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Epidemiological Study for Prevalence and Incidence of Syphilis among Blood Donors in Thi-qar Province

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Abstract

To find out the prevalence of *Trepenoma Pallidum* among the blood donors aged from 20-75 years, at the main blood bank in AL-Nasiriya and blood banks of Suq AL- Shiok, Refaei and AL-Shatra, a total of 28287 blood donors were analyzed during the period from the beginning of April/2016 to the end of March/2017 in epidimological study for this purpose. Results showed that from 28287 bloods volunteer groups 200 cases were discovered infected with syphilis disease. Among this 94.5% (189) were male and 5.5% (11) were female with ratio 17:1. Socio-demographic characteristics the donors; majority were Illiterates 42.5% (85), 1-6 37.5% (75), unemployed/jobless 139 (69.5%), governments 35 (17.5%), merchants 12 (6%), farmers 11 (5.5%), students 3 (1.5%). It was found that married were more infection than unmarried with a percentage of 77% (154) married vs 23% (46) unmarried. The ABO profile of the participants were 92 (46%) O, 64 (32%) A, 33 (16.5%) B, and 11 (5.5%) AB. These findings demonstrate that screening for syphilis may still retain certain value in Thi-qar governorate and should be considered in other governorates in Iraq, depending on their blood donors' epidemiology data.

Keywords: *Trepenoma Pallidum; Syphilis; Epidimology; Blood donors*

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Introduction

Syphilis remains a global problem, is a chronic and multi-stage disease which is transmitted both sexually and from mother-to-child and can result in multisystem injury by invading nerve, skeleton, skin, mucuous membrane, angiocarpyetc, and can result in abortion, stillbirth and congenital syphilis fetus. Besides, syphilis has synergistic action with HIV and can promote HIV infection (Tipple., *et al.* 2015; Han and Dai, 2015). Syphilis is a sexually transmitted disease (STD) caused by *Treponema pallidum*, which can also be transmitted via accidental direct inoculation, transplacenta during pregnancy, and, rarely, via blood transfusion (Van Dyck., *et al*. 2004). It is a systemic infectious diseases, non-immune complex, with chronicevolution, with variable clinical manifestations, "chameleon", imitating many skin problems caused by *T. pallidum* which only affects some people and primates (Behets., *et al*. 1996).

Globally, more than 81 million units of blood are donated each year. More than 18 million units of blood are not screened for transfusion-transmissible infections. According to World Health Organization (WHO), in the year of 2006 only 38 countries were collecting more than 75% of their blood supplies from families, the rest obtained it from professional blood donors on payment (WHO, 2008). In many parts of the world, the incidence and prevalence of syphilis still remain high in both volunteer and family/replacement blood donors (Ji., *et al*. 2013; Noubiap., *et al*. 2013). There are numerous reports in high-risk groups in the literature, both from developed and developing countries, indicating rising prevalence and incidence of syphilis (Hao., *et al*. 2011; Muldoon and Mulcahy, 2011). For example, in Pakistan, there are approximately 100,000 patients of thalassemia major with their lives totally dependent on blood transfusions (Ishfaq., *et al.* 2013). Hussain., *et al*. (2015) stated that among 48020 blood samples 94.08% were found free from infection and therefore safe for transfusion. While 5.92% blood donations were infected with one or another infectious agent. Among infected blood donors, *T. pallidum* (TP)exhibited prevalence of (0.07%). Vera., *et al*. (2014) reported that the prevalence of syphilis was 47:100,000, similar in men and women and increased significantly with age.

Among blood donors allows for assessment of epidemiology of this infections in the community (Bhattacharya., *et al*. 2007). The acquisition of the infections in the healthy blood donor population can be a serious threat to safety of the collected blood donations. The present study was conducted to determine the prevalence of *T. pallidum* (TP) among blood donors in Thi-qar province, Iraq during the beginning of April/2016 to the end of March 2017 and reveal the epidemiology of these infections in the resident population to assess the determinants of this disease in this selected population this type. By studying this prevalence, attention will be drawn towards the severity of the situation so that effective action can be taken to prevent further transmission of diseases via blood transfusions.

Materials and Methods

Study Population

The study population constituted the subjects who donated blood at main blood bank AL-Nassiriya and blood banks of Suq AL-Shiok, Refaei and AL-Shatra aged from 20-75 years. During the beginning of April/2016 to the end of March/2017 a total of 28287 blood volunteer at the blood banks of were of both sexes, different age groups from different nearby districts of Thi-qar province, Iraq.

Primary Screening

Donors were screened primarily by asking question about current health status, any previous infection, and blood donation or transfusion history. Any individual suffering from disease, any previous history.

Epidemiological study

The patients were classified into age groups, gender, Occupations, Donation, Marital states, Educational background and Blood group (ABO).

Laboratory Tests

Treponemal serologic tests are more complex and based upon the detection of specific antibodies to cellular component of *T. pallidum*. Tests were done using a specific serological *T. Pallidum* hemagglutination assay (TPHA), the nonspecific treponemal assay Venereal Disease Research Laboratory (VDRL), fluorescent Treponemal absorption test (FTA-ABS) and enzyme immunoassay (EIA).

Results and Discussion

In the present study, a total of 28287 blood donors in main blood bank at AL-Nassiriya and blood banks of Suq AL- Shiok, Refaei and AL-Shatra aged from 20-75 years were screened during the study period. The study was conducted in the period between the beginnings of April/2016 to the end of March/2017. Number of volunteers at each month were illustrated in table 1. The table shows that the number of male donors was close during the months except for November, when the number of donors decreased, while the most female donors were in the months of January and March.

Months	Total donors	Males	Females
April	2479	2456	23
May	2730	2709	21
June	2189	2183	6
July	2086	2073	13
August	2379	2366	13
September	2246	2238	8
October	2662	2653	9
November	1772	1763	9
December	2609	2595	14
January	2412	2382	30
February	2271	2266	5
March	2452	2407	45
Total	28287	28191	196

Table 1: *Number of volunteers during each month of the study period.*

From 28287 bloods volunteer groups 200 cases were discovered through their attending to blood bank for donation of blood, aged from 20-75 years (Table 2). Among this 94.5% (189) were male and 5.5% (11) were female with ratio 17:1 (Figure 1). The prevalence of syphilis among blood donors according to the present study in both sexes had varied proportion, male donors was 189/28191 (0.67%) and the females was 11/196 (5.6%), this finding was similar to the results of the study done by Nazir., *et al*. (2013) in Pakistan, who found the prevalence among the males donors was high 446 (3.1%) when compared with female donors, 3 (1.6%). But differ with Shrestha., *et al*. (2009) in male 90 (0.48%) and female 16 (0.48%), and Vera., *et al*. (2014) who reported that the prevalence of syphilis was similar in men and women and increased significantly with age ($P < 0.001$).

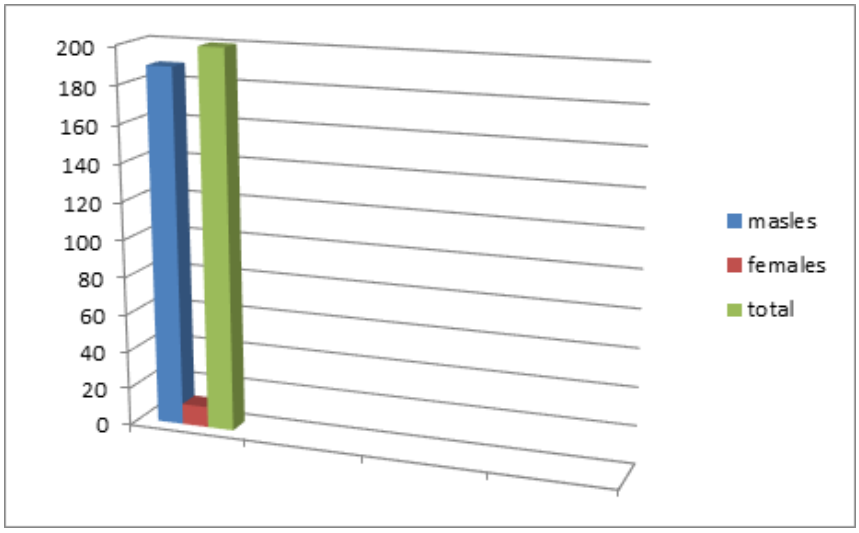

Figure 1: *Distribution of syphilis patients according gender.*

Characteristic		Frequency	Percent
Age group	20-26	4	2
	27-33	10	5
	34-40	60	30
	41-47	85	42.5
	48-54	14	7
	55-61	18	9
	62-68	6	3
	69-75	3	1.5
	Total	200	100
Gender	Male	189	94.5
	Female	11	5.5
	Total	200	100
Occupations	Government	35	17.5
	Merchant	12	6
	Famer	11	5.5
	Student	3	1.5
	Jobless	139	96.5
	total	200	100
Donation	Volunteers	147	73.5
	Replacement	53	26.5
	Total	200	100
Marital states	Married	154	77
	Unmarried	46	32
	Total	200	100
Educational background	Illiterate	85	42.5
	1-6	75	37.5
	7-9	31	15.5
	10-12	6	3
	Above 12 grade	3	1.5
	Total	200	100
Blood group (ABO	A	64	32
	B	33	16.5
	AB	11	5.5
	O	92	46
	Total	200	100

Table 2: *Socio-demographic characteristics of blood donors at Thi-qar blood banks during April 2016 to March 2016.*

The minimum participant's age was 20 and maximum was 75 years old. The majority of donors 145 (72.5%) were in the age group between 30 to 42 years. In many parts of the world, the incidence and prevalence of syphilis still remain high in both volunteer and family/replacement blood donors (Ji., *et al*. 2013; Noubiap., *et al*. 2013; Vera., *et al.* 2014). High prevalence of syphilis infection were found among family replacement blood donors when compared with voluntary blood donors (Bonja, 2015), however, results of this study was differ, from 200 cases, 73.5% (147) were voluntary donors and 53 (26.5%) family replacement donors (Table 1).

Socio-demographic characteristics the donors; majority were Illiterates 42.5% (85), 1-6 37.5% (75), unemployed/jobless 139 (69.5%), governments 35 (17.5%), merchants 12 (6%), farmers 11 (5.5%), students 3 (1.5%). Table 2 and figure 2 show the distribution of syphilis patients according to martial states. It was found that married were more infection than unmarried with a percentage of 77% (154) married vs 23% (46) unmarried. The ABO profile of the participants were 92 (46%) O, 64 (32%) A, 33 (16.5%) B, and 11 (5.5%) AB (Table 2).

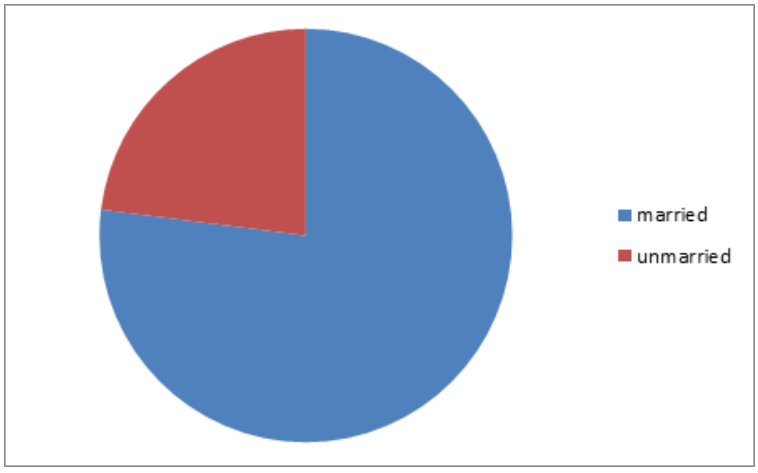

Figure 2: *Percentage of infected married and unmarried.*

The global incidence of syphilis among blood donors is variable. In this study, the prevalence of syphilis among blood donors was 0.67%, this finding was similar to the results of the study conducted by Dhruva., *et al*. (2014) from January 2013 to December 2013 at Indian blood bank in Rajkot hospital which showed Seroprevalence of Syphilis were observed to be 0.065%. On other hand results of this study showed low prevalence when compared with results of other authors, Adjei., *et al*. (2003) 7.5 % in Ghanian, Matee., *et al*. (1999)12.7% in Tanzanian, Khan., *et al*. (2007) 90 (0.89%) in Islamabad, Pakistan, Kaur., *et al.* (2010) 0.7% in India, Nwankwo., *et al.* (2012) 7.5% in Nigeria, Bonja (2015) 0.8% in Ethiopia and Xu., *et al.* (2016) 7.7% in china. But the present study findings was higher when compared with studys done by El-Gilany and El-Fedawy (2006) 0.05% in Egypt, Shrestha., *et al*. (2009) 0.48% in Nepal, Zulfikar., *et al*. (2012) 0.12% in Pakistan, Attaullah., *et al*. (2012) 0.43% in Pakistan, Lathamani., *et al*. (2013) 0.09% in India, and Drago., *et al*. (2014) 0.031% in Italy. Overall, these differences in the results of researches in different countries may be attributed to the difference in races, environmental conditions and the social norms and traditions of the peoples of these countries.

These findings demonstrate that screening for syphilis may still retain certain value in Thi-qar governorate and should be considered in other governorates in Iraq, depending on their blood donors' epidemiology data. The data support the need to continue screening blood donors in Iraq for syphilis and employ preventive measures to populations at risk, in order improving public health, blood safety, and quality. The risk of infection can be reduced by selection of healthy blood donors and public realization programs will be an important measure to stop its transmissible through blood transfusion.

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