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Research

A rapid assessment approach for public health decision-making related to the prevention of malaria during pregnancy

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Objective To develop a rapid field assessment methodology to address the burden of malaria during pregnancy and the options for intervening within the existing antenatal care system in Kenya.

Methods Surveys consisting of questionnaires, sampling of blood for parasitaemia and anaemia, and birth outcome assessment were conducted in antenatal clinics, delivery units, and in the community in Kisumu and Mombasa, Kenya.

Findings The rates of maternal anaemia and severe anaemia, were, respectively, 79% and 8% in Kisumu, and 95% and 24% in Mombasa. The rates of placental parasitaemia were 27% and 24% and the rates of low birth weight were 18% and 24% in Kisumu and Mombasa, respectively. Women with placental parasitaemia had a higher incidence of low birth weight compared with women without placental parasitaemia in both Kisumu (28% vs 16%, $P = 0.004$) and Mombasa (42% vs 20%, $P=0.004$). A total of 95% and 98% of women in Kisumu and Mombasa, respectively, reported attending an antenatal clinic during their previous pregnancy.

Conclusion This methodology can be used by ministries of health to collect data for decision-making regarding malaria control during pregnancy; it can also provide a baseline measurement on which to evaluate subsequent interventions.

Keywords Malaria, Falciparum/epidemiology/drug therapy; Pregnancy; Plasmodium falciparum/pathogenicity; Antimalarials/therapeutic use; Anemia/etiology; Placenta/parasitology; Parasitemia; Cost of illness; Knowledge, attitudes, practice; Cluster analysis; Cross-sectional studies; Kenya (*source: MeSH, NLM*).

Mots clés Paludisme plasmodium falciparum/épidémiologie/chimiothérapie; Grossesse; Plasmodium falciparum/pathogénicité; Antipaludique/usage thérapeutique; Anémie/étiologie; Placenta/parasitologie; Parasitémie; Coût maladie; Prise décision; Connaissance, attitude, pratique; Sondage en grappes; Etude section efficace; Kenya (*source: MeSH, INSERM*).

Palabras clave Paludismo falciparum/epidemiología/quimioterapia; Embarazo; Plasmodium falciparum/patogenicidad; Antimaláricos/uso terapéutico; Anemia/etiología; Placenta/parasitología; Parasitemia; Costo de la enfermedad; Toma de decisiones; Conocimientos, actitudes y práctica; Análisis por conglomerados; Estudios transversales; Kenya (*fuente: DeCS, BIREME*).

الكلمات المفتاحية: الملاريا، الملاريا المنجلية، وبائيات الملاريا، المعالجة الدوائية للملاريا، الحمل، المتصوّرات المنجلية، الإمراضية، مضادات الملاريا، استخدام المعالجات المضادة للملاريا، فقر الدم، أسباب فقر الدم، المشيمة، وجود الطفيليات في المشيمة، وجود الطفيليات في الدم، تكاليف الأمراض، المعارف، المواقف، الممارسة، تحليل المجموعات، دراسات مستعرضة، كينيا (*المصدر: رؤوس الموضوعات الطبية، إقليم شرق المتوسط*).

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Voir page 322 le résumé en français. En la página 322 figura un resumen en español. يمكن الاطلاع على الملخص بالعربية على الصفحة ٣٢٢.

Introduction

Infection of pregnant women with *Plasmodium falciparum* contributes to their children having a low birth weight, a major risk factor for neonatal and infant mortality (*1*). Malaria is one of the few causes of low birth weight that is amenable to intervention once a woman becomes pregnant (*2*). The clinical manifestations of malaria during pregnancy depend on whether a woman has acquired antimalarial immunity and thus on the intensity of malaria transmission where she lives. In areas of high transmission, where women have substantial acquired immunity, *P. falciparum* infection during pregnancy is often asymptomatic; however, parasites can sequester in the placenta, particularly in primigravidae and secundigravidae, and contribute to low birth weight (*3–7*). In areas where *P. falciparum* transmission is low or varies dramatically with season, women generally have less acquired immunity, and malaria infection during pregnancy might be associated with maternal morbidity in women of all parities and fetal loss (*8–13*).

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WHO recommends that women in areas of high transmission in Africa receive intermittent preventive treatment with an effective antimalarial drug at regularly scheduled antenatal clinic visits after "quickening", i.e., when the pregnant woman feels fetal movement for the first time (*14*). Given that resources are scarce, health policy-makers must consider several issues before deciding to invest in malaria control programmes for pregnant women. First, the public health impact of malaria in pregnant women, and whether certain groups of pregnant women are at specific risk and need targeted interventions, must be understood. Second, an effective, safe, and practical antimalarial drug regimen must be identified. Third, an assessment of the ability to implement the intervention within the existing antenatal clinic system is needed. This information can be used to direct policy development and programme implementation and can provide a baseline measurement on which the impact of interventions can be evaluated.

Several studies have reported on the safety and efficacy of intermittent preventive treatment with sulfadoxine–pyrimethamine for preventing malaria during pregnancy (*15–17*). Here, we describe the development and testing of a rapid field assessment methodology to address the first and third decision-making steps — evaluating the extent of the problem of malaria in pregnant women and understanding the opportunities for intervention.

Methods

Development of rapid field assessment surveys and instruments

On the basis of previous experience in examining issues relevant to malaria during pregnancy (*18, 19*), we developed a set of simplified field surveys (Table 1).

Measuring the public health impact of malaria in pregnant women

We developed cross-sectional surveys to examine the prevalence of malaria in pregnant women during gestation and at delivery. Questionnaires assessed parity, demographic and socioeconomic information, alcohol and tobacco use, febrile illness, and use of antimalarial drugs during pregnancy. Finger-stick blood was examined for parasitaemia and haemoglobin levels, and axillary temperatures were measured. Blood smears were taken from the placenta and umbilical cord. Newly born infants were examined for clinical status and weighed within 24 hours of birth; their gestational age was determined by physical and neurological examination (*20*).

Assessing opportunities for intervention

The opportunities for providing antimalarial drugs to pregnant women might be affected by health care facility and client factors. Facility-dependent factors include the types of services offered in antenatal clinics, supplies of drugs, and health care worker practices. Client-dependent factors include the timing and frequency of visits to the antenatal clinic by the pregnant woman and her attitudes towards taking antimalarial drugs during pregnancy.

Facility-dependent factors were examined using surveys of equipment, supplies, and medications. Health care worker practices were assessed by interviewing supervisory health care workers and by directly observing encounters between pregnant women and health care workers at the facility over a period of approximately 1 week. Supervisory health care workers were asked for information on days and hours of clinic operation, staffing patterns, and current recommendations and actual practices at their facility. The time that health care workers spent with their clients, how they prescribed or administered antimalarial drugs, and what instructions they gave to clients regarding use of antimalarial drugs were observed.

Client-dependent factors were assessed through exit interviews conducted at antenatal clinics and at delivery. Information was collected on demographics, parity, distance they lived from health facility, reasons for attending an antenatal clinic, antimalarial drug use during pregnancy, use of birth attendants, understanding of advice given by the health worker at that day's visit, and use of antenatal clinic and place of delivery during any previous pregnancy. Information on the total number of visits to the antenatal clinic during pregnancy was collected from the woman's antenatal card at delivery.

Because women attending an antenatal clinic might not be representative of all pregnant women in the area, a cluster-sample community survey of women regarding their knowledge, attitudes, and practices (KAP) about health care during pregnancy was performed. Before the KAP survey was begun, focus groups were conducted with women of childbearing age to identify issues that influence their health-seeking behaviours during pregnancy. The KAP survey collected information on demographics, parity, socioeconomic status, beliefs about malaria and the use of antimalarial drugs during pregnancy, antenatal clinic attendance, other sources of health care or advice, place of delivery, and fees charged at health care facilities. Reasons for attending or not attending the antenatal clinic unit were explored. When available, relevant antenatal clinic records were examined.

Application of rapid field assessment surveys

Sites

Malaria transmission in Kenya (approximately 98% is *P. falciparum*) (*21*) is highest from mid-April to June and varies in intensity across the country. Two districts in Kenya were chosen for the rapid field assessment because of their different ethnic populations with possible differences in health-seeking behaviour, different malaria transmission rates, and their geographic differences. The Kisumu district in western Kenya has very high malaria transmission, with adults experiencing 200–300 infective mosquito bites each year (*22*). Mombasa district (and parts of Kilifi and Kwale districts) is coastal and has low malaria transmission, with adults experiencing approximately 1–8 infective mosquito bites each year (*23*).

Studies were completed at five government-operated clinics in Kisumu district and at four clinics in Mombasa district, representing one antenatal clinic from each division of the district. Studies of delivery units were conducted in the main government-operated referral hospitals in Kisumu and Mombasa districts, and community surveys were conducted in villages throughout both districts.

Conduct of survey

Surveys were conducted during and shortly after the rainy season. Women were eligible for enrolment at an antenatal clinic if gestation was between 13 weeks and 34 weeks. Fewer than 5% of women in these districts make their first visit to an antenatal clinic in the first trimester (M. Parise, personal communication, 2001). Women with reported fever who had blood smears indicating the presence of asexual malaria parasites were treated with sulfadoxine–pyrimethamine (1500 mg sulfadoxine and 75 mg pyrimethamine).

Table 1. **Information on women obtained for each of the components of the rapid assessment methodology**

Information collected	Antenatal clinics			Delivery units	KAP[a]
	Parasitaemia survey	Exit interviews	Facility survey		
Demographics, parity, and SES[b]	X	X	–	X	X
History of fever	X		–	X	–
Use of antimalarial drugs	X	X	–	X	X
Distance travelled to facility	–	X	–	–	–
Attitudes regarding malaria and antenatal care	–	X	–	–	X
Site of last delivery	–	X	–	–	X
ANC attendance[c]	–	–		X	X
Alternative health care	–	X	–	–	X
Understanding of teaching	–	X	–	–	–
Fees paid for health care	–	–	–	X	X
Axillary temperature	X	–	–	–	–
Haemoglobin	X	–	–	–	–
Peripheral parasitaemia	X	–	–	X	–
Placental parasitaemia	–	–	–	X	–
Birth weight and gestational age	–	–	–	X	–
Equipment, supplies and drugs available	–	–	X	–	–
ANC policies and practices[c]	–	–	X	–	–

[a] KAP = community knowledge, attitudes, and practices survey.
[b] SES = socioeconomic status.
[c] ANC = antenatal clinic.

At each site, the KAP surveys were conducted in 30 clusters of seven women, each with households selected using the Expanded Programme on Immunization cluster sample survey methodology (*24*). In these households, all women of childbearing age who had delivered within the past five years were interviewed.

All women gave written informed consent. The study protocol was approved by human subjects review boards at the Kenya Medical Research Institute and the Centers for Disease Control and Prevention.

Laboratory investigations

Thick smears from peripheral, placental, or umbilical cord blood were stained with Giemsa and examined for *Plasmodium* parasites. Parasites and leukocytes were counted in the same fields until 300 leukocytes were counted. Parasite densities were calculated on the basis of an assumed leukocyte count of 6000/μl of blood. A smear was considered negative if no parasites were seen in 200 fields. Haemoglobin levels were determined using a HemoCue® haemoglobin detection system (*25*).

Definitions

Parasitaemia (in peripheral, placental, or umbilical cord blood) was defined as the presence of asexual parasites in thick blood smears. Infants were considered to have a low birth weight if they weighed less than 2500 g and premature if they were born at less than 37 weeks' gestation. Anaemia, severe anaemia, and very severe anaemia in pregnant women were defined as haemoglobin levels of less than 11, 7, and 4 g/dl, respectively (*26*). Measured fever was considered an axillary temperature >37.5 °C.

Statistical analysis

EpiInfo, SAS, and SUDAAN statistical software packages were used for data analysis. Differences between means were tested using one-way analysis of variance, and differences between proportions were evaluated by the χ^2 or Fisher's exact tests. Cluster survey analytical methods, which adjust for correlation of data within clusters, were used for comparisons involving the KAP community survey data set. Statistical significance was achieved if $P<0.05$.

Results

Extent of malaria and its consequences

During pregnancy

The characteristics of pregnant women in the antenatal clinics are shown in Table 2. The prevalence of maternal peripheral parasitaemia was 51% and 40% in Kisumu and Mombasa, respectively (Table 3). In Kisumu, prevalence was highest in primigravidae followed by secundigravidae, whereas in Mombasa, rates varied little with parity. Parasite densities were low, with 80% and 69% of parasitaemic women in Kisumu and Mombasa, respectively, having fewer than 2500 parasites/μl of blood.

Most women who reported having fever during pregnancy had taken medication — most commonly antipyretics (55%) or chloroquine (35–40%). Among parasitaemic women in Kisumu and Mombasa, 79% and 50% gave a history of recent fever, respectively, and 57% and 50% of those reporting recent fever had peripheral parasitaemia, respectively.

In Kisumu, women with severe anaemia tended to be primigravidae and younger than women without severe anaemia (20.2 ± 5.4 years vs 23.2 ± 5.7 years, respectively; $P = 0.012$). In Mombasa, the highest rates of anaemia were seen in multigravidae (⩾3 pregnancies), although the parity-specific differences in Mombasa were not statistically significant. In Kisumu, the prevalence of anaemia was significantly higher among parasitaemic than aparasitaemic women (87% vs 70%, $P=0.004$). In Mombasa, the prevalence

Table 2. **Characteristics of women attending antenatal clinics and participating in community surveys in Kisumu and Mombasa, Kenya**

Characteristic	Antenatal clinics		Community surveys	
	Kisumu (*n* = 186)	Mombasa (*n* = 153)	Kisumu (*n* = 216)	Mombasa (*n* = 231)
Age ± SD (years)	23.0 ± 5.7[a]	22.4 ± 4.6[a]	26.9 ± 7.3[a]	26.0 ± 5.9[a]
Parity				
Primigravidae	59 (31.7)[b]	58 (37.9)	37 (17.1)	47 (20.3)
Secundigravidae	46 (24.7)	37 (24.2)	33 (15.3)	60 (26.0)
Multigravidae (⩾3 pregnancies)	81 (43.5)[a]	58 (37.9)[a]	146 (67.6)[a]	124 (53.7)[a]
Married (%)	158 (84.9)	141 (92.2)	190 (88.0)	209 (90.5)
SES (low/middle)[c]	148 (79.6)[a]	144 (94.1)	204 (94.4)[a]	224 (97.0)
Education (completed primary school)	116 (62.4)[a]	84 (54.9)[a]	110 (50.9)[a]	160 (69.3)[a]
Occupation				
Housewife/farming	128 (68.8)	136 (88.9)[a]	138 (63.9)	158 (68.4)[a]
Informal business	43 (23.1)[a]	6 (3.9)[a]	71 (32.9)[a]	60 (26.0)[a]

[a] Denotes statistically significant differences ($P<0.05$) between the antenatal clinic and community survey populations within a given study site.
[b] Figures in parentheses are percentages.
[c] SES = socioeconomic status, measured on the basis of house construction (*18, 27*).

of anaemia was 98% and 93% among parasitaemic and aparasitaemic women, respectively ($P = 0.14$).

At delivery

The overall prevalences of maternal peripheral and placental parasitaemia were similar in Kisumu and Mombasa (Table 4). The highest rates of premature delivery occurred in primigravidae. Women with placental parasitaemia had a higher incidence of low birth weight compared with aparasitaemic women in both Kisumu (28% vs 16%, $P = 0.004$) and Mombasa (42% vs 20%, $P = 0.004$). In Mombasa, women delivering with either peripheral or placental parasitaemia were more likely than aparasitaemic women to deliver a premature infant (27% vs 9%, $P = 0.003$; and 23% vs 9%, $P = 0.005$ for peripheral and placental parasitaemia, respectively). Parasitaemia at delivery was not associated with premature delivery in Kisumu.

Opportunities for malaria interventions during pregnancy

Facility-dependent factors

All of the antenatal clinics evaluated were in operation 5 days per week and were scheduled to be open for 7–9 hours per day. The clinics were commonly staffed by nurses, nurse midwives, and clinical officers. In Kisumu and Mombasa, respectively, 50% and 25% of antenatal clinics employed a laboratory technician and 20% and 75% held a health education class for women on the day of our evaluation.

Tetanus toxoid, chloroquine, and a microscope were often present in antenatal clinics, but other medications and supplies were often lacking (Fig. 1). Although certain services (e.g. measurement of uterine size) were performed consistently, others such as dispensing or prescribing medications, were provided for fewer than one-third of women (Fig. 2). In Kisumu and Mombasa, women spent a total of 107 ± 66 min and 112 ± 65 min, respectively, in an antenatal clinic from the time they arrived at the clinic until the time they completed their visit with the health care worker; approximately 17 ± 20 min and 13 ± 11 min of this time, respectively, were spent with a health care worker.

Client-dependent factors

Approximately 70 women participated in exit interviews at the Kisumu and Mombasa antenatal clinic sites; about 60% of women at both sites walked to the antenatal clinic, a trip that averaged 34–45 min but which in some cases took up to 3 hours. Reasons cited for attending the clinic include health benefits for both mother and child and to receive medications. On the days of our visit, 24% and 1% of women received medications in antenatal clinics in Kisumu and Mombasa, respectively. Women delivering in hospital typically made their first visit to the clinic at 25–27 weeks gestation; women in Kisumu and Mombasa made 4.6 ± 2.2 and 4.9 ± 2.4 visits, respectively.

The KAP surveys (Table 2 and Table 5) showed that, although most women believed that malaria was a problem during pregnancy, 74% also believed that antimalarial drugs could be harmful to a pregnant woman or her fetus. Major reasons the women gave for not delivering in a facility included being in labour and being unable to reach a facility in time, especially at night. In Kisumu and Mombasa, 30% and 66% of high-risk women, respectively, defined as primigravidae and grand multigravidae (more than five previous pregnancies), had delivered their previous child in a health care facility.

Discussion

We developed a rapid survey methodology for assessing the burden of malaria during pregnancy and the opportunities for intervention. We applied these methods in two areas of Kenya to obtain a range of representative data that might direct local programme modifications. At each site, the assessment took 6–8 weeks, required eight interviewers, and cost US$ 4000–6000.

On the basis of experience, we suggest that the inclusion of three to five antenatal clinics and one to three delivery units, chosen so as to be geographically and demographically representative, are both adequate and feasible for a district-wide evaluation. Sample sizes are calculated to estimate prevalence within a selected level of confidence (e.g. approximately ±10%). Additionally, programmes might elect to calculate a sample size that is adequate for detecting a

Table 3. **Malaria and anaemia in pregnant women attending antenatal clinics in Kisumu and Mombasa, Kenya**

Characteristic	Study site	
	Kisumu (n = 186)	Mombasa (n = 153)
Parasitaemia		
Overall	95 (51.1)[a]	62 (40.5)
Primigravidae	41/59 (69.5)	24/58 (41.4)
Secundigravidae	21/46 (45.7)	14/37 (37.8)
Multigravidae (⩾3 pregnancies)	22/81 (40.7)	24/58 (41.4)
Reported fever during pregnancy	149 (80.1)	119 (77.8)
Reported fever within week before enrolment	130 (69.9)	62 (40.5)
Documented fever	4 (2.2)	8 (5.2)
Mean haemoglobin ± SD (g/dl)	9.6 ± 1.7	8.1 ± 1.8
Parasitaemic[c]	9.2 ± 2.6	7.8 ± 2.1
Aparasitaemic	10.1 ± 2.9	8.3 ± 4.0
Anaemia (Hb<11 g/dl)[b]		
Overall	147 (79.0)	146 (95.4)
Primigravidae	52/59 (88.1)	55/58 (94.8)
Secundigravidae	32/46 (69.6)	34/37 (91.9)
Multigravidae (⩾3 pregnancies)	63/81 (77.8)	57/58 (98.3)
Severe anaemia (Hb<7 g/dl)[c]		
Overall	14 (7.5)	36 (23.5)
Primigravidae	9/59 (15.3)	15/58 (25.9)
Secundigravidae	1/46 (2.2)	5/37 (13.5)
Multigravidae (⩾3 pregnancies)	4/81 (4.9)	16/58 (27.6)
Very severe anaemia (% with Hb<4 g/dl)[c]	0 (0.0)	5 (3.3)

[a] Figures in parentheses are percentages.
[b] Significant difference between mean haemoglobin in parasitaemic compared with aparasitaemic women in Kisumu (P<0.001) and Mombasa (P=0.018).
[c] Hb = haemoglobin.

Table 4. **Parasitaemia and birth outcomes in women delivering in health facilities in Kisumu and Mombasa, Kenya**

Characteristic	Study site	
	Kisumu (n = 505)	Mombasa (n = 222)
Peripheral parasitaemia		
Overall	137 (27.1)[a]	54/220 (24.5)
Primigravidae	69/183 (37.7)	27/88 (30.7)
Secundigravidae	37/108 (34.3)	12/53 (22.6)
Multigravidae (⩾3 pregnancies)	29/205 (14.1)	15/79 (19.0)
Placental parasitaemia		
Overall	120 (23.8)	43/221 (19.5)
Primigravidae	63/180 (35.0)	24/88 (27.3)
Secundigravidae	31/109 (28.4)	9/53 (17.0)
Multigravidae (⩾3 pregnancies)	23/202 (11.4)	10/80 (12.5)
Umbilical cord parasitaemia	19 (3.8)	11 (5.0)
Reported fever during pregnancy	331 (65.5)	154 (69.4)
Reported fever within last 2 weeks before delivery	221 (43.8)	64 (28.8)
Singleton birth weight ± SD(g)[b]	2911 ± 479	2849 ± 537
With placental parasitaemia	2751 ± 474	2596 ± 440
Without placental parasitaemia	2954 ± 469	2919 ± 525
Low birth weight		
Overall	85/467 (18.2)	53/216 (24.5)
Primigravidae	41/177 (23.2)	29/86 (33.7)
Secundigravidae	21/106 (19.8)	12/52 (23.1)
Multigravidae (⩾3 pregnancies)	23/184 (12.5)	12/78 (15.4)
Stillbirths	13 (2.5)	2 (0.9)
Premature delivery (<37 weeks)	49 (9.7)	28 (12.6)
Maternal deaths	0	0

[a] Figures in parentheses indicate percentages.
[b] Significant difference between singleton mean birth weight in infants born to mothers with and without placental parasitaemia in Kisumu (P<0.001) and Mombasa (P<0.001).

significant difference before and after an intervention. Different programmes can incorporate the part(s) of the methodology that are most appropriate to their situation. For example, if a recent Demographic and Health Survey has been completed, information on antenatal care coverage might already be available and might not need to be collected in a KAP survey.

Despite greatly different entomological inoculation rates (EIRs), the epidemiology of malaria during pregnancy was found to be similar in the two study sites. The high parasitaemia rates in Mombasa show that placental infection can still be substantial, even at relatively low EIRs. In an area of The Gambia with seasonal transmission (with EIR = 20–30) (*28*), high rates of placental parasitaemia (46%) were also noted (*29*). Our findings are consistent with reports of similar prevalences of *P. falciparum* parasitaemia across a wide range of EIRs in Africa (*30*). Thus, EIRs do not appear to be a good surrogate marker for the extent of the need for antimalarial interventions during pregnancy. Since this study, we have conducted an assessment in areas of even lower transmission and found placental parasitaemia rates of 2.5% and 6.5% in Ethiopia in areas with unstable and stable transmission, respectively. In this instance, we did not recommend intermittent preventive treatment (M. Parise, personal communication, 2003). These findings highlight the need for interventions to prevent malaria during pregnancy in a wide range of transmission areas, but also suggest that intermittent preventive treatment is not indicated in all areas. They also suggest that countries with varying transmission patterns do not necessarily need to conduct assessments in many districts — a few sites might be sufficient. The assessment might be more useful in determining the impact of interventions in areas of high transmission, rather simply than to indicate the burden of disease.

Anaemia was a problem in both sites and the strikingly high prevalence of severe anaemia in Mombasa is especially of concern. Despite slightly higher prevalences of peripheral parasitaemia in antenatal clinics in Kisumu, the rates of severe anaemia were threefold higher in Mombasa. This study was not designed to identify the etiologies of maternal anaemia, but hookworm is known to be highly prevalent on the Kenyan coast (*31, 32*) and might have contributed to the high anaemia rate there. In other investigations, we found a hookworm prevalence of 15% among pregnant women in Bungoma district, a neighboring district to Kisumu (*33*).

Febrile case management is not an optimal strategy for preventing malaria-associated low birth weight in areas of high malaria transmission. Although recent fever was associated with placental parasitaemia, substantial numbers of women with placental parasitaemia will not be identified if fever history is used to predict parasitaemia. Approximately 25–30% of infected women reported no fever at any time during their

Fig. 1. **Availability of medications and supplies in antenatal clinics in Kisumu and Mombasa, Kenya**

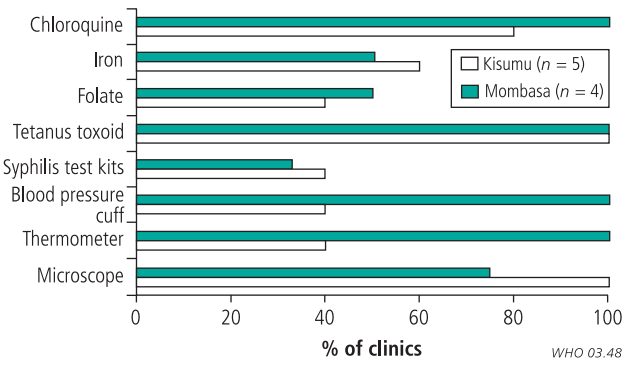
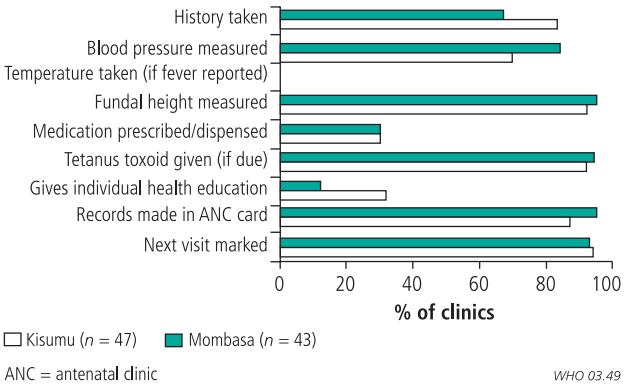


Fig. 2. **Services provided to women in antenatal clinics in Kisumu and Mombasa, Kenya**



pregnancy — and would not be receiving treatment if the decision to treat was based on symptoms.

Shortages of medications and supplies were common and contributed to missed opportunities to provide interventions at the antenatal clinics. At the time of this study Kenya did not have an active programme for the administration of antimalarial drugs for preventing malaria during pregnancy, and thus women were not receiving them in the clinics. Less than one-third of women received haematinics or individual health education, although some health centres held health education classes. Group health instruction would take less time than individual instruction and would therefore be an advantage in an understaffed system, but it could lead to some women missing important topics because class topics usually rotate.

Many women believed that malaria was a problem for pregnant women that could be prevented with medications; however, the concerns expressed about the safety of antimalarial drugs during pregnancy will need to be addressed. Although pregnant women frequently walked for more than 30 min to get to an antenatal clinic, and despite the incomplete delivery of an essential package of antenatal services, they still saw benefit in attending the clinic and made several visits.

As we have gained experience in implementing this methodology, we have observed several ways in which it might be improved. Focus groups and in-depth interviews among women who are recently or currently pregnant, health care workers, as well as among men or husbands in certain areas (depending on cultural norms), might complement KAP survey data. Consideration should be given to collection of data at nongovernmental as well as governmental sites, especially in localities where a substantial portion of women obtain care at nongovernmental sites. In addition, the assessment could be limited to singleton births for collection of delivery data. In settings where the antenatal clinic system is less developed or where the use rate of these clinics is lower than we observed in Kenya, relevant data need to be collected in alternative sites, such as through the traditional birth attendant system. The collection of clinical data (parasitaemia, anaemia, low birth weight) during the season of high malaria transmission is optimal so that data obtained are comparable and the impact of subsequent interventions can be best evaluated. Finally, because peripheral parasitaemia tends to clear within hours to days after delivery (*34*), peripheral parasitaemia at delivery is best evaluated before delivery.

Kenya has recently adopted a new malaria prevention strategy, which is to administer intermittent preventive treatment with sulfadoxine–pyrimethamine to all pregnant women in malarious districts in the country (*35*). The findings from our study support wide implementation of the policy. Administering intermittent doses of sulfadoxine–pyrimethamine within the clinic (*15–17*) (under the observation of a health care worker) will be feasible. This methodology can be used by other countries or localities to provide information to ministries of health with data to formulate policy decisions related to malaria prevention in pregnant women. ■

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Résumé

Méthode d'évaluation rapide utilisable pour la prise de décision par les organismes de santé publique en vue de la prévention du paludisme pendant la grossesse

Objectif Elaborer une méthodologie d'évaluation rapide sur le terrain pour examiner la charge représentée par le paludisme pendant la grossesse et les options d'intervention dans le cadre du système existant de soins anténatals au Kenya.

Méthodes Des enquêtes avec questionnaires, prélèvements de sang pour la recherche de la parasitémie et de l'anémie et évaluation de l'issue de la grossesse ont été réalisées dans des dispensaires de soins anténatals, dans des maternités et dans la communauté à Kisumu et Mombasa (Kenya).

Résultats Les taux d'anémie et d'anémie sévère chez la mère étaient respectivement de 79 % et 8 % à Kisumu et de 95 % et 24 % à Mombasa. Les taux de parasitémie placentaire étaient de 27 % et 24 % et les taux de faible poids de naissance étaient de 18 % et 2 % à Kisumu et Mombasa respectivement. Chez les enfants dont la mère présentait une parasitémie placentaire, l'incidence du faible poids de naissance était accrue par rapport à ceux dont la mère ne présentait pas de parasitémie, à Kisumu (28 % contre 16 %, p = 0,004) comme à Mombasa (42 % contre 20 %, p = 0,004). Au total, 95 % des femmes ont indiqué avoir fréquenté un dispensaire de soins anténatals au cours de leur précédente grossesse à Kisumu et 98 % à Mombasa.

Conclusion Cette méthodologie peut être utilisée par les ministères de la santé pour recueillir des données en vue de la prise de décision concernant la lutte contre le paludisme pendant la grossesse ; elle peut également fournir des données de référence qui serviront à évaluer de futures interventions.

Resumen

Método de evaluación rápida para la adopción de decisiones de salud pública en relación con la prevención del paludismo durante el embarazo

Objetivo Desarrollar un método de evaluación rápida sobre el terreno para hacer frente a la carga de paludismo durante el embarazo y determinar las opciones de intervención dentro del sistema de atención prenatal existente en Kenya.

Métodos Se llevaron a cabo encuestas en una serie de consultorios de atención prenatal, en unidades de parto y en las comunidades de Kisumu y Mombasa (Kenya); las encuestas se basaron en cuestionarios, análisis de muestras de sangre para determinar la parasitemia y la anemia, y evaluaciones del resultado de los partos.

Resultados Las tasas de anemia materna y anemia grave, fueron, respectivamente, del 79% y el 8% en Kisumu, y del 95% y el 24% en Mombasa. Las tasas de parasitemia placentaria fueron del 27% y el 24%, y las tasas de bajo peso al nacer, del 18% y el 24% en Kisumu y Mombasa, respectivamente. La incidencia de nacimientos de niños con bajo peso fue mayor entre las mujeres con parasitemia placentaria que entre las mujeres sin parasitemia placentaria, tanto en Kisumu (28% frente a 16%, $P = 0,004$) como en Mombasa (42% frente a 20%, $P = 0,004$). En total el 95% y el 98% de las mujeres de Kisumu y Mombasa, respectivamente, declararon haber acudido a un consultorio de atención prenatal durante su embarazo anterior.

Conclusión Esta metodología puede ser utilizada por los ministerios de salud para reunir datos de valor decisional en la lucha contra el paludismo durante el embarazo, y puede proporcionar además unos valores de referencia para evaluar las intervenciones posteriores.

ملخص

أسلوب للتقييم السريع لاتِّخاذ القرارات الصحية العمومية المتعلقة بالوقاية من الملاريا أثناء الحمل

الغرض: إعداد منهجية لتقييم ميداني سريع يمكنه تقييم عبء الملاريا أثناء الحمل والاختيارات المتاحة للتدخُّل في نظام الرعاية الصحية المعمول به في كينيا في الفترة السابقة للولادة

الطريقة: أُجريت مسوحات بواسطة استمارات وفحص عينات من الدم تحرِّياً لوجود الطفيليات في الدم ولفقر الدم، وتقييم نتيجة الولادة، وذلك في عيادات الرعاية في الفترة السابقة للحمل ووحدات الولادة وفي المجتمع في كلٍّ من كيسومو ومومباسا في كينيا.

الموجودات: لقد بلغت معدلات فقر الدم في كيسوما ٧٩٪ وفقر الدم الشديد ٨٪ أما في مومباسا فقد بلغت معدلات فقر الدم ٩٥٪ وفقر الدم الشديد ٢٤٪. أما معدلات وجود الطفيليات في الدم المشيمي فقد بلغت في كيسوما ٢٧٪ وفي مومباسا ٢٤٪، وبالنسبة لمعدلات الولدان المنخفضي الوزن عند الولادة فقد كان في كيسوما ١٨٪ وفي مومباسا ٢٤٪. وفي كيسوما كان لدى النساء اللاتي وُجد لديهن طفيليات في الدم المشيمي معدلات حدوث لانخفاض وزن الولدان (٢٨٪) وهو معدل أعلى من معدل حدوثه لدى النساء اللاتي لم يكن لديهن طفيليات في الدم المشيمي (١٦٪) وكانت قيمة الاحتمال ٠,٠٠٤، أما في مومباسا فقد كان لدى النساء اللاتي وُجد لديهن طفيليات في الدم المشيمي معدلات حدوث لانخفاض وزن الولدان (٤٢٪) وهو معدل أعلى من معدل حدوثه لدى النساء اللاتي لم يكن لديهن طفيليات في الدم المشيمي (٢٠٪) وكانت قيمة الاحتمال ٠,٠٠٤. وكان المجموع من النساء ٩٥٪ في كيسوما و٩٨٪ في مومباسا ممن أبلغن عن زيارتهن لعيادات الرعاية السابقة للولادة خلال الحمل المنصرم لهن.

الاستنتاج: يمكن لهذه المنهجية أن تستخدم من قِبَل وزارات الصحة لجميع المعطيات التي تفيد في اتِّخاذ القرارات حول مكافحة الملاريا أثناء فترة الحمل، ويمكنها أيضاً أن تشكِّل أساساً لقياسات تالية يمكن من خلالها تقييم التدخُّلات التالية.

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