HIV -1 INFECTION AND SOME RELATED RISK FACTORS AMONG FEMALE SEX WORKERS IN ADDIS ABABA

Mengistu Mehret*, Lev. Khodakevich, Debrework Zewdie***
Seyoum Ayehunie, Bekele Shanko*, Getachew Gizaw*,
Demillew Bekele*, Tigist Kebede* Mengesha Yadetta*,**
Fasil Ketema*, Tadelle Fesehaye*, Mulugeta Tadesse***,**
Hailemichael Manore*, Ermiaa Hailu*, Gezahep Adal***,**
Semunegua Lakew*.

SUMMARY: A sero-epidemiological survey on HIV-l infection was carried out in July 1989, among four groups of female sex workers randomly selected in Addis Ababa. The four groups were comprised of: bar girls, tej (traditional wine) sellers, tella (traditional beer) sellers and females in red light houses. Sera were tested by ELISA and confirmed y western blot. The mean age of the 2617 females studied was 31.2 years, and the prevalence rate for HIV-1 was 24.7%. Persons in the 15-24 age group were affected more frequently. The highest prevalence (43.8%) was found among the females in red light houses. Females with relatively larger number of sexual partners and those who had previous exposure to STDs, had a higher prevalence of the infection. The survey revealed that HIV-1 is highly prevalent among females practicing multi-partner sexual contact (MPSC) in Addis Ababa, and the infection concentrates in the central areas of the city .

INTRODUCTION

Following recognition of AIDS and HIV infection in neighboring countries (1), several investigators in Ethiopia conducted serological surveys for HIV-l between 1984 and 1987. In a study completed in 1986, in Addis Ababa, the HIV prevalence was found to be 5.9% among prostitutes, and 3.08% among male clients of prostitutes (2). Another study carried out in 1985-1986 (3) showed that 0.07% of 5265 military recruits were positive for HIV-l antibodies.

A nation-wide sero-epidemiological survey carried out in 1988 among female sex workers in 23 urban areas of Ethiopia, excluding Addis Ababa revealed an average HIV-l prevalence rate of 17% ranging from 1.3% in Massawa to 38.1% in Desse (4). The purpose of this survey in Addis Ababa, which was conducted in July 1989, was to determine HIV-1 prevalence rates among various groups of female sex workers and identify major risk factors for HIV infection.

SUBJECTS AND METHODS

The target groups were represented by females working in four different categories of the beverage establishments. These establishments were identified from a census list prepared earlier by the Ministry of Health and they included: bars, tej (traditional wine) houses, tella (traditional beer) houses, and private red light houses. Out of the 284

*AIDS Control Programme, Ministry of Health, Ethiopia -
.**WHO Team Leader, AIDS Control Programme, Ethiopia
***National Research Institute of Health
****Addis Ababa University

Kebeles (smallest administrative unit) in Addis Ababa, 40 kebeles (14.1% of total) were selected by systematic sampling. This number represented at least one, generally two kebeles in each

Kefitegna (the second level administrative unit). The establishments and subjects of the target population in each category in a Kebele were again selected by a second stage systematic sampling, to achieve a representative sample of 68 persons from each kebele. Married tella sellers were analyzed as a separate group. Blood drawing was preceded by group counselling and individual interviews concerning the social and health
status of the individuals studied. Sera were tested for HIV-l antibodies by ELISA (Wellcozyme). Double ELISA positive samples were tested by Western blot (BIORAD) for confirmation. The analysis was conducted using "EPIINFO" software.

RESULTS

A total of 4975 females were registered during the survey census in 40 kebeles. Of these, 2617 were interviewed and tested for HIV-l.

Table 1. Prevalence rates of H1V-1 infection among MPSC females in Addis Ababa, 1989

Category	Sample size	No. postives	% postives 95% C.I. for P
Bar girls	947	212	22.42.6
Tej sellers	121	11	9.15.1
Tella sellers			
-Unmarried	539	73	13.52.9
-Married	243	15	6.23.0
Females in red light houses	767	336	43.83.5
All groups	2617	647	24.71.6

The mean age of the whole group under study was 31.2 years, with the lowest mean age in the bar girls (26.3 years) and highest in the tella sellers group (39.5 years). 14% of the target population were married; the highest proportion (31.1 %) of married participants was found among tella sellers. The overall HIV prevalence rate for all groups was 24.7%. Females from red-light houses, practicing MPSC, were more frequently infected by HIV (43.8%) than any other group in the study (table 1). The prevalence rate among tella sellers, was lower than in the bar girls and females in red-light houses.

The prevalence rate among unmarried tella sellers was more than double, as compared to the married tell a sellers (table 1). In four of the five groups, the prevalence rates uniformly decreased as the age increased ($p < 0.001$), (table 2). The highest prevalence rates were observed in the 15-24 years age group, for all groups, except tej sellers. The prevalence rate among illiterate persons was 26.1% ; among females who completed 9 to 12 grades of a general school, the prevalence was lower (20.4%), (table 3), though the difference was not statistically significant ($p > 0.1$).

The average number of sexual partners per week in each category varied from 1.1 for tella sellers to 4.2 for females in red-light houses. Some married tella sellers have also reported occasional extramarital sex. Table 4 demonstrates that the prevalence of HIV infection grows as the number of sexual partners increases. The number of sexual partners per week was greater in the age group 15-29 years (average = 3.19) as compared to those over 30 years of age (average = 1.61)$P < 0.001$. The rate for the entire group varied from 10.3% for those having one or less partner per week to 66.7% for those with 6-7 partners per week.

HIV prevalence was found significantly higher among persons with other sexually transmitted diseases (STDs) (40.0%) during the year preceding the survey, as compared to those who did not acquire STDs (21.0%) ($P < 0.0001$). These episodes were more frequently reported among females in red-light houses.

18.6% of the females who practice multipartner sexual contact up to 2 years, were HIV positive; the corresponding prevalence rate for those who practiced MPSC for 2-4 years
was 45.3%. The rate decreased among persons who practiced MPSC for more than five years. The number of females who had blood transfusion in the last 3 years was only 22. No intravenous drug users were identified.

In order to identify the relation of the prevalence rates to demographic features of various areas in the capital city, the map obtained from the population and housing census

Table 2. Age specific prevalence rates of HJV-1 infection among MPSC females in Addis Ababa, 1989.

Age groups	Bar girls	Tej sellers	Tella sellers		Females in red light houses	All
			married	unmarried		
15-24	156/515	5/42	2/19	21/112	175/283	359/971
	(30.3%)	(11.9%)	(10.5%)	(18.8%)	(61.8%)	(36.8%)
25-34	47/276	5/31	6/63	17/90	122/282	197/742
	(17.0%)	(16.1%)	(9.5%)	(18.9%)	(43.3%)	(26.5%)
35-44	6/85	1/47	5/83	20/112	30/141	62/468
	(7.0%)	(2.1%)	(6.0%)	(17.9%)	(21.3%)	(14.2%)
45+	3/71	-	2/78	15/218	9/61	29/428
	(4.2%)		(2.6%)	(6.8%)	(14.7%)	(6.3%)
Unknown	-	0/1	-	0/7	-	0/8
		(0.0%)		(0.0%)		(0.0%)
All ages	212/947	11/121	15/246	73/539	336/767	647/2617
	(22.4%)	(9.1%)	(6.2%)	(13.5%)	(43.8%)	(24.7%)

of Ethiopia (11) was divided into three zones. The external border of Addis Ababa roughly corresponds to a geometric circle. Circles were drawn from the geometric centre of the city with the radius doubling for succeeding circles (Fig. 1). The areas of all kebeles located totally or of their larger part within a particular zone were summed up.

These figures served as denominators for the calculation of population density in each zone. Relation of the population density and HIV prevalence rates in the three zones of Addis Ababa is shown in table 5. T1.e prevalence rates varied significantly ($P < 0.01$) between the three zones. Plotting of the prevalence in various kebeles on the map of Addis Ababa showed that the kebeles with higher rates were mainly situated in the centre of the city. Kefitegna 5, Kebele 12 and Kefitegna 5, Kebele 07 had the highest prevalence rates, 52.6% & 60.0% respectively (figure1).

DISCUSSION

The results of the seroprevalence studies carried out previously, between 1984 and 1987 among female sex workers attending STD clinics in Addis Ababa, have shown relatively low prevalence rates (2,7) as compared to a study done on a similar population in 1988 in twenty three urban areas of Ethiopia (4). The result of the present study in the capital city indicated that a quarter of the female sex workers have been infected by HIV.

Comparing the HIV prevalence rates in female sex workers with HIV prevalence rates in the general population, represented by antenatal clinics (3.6%), (12) indicates that' heterosexual intercourse is the predominant mode of transmission of human immunodeficiency virus in Ethiopia. The pattern is similar to other African countries (6,9).

The major risk factors associated with HIV infection in the groups studied were: high number of sexual partners, infection with other sexually transmitted diseases, lack of general education, and duration of the involvement in prostitution. Most of these risk factors were found to be the same as a similar study conducted among Kenyan prostitutes (5). Decrease in the HIV carrier rate among females who practice prostitution for more than four years, does not have an immediate explanation. The higher HIV prevalence rates among females in the red-light houses and in bar girls, are possibly attributed to the factors listed above. The study on the social and sexual practices of females in red-light houses (II) revealed that they entertain more sex partners until midnight, as compared to tella and tej sellers. Bar girls also entertain few partners until midnight, although not as many as the females in red-light houses. Tella and tej sellers (who had relatively

Table 3. Educational level and prevalence of HIV infection among various groups of MPSC female in Addis Ababa, 1989 Tella Sellers

Grades completed	Bar girls sellers	Tej sellers	Tej sellers		Females in red-light houses	All
			Married	Unmarried		
Illiterate	60/249	6*66	4/142	48/365	215/454	333/1276
	(24.1%)	(9.1%)	(2.8%)	(13.2%)	(47.4%)	(26.1%)
1-6	93/393	2/36	9/88	22/130	98/244	244/891
	(23.7%)	(5.7%)	(10.3%)	(16.9%)	(40.2%)	(25.2%)
7-8	33/144	0/6	2/5	1/18	14/37	50/210
	(22.9%)	-	(40.0%)	(5.6%)	(37.8%)	(24.5%)
9-12	22/109	1/7	0/5	2/18	8/23	33/162
	(20.2%)	(14.3%)	-	(11.1%)	(34.8%)	(20.4%)

lower prevalence rates) had also lesser exposure to the risk factors. Nevertheless, even the married tella sellers were at a higher risk than the general female population represented by antenatal clinic attendants (12). The extramarital sex reported by some married tella sellers may be the reason for the higher positivity rate.

According to our arbitrary division of the territory of Addis Ababa, the highest HIV prevalence rate was in the central zone, which includes Mercato, Arada, and other business centres covering an area of 24.7 sq. km. The population density in the central zone is two times that of the second zone area (table 1). Mercato is a metropolitan commercial area comprised of big department stores and small shops, residential houses, having medium and small bars, hotels and red-light houses. It is densely populated; many low socio-economic groups of people live in crowded situations. The

females in the study group, particularly, live in houses with poor sanitary condition (five to six females in a house). The prices requested from male clients are low compared to the price in other areas. The frequency of experience to Sills were also higher in this zone.

The second zone covers an area of 73.9 sq. km. The average HIV prevalence rate, for all groups of females in the 19 kebeles studied in zone two, was 10.5%. This area is less crowded, though bars are more predominant. The peripheral zone is wider, covering an area more than the sum of the central and medium zones, but with a lower population density and less beverage establishments. The HIV prevalence among the females in this zone is the lowest (2.4%).

The results of this sero-epidemiological survey clearly indicate that the infection con-centrates in the central areas of the city , which require more attention with intervention strategies. It is interesting to compare HIV prevalence rates among MPSC females in the various zones of Addis Ababa, with the results of the study on the same group in the other twenty three urban areas of Ethiopia (4). In Addis Ababa, the prevalence is very high in the central highly populated areas of the city, and very low in the peripheral and scarcely populated portion. Among other towns of Ethiopia the prevalence was higher in the settlements with major urban migration, and lower in the areas of limited urban traffic, indicating the importance of high urban traffic and population density in HIV transmission.

As in many parts of Africa (9), all sexually active men and women in Ethiopia, who are not in mutually monogamous relationship with an uninfected person, are now at risk of acquiring HIV infection. The wide spread emergence of HIV, and the very high prevalence rate of Sills among female sex workers

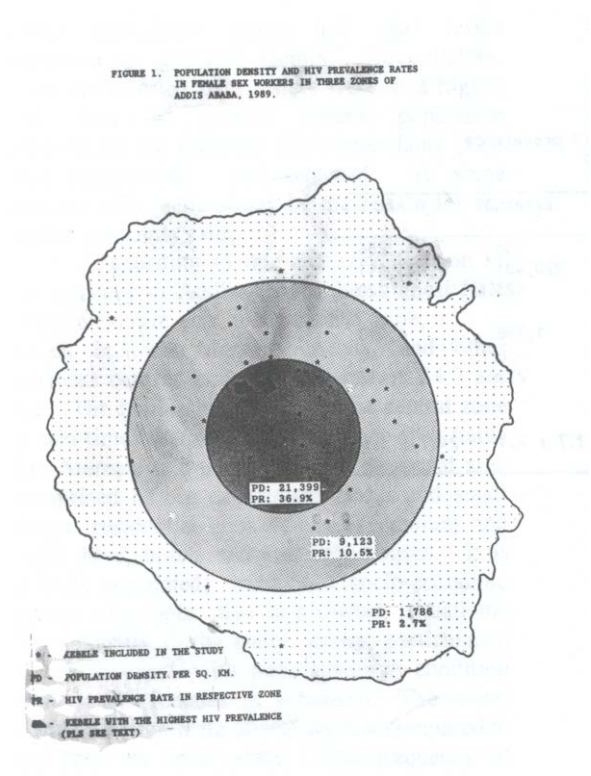
Table 4. Number of sexual partners and HIV prevalence rates among MPSC females in Addis Ababa, 1989

Number of parents per week	Bar girls sellers	Tej sellers	Tella sellers		Female in red-light houses	All
			Married	Unmarried		
0-1	48/456	3/100	15/244	39/438	45/218	1456
	(10.5%)	(3.0%)	(6.1%)	(8.9%)	(20.6%)	(10.3%)
2-3	122/389	5/15	-	83/27	131/291	285/778
	(31.4%)	(33.3%)	-	(32.5%)	(45.0%)	(55.2%)
4-5	16/48	1/4	-	5/12	70/106	92/170
	(33.3%)	(25.0%)	-	(41.7%)	(66.0%)	(54.1%)
6-7	22/36	2/2	-	2/6	44/61	70/105
	(61.1%)	(100.0%)	-	(33.3%)	(72.1%)	(66.7%)

Table 5. Relation of the population density and HIV prevalence rates in three zones of Addis Ababa, 1989

	Central	Medium	External	All
Total No. of Kebeles Population	105	143	36	284
Area in sq km	528,551	674,159	220,401	1,423,111
Population Density(per sq. km.)	24.7	73.9	123.4	220
No. of kebeles tested	21,399	9,123	1,786	6,410
Persons tested	15	19	6	40
HIV Prevalence	1,473	921	223	2,617
HIV Prevalence Rate & 95% C.I for P	36.9±2.5	10.52.0	2.72.1	24.71.6

in Addis Ababa, (13) needs special consideration.
Reduction of HIV transmission in the study groups and their partners can be achieved by change of sexual behaviour. This requires sustained public education and mobilization campaigns -aimed at both the risk groups and the general population. Use of condoms and maintaining faithful partnerships is to be encouraged. Prevention and control of other
sexually transmitted diseases requires strengthening.



REFERENCES

1. Quinn C, Mann J, Curran JW, Piot P. AIDS in Afiica: An epidemiologic Paradigm, New Scientilt. Nov. 1986; Vol. 234: 955-962. 2. Ayehunie S, Britton S, Yemane-Berllan T, Fehniger T . Prevalence of Human Immunodeficiency Virus (HIV) Antibodies in Prostitute. and their Clienta in Addis Ababa, Ethiopia. ill International Conference on
AIDS, Washington, June 1987; abstract MP 214. 3. Kefenie H, Butto S, Desta B, Verani P, Titti F, Sernicols L, Rapicetta M, Posquini P, Rolli GB. Serological Survey of Human Immunodeficiency Virus (HIV) in Ethiopia. Journal of Medical Virology, 1989; 28: 21-24.
4. Mehret M, Khodakevich L, Zewdie D, Getachew G, Ayehunie S, Bekele S, Hailemichael M, Fosil K, Mengesha Y, Asefa G, Refis.. B, Tigist K, Demissew B, Semunegus L. Prevalence of H\V Infection Among Females Practicing Multipartner Sexual Contacts in Ethiopia. XVI Annual Medical Conference of Ethiopia, May 1990; abstract 60.
5. Simonsen IN, Plummer FA, Ngugi N, Black C, Kreis IK, Galcinya MN, Waiyaki P, D'Costa L, Ndinya Achola ,J, Piot P, and Ronald A. H\V Infection Among Lower Socioeconomic Strata Prostitutes in Nairobi, AIDS 1990; 4:139- 144.
6. Nancy S. Padion. Prostitute Women and AIDS, epidemiology. AIDS 1988; 2: 413-419.

7. AyehunieS, Zewdie D, Ketema F, Adal G. Seropositivityt HIV-l Antibodies in Addis Ababa, Ethiopia. IV International conference on AIDS, Stockholm, Ju.. 1988; abstract 5044.
8. Mehret M, Khodakevich L, Zewdie D, Getachew G, Ayehunie S, Bekele S, Asefa G, Belaineh G, RefillS B,
Teshome A, Gezahegn A. Prevalence of H\V Infection Among Long Distance Driven in Ethiopia. XXVI
Annual Medical Conference of Ethiopia, May 1990; abstract 62.
9. Piot P, Kreill JK, Ndinyo- Achola JO, Ngugi EN, Simonsen IN, Cameron DW, Taelman H, Plummer F. Editorial
Review, Heterosexual Transmission of H\V .AIDS 1987; 1: 199-206.
10. Statistical Abstract, Central Statistical Authority, Ethiopia, 1986.
11. Mehret M, Khodakevich L, Bekele S, Fikerte B. Sexual BehavioR and some Social Features of Female.
Practicing Multipartner Sexual Contacta (MPSC) in the City of Addis Ababa. Ethiopian Journal of Health Development, 1991; (in press).
12. Zewdie D, Tafari N, Kebede T, Gebrehiwot B. Sero- prevalence of H\V and Syphilis Infection Among
Childbearing Age Women of Central Elhiopio. Vlth International Conference on AIDS, San Franciaco 1990; abstract FC 600.
13. Desta S, Feleke W, Yusuf M, Mehret M, Ghidinelli M, Geyid A, Zewdie D, Khodakevich L, Carosi G. STD.
and Related Factors Among Female Sex Workers in Addis Ababa. Ethiopia Journal of Health Development, 1991; in press.