

MALARIA INFECTION IS ASSOCIATED WITH PREGNANCY LOSS IN OUELESSEBOUGOU, MALI

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In malaria endemic areas, pregnant women are more susceptible to malaria infection compared to their non-pregnant counterparts. While the relationships between pregnancy malaria (PM) and outcomes such as severe maternal anemia and low birth weight are well established, there have been limited studies on the relationship between PM and pregnancy loss particularly in areas of high malaria transmission. We evaluated the relationship of fetal loss to malaria infection among pregnant women in Ouelessebouguou Mali from November 2010 to January 2014. Pregnant women were enrolled during the antenatal consultation visits and followed up to delivery. Malaria infection in peripheral blood was detected by blood smear, and submicroscopic infection by PCR when the BS was negative. The proportion of women with submicroscopic malaria infection at delivery was 25.5% and pregnancy loss occurred in 5.8% of the cohort (80/ 1,377). Submicroscopic infection at delivery was associated with increased odds of fetal loss (unadjusted OR = 3.26, 95% confidence interval (CI) 1.35 - 7.89; and adjusted OR = 3.35, 1.37 - 8.16). A recent positive blood smear also increased the odds of fetal loss. In summary, preliminary analysis indicates that a submicroscopic malaria infection is associated with four times increase in odds of the pregnancy loss.

ASYMPTOMATIC INFECTIONS AND MALARIA TRANSMITTED BY BLOOD TRANSFUSION: AN INVISIBLE RISK

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Transfusion transmitted malaria represents a major challenge, essentially due to the occurrence of asymptomatic infections. The vector transmission in Brazil mainly occurs in the Amazon Region, where 166,864 cases were notified in 2013. Outside the endemic region sporadic cases of autochthonous malaria are reported, including asymptomatic carriers of *Plasmodium*. In the state of São Paulo, transfusional cases were detected, due to asymptomatic donors harboring *P. malariae*, one of them leading to the death of the recipient. The occurrence of parasitemia without clinical symptoms in addition to the fact that *Plasmodium* can survive in stored red blood cells between 2 and 6° C for up to three weeks, increases the risk of transmission. In order to minimize the possibility of transfusional cases, the use of platforms including molecular and serological tests might point out donors suspected of harboring *Plasmodium*. We tested samples from 56 candidates for blood donation living in an area of São Paulo State where asymptomatic infections are reported. Thick blood smear, PCR, ELISA with recombinant *P. vivax* MSP119 antigen and SD Bioline Malaria Pf/Pv immunochromatographic test were used. Two samples (3.5%) (0.98 -12.1) were positive by thick blood film for *Plasmodium*, in a very low parasitemia. One of them was also positive by PCR, indicating the presence of *P. malariae*. ELISA detected 53.6% (40.7- 65.9) of samples reagent for *P. vivax*, with Reactivity Index ≥ 1.0 . SD Bioline detected antibodies against *P. vivax* MSP and CSP recombinant antigens in 48.2% (35.6 - 60.9) of the samples. The frequency of positive samples in the serological tests pointed

out to the risk of transfusional malaria, even in areas of low endemicity, since asymptomatic donors could be accepted based on clinical screening. Moreover, the lack of knowledge about this silent malaria outside the Amazon Region increases the risk of transmission. The use of platforms with different approaches could minimize this invisible risk.

SUB PATENT INFECTION OF *PLASMODIUM FALCIPARUM* IN NORTHWESTERN PERU

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The North-western region in Peru, is an area categorized as low endemicity for malaria after the El Niño Southern Oscillation (ENSO) phenomenon that increased the number of malaria cases to a peak with more than 200 000 cases in 1998 for both species, *Plasmodium vivax* and *P. falciparum*. The new treatment scheme implement in 2000 in this area decreased the number of *P. falciparum* cases in this area and since 2008, no cases have been reported by Ministry of Health. In Peru, microscopy is the diagnostic test used as routine by the Ministry of Health; but there are other technics as the Polymerase Chain Reaction (PCR), which is more sensitive to detect and identified correctly the species of *Plasmodium*, under the microscopy detection limit. In June of 2013, a total of 750 individuals from 3 urban areas were enrolled in a surveillance study in Piura, a malaria endemic region North-western of Peru: 350 from Bellavista, 329 from Obrero and 71 from Querecotillo. From each individual, a blood sample was taken to prepare 2 slides for microscopy and a filter paper for PCR diagnostic. Microscopy diagnosis was performed twice, one a local level and the second one by an expert microscopist as quality control. The DNA extraction from the filter paper was done by the Chelex-100 method and the PCR was based in a Real time protocol using specific probes to detect *P. falciparum* and/or *P. vivax*. No malaria cases was detected by microscopy; but PCR detected two positive cases for *P. falciparum* only, one case was located in Obrero and the other one in Bellavista. The parasitaemia level in both cases was lower than 450 parasites/ μ L and no symptom was present at moment when the sample was taken. These results showed the presences of *P. falciparum* in the North-western region of Peru and stress out the need to implement more sensitive tools for malaria diagnostic in areas of low endemicity where microscopy cannot detect if the country aims to improve control measures looking into malaria elimination.

IMPLICATIONS AND EFFECTS OF DIVERSE *PLASMODIUM VIVAX* RELAPSE DISTRIBUTIONS IN SIMULATIONS OF VARYING TRANSMISSION SETTINGS

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Control and elimination of *Plasmodium vivax* is complicated by recurring relapses from hypnozoites in the liver of infected individuals. Different strains of vivax exhibit different patterns of relapse, ranging from the Chesson strain with an initial infection followed by early relapses, to strains with mixes of short and longer relapses, to North Korean strains that have infrequent early infections and longer latencies to relapse. Which strains predominate in a given geographic region depends on the local transmission setting, and earlier observational and modeling studies by various groups have allowed classification of different malaria zones. We present a new model for *P. vivax* transmission, host interactions, and relapse distributions and incorporate it into the EMOD model for malaria transmission. The broad diversity of relapse patterns is recreated with