

Malaria in Pregnant Women Attending Antenatal Clinic at Ed-Duweim Hospital, Sudan

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Abstract:

A study was carried out to investigate malaria in pregnant women attending antenatal clinics in Ed-Duweim Hospital, Khartoum, Sudan. Blood samples were collected from all pregnant women (118) in their different gestational age of pregnancy who were attending the hospital during one Month. The prevalence of malaria was 38.1%. Majority (97.8%) of these cases were Plasmodium falciparum infections. It was found that malaria infection was associated with gravidity (p -value = 0.002), rural residence (odds ratio RR =3.5, 95% confidence interval CI = 1.6 - 7.8), lack of knowledge on malaria (odds ratio RR =22.4, 95% confidence interval CI = 7.5 – 66.6) and mosquito breeding sites in the family house (odds ratio RR =5.0, 95% confidence interval CI = 1.2 – 11.7). Although, the prevalence of malaria in pregnant women was high, it was expected that many cases of malaria in the catchment area were remaining at homes without seeking diagnosis and treatment in the hospital.

Key words: malaria, pregnant, women, *plasmodium*, Sudan.

1. Introduction

Each year, there are approximately 515 million cases of malaria, and the annual deaths due to malaria are between 1

and 3 million people, about 90% of malaria-related deaths occur in Sub-Saharan Africa (Miskelyemen et al. 2012). Malaria is a public health problem in Sudan where the annual cases are 3,073,966 and deaths are 1,125, *Plasmodium falciparum* is responsible for 90% of all infections being the species associated with most severe cases, especially young children and pregnant women (Hani et al. 2013). Despite these figure are high, the estimation of malaria cases in Sudan is not accurate because official figures of incidence and mortality reflected cases reported only from the formal health system (Safa et al. 2007) as many cases remains out of records.

Malaria is a potential risk during pregnancy. It can lead to maternal anemia, low birth weight stillbirths, abortions, and maternal mortality particularly the infection with *Plasmodium falciparum* which is common in Sudan and usually cause severe malaria. Around 125 million pregnant women are living under risk of malaria, and 32 million of them in sub-Saharan Africa (Awadalla et al. 2013). Pregnant women are vulnerable to malaria because pregnancy reduces woman's immunity, making her more susceptible to malaria (Nour Eldaim et al. 2012).

In Khartoum, Sudan, Samia et al found that the prevalence of malaria among pregnant women was 26.2% (Samia et al, 2011). Other previous studies in different malaria-affected regions reported high frequency of found that, Malaria-related admissions among pregnant women compared to non-pregnant women (Neeru et al. 2012) (Samuel et al. 2013)

2. Materials and Methods

2.1. Study area

The study was carried out in Ed-Duweim hospital. Ed-Duweim is a large town on the west bank of White Nile, with an area 38816 km², average rainfall 72 mm, in June-October, average temperature 45deg.C and relative humidity is 28%. It has a long rainy season, up to 5 months; so there is huge burden of

seasonal malaria. Ed-Duweim is one of the most affected areas with mosquitoes and malaria. Because the area is surrounded by agricultural schemes, thus it provides better environment for mosquito breeding. Ed-Duweim hospital serves people of the town and of some villages in the catchment area.

2.2 Study population and period

The study population included all pregnant women (118) in their different gestational age of pregnancy, who were attending antenatal clinics in Ed-Duweim Hospital during one Month.

2.3. Laboratory investigation

Blood samples were collected to detect malaria parasite. Thick and thin smears were prepared, stained with Giemsa and examined by microscope.

Other relevant data were collected by questionnaire.

3. Results

The prevalence of malaria among pregnant women (118) in their different gestational age of pregnancy, who were attending antenatal clinics in Ed-Duweim Hospital during one month was 38.1% as shown in table 1. About 44(97.8%) of these cases were *Plasmodium falciparum* infections and only 1(2.2%) was *P. vivax* (table 2). In table three, prevalence rates for primigravidae, second gravidae, third gravidae, fourth gravidae and multigravidae women were 45.9%, 55.6%, 50%, 37.5% and 4% and 20% respectively with $P=0.002$. Factors associated with malaria infections were rural residence (odds ratio RR =3.5, 95% confidence interval CI = 1.6 - 7.8), lack of knowledge on malaria (odds ratio RR =22.4, 95% confidence interval CI = 7.5 – 66.6) and mosquito breeding sites in the family house (odds ratio RR =5.0, 95% confidence interval CI = 1.2 – 11.7) as displayed in table 4

Malaria	No	%
Positive (+ve)	45	38.1
Negative(-ve)	73	61.9
Total	118	100.0

Table 1: Prevalence rate of malaria in pregnant women in attending clinics in Ed-Duweim Hospital at Ed-Duweim Hospital, Sudan

Species	No	%
<i>P. falciparum</i>	44	97.8
<i>P. vivax</i>	1	2.2
Total	45	100.0

Table 2: Detected species of plasmodium in pregnant women in Ed-Duweim Hospital, Sudan

Gravidity	Malaria Infection			P-value
	Positive	Negative	Total	
	No (%)	No (%)	No (%)	
Primigravida	17(45.9)	20(54.1)	37(31.4)	0.002
Second gravida	10(55.6)	8(44.4)	18(15.3)	
Third gravida	11(50)	11(50)	22(18.6)	
Fourth gravida	6 (37.5)	10(62.5)	16(13.6)	
Multigravida	1(4)	24 (96)	25(21.2)	
Total	45(38.1)	73(61.9)	118(100)	

Table 3: Relationship between gravidity and malaria infection in pregnant women in attending clinics in Ed-Duweim Hospital at Ed-Duweim Hospital, Sudan

Residence	Malaria Infection			Odds Ratio (RR)	%95 Confidence Interval (CI)
	Positive	Negative	Total		
	No (%)	No (%)	No (%)		
Rural	32(51.6)	30(48.4)	62(52.5)	3.5	1.6 - 7.8
Urban	13(23.2)	43(76.8)	56(47.5)		
Knowledge about malaria					
Not Knew	28(84.8)	5(15.2)	33(28)	22.4	7.5 – 66.6
Knew	17(20)	68(80)	85(72)		
Breeding site in the house					

Present	35(53.8)	30(46.2)	65(55.1)	5.0	1.2 – 11.7
Not present	10(18.9)	43(81.1)	53(44.9)		

Table 4: Associated factors with malaria infection in pregnant women in attending clinics in Ed-Duweim Hospital at Ed-Duweim Hospital, Sudan

4. Discussion

Malaria infection during pregnancy is studied in many malaria-affected regions because the problem has serious adverse effects on mothers and their fetuses. The present study found similar problem among pregnant mothers attending antenatal clinics in Ed-Duweim Hospital. The prevalence among them was high (38.1%), in addition to that majority of cases were *Plasmodium falciparum* infections. In Khartoum, Sudan, Samia et al found that the prevalence of malaria among pregnant women was 26.2% (Samia et al, 2011). Considerable figure was obtained in Nigeria where the prevalence of malaria parasite infection among pregnant women attending antenatal clinics in Port Harcourt, Rivers State, was 26% (Michael et al, 2013). Pregnant women are 3 times more likely to suffer from severe disease as a result of malarial infection compared with their non-pregnant women (Julianna and Nawal 2009).

All cases except one (*p. vivax*) in this study were *Plasmodium falciparum* infections (97.8%).

In university hospital in Ghana, infection with *P. falciparum* in pregnant women was 85.4% (Samuel et al. 2013). *Plasmodium falciparum* is fatal compared to other five human malaria species and responsible for the majority of malaria related deaths. The seriousness of plasmodium is due to that *falciparum* destroys red blood cells, and causes acute anemia in addition to cerebral malaria, which can lead to coma, transient or permanent neurological effects, and death.

There were strong statistical associations between malaria and gravidity (p-value = 0.002), rural residence (odds ratio RR =3.5, 95% confidence interval CI = 1.6 - 7.8), lack of

knowledge on malaria (odds ratio RR =22.4, 95% confidence interval CI = 7.5 – 66.6) and mosquito breeding sites in the family house (odds ratio RR =5.0, 95% confidence interval CI = 1.2 – 11.7). In malaria-endemic areas, it is estimated that at least 25% of pregnant women are infected with malaria, with the highest risk for infection and morbidity in primigravidas (Julianna and Nawal 2009). Pierre et al found that the risk of malaria was higher in mothers who lived in rural areas (Pierre et al, 2013).

The association with rural areas might due to presence of irrigated projects and farms which represent suitable environment for breeding of malaria vector, in addition to insufficient health care infrastructure. High level of mother's knowledge about malaria enables them to protect themselves by using different methods such as insecticide-treated bed nets, repellants and seeking health care when needed. Samia et al found that malaria in pregnant women was associated with gravidity and residence in rural areas, where health care facilities and malaria control programmes are meager and less effective (Samia et al. 2011)

5. Conclusion

The prevalence of malaria in pregnant women was high, however many cases of malaria in the catchment area were remaining at homes without seeking diagnosis and treatment in the hospital. Gravidity, rural residence, knowledge about malaria and presence of breeding sites in the house were factors associated with malaria in pregnant women.

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