

CLINICAL ASPECTS OF MALARIA IN THE ASIR REGION, SAUDI ARABIA

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Three hundred and thirty-four cases of confirmed malaria seen in the Asir Central Hospital, Abha, in southwestern Saudi Arabia, were studied retrospectively. Two hundred and eighty-two of these (84.4%) were Saudis and the majority (72.2%) were living in the lowlands of Tihama. Transmission was found to occur throughout the year, with peaks following the rainy season and in the summer. In Saudis, falciparum malaria is more common than vivax (97.2% vs. 2.8%), while vivax malaria is more commonly seen in expatriates (46.2%). Poor response of falciparum malaria to chloroquine was more prevalent in expatriates than in Saudis (46.4% vs. 23%). Most of the expatriates gave a history of recent travel to countries known to be endemic with resistant malaria. The possibility of the emergence of chloroquine-resistant malaria in the southwestern region of Saudi Arabia was discussed. *Ann Saudi Med 1998;18(1):15-17.*

The geography of the Asir region in the southwestern part of Saudi Arabia consists of the highlands (average 2000 meters above the sea) which are the extension of the Sarawat mountains parallel to the Red Sea and the lowlands (Tihama) at sea level. Malaria has been known to be endemic in the lowlands of this region,^{1,2} and three species of anopheles mosquitoes have been identified there.³ Malaria has also been described in other regions in the Kingdom of Saudi Arabia.^{4,5} We undertook this retrospective study to describe some of the epidemiological and clinical aspects of the disease in the Asir region.

Materials and Methods

All malaria cases seen in Asir Central Hospital, Abha, Saudi Arabia, during the period 1991-1995 were studied. Asir Central Hospital is the main referral hospital in the region. Only cases in which the diagnosis was confirmed by a positive blood film were studied retrospectively. The charts of those patients were reviewed for demographic and clinical data. SPSS for Windows statistical package was used for the statistical analysis.

Results

Three hundred and thirty-four cases of malaria were

studied. Of these, 282 (84.4%) were Saudis and the remaining 52 (15.6%) were expatriates of different nationalities, from the Far East, Africa and Middle East. They comprised 231 males (69.2%) and 103 (30.8%) females. The majority of the patients (72.2%) were living in the lowlands of Tihama. The average age was 15.9 ± 17.2 years, with a range of two months to 80 years. Three hundred and two (90.4%) had falciparum malaria and the remaining 32 (9.6%) had vivax malaria. Table 1 summarizes the main clinical symptoms in the patients presenting with malaria, while Table 2 shows the common physical findings. Table 3 describes the types of parasites seen in Saudi and non-Saudi patients and the response of falciparum malaria to chloroquine. Table 4 shows the cumulative monthly admissions over the five-year period.

TABLE 1. Common symptoms of malaria in the Asir region.

Symptoms	Number of cases (334)	Percentage*
Fever	333	99.7
Vomiting	162	48.5
Rigors	110	32.9
Headache	90	26.9
Arthralgia	67	20.1
Cough	60	18
Abdominal pain	55	16.5
Backache	50	15
Diarrhea	36	10.8
Convulsions	16	4.8

*Percentage is not a true percentage due to missing values.

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TABLE 2. Common signs of malaria in the Asir region.

Signs	Number of cases (334)	Percentage*
High temperature (>38.0 °C)	296	89.7
Tachycardia (>100 beats/min)	246	75.7
Splenomegaly	148	44.7
Hypotension (BP <100/60)	95	40.9
Hepatomegaly	117	35.3
Chest crepitations	20	6.1
Jaundice	16	4.8
CNS abnormality**	2	0.6

*Percentage is not a true percentage due to missing values; **altered higher cerebral function or focal signs.

TABLE 3. Types of malaria parasites in Saudi and non-Saudi patients and the response of *Falciparum malaria* to chloroquine.

Parameter	Saudi (282)	Non-Saudi (52)	P-value*
<i>Falciparum malaria</i>	274 (97.2%)	28 (53.8%)	<0.00005
<i>Vivax malaria</i>	8 (2.8%)	24 (46.2%)	<0.00005
Chloroquine-responsive <i>Falciparum malaria</i>	211/274 (77.0%)	15/28 (53.6%)	0.006

*Pearson chi-squared test.

TABLE 4. Malaria cases seen in the Asir region, according to month of admission.

Month	Number of cases	Percentage
January	25	7.49%
February	70	20.96%
March	32	9.58%
April	24	7.19%
May	16	4.79%
June	51	15.27%
July	21	6.29%
August	15	4.49%
September	11	3.29%
October	23	6.89%
November	28	8.38%
December	18	5.38%
Total	334	100%

Discussion

Although malaria has been largely controlled in the Eastern part of Saudi Arabia, transmission still occurs in the north, western and especially the southwestern region, where it is considered to be hyperendemic.⁶ This study has emphasized that malaria is still a health problem in the Asir region. Cases were seen throughout the year, with two

peaks, in February and June (Table 4). These peaks of transmission are most likely related to the rainy and hot seasons, respectively. The clinical presentation is similar to that described in other parts of the Kingdom,^{4,5} and there is a predominance of *falciparum malaria*, as was seen in previous studies from the Jeddah area.⁷ *Vivax malaria* is found more commonly in non-Saudis with a history of recent travel to their home countries, especially patients from the Far East. The majority of the patients (72.2%) were living in the lowlands of Tihama, where the anopheline mosquitoes are abundant. Anopheline mosquitoes are usually not found in the highland area and all the patients who were living there (27.8%) had a history of either traveling to the lowlands, or coming recently from a country endemic with malaria. Males were affected more than females (69.2%), with an average age of 15.9±17.2 years, and 61.6% were below the age of 15 years, similar to the findings in endemic areas where the disease is more common in children who are nonimmune and whose immunity increases as they grow up due to repeated exposure. Complications were found in 13.8% of cases of *falciparum malaria*, including hemolysis requiring blood transfusion in 38 patients, blackwater fever in two patients, dysenteric malaria in two patients and cerebral malaria in three patients. Two patients (0.7%) died from cerebral malaria. The low mortality could be due to the ready availability of hospital services, since most cases were admitted to hospitals. The average hospital stay was 6.12±2.99 days, indicating that most patients were kept long enough in the hospitals for proper management until they were cured.

The study has shown that in 77% of Saudi patients *falciparum malaria* responded to chloroquine alone, in comparison to only 53.6% ($P=0.006$) of expatriates, most of whom were from areas known to be endemic with chloroquine-resistant malaria (Table 3). *Falciparum malaria* in Saudi Arabia has been widely considered to be chloroquine-sensitive.³ However, there has always been a concern about establishing chloroquine resistance, due to the large movement of expatriates and pilgrimages between the Kingdom and countries endemic with resistant malaria.^{1,2,8} Cases of chloroquine resistance have been described in expatriates working in the Kingdom who had recently arrived from endemic countries.^{9,10} We previously described a case which exhibited no response to chloroquine therapy in a Saudi patient with endogenous transmission, and we highlighted the possibility of the emergence of chloroquine resistance in the southwestern region of Saudi Arabia.¹¹ This retrospective study strengthens our suspicion, since it has been found that in 23% of the Saudi patients with *falciparum malaria*, another drug like quinine or Fansidar[®] was needed to cure malaria on clinical grounds. Chloroquine is still considered the first-line treatment of uncomplicated

falciparum malaria in the region. However, clinicians should be alerted to the possible emergence of chloroquine resistance, and be ready to use second-line drugs such as quinine, Fansidar® or mefloquine in cases that do not respond to chloroquine. Prospective in vivo and in vitro studies will be needed to confirm this suspicion, and we are currently pursuing a prospective in vivo study.

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