

PREVALENCE OF PLASMODIUM VIVAX AMONG DIFFERENT SECTORS OF KIRKUK PROVINCE⁺

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Abstract:

A retrospective cross – sectional study was carried out to show the prevalence of malaria infection in kirkuk province for period from 2000-2004. It was found that overall rate of infection was (0.05%) by *P.vivax*, the 0.6% in males 0.4% in females. The infection rate was highest in 2000 (0.08%) and was lowest in 2004 (0.03%).

The rate of infections varied by season. The infection was highest in autumn (0.36%).

The positive case of *P. vivax* was detected in Al-Dibis sector (0.17%) and in kirkuk sector (0.07%). No cases were detected in Dakok and Hawija 1 and Hawija 2 districts.

المستخلص :

أجريت دراسة رجعية لبيان مدى انتشار عدوى الملاريا في محافظة كركوك للفترة من ٢٠٠٠ - ٢٠٠٤ إذ وجد أن نسبة الإصابة الكلية عموماً كانت ٠,٥% لطفيلي *P. vivax* ٠,٦% في الذكور ٠,٤% في الإناث).

كانت أعلى نسبة إصابة في عام ٢٠٠٠ (٠,٨%) أقل نسبة في سنة ٢٠٠٤ (٠,٣٦%) أن نسبة الإصابة كانت متغيرة خلال الفصول إذ كانت أعلى إصابة خلال الخريف (٠,٣٦%) عن طريق الدراسة اكتشفت حالات الإصابة التي كانت أكثر نسبة في قطاع الدبس ٠,١٧% وقطاع كركوك ٠,٧% وعدم وجود إصابات في قطاعات الحويجة الأولى والثانية وداقوق.

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Introduction :

Malaria is a mosquito – borne disease caused by genus plasmodium (P.vivax,P.falciparum , P . malariae , & P.ovale) [1] .Plasmodium vivax is more common in tropical and % subtropical regions including Iraq [2] .

Malaria is endemic in Iraq , which causes the death of population , the death rate approximately from 1929-1 956 was (9.7%) from total infection rate (12.7%)[3] .The eradiction programme started in 1957 on country in a wide coverage basis .

By the beginning of the sixth year of eradication , i.e in 1962 , 4.1 million population out 4.5 million at risk had entered the consolidation phase , only 0.4 million in the riverian tracts and valleys of the mountainous northern part of the country needed residual insecticidal protection [4] .

The total number of malaria cases in Iraq from 1961 to 1967 was 47834 [4,5].From 1970 to 1975 there were 47395 cases of which 45928 were due to P . vivax and 1467 to P. falciparum [6] and from 1977 and 1982 , malaria prevalence varied between 5069 cases and 2422 cases with approximately 99% due to P.vivax [7,8] . In kirkuk province (Al-Tameen) during 1980-1990,the highest rate of malaria infection was in 1998 and the lowest in 1985 . the overall rate of infection was 2.02% (1.29% were males & 0.73% were females) in 1964 blood Smears examined from different locations in the province [9]. In a study carried on in Erbil province , it was found that the incidence of malaria had a strong linear correlation with temperature and negative correlation with wind spread and rainfall [10] .

The present study aims to show the prevalence of malaria infection in different locations of the kirkuk province for the period from 2000-2004 .

Materials and Methods :

A retrospective cross sectional study was carried out in Kirkuk province , for the period from January 2000-December 2004 . Kirkuk province is situated in the north of Iraq , which is endemic with malaria parasite , especially P.vivax . The study was conducted on suspected patients referred by physician to Central Public Health Laboratory & Primary Health Care Centers in nearby districts .The different sectors in Kirkuk province included Kirkuk , Al-Dibis , Dakok & Hawija 1&2.Both thin and thinck blood smears were collected from 75826 individuals (41704 Males & 34122 females) . Blood smears were stained with Giemsas stain[11] in the Central Public Health Laboratory , Kirkuk and examined under oil immersion using light microscope .

Result and Discussion :

Table (1) :: Distribution of P.vivax infection according to years .

Year	No.of blood smear examined	No.positive	Positive %
2000	30129	25	0.08
2001	19308	1	0.005
2002	12895	7	0.05
2003	5840	3*	0.05

2004	7654	3**	0.03
Total	75826	39	0.05

$\chi^2 = 14.11$ d.f=4 p <0.05 significant

From 75826 blood smears examined in Kirkuk province from 2000-2004 ,39(0.05%) were positive for P.vivax .There was significant difference in the distribution of infection according to years (Table 1) . The highest rate of infection was in 2000 (0.08%) and the lowest was in 2004 (0.03%). Among three positive cases in 2003 ,2 cases were imported and 1 case was local . The three positive cases registered in 2004 were form Shwan village which previously belonged to Erbil province (Table 1).The present study shows that malaria due to P.vivax is still endemic in Kirkuk province ,The overall rate of P.vivax infection (0.05%) is lower than reported in 1996 (2.24%).

* 3 cases (2) imported ,1 Local)

** 3cases from Shwan village which previously belong to Erbil province

In 1991-2000 (0.76%) and in 2001 (2.02%) in different districts of Kirkuk province , higher than repoted in 1966 (0.001%) but in agreement with that reported in 1978 (0.05%)[5,9,12,13,14] .

The decline in the rate of infection from 2000 to 2004 is attributed to the efforts of the Kirkuk Health Authority in controlling the infection . As only 3 cases were reported in 2003 and all of them were form Shwan village which previously belonged to Erbil province .

Table 2.Distribution of p.vivax infection according to sex .

Sex	No.examined	No . positive	Positive
Male	41704	24	0.06
Female	34122	15	0.04
Total	75826	39	0.05

$\chi^2 = 0.674$ d.f = 1 p <0.05 Not significant

Although statistically it is indicated in Table 2, that the rate of infection did not vary significantly between males (0.06 %) and females (0.04%), this finding is not in agreement with that reported by Salman [11] and Kadir et al[12]in Kirkuk province who found that the rate of infection was higher in males than females, and also not in agree ment with Shihab et al[15] who found the rate of infection was higher in females than males in Al-Najaf province .

The difference in the rate of infection among sexes in different studies might be related to samples and place of studies .

Table 3 Distribution of P.vivax infection according to months .

Month	No.of blood smear examined	No.Positive	Positive%
December	4955	0	0
January	16035	0	0
February	6763	9	0.1
March	6256	5	0.07
April	5807	0	0

May	5082	2	0.03
June	7190	1	0.01
July	5191	8	0.15
August	5268	9	0.17
September	4959	3	0.06
October	5028	1	0.01
November	3292	1	0.03
Total	75826	39	0.05

$\chi^2 = 52.254$ d.f = 11 p < 0.05 significant

Table 3 shows that the distribution of malaria cases according to months , the highest rate of infection was in August (0.17%) followed by July (0.15%) statistically there is significant difference between months (P<0.05) . It is clearly indicated that the rate of infection increased in summer months .The highest rate was detected in August followed by July . There was fluctuation in the distribution of infection in different months .

Table 4 Distribution of P.vivax infection according to seasons .

Season	No.of blood smear examined	Positive	Positive %
Winter	27753	9	0.03
Spring	17145	7	0.04
Summer	17649	18	0.10
Autumn	13279	5	0.05
Total	75826	39	0.05

$\chi^2 = 11.590$ d.f = 3 P < 0.05 significant

The infection rate was lowset in winter months (0.03%) increased in spring (0.04%) ,in summer (10%), and peaked in autumn (0.036%) as indicated in Table 4.The difference between seasons is statistically significant (P<0.05) .The highest rate of infection in summer months reflects to the season of distribution of the vector of the malaria [8,11]. This could be explained as the insect is latent in winter , it starts in its activity during spring months and begins to the fertilization and laying of eggs and the first generation becomes active in the end of the March and April . Then it begins taking the blood meal [13] .As the incubation period of the disease range from (8-21) days the appearance of clinical symptoms becomes high in summer months [14]. The presence of positive cases in autumn winter may be related to relapse cases .

Table 5 Distribution of P.vivax infection according to sectors .

ector	No.of blood smear examind	Positive	Positive %
Kirkuk	28539	20	0.07
Dakok	16095	0	0
Hawija 1	6459	0	0
Hawija 2	13874	0	0

Dibis	10859	19	0.17
Total	75826	39	0.15

$\chi^2 = 52.913$ d.f. = 4 P < 0.05 significant

It is indicated in Table 5, that the distribution of positive cases varies significantly (P<0.05) between sectors. The rate of positive cases in Kirkuk sector is (0.07%) and in Al-Dibis (0.17%).

No. positive cases were registered in Dakok, Hawija 1 & 2 districts. The distribution of *P. vivax* infection in Kirkuk may be due to the people from city travelling to rural areas for work or by visitors traveling from neighboring such as Erbil and Sulaimania where malaria is also endemic [11].

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