Uganda. Pregnant women received iron and folic acid supplementation, deworming, and information on proper nutrition. Those who presented in the first trimester were given an appointment to come back. Exclusion criteria were refusal to give consent to the study and a history of allergy to drugs containing sulphonamide.

Data were collected by the community resource people from pregnant women at recruitment, before receiving the second dose of SP and at 36 weeks gestation or at delivery on sociodemographic characteristics, obstetric history, reported malaria illnesses, use of insecticide-treated nets, doses of SP and dates when taken, pregnancy outcomes and deaths. These data were also collected at health units.

To have comparable groups, pregnant women who exclusively accessed

Table 1. Background characteristics of pregnant women who accessed IPTp in health units and the new delivery system

Sociodemographic characteristics	Women who accessed IPTp at health units (N = 704)	Women who accessed IPTp at the new delivery system (N = 2081)	Significance of difference (P)
<b>Age</b>			
Mean age (years)	23.6	24.0	> 0.12
10–19 years	200 (28.4%)	521 (25.0%)	< 0.03
20–34	466 (66.2%)	1435 (69.0%)	> 0.20
35–46	38 (5.4%)	125 (6.0%)	> 0.89
<b>Marital status</b>			
Single	123 (17.5%)	337 (16.2%)	> 0.74
Married	473 (67.2%)	1203 (57.8%)	< 0.004
Widowed or separated	108 (15.3%)	541 (26.0%)	< 0.02
<b>Occupation</b>			
Cultivator	571 (81.1%)	1580 (76.0%)	< 0.004
Employed	25 (3.6%)	91 (4.4%)	> 0.24
Own business	43 (6.1%)	92 (4.4%)	< 0.001
No job	65 (9.2%)	318 (15.2%)	< 0.002
<b>Education of the women</b>			
No education	93 (13.0%)	294 (14.1%)	> 0.78
Primary	435 (62.0%)	1352 (65.0%)	< 0.03
Secondary advanced	163 (23.2%)	383 (18.4%)	< 0.04
Secondary advanced	13 (1.8%)	52 (2.5%)	> 0.88

IPTp, intermittent preventive treatment.

IPTp (both the first and second dose of SP) with the health units constituted the control group, while pregnant women who exclusively accessed IPTp with the new approaches were the intervention group.

### Data analyses

Data were entered into EpiInfo version 6.0 (CDC, Atlanta, GA, United States of America), cleaned and transferred to Stata version 8.2 (Stata corp. College Station, TX, USA). Bivariate analyses were done to calculate access and adherence rates to IPTp. The comparison of the effect of the intervention between the new delivery system and health units on access, use of IPTp, maternal health and pregnancy outcomes were calculated with a two-sample proportion test. All estimates with  $P < 0.05$  were considered significant. To assess the effect of SP delivery approaches on maternal-health outcomes, we constructed a logistic regression model while controlling for the effects of age, education, parity and occupation of respondents. The dependent variable was access to the first dose of SP at either the new approaches or health units, while the independent variables were reported number of malaria episodes, parasitaemia, haemoglobin levels at 36 weeks and birth weight. The model fit was assessed for robust-

ness with the log-likelihood ratio test and model estimates were computed at  $P < 0.001$ .

### Sample-size calculations

The study aimed to detect differences in mean haemoglobin of 0.5 g/dl, mean birth weight of 150 g, and a difference of 12% in the proportion of women accessing IPTp between the health units and the new approaches. The minimum sample size required were 310 at each SP distribution outlet; with a study power of 80% and 5% level of significance. To achieve this, 25 parish clusters were selected. On average a parish has a population of approximately 2000 people; therefore the total population was 54 000. With a crude birth rate of 46.9/1000 per year, a total of 3596 pregnant women were expected over a 17-month study period. The number of parish clusters (21 for the new approaches and four for health units) were determined by the sample size required for measuring the primary outcome variables and the rate at which pregnant women would be recruited. For all the analyses, pregnant women accessing IPTp with the new approaches were grouped after calculations showed no significant differences among the different community approaches on all the outcome variables.

Self-reported malaria was defined as a febrile illness characterized by feeling hot with headache, joint pains and general weakness. The reference period for self-reported malaria episodes was two weeks before the assessment. Anaemia was defined as haemoglobin concentrations less than 11.0 g/dl.

### Ethical issues

The study was approved by the Danish National Committee for Biomedical Research Ethics and the Uganda National Council of Science and Technology. Verbal consent was obtained from all pregnant women who participated in the study.

## Results

### Study population

A total of 2785 women participated in the study. The mean age was 23.9 years, range 14–46 years. There was no difference in mean age of women accessing IPTp with health units (control) and those receiving treatment through the new delivery system (intervention), 23.6 years versus 24.0 years ( $P > 0.12$ ). Most women in both sets had attained primary education, while more women using IPTp with health units had attained secondary level education (23.2% versus 18.4%) a factor that influences health seeking behaviour (Table 1).

Table 2. The effect of a community based delivery of IPTp on access and adherence rates

Access and adherence to IPTp	Pregnant women who accessed SP at health units (N = 704)	Pregnant women who accessed SP at the new delivery system (N = 2081)	Significance of difference (P)
<b>Access to IPTp</b>			
Timing of the first dose of SP (weeks of gestation)	23.1	20.8	< 0.0001
First dose of SP in second trimester	523/687 (76.1%)	1905/2061 (92.4%)	< 0.0001
First dose of SP in third trimester	164/687 (23.9%)	157/2065 (7.6%)	< 0.0001
Proportion, 10–19 years, at first dose	200/704 (28.4%)	521/2081 (25.0%)	< 0.03
Proportion of first pregnancies, at first dose	166/704 (23.6%)	435/2081 (20.9%)	< 0.04
<b>Proportion of women adhering to two doses of SP</b>	281/704 (39.9%)	1404/2081 (67.5%)	< 0.0001
<b>Proportion of women using insecticide-treated nets</b>	64/259 (24.7%)	211/1416 (14.9%)	< 0.001

IPTp, intermittent preventive treatment; SP, sulfadoxine-pyrimethamine.

### Effect of a new delivery system on access and compliance to IPTp

Of the women using the new delivery system, 1905 (92.4%) of 2062 received first dose of SP in the second trimester compared with 523 (76.1%) of 687 receiving treatment in health units,  $P < 0.0001$ . The mean gestational age for all women was 21.4 weeks (range 16–36 weeks). Women visiting health units had a mean gestational age of 23.1 weeks versus 20.8 weeks with the new delivery system  $P < 0.0001$ . Adherence to two doses of SP was 39.9% (281 of 704) with health units and 67.5% (1404 of 2081) with the new delivery system,  $P < 0.0001$  (Table 2). Few women, 286 (17.0%) of 1685 accessed SP from both health units and the community approaches.

### Effect of a new delivery system on maternal health and pregnancy outcomes

Most, 116 (62.7%) of 185 women who accessed IPTp in health units delivered their babies with the help of skilled attendance, while fewer, 460 (40.6%) of 1133, who accessed IPTp with the new delivery system gave birth with the help of skilled attendants. In both approaches, most deliveries (over 98%) were live births while there were few abortions and stillbirths; most births (over 95%) were singleton babies (Table 3).

Blood samples for haemoglobin analyses were collected from 761 (27.3%) of 2785 pregnant women at recruitment; 389 (23.1%) of 1684 women after the first dose of SP; and 228 (13.5%) of 1689 at 36 weeks or at delivery. At 36 weeks gestation or at delivery, mean haemoglobin was 10.8 g/dl (range 9.9–11.6 g/dl) among women

visiting health units and 11.0 g/dl (10.7–11.5 g/dl) with the new delivery system ( $P > 0.6$ ). The proportion of anaemia (haemoglobin < 11.0 g/dl) was lower at health units, 40.6%, than in patients treated with the new approaches, 56.6% ( $P < 0.02$ ). Both delivery approaches were associated with a high mean birth weight, 3201 g (range 3030–3236 g) with health units and 3223 g (range 3186–3264 g) with the new delivery system. Women using the new delivery system registered a lower proportion of low birth weight, 57 (6.0%) of 950, than did those in health units, 12 (8.3%) of 144, ( $P < 0.03$ ; Table 3).

The prevalence of reported malaria episodes decreased from 261 (39.1%) of 667 at recruitment to 13 (13.1%) of 99 at delivery among women who accessed IPTp at health units. Reported malaria episodes decreased from 906 (49.5%) of 1830 at recruitment to 160 (17.6%) of 909 at delivery among women who accessed IPTp with the new delivery system. Both at recruitment and delivery, the prevalence of reported malaria episodes was lower in women accessing treatment at health units than in those accessing treatment in the new delivery system.

At recruitment, 573 (24.5%) were positive for *Plasmodium falciparum* parasites: 124 (22.2%) of 559 with health units and 449 (25.2%) of 1782 with the new delivery system ( $P > 0.15$ ). After the first dose of SP, 180 (15.9%) of 1132 were positive for *P. falciparum* parasites: 12 (10.6%) of 113 were recorded at health units and 168 (16.5%) of 1018 with the new delivery system. At 36 weeks or at delivery, 105 (16.1%) of 654 had parasitaemia: three (9.1%) of 33 in health units and 102 (16.4%) of

622 with the new delivery system ( $P < 0.04$ ; Table 3).

A total of 1061 (115 with the health units and 946 with the new delivery system) outcomes of pregnancies were documented at the end of the study (Table 3). With the health units, 113 (98.3) were live births, 1 (0.9%) was an abortion and 1 (0.9%) was a stillbirth. With the new delivery system, 928 (98.1%) were live births, 5 (0.5%) were abortions while 13 (1.4%) were stillbirths (Table 3).

There were few registered deaths in this study. By the end of the intervention, 5 (2.7%) of 185 children born to women who accessed IPTp with the health units died while 21 (1.9%) of 1105 children born to women who used the new delivery system died. No woman died among those who accessed IPTp with the health units and 4 (0.4%) died among those who accessed IPTp with the new delivery system (Table 3).

Multivariate analyses were used to assess the effect of SP delivery approaches on outcomes in maternal health and pregnancy. The effect of age, education, parity, occupation of respondents and use of insecticide-treated nets were controlled. The differences observed in Table 3 were still significant for parasitaemia at 36 weeks (odds ratio: 2.3, 95% confidence interval, CI: 1.2–5.5,  $P < 0.03$ ), self-reported malaria episodes at 36 weeks (OR: 1.6, 95% CI: 1.3–6.1,  $P < 0.04$ ); and birth weight (OR: 1.8, 95% CI: 1.6–5.4,  $P < 0.03$ ; data not shown).

## Discussion

The results of the present study show that women using the new delivery

Table 3. The new delivery system of IPTp on maternal health and pregnancy outcomes

Maternal health and pregnancy outcome	Pregnant women who accessed SP at health units	Pregnant women who accessed SP at the new delivery system	Significance of difference (P)
<b>Place where woman delivered a child</b>			
Health units	116 (62.7%)	460 (40.6%)	< 0.001
Home	5 (4.5%)	137 (14.5%)	> 0.53
TBAs	23 (20.0%)	327 (34.6%)	> 0.15
	N = 185	N = 1134	
<b>Outcome of pregnancy</b>			
Live birth	113 (98.3%)	928 (98.1%)	> 0.89
Abortion	1 (0.9%)	5 (0.5%)	–
Still birth	1 (0.9%)	13 (1.4%)	–
	N = 115	N = 946	
<b>Live births</b>			
Singleton	109 (95.6%)	911 (98.7%)	< 0.001
Twin	5 (4.4%)	12 (1.3%)	> 0.53
	N = 114	N = 923	
<b>Birth weight of baby</b>			
Mean birth weight (g)	3201 (3030–3236)	3223 (3186–3264)	> 0.7
Proportion of low birth weight	12/144 (8.3%)	57/950 (6.0%)	< 0.03
<b>Hb concentration (g/dl)</b>			
Mean Hb at 36 weeks or at delivery	10.8 (9.9–11.6)	11.0 (10.7–11.5)	> 0.6
Proportion of anaemia at 36 weeks or delivery (Hb < 11.0 g/dl)	13/32 (40.6%)	72/155 (46.6%)	< 0.04
<b>Prevalence of reported malaria episodes</b>			
At recruitment	261/667 (39.1%)	906/1830 (49.5%)	< 0.001
At 36 weeks or at delivery	13/99 (13.1%)	160/909 (17.6%)	< 0.02
<b>Peripheral parasitaemia</b>			
Positive smear at recruitment	124/559 (22.2%)	449/1782 (25.2%)	> 0.15
Positive smear at 36 weeks or at delivery	3/33 (9.1%)	102/622 (16.4%)	< 0.04
<b>Child</b>			
Alive	182 (97.3%)	1106 (98.1%)	> 0.38
Dead	5 (2.7%)	21 (1.9%)	–
	N = 187	N = 1127	
<b>Mother</b>			
Alive	187 (100%)	1126 (99.6%)	> 0.39
Dead	0 (0.0%)	4 (0.4%)	
	N = 187	N = 1130	

HB, haemoglobin; IPTp, intermittent preventive treatment; SP, sulfadoxine-pyrimethamine; TBA, traditional birth attendant.

system accessed IPTp early and most of them adhered to the two doses of SP. In health units and the new approaches, women experienced a reduction in malaria episodes, anaemia, parasitaemia and low birth weight. Although these results cannot be attributed to the intervention alone, after controlling for age, education, parity and occupation, significant differences existed for parasitaemia, reported malaria episodes and birth weight; indicating the importance of access and adherence to IPTp. There was easy access to community resource people, and their ability to make frequent home visits, especially community reproductive health workers

and adolescent peer motivators, was an important factor in reaching pregnant women early with IPTp, which explains why early access to the first dose of IPTp (gestation age) was lower for women in the new approaches compared with those in health units (Table 2).

Adolescents and women in their first pregnancies were more likely to visit health units than access care with the new approaches (Table 2). This trend has also been observed with larger surveys in Uganda<sup>9,10</sup> and is probably because such people have no experience with pregnancies and they visit health units for explanations and care in case of complications.

Generally more women visiting health units were using insecticide-treated nets and were likely to get effective case management of malaria, information on benefits of insecticide-treated nets and other malaria prevention interventions. This probably explains why women at the health units had lower episodes of malaria at recruitment and subsequent measurements. However, early access and adherence to IPTp are important factors in mitigating the negative effects of malaria in pregnancy. This is probably why the new delivery system was associated with a lower proportion of low birth weight and slightly higher (though not significantly so) mean

haemoglobin concentration and mean birth weight than was access through health units.

There were few abortions and still births, which is consistent with previous studies on malaria in pregnancy that have shown that in high transmission areas malaria leads to anaemia and low birth weight.<sup>6,19-21</sup> Although measuring mortality was not the primary objective of the study, data on deaths among women who accessed IPTp and their children were collected. Fewer children born to mothers who accessed IPTp at health units died and no woman was reported dead at this delivery point. Relatively, more children and women died among the group that accessed IPTp with the new delivery system. This finding could be related to the different health seeking behaviours for effective case management of malaria and other life threatening conditions at health units among the different groups of women. For example, a higher proportion of women who accessed IPTp at health units also gave birth in them with skilled care (Table 3), thus reducing the risk of dying from pregnancy-related complications, especially during delivery or immediately thereafter. We recommend a study with adequate sample size to evaluate further the effect of the new delivery system on maternal and neonatal mortality.

The case definition for malaria used in this study could have led to an overestimate of malaria episodes. This is because the local term *omusujja gw'ensiri* is commonly used interchangeably with another local term *omussujja*, which is non-specific and refers to any febrile illness.<sup>13,22</sup>

A limitation with this study is that placenta malaria was not measured. This is a sensitive measure for malaria in pregnancy and could have given more insight into the effect of the new delivery system. Use of community resources in studies has its own limitations, such as how much laboratory and clinical work can be done. Community resource people are not professionals and may not provide accurate data.

Data on maternal health and pregnancy outcomes in a malaria endemic area are of public-health importance for two reasons. First, these data can be used for routine monitoring of malaria treatment and prevention interventions, and this could help policy-makers and programme managers make decisions regarding treatment and prevention policies. Second, local analyses and interpretation of data on pregnancy outcomes could be used by health workers to improve quality of care and as a source of motivation. We recommend a further study in which midwives are taught to analyse data and calculate

mean haemoglobin levels, anaemia and low birth weight, and assess how this can influence them to encourage pregnant women to access and to adhere to malaria prevention interventions.

Scaling up provision of IPTp and maintaining this approach has policy implications. The resource people will have to be trained, facilitated and linked to the health units to get SP, basic supplies and effective supervision. The results of this study need to be disseminated to policy-makers and programme managers at the Ministry of Health and the district and sub-county managers to gain consensus on these results. ■

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**Conflict of interest:** None declared.

## Résumé

### Traitement préventif intermittent du paludisme pendant la grossesse : effets d'un nouveau système de délivrance de ce traitement sur la santé maternelle et l'issue de la grossesse en Ouganda

**Objectif** Évaluer la possibilité de faire administrer aux femmes enceintes le traitement préventif intermittent antipaludique (TPI) à base de sulfadoxine-pyriméthamine par des accoucheuses traditionnelles, des vendeurs de médicaments, des agents de santé reproductive communautaires ou des mobilisateurs adolescents.

**Méthodes** Un essai en communauté non randomisé a été réalisé parmi 21 groupes communautaires (intervention) et quatre groupes dont les centres de santé dispensaient le TPI selon le mode habituel (témoins). Les principales mesures de résultat étaient l'accès au traitement et son observance, le nombre d'épisodes palustres, la prévalence de l'anémie et le poids à la naissance. Les nombres de naissances vivantes, d'avortements, de mortinaissances et de décès maternels et infantiles constituaient des mesures secondaires.

**Résultats** 1404 (67,5 %) des 2081 femmes bénéficiant du nouveau système de délivrance ont reçu deux doses de sulfadoxine-pyriméthamine contre 281 (39,9 %) des 704 femmes desservies par des centres de santé ( $p < 0,0001$ ). La prévalence des épisodes palustres a baissé de 906 sur 1830 (49,5 %) à 160 sur 909

(17,6 %) ( $p < 0,001$ ) avec le nouveau système de délivrance et de 161 sur 412 (39,1 %) à 13 sur 99 (13,1 %) dans le cas de la desserte par des centres de santé. La prévalence de l'anémie était sensiblement plus faible dans les deux bras de l'étude. La proportion de faibles poids à la naissance était plus réduite (6 %) avec le nouveau système de délivrance qu'avec la délivrance par les centres de santé ( $p < 0,03$ ). Dans l'un et l'autre bras de l'étude, on a enregistré peu d'avortements et de mortinaissances. Le nombre de mères et d'enfants décédés était plus faible dans les groupes recevant le TPI des centres de santé que parmi les groupes témoins.

**Conclusion** La nouvelle approche était associée à un accès plus précoce au TPI et à une observance accrue de ce traitement. Les centres de santé se sont néanmoins révélés plus efficaces dans la réduction de la parasitémie et des épisodes palustres. Nous recommandons la réalisation d'études supplémentaires afin d'évaluer les modalités programmatiques pour faire la liaison entre la nouvelle approche et celle s'appuyant sur les centres de santé.

## Resumen

**Tratamiento preventivo intermitente de la malaria en el embarazo: efectos de un nuevo sistema de administración del tratamiento en la salud materna y los resultados del embarazo en Uganda**

**Objetivo** Determinar si las parteras tradicionales, los vendedores de medicamentos, los agentes comunitarios de salud reproductiva y los movilizadores adolescentes podrían administrar tratamiento preventivo intermitente (TPI) contra la malaria con sulfadoxina-pirimetamina a las mujeres embarazadas.

**Métodos** Se llevó a cabo un ensayo comunitario no aleatorizado en 21 conglomerados de comunidades (intervención) y cuatro conglomerados donde el TPI se administró de la manera habitual en los puestos de salud (control). Las medidas de resultado principales fueron el acceso al TPI y la observancia del mismo, el número de episodios de malaria, la prevalencia de anemia y el peso al nacer. Como criterios secundarios de valoración se consideraron el número de nacidos vivos, de abortos y de mortinatos y las defunciones maternoinfantiles.

**Resultados** Un total de 1404 (67,5%) de las 2081 mujeres tratadas mediante el nuevo sistema recibieron dos dosis de sulfadoxina-pirimetamina, frente a 281 (39,9%) de las 704 tratadas en los puestos de salud ( $P < 0,0001$ ). La prevalencia de episodios de malaria disminuyó de 906 (respecto a 1830,

49,5%) a 160 (respecto a 909, 17,6%) ( $P < 0,001$ ) con el nuevo sistema de administración, y de 161 (respecto a 412, 39,1%) a 13 (respecto a 99, 13,1%) ( $P < 0,001$ ) en los puestos de salud. La anemia fue significativamente menos prevalente en ambos casos. Se detectó una menor proporción de casos de bajo peso al nacer con el nuevo sistema de administración en comparación con los puestos de salud, 6,0% y 8,3% respectivamente ( $P < 0,03$ ). En los dos casos se registraron pocos abortos y muertes prenatales. El número de mujeres y niños que accedieron al TPI en los puestos de salud y fallecieron fue menor que en el grupo de intervención.

**Conclusión** El nuevo sistema se asoció a un pronto acceso al TPI y un aumento de la observancia. Los puestos de salud, sin embargo, demostraron una mayor eficacia en lo tocante a reducir la parasitemia y los episodios de malaria. Recomendamos que se realicen más estudios para evaluar modalidades de programas que vinculen el nuevo enfoque con los puestos de salud.

## ملخص

**المعالجة الوقائية المتقطعة للملاريا لدى الحوامل: نظام جديد لإيتاء الرعاية وأثره على صحة الأمومة وحصائل الحمل في أوغندا**

سيدة (نسبة احتمال أقل من 0.001) ضمن نظام إيتاء الرعاية الجديد، ومن 161 (39.1%) من بين 412 سيدة، إلى 13 (13.1%) من بين 99 سيدة (نسبة الاحتمال أقل من 0.001) في الوحدات الصحية. وقد انخفضت حالات فقر الدم بشكل يُعْتَدُّ به إحصائياً في كلتا المجموعتين. وكانت نسبة وزن الولادة المنخفض أقل انتشاراً بشكل يُعْتَدُّ به إحصائياً، حيث بلغت 6.0% مع نظام إيتاء الرعاية الجديد، مقابل 8.3% في الوحدات الصحية (نسبة الاحتمال أقل من 0.03). وسُجِّلَ عدد قليل من حالات الإجهاض وموت الجنين داخل الرحم في كلتا المجموعتين، بينما كان عدد وفيات الأطفال والأمهات أقل في المجموعة التي تلقت المعالجة الوقائية المتقطعة في الوحدات الصحية، منه في مجموعة التدخلات.

**الاستنتاج:** ترتبط الأساليب الجديدة بالحصول المبكر على المعالجة الوقائية المتقطعة، والامتثال المتزايد لها. ومع ذلك، فإن الوحدات الصحية أكثر فعالية في تقليل وجود الطفيليات في الدم، وحدوث نوبات الملاريا. وينصح الباحثون بإجراء المزيد من الدراسات لتقييم طرائق البرمجة التي تربط الوحدات الصحية بالأساليب الجديدة.

**الهدف:** تقييم ما إذا كان يمكن للدايات، والبائعين في الصيدليات، والعاملين الصحيين في مجال الصحة الإنجابية في المجتمع، أو المراهقين الذين يستنهضون زملاءهم، تقديم المعالجة الوقائية المتقطعة للملاريا بدواء السلفادوكسين بيريميثامين لدى الحوامل.

**الطريقة:** أجريت تجربة مجتمعية غير عشوائية في 21 مجموعة سكانية (تدخلات)، وأربع مجموعات لحوامل يتلقين المعالجة الوقائية المتقطعة الروتينية في الوحدات الصحية (شواهد). وتمثلت مقاييس النواتج المبدئية في الحصول على المعالجة والامتثال لها، وعدد نوبات الملاريا، ومدى انتشار فقر الدم، ووزن الوليد، بينما تمثلت الآثار النهائية في أعداد الولادات الحية، وحالات الإجهاض، وموت الجنين داخل الرحم، ووفيات الأمومة والطفولة.

**الموجودات:** تلقت 1404 (67.5%) سيدة، من بين 2081 يخضعن للنظام الجديد للمعالجة الوقائية المتقطعة، جرعتين من دواء السلفادوكسين بيريميثامين، مقابل 281 (39.9%) سيدة من بين 704 تعالجن في الوحدات الصحية (نسبة الاحتمال أقل من 0.0001). وقد قل انتشار نوبات الملاريا من 906 (49.5%) من بين 1830 سيدة إلى 160 (17.6%) من بين 909

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