



Uncomplicated malaria among pregnant women in the Brazilian Amazon: Local barriers to prompt and effective case management

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ABSTRACT

Malaria in pregnancy is associated with increased risks of maternal anemia, spontaneous abortion, low birth weight, premature delivery and other adverse effects on health. In Brazil, disease transmission is highly concentrated in the multi-state region that constitutes the Brazilian Amazon (more than 99% of all cases). This study, conducted between the first bimesters of 2007 and 2008, aims to identify the local barriers to prompt and effective case management of malaria in pregnancy and was carried out in health facilities located in three endemic municipalities of the Brazilian Amazon (Manaus, Presidente Figueiredo and Porto Velho). The study design combined both qualitative and quantitative descriptive methods. The qualitative design involved semi-structured interviews with health personnel who routinely deal with malaria care. The quantitative design involved a review of medical records of pregnant women in the visited health facilities. Additionally, data were abstracted from SIVEP-Malaria Epidemiological Surveillance Information System (Brasil, 2007) and Primary Care Information System (SIAB) databases. Flaws were detected in diagnosis (only 6.8% of women tested for malaria) and treatment (for *Plasmodium falciparum* infections, only 44.8% of patients received recommended first-line therapy; 10.2% of prescription presented treatments were not found in national guideline and 7.3% of the prescriptions for *Plasmodium vivax* and 17.9% of the prescriptions for *P. falciparum* were not sanctioned by the official guidelines). Training (only 37.3% had had some training), knowledge and counseling were also sub-optimal. These results indicated the need to improve the health-worker performance through training. Close supervision and feedback on the health-worker performance are also needed. These findings also highlighted the need to put into practice a series of government recommendations that encourage close collaboration between the National Malaria Control Program and Primary Health Care actions in order to achieve safer pregnancies.

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1. Introduction

Malaria in pregnancy is associated with increased risks of maternal anemia, spontaneous abortion, low birth weight, premature delivery, congenital infection, and neonatal and/or maternal death (Desai et al., 2007).

In Brazil, disease transmission is highly concentrated in the multi-state region that constitutes the Brazilian Amazon (more than 99% of all cases), with a greater prevalence of *Plasmodium vivax* (83.7%) (Oliveira-Ferreira et al., 2010). Although over the years there has been success in reducing deaths, severe cases and hospitalizations, malaria continues to be a major public health problem, with more than 300,000 registered cases in 2009 (Oliveira-Ferreira

et al., 2010). Additionally, despite the considerable impact of the disease, there is limited available information regarding the burden of malaria in pregnancy in the Brazilian Amazon (Desai et al., 2007; WHO, 2007).

The National Malaria Control Program (*Programa Nacional de Controle de Malária – PNCM*) is the permanent policy for prevention and control of the disease in the country (Brasil, 2003). The control rationale focuses on prompt access to the parasitological diagnosis and the provision of the appropriate treatment. Considering the recommended treatment for uncomplicated malaria infection in pregnancy, the first-line antimalarial treatment for those women diagnosed with *P. vivax* is chloroquine monotherapy (primaquine is contraindicated in pregnancy and in lactating women). For *Plasmodium falciparum* episodes, the official recommendation is quinine monotherapy or quinine plus clindamycin. The guideline also recommends artemether plus lumefantrine or mefloquine as alternative options for *P. falciparum* in the second and third trimesters of pregnancy (Brasil, 2001, 2006a; Nosten et al., 2007).

The success of malaria case management depends, in part, on adherence to the official recommendations (Zurovac et al., 2004). However, studies have shown that health professionals frequently do not comply with the guidelines. The attributed reasons for the discrepancies between guidelines and practices include, among other explanations, lack of training and knowledge of guidelines (Kalilani-Phiri et al., 2011; Osorio-de-Castro et al., 2011), unfamiliarity with diagnosis and treatment (Tarimo and Malekela, 2007; Wijesinghe et al., 2011) and personal perceptions about treatment (Osorio-de-Castro et al., 2011; Tarimo and Malekela, 2007; Wijesinghe et al., 2011).

In this study, we described epidemiological and treatment characteristics of malaria in pregnant women and assessed the training, work experience, knowledge, and perception of health workers and professionals regarding malaria in pregnancy in order to identify the local barriers to prompt and effective case management of malaria.

2. Methods

The data presented in this paper were derived from a broader study, the Mafalda Project, conducted between the first bimesters of 2007 and 2008. This project assessed pharmaceutical services in the treatment of non-complicated malaria (organization of services, prescribing, dispensing and adherence). The conceptual framework for the study was published elsewhere (Osorio-de-Castro et al., 2009).

The Mafalda Project was carried out in health facilities located in six selected municipalities of the Brazilian Amazon (Manaus and Presidente Figueiredo, in the state of Amazonas; Porto Velho and Ariquemes, in the state of Rondônia; and Cruzeiro do Sul and Rodrigues Alves, in the state of Acre). The eligibility criteria for these municipalities included: malaria high-risk classification (an API – Annual Parasitic Index – greater than 50 cases per 1000 inhabitants), a count of, at least, 7000 cases of malaria per year, adoption of the 2001 national guideline and the existence of a prescription or a written instruction given to the malaria patient (Brasil, 2001; Osorio-de-Castro et al., 2011; Suárez-Mutis et al., 2011).

Eligible health units were all primary health facilities and health centers in municipal urban areas involved in Primary Health Care and distancing not more than 50 km from city-center (Osorio-de-Castro et al., 2011; Suárez-Mutis et al., 2011) and the chosen unit of analysis was the municipality. In order to accomplish the Mafalda Project purposes, health managers, health personnel and malaria patients of both genders aged 15 years or more were invited to participate in the study. Qualitative and quantitative designs were

used and the data collection instruments included questionnaires, observation forms, interviews forms and charts review forms that were applied successively during the study period by a team of trained field researchers. Data collection took around 10 days for each municipality (Osorio-de-Castro et al., 2009, 2011; Suárez-Mutis et al., 2011).

2.1. Study area

Three municipalities, among the six investigated in the scope of the Mafalda Project, counted with maternity services and were selected for the present study: Manaus and Presidente Figueiredo, in the state of Amazonas, and Porto Velho, in the state of Rondônia. Manaus is the capital city of the state of Amazonas with 1,802,014 inhabitants. Presidente Figueiredo is a municipality of 27,175 inhabitants located in the northern metropolitan region of Manaus, distancing 107 km from the city. Porto Velho is the capital of the state of Rondônia with 428,527 inhabitants. These cities are malaria endemic.

2.2. Study design

As in Project Mafalda, this, study combines both qualitative and quantitative descriptive designs. The qualitative design involved semi-structured interviews with health personnel who routinely deal with malaria care. In each municipality six health units were visited, among primary health facilities, health centers and reference centers. These facilities were chosen because they concentrated a high number of malaria cases, according to information from the State Health Secretariats. Questions exploring information on pre/in-service training, work experience, possession of the official national treatment guideline (*Manual de Terapêutica da Malaria – MTM Brasil, 2001*), perceptions of the hazards associated with malaria in pregnancy, local experience with malaria treatment in pregnancy and general recommendations for malaria treatment in pregnancy were discussed.

The quantitative design involved a review of medical records of pregnant women. Data were collected in health units which were more likely to have records of pregnant women, based on information from the State Health Secretariats. These health facilities included four primary health facilities/health centers and two reference centers for malaria treatment (one in Manaus and one in Porto Velho). Selection of records was based on pre-identification of prescriptions for uncomplicated malaria (Osorio-de-Castro et al., 2009). Data on the following variables were collected: malaria diagnosis, maternal age, gestational age, parity, pregnancy type (single or multiple pregnancy), number of prenatal visits, prescribed antimalarial treatment, reports of adverse effects.

The prescribed antimalarial treatments were classified in accordance with the official guideline version adopted at the time of the study (Brasil, 2001). A combined artemisinin treatment regimen that was introduced in 2006 and published as a pamphlet by the PNCM (Brasil, 2006b) was also acknowledged as harboring official antimalarial treatment options.

Additionally, data were abstracted from the following available Brazilian National Health System (*Sistema Único de Saúde – SUS*) databases: SIVEP-Malaria Epidemiological Surveillance Information System (Brasil, 2007) and Primary Care Information System (SIAB). The SIVEP-Malaria database contains information of malaria cases diagnosed in Brazil since 2003. The SIAB database contains population indicators (morbidity, mortality and health care delivery) for a given area. Information within these two databases was collected for the year 2007, to coincide to Mafalda's investigation period. The guideline indicates that all pregnant women in endemic areas must be screened for malaria (Brasil, 2006c).

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