Original article

Prevalence of syphilis among Ethiopian blood donors

Yonas Sisay[1] **and Yonas Tegene**[1]

Abstract: The study was performed to asses the prevalence and distribution of syphilis among Ethiopian blood donors. Serological data of 21,846 blood donors obtained over two years peroid (1987-89) from five blood transfusion centers were analayzed. Syphilis testing was done using the rapid plasma reagin (RPR) test. Overall RPR reactivity of 3% to over 1 2% and sex specific rates of about 3% in females and over 4.5% in males were obtained following prior health screening, including information on risk factors such as sexually transmitted diseases, in the five regions studied. The male to female ratio was 1.5: 1. Distinct low and high seroprevalence centers, with overall rates of 3.0% -4.1% and 10.1 % -12.2%, respectively, were also observed. There was a statistically significant difference (P = 0.0004) in the RPR rate between the two sexes. There is a high prevalence of syphylis in Ethiopian blood donors who underwent prior health screening. Thus, universal syphilis screening of blood intended for transfusions in Ethiopia and Syphilis serostatus notification of blood donors are recommended. [Ethiop. J. Health Dev. 1995;9(1):91103]

Introduction

Recently, syphilis has emerged as a public health priority due to its association with HIV infection.

There is a high prevalence of syphilis in many parts of Africa such as Mozambique(I), Zambia(2), Swaziland(3), Tanzania(4), and Somalia(5), in the various population groups studied. Reported prevalence of syphilis test seroreactivity in pregnant women attending antenatal clinics in Africa ranged from 4% - 15% (1,2,6-11). In surveys conducted in neighboring Somalia (12) and Tanzania(4), positive venereal disease research laboratory (VDRL) reactivity was observed in approximately 7% and 14% of blood donors, respectively.

In Ethiopia, seroprevalence data on syphilis is limited to selected population groups. Data on the general population or groups more or less representative of the general population, such as blood donors are lacking. Blood used for transfusions is also not screened for syphilis markers in hospital blood banks currently not served by a regional blood bank of the Red Cross.

However, sexually transmitted diseases are common accounting for over 5% of all visits to health institutions every year(13). Two previous studies have shown that 13% -15% of mothers attending antenatal clinics in Addis Ababa were VDRL reactive(14). Of these about two-thirds of the infants of seropositive mothers were also VDRL reactive at birth, and 20% had clinical signs of congenital syphilis (15). A Study of in-patiemsdone in Ethiopia in 1982 has shown a syphilis test reactivity of about 10% , using the treponema palladium hemagglutination (TPHA) test (17).

Moreover, 16% and 22% of syphilitic inpatients had congenital and cardiovascular syphilis, respectively (17). In addition 38% of prostitutes in Addis Ababa were found to be seroreactive or syphilis in 1990(18). It has also been estimated that 5% of all pregnancies in Ethiopia are lost

because of syphilis, which is an estimated loss of 75,000 pregnancies each year(16). Congenital Syphilis is the fourth major cause of perinatal
mortality in Ethiopia. The high seropositivity rates for syphilis and the seriousness of its complications have prompted the suggestion .for routine syphylis screening of patients visiting health care facilities (17, 19).

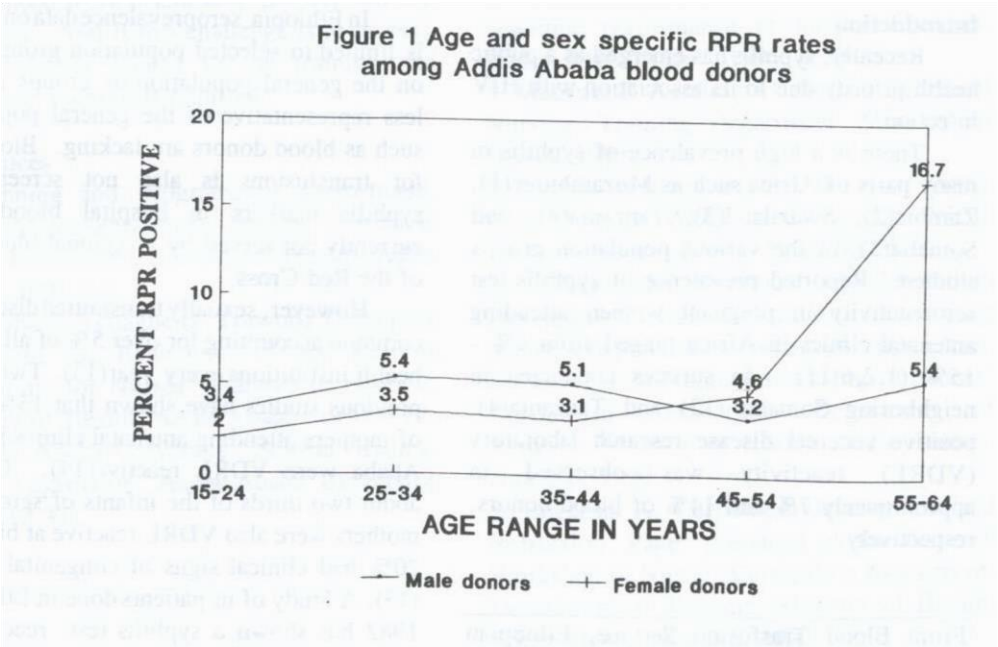
[1]IFrom Blood Transfusion Service, Ethiopian Red Cross Society, P.O.Box 195 , Addis Ababa, Ethiopia

Baseline prevalence and distribution data on syphilis are important for three main reasons: (1) for the prevention and control of the infection and its sequelae, such as congenital syphilis, (2) for the indirect evaluation of the effectiveness of HIV control programs by monitoring syphilis serology, and (3) for the formulation of policy on screening of blood nation wide. The present study aims to describe the prevalence and distribution of siphilis among Ethiopian blood donors.

Methods

Blood bank data of 21,846 donors was analyzed for syphilis serology. These data included 18,418 donors of the Addis Ababa blood transfusion center (October 1987 to September 1989) and 3428 donors of four regional blood banks (January to June, 1989). the four regional blood banks that participated in the study were Asmara, Harar , Yirgalem, and Jima centers.

All blood donors filled a standard blood bank questionnaire, underwent routine physical examinations, and then were apparently healthy and eligible to donate blood. Sera were coded and examined the same day. All the 21,846 sera were tested for syphilis using 18 mm RPR card test (Brewer Diagnostics). All reactive sera were retested using the same kit. Controls with established patterns of graded reactivity were used in each day's testing. Statistical analyses included regional, age and sex specific RPR reactivity rates, and a test of significance (chi square test) (Figure 1).



Results

The prevalence of RPR positivity among blood donors of the five regions of Ethiopia is shown in the table below. The overall pooled prevalence rate was 4.5% in males and 3.0% in females. The range was 3%-12% in males and 0%-13.3% in females.

Two distinct syphilis seroprevalence regions i.e. high and low prevalence centers, have been observed. Low prevalence centers were Asmara and Addis Ababa with overall rates of 3.0% and 4.1%, respectively. High
prevalence centers were Jimma (10.1%), Yirgalem (10.9%) and Harar (12.2%). The differences in regional rates were statistically significant [$p < 0.01$, four degrees of freedom, and $X2 = 130.01$].

Of the two sexes, male donors in all centers except Yirgalem, showed higher prevalence rates as opposed to female donors. The difference in RPR reactivity rates between the two sexes was statistically significant ($p = 0.0004$), and the male to female ratio was 1.5:1.

Figure 1 shows age and sex specific RPR positivity rates among blood donors of the Addis Ababa Center. Syphilis seroprevalence rises steadily from the age of 18 years (the lower age limit for blood donation) to 30-34 years in both sexes, remaining nearly the same through the age group of 35-44 years. Peak RPR positivity rate was observed in females in the late ages of 55-64 years.

Discussion

The overall pooled prevalence of RPR positivity seen in Ethiopian blood donors of the five regions (4.1% -12.2%) is comparable to rates seen in neighboring countries, including Somalia(12) and Tanzania(4). These high seroprevalence rates were obtained following prior health screening, including history of sexually transmitted diseases and sexual promiscuity , which are reasons for referral. Thus, the results represent underestimates for the actual prevalence of syphilis in the general population.

For most Sexually transmitted diseases overall age specific morbidity rates are higher for men than for women(20). This has also been observed in our study. The overall prevalence in males was 4.5% while in females it was 3.0% (a M:F ratio of 1.5: 1.0). This is consistent with the male to female ratio of (1 :0.7) observed for HIV infection in blood donors(21). Differences in RPR seroreactivity rates in the two sexes were statistically significant indicating that gender is one determining factor for the acquisition of the disease.

The reasons for the observed high and low prevalence centers are not apparent from the present study. The variations observed in RPR positivity rates are either due to wide variations in the prevalence of syphilis in the donor population, or factors related to the efficiency of health screening prior to blood donation by the centers in question.

Table 1: **Prevalence of RPR reactivity among Ethiopian Blood Donors in Selected Regions**

Region	Total Number Wxamined			Number Positive (%)		
	Male	Female	Total	Male	Female	Total
Addis Ababa*	15851	2567	18418	686(4.3)	73(2.8)	759(4.1)
Asmara	2383	55	2438	72(3.0)	(0)	72(3.0)
Harrar	412	38	450	52(12.6)	3(7.9)	55(12.2)
Yirgalem	412	15	174	17(10.7)	2(13.3)	19(10.9)
Jimma	313	53	366	33(10.5)	4(7.5)	37(10.1)
Total	19118	2728	21846	860(4.5)	82(3.0)	942(4.3)

Note: Data presented is from October 1987 to September 1989 inclusive for Addis Ababa and Janouary - June 1989 for the rest of the regions.

Two major factors that could affect RPR positivity rates are reactives due to treponemas other than T. palladium and other disease states and conditions. No convincing serologic differences between. the pathogenic Treponemas have been discerned. False positivity can also be obtained in acute infections (such as malaria, infectious hepatitis, and others), immunization, autoimmune diseases, drug addiction (in about 25% of narcotic addicts) and diseases associated with hyperglobulinemia states such as leprosy(20).

False seropositivity are unlikely to have affected the observed rates due to the thorough health screening prior to blood donations for the above. Even though yaws has been reported in Ethiopia (23), yaws and endemic syphilis are not expected to contribute much to the seroreactivity observed as Ethiopia is not a recognized African focus for these diseases(8,10). Thus, the serological findings probably reflect sexually acquired syphilis rather than non-venereal treponematoses.

The observed peak RPR positivity :-ate in females 55-64 years of age could be due to the small sample size in both sexes in this age group. In the USA, peak incidence occurs in the age group of 15-34 years and 10% of people over the age of 70 years have false positive RPR results(22). However, due to paucity of observation (only 93 male and 6 female donors) in this age group, the role of aging should be taken with caution. Further studies are needed to clarify the above.

The RPR test is the test of choice for donor screening and the most widely used non- treponema or reagin antibody test. However , the sensitivity of the test is variable in the various stages of the disease. A Zambian
study using treponemal tests(II) in hospital patients and cOntrols have shown that the test showed a false negativity rate of 11%-14%, respectively, and a false positivity of 5% . This suggests that

the actual prevalence of syphilis among Ethiopian blood donors may be higher than the rates obtained using the RPR test.

Blood donor populations in Ethiopia more or less represent the adult urban general population(2l). The relatively high overall RPR positivity rates (about 3% in females and over 4% in males) obtained in adults with no apparent risk factors for syphilis, supports the previously reported high magnitude of syphilis in the adult urban population of Ethiopia. The interaction between syphilis and HIV infection occurs on a number of levels(20) It includes (1) the disproportional occurrence of HIV in persons with syphilis and vice versa,
(2) the enhancement of the acquisition and transmission of HIV infection by syphilitic genital ulcers, and (3) the modification of the serologic response to syphilis, its natural course, and the ineffectiveness of standard therapy in HIV infected persons.

The reported interaction between syphilis and HIV infection, the high prevalence, and the complications of the disease itself, particularly congenital syphilis, indicate that more pronounced control measures are required.

The study shows that the prevalence of syphilis among Ethiopian blood donors is high. The same has been observed in other population groups(14, 15). Due to this, established congenital consequences of the disease
and its interaction with HIV infection, commitment of more health resources to the prevention and control of syphilis in Ethiopia is recommended. Prevention strategies to be adopted should include universal syphilis screening of blood (and the discard of reactive units) and notification of reactive donors with referral for further investigation and therapy. Routine syphilis screening of patients, and specially females in the sexually active age group who visit health institutions would 3Iso reduce the syphilis burden in the population. The study also provides base line-data for a quick evaluation of HIV control programs by systematically monitoring trends in syphilis serology.

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