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PREVALENCE OF SYPHILIS IN PREGNANCY IN ADDIS ABABA

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ABSTRACT

Objective: To assess the extent of syphilis seropositivity in pregnant women, identify the risk factors associated with it and re-evaluate the need for routine antenatal care screening for syphilis.

Design: Prospective cross-sectional study.

Setting: Three teaching hospitals of Addis Ababa University Faculty of Medicine, Department of Obstetrics and Gynecology, Addis Ababa, Ethiopia.

Subjects: A total of 410 pregnant women attending antenatal care from April 1997 to September 1997 were included in the study. Subjects were excluded from the study if they were registered prior to the study period.

Main outcome measures: Seropositivity for syphilis, and socio-demographic factors related to it.

Results: Among the study population, twelve women (2.9%) were positive for Venereal Disease Research Laboratory (VDRL). The study showed that the seropositive women were more likely to be those with lesser income (<600 birr/month). Past history of abortion was significantly associated with VDRL seropositivity ($p < 0.05$). Similarities and differences between the findings of this study and other national and international reports have been noted.

Conclusion: It is necessary to conduct a large scale study to evaluate if screening is cost-effective and establish risk scoring methods.

INTRODUCTION

Syphilis occurs through out the world. It is more common among the under-privileged, in cities than rural areas and in blacks than whites(1).

The growing recognition of the major role that sexually transmitted infections play in reproductive health, the worldwide epidemic of these infections and their reproductive sequel it demands greater commitment to their prevention and control. Much attention is being focussed on the second generation of sexually transmitted infections. However, it is important to remain vigilant to the serious sequel of syphilis, especially in areas where the first generation of sexually transmitted disease are rampant and have not been controlled. Syphilis is a multifaceted disease with serious implications for the pregnant women and the unborn foetus.

According to Colombian theory, the disease was unknown in Europe before 1492. In 1492, Christopher Columbus made his historic crossing of the Atlantic. The sailors are said to have contracted syphilis on the island of Hispaniola in the West Indies from local women. After 1493 there was an epidemic of a disease which was probably syphilis throughout Europe, and reported from India and China(1). Africa in the 1980s appeared to be facing problems associated with syphilis during pregnancy similar in severity and magnitude to those faced by the industrialised world in the early 1900s. Reported prevalence of syphilis in pregnant women in Africa frequently ranges from 10 - 15%, with 50 - 80% of those new positive women

experiencing an adverse outcome(2). Published studies have shown a high sero-prevalence of syphilitic infection among pregnant women in some developing countries, and a low sero-prevalence in others, and in the developed industrialised countries(2).

Syphilis is not a new problem in Ethiopia. Richard Pankrust, in his monograph on the economic history of Ethiopia mentions that the disease was probably introduced into Ethiopia by the Portuguese and the Arabs in the sixteenth century and that it had its highest incidence in the northern provinces, from where it did not seem to spread south wards until the last century. Early travellers also reported that syphilis was often encountered in serious forms and a report by Kirk presents some details about 316 syphilitic patients seen in Ankober during the five months in 1842(3).

In Ethiopia, Ferreira Marques in a survey done in 1952 showed an average of 48% sero-positivity in cardiolipin test, and Buck and Sprugy using VDRL and FTA test showed that 31% of sera from unselected population gave positive results(4).

According to Friedmann, a survey done in 1976 in unselected group of women admitted to one of the largest obstetric units in Addis Ababa(St. Paul's Hospital) showed sero-positivity of 12.7% for VDRL and 10.9% for fluorescent treponemal antibody absorption (FTA - AB). He concluded that syphilis was still prevalent in Addis Ababa although it was decreasing probably because of the wide spread use of penicillin(4). Another study done in

1975/76 by Elizabeth Duncan, in Addis Ababa pregnant women attending antenatal clinic showed the seroprevalence rate of 27% to TPHA and 28% to VDRL(5). A more recent study done in rural hospital in northwest Ethiopia, in September 1994, showed VDRL seropositivity of 13.7% in ante-natal attendees(6).

In Ethiopia twenty one per cent of children of seropositive mothers developed signs of syphilis, while stillbirth and abortion rate of infected women was almost double than among the general population(3). A contemporary study to this found that syphilis was the fourth most common cause of perinatal death and accounted for 10% of the 70 perinatal deaths per 1000 births and almost five per cent of all postnatal deaths(7). Rates for congenital syphilis have been reported to be 850/100,000 livebirth in Lusaka and 3,200/100,000 in Addis Ababa(8).

Many adverse effects on the foetus and infant due to maternal syphilis were reported in Zambian studies. The incidence of such outcomes is likely to be high in areas of high prevalence of the infection, where latent or early syphilis are likely to be common in women(9). This study was conducted to assess the extent of the disease, and risk factors associated with it and to re-evaluate the need of routine ante-natal screening for syphilis.

MATERIALS AND METHODS

The study was a prospective hospital-based cross-sectional study carried out between April 1997 and September 1997 in three teaching hospitals of Addis Ababa University, namely; Tikur Anbessa, Saint Paul's and Zewditu Memorial Hospitals. These are referral hospitals which serve all categories of patients.

Pregnant women attending the outpatient clinic for antenatal care follow up visit during the study period were included in the study. Subjects were excluded from the study if they were already registered for prenatal clinic prior to the study period because it was difficult to retrieve results in many records of the mothers. Those who refused to enter into the study were also excluded from the study.

A sample size of 410 women was calculated using an estimated prevalence of syphilis in pregnancy 11% (taken from Safe Motherhood Practical Guide, WHO, Geneva WHO/MCH 91.10), confidence level of 95%, magnitude of error 3% and contingency 10%.

Pre-structured and pre-tested questionnaire was used to collect the data. Socio-demographic characteristics (age, marital status, occupation, number of pregnancy, monthly income), past obstetric history (parity, gravidity, stillbirth, abortion) and past history of sexually transmitted infections were included in the questionnaire. These characteristics were then compared with sero-positivity of VDRL.

After an informed consent, the questionnaire was filled for each pregnant women by a resident or intern. According to the protocol of antenatal care follow up in the hospitals, serum was examined from the pregnant women for syphilis using VDRL test. Those pregnant women whose sera turns out to be positive for VDRL were sent to National Research Institute of Health for confirmatory test with TPHA or FTA-ABS. Ten of the twelve sero-positive women did not volunteer to go to National Research Institute of Health for the test. So, it was not possible to calculate the sensitivity and specificity of the tests. Standard treatment for syphilis was given for all those who were VDRL positive after they were counselled. The partners of the women were also

counselled. Repeat VDRL test was advised after three to six months following the treatment.

Data collected were coded, entered into a computer and cleaned. The statistical package EPI-INFO-6 was used to analyse the data. Results were presented in tables using means and percentages. Chi-square, p-value and odds ratio were used to assess the statistical significance. Yates' corrected odds ratio and Fischer's exact test were employed to analyse the two by two tables when the sample size is less than 5. Statistical significance was decided when $P < 0.05$.

RESULTS

A total of 410 pregnant women were included in the study. Twelve tested positive for syphilis using VDRL giving a seroprevalence of 2.9%.

The mean age Table 1 of the study subjects was 26.9 ± 5.1 years and there was no statistically significant difference between the mean ages of seropositive and seronegative women ($p > 0.05$). The majority of the pregnant women (35.6%) belonged to the age group 26 - 30 years. Three hundred and twenty two (78.5%) of the women were less than 30 years of age. Almost all of the pregnant women in the study (96.8%) were residents of Addis Ababa. A substantial majority of the study population 391/401 (95.4%) were married and 3.7% were unmarried. Two hundred fifty seven women (62.7%) were house wives. Only six (1.5%) were registered as commercial sex workers.

Table 1

The socio-demographic characteristics of patients Addis Ababa, Ethiopia

Age (years)	Frequency	%	Cumulative%
16 - 20	50	12.2	12.2
21 - 25	126	30.7	42.9
26 - 30	146	35.6	78.5
31 - 35	67	16.3	94.9
36 - 40	19	4.6	99.5
41 -45	2	0.5	100.0
Total	410		
Marital status			
Married	391	95.4	95.4
Unmarried	15	3.7	99.0
Divorced	3	0.7	99.8
Widowed	1	0.2	100.0
Total			
Occupation			
Housewife	257	62.7	62.7
Govt. employee	114	27.8	90.5
House maid	10	2.4	92.9
Commercial sex worker	6	1.5	94.4
Student	22	5.4	99.8
Others	1	0.2	100.0
Total			
No. of pregnancies			
1	141	34.4	34.4
2 - 4	216	52.7	87.1
> 5	53	12.9	100.0
Total			
Monthly income			
0 - 300	136	33.2	33.2
301 - 600	117	28.5	61.7
601-900	66	16.1	77.8
901 - 1200	39	9.5	87.3
>1200	52	12.7	100.0

Table 2

Past history of STI and sero-status to VDRL of women screened for syphilis: April 1997 to September 1997, Addis Ababa, Ethiopia.

History of STD	Sero- status to VDRL		Total
	Positive	Negative	
Yes	2 (9.0%)	20 (90.9%)	22 (5.3%)
No	10 (2.5%)	378 (97.4%)	388 (94.6%)
Total	12 (2.9%)	398 (97.0%)	410 (100.0%)

STI = Sexually Transmitted Infections

The majority of women, 223 (54.4%) were secondary school leavers. Forty five (11.0%) were illiterate and 61(14.9%) had gone to college and university. Two hundred and fifty three (61%) of the women earned less than 600 birr per month and sero-prevalence for syphilis is statistically significantly higher in this group as compared to women earning greater than 600 birr per month (P=0.038). The mean income of the study population was 666 birr per month.

One hundred forty one women (34.4%) were pregnant for the first time and 53 (12.9%) had one or more pregnancies. The mean number of pregnancy is 2.55. Only 43 women (10.5%) started attending ante-natal during the first trimester and 107 (26.1%) started attending in the third trimester.

History of sexually transmitted infections was found in 22 women (5.4%). Seropositivity in these gravidas patients was nine per cent and is not statistically significantly different from patients without history of sexually transmitted infections (Table 2). Fourteen women had history of still birth. Only two of these women had positive serostatus and there was no statistically significant association with seropositivity and still birth (Table 3).

Table 3

Past history of still birth and sero-status to VDRL of women screened for syphilis: April 1997 to September 1997, Addis Ababa, Ethiopia.

History of still birth	Sero- status to VDRL		Total
	Positive	Negative	
Yes	2 (14.2%)	12 (85.7%)	14 (3.4%)
No	10 (2.5%)	386 (97.4%)	396 (96.0%)
Total	12 (2.9%)	398 (97.0%)	410 (100.0%)

Table 4

Past history of abortion and sero-status to VDRL of women screened for syphilis April 1997 to September 1997, Addis Ababa, Ethiopia.

Past history of abortion	Sero status to VDRL		Total
	Positive	Negative	
Yes	7 (5.8%)	112 (94.1%)	119 (29.0%)
No	5 (1.7%)	286 (98.2%)	291 (70.9%)
Total	12 (3.0%)	398 (97.0%)	410 (100.0%)

P = 0.03

History of abortion was found in 119 women (29.3%). Seven of the 12 (58.3%) women with VDRL seropositivity had history of abortion. All of these abortions were induced because they were unplanned and unwanted (Table 4). Seropositivity in these women was 5.8% which is statistically significantly associated with VDRL seropositivity (P=0.03).

Table 5

VDRL status of pregnant women attending ante-natal by socio demographic characteristics, Addis Ababa, Ethiopia.

Characteristics	VDRL status		Chi square P
	Reactive	Non reactive	
<i>Age</i>			
16 - 20	0	50	
21 - 25	3	123	
26 - 30	8	138	2=7.43
31 - 35	0	67	P=0.19
36 - 40	1	18	
41 - 45	0	2	
<i>Marital status</i>			
Married	12	391	
Unmarried	0	15	2=0.60
Divorced	0	3	P=0.89
Widowed	0		
<i>Occupation</i>			
House wife	6	251	
Govt. employee	5	109	2=35.48
Housemaid	0	10	P=0.00012
Commercial sex worker	0	6	
Student	0	22	
Others	1		
<i>No. of pregnancy</i>			
1	1	140	
2 - 4	9	207	2=3.74
<i>GA at first visit</i>			
1st trimester	2	41	
2nd trimester	6	254	
3rd trimester	4	103	
<i>Monthly income</i>			
0 - 300	3	133	
301 -600	8	109	2=10.12
601 - 900	0	66	P=0.03
901 - 1200	1	38	
> 1200	0	52	

Table 6

VDRL positivity among pregnant women attending ante-natal screened for syphilis: April 1997 to September 1997, Addis Ababa, Ethiopia.

VDRL status	No.	%
Negative	398	97.1%
Positive	12	2.9%
Total	410	100.0%

Table 5 shows age, marital status, occupation, number of pregnancies and gestational age at which ANC began. None of these variables has statistically significant association with VDRL serostatus. However, low monthly income and past history of abortion were statistically

significantly associated with VDRL seropositivity ($p < 0.05$).

DISCUSSION

Syphilis is not only important in developing countries but has re-emerged as a significant public health problem for pregnant women and their babies as seen in Michigan, United States and in many areas of the world(10). Among Canadian women aged 20 - 29 years, the estimated incidence of infectious syphilis during the 1980s was approximately 3 per 100,000. Although similar numbers were found among British women, American figures have been higher, especially within some urban centres (11).

Epidemiological surveys in selected population group yield useful data on STIs prevalence in the community in which antenatal attendants are considered as a normal risk group of healthy women of reproductive age group.

Prevalence rates for syphilis among African pregnant women are high(2). The finding of sero-prevalence of syphilis to VDRL, 2.9% in this study, is one of the lowest when compared to reported prevalence of syphilis in pregnant women in Africa which ranges from 10-15% except in one study from Rwanda which was 1.2%(2). This result is comparable to reports of some South American countries like Chile which is 3.4%(2).

Practical serological tests commonly available are divided into two groups: non-treponemal and treponemal tests. Much controversy exists about the accuracy and predictive power of serological test. Venereal Disease Research Laboratory (VDRL) and Rapid Plasma Reagin (RPR) assays are said to be non-specific. These tests detect antibodies against cholesterol-lecithin cardiophilin antigens. Positive serology usually occurs within one week of disease manifestation in 60 - 75% of cases of primary syphilis, and virtually all cases of secondary syphilis. Specificity ranges from 84-99%(12). Biologic false - positive tests are common with both the VDRL and RPR, most likely due to the cross-reactivity of these tests with the cholesterol - lecithin - cardiophilin antigens found in other disease processes.

The fluorescent treponemal antibody absorption (FTA - AB) test and the microhaemagglutinin test for syphilis (MHA -TP) are widely used to confirm positive non treponemal test. These are reactive earlier and with sensitivity of 81% to 98% and specificity of about 90%. These treponemal tests detect antibodies directly against *T. pallidum*, and are considered more expensive because of the assay cost and time needed for processing. If VDRL is positive, then treponemal serology is warranted, bearing in mind that up to 16% of primary syphilis patients with a positive VDRL will have a negative MHA -TP(12).

A cross-sectional study on antenatal risk profile on 345 antenatal patients done in the same institution found a seroprevalence rate of 2.3% (Tigabu, unpublished data). This shows that the seroprevalence of syphilis in urban population is quite low and has decreased markedly over the last decade.

The low prevalence rate of seroreactivity might be explained by the over counter use of antibiotics for minor complaints and easy availability of drugs in this country. The other explanation might be early seeking of effective medical treatment for STI among the antenatal attendees.

The prevalence of syphilis has declined since 1953 as shown by Friedmann sero-prevalence of 12.7% by the year 1976 in Addis Ababa as compared to Ferreira Marques VDRL positivity of 48% in unselected population in Addis Ababa in 1952(4). His probable explanation was the wide-spread use of penicillin since 1953.

Only 10.5% of the pregnant women in the study population started antenatal clinic during the first trimester. This contrasts with findings of studies in Addis Ababa where 26% of the pregnant women started attending antenatal clinic in the first trimester and else where(13). This might be due to referral system currently set within the city.

Economic status as measured by monthly income appears to be the most important socio-demographic determinant for syphilis sero-positivity among pregnant women attending antenatal clinic. Low socio-economic factor initiates multiple sexual partnership, unprotected sex and predisposes to STI. This is true in other studies done(6,8,14).

Reported past history of abortion was significantly associated with sero-positivity to syphilis ($p < 0.05$). Since most of the abortions were induced it does not seem to have any relationship with VDRL sero-positivity leading to abortion.

This study showed no significant association between sero-prevalence of syphilis and occupation, and marital status as reflected by wide calculated confidence interval in different tables due to small size number. This needs further community-based, bigger sample sized study to verify.

The impact of syphilis on pregnancy outcome has been documented in Ethiopia by some studies. Congenital syphilis was the fourth major cause of perinatal mortality in infants with a death rate of 4.9/1000 birth(7). It was difficult to compare as the outcome of pregnancy in this study was not studied. In current practice it looks that congenital syphilis has no major role as a cause of perinatal mortality.

Due to the limited number of seropositive subjects (only twelve) and since FTA-AB was not done for those women who were positive for VDRL, sensitivity and specificity for the serological tests could not be calculated.

In conclusion, this study showed that the prevalence of syphilis in pregnancy is declining with seroprevalence of 2.9% using VDRL test, among 410 pregnant women attending antenatal clinics. Economic status as measured by monthly income and past history of abortion were found to be significantly associated with seropositivity to syphilis. So, we recommend that performing routine screening for syphilis in ante-natal clinic should be considered. A risk scoring method should be developed to reduce unnecessary wastage of resources and workload on staff in routine screening.

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