PROGRESSION OF HUMAN IMMUNODEFICIENCY VIRUS EPEDEMIC IN ETHIOPIA

Mengistu Mehret*, Lev Khodakevich.,**
Debrework Zewdie*, Bekele Shanko**

SUMMARY: A series of HIV sero-prevalence surveys have been carried out in Ethiopia within the framework of the medium term plan for AIDS Control. The surveys were designed to monitor progression of the HIV epidemic in the populations experiencing various risk behaviours as well as in the general population. Sex workers were represented by 2056 randomly selected females practicing multi-partner sexual contact (MPSC) in seven urban areas in 1988, and by 1987 persons in 1989. Similarly, 995 employees of thee Ethiopian Freight Transport Corporation (EFTC), (drivers, assistants, and technicians) were tested in 1988, and 555 in 1989. A survey was also conducted in December 1989 among 318 out patients in Assela Hospital. The average HIV prevalence rate in the country in 1988 among MPSC females was 18.5%. In the second year the average prevalence rate in the seven towns increased to 29.2%. This showed a progression rate of 57.8% in a 12 months period. The progression rates were higher in the initially low prevalence areas and vice versa (r = -0.92). Among the EFTC employees the rate of progression was 33.0% in the drivers and 78.0% in the technicians (initial prevalence rates were 17.3% and 4.1% respectively). The sero-conversion rate was 7.2 % among these EFTC workers within 12 months. No HIV sero-positive person was found among 300 hospital outpatients in Assela hospital in the 1985-86 survey while by the end of 1989 3.5% of the same population group were infected. The results of consecutive testing of blood donors also indicated that HIV prevalence has been increasing steadily, though at a lower rate than among those groups who practiced risk behaviour. These studies indicate that HIV infection is progressing among the urban population in Ethiopia. There is an urgent need for intensive health education aimed at changing sexual behaviour and at promotion of condoms in order to decrease further spread of HIV

INI'RODUCTION

A series of HIV sero-prevalence surveys had been carried out in Ethiopia within the framework of the medium term plan for AIDS Control. The surveys were designed to monitor the progression of the HIV epidemic in the populations experiencing various risk behaviours, as well as in. the general population. The target groups included female sex workers, long distance truck drivers, lorry technicians, blood donors, military recruits, tuberculosis patients, and the winners of foreign scholarship. The results of the initial studies indicated that HIV is spread in both high and low risk behaviour groups (1-8). This paper reviews the results of various studies on HIV conducted in Ethiopia between 1984-1989 and determines the progression of the epidemic up to 1989.

* Departmem of AIDS Control, Ministry of Health, Ethiopia .
** WHO Team Leader, AIDS Control Programme, Ethiopia

MATERIALS AND METHODS

Most HIV surveillance data available in Ethiopia until the end of 1989 were used for monitoring trends over time. For the study on the females involved in multi-partner sexual contacts (MPSC),

the 23 urban settlements were stratified into 4 groups based on the results of the 1988 HIV sero-prevalence survey (9,11,27).

Areas with the same ranges of HIV prevalence rates were represented by one or two towns during the second round of the survey conducted in a 12 month period. The towns
of Asmara and Metu were chosen to represent women in the areas with prevalence rates lower than 10%; the women in the areas with prevalence rates between 10%-19% were represented by the towns of Nazareth, Diredawa, and Nekemte. Women in Bahrdar and Adaitu were chosen to represent the towns with prevalence rates greater than 20%.

The first survey among the employees of the Ethiopian Freight Transport Corporation (EFTC) was conducted in July 1988 (10). The second round of the survey in July 1989 included 555 employees of the corporation, the whole registered target population at the time of the study (12). The data on blood donors were received from the blood banks and regional hospitals screening blood for HIV (8,13).

Reports of blood donors have not been sent regularly to the Department of AIDS Control from blood banks and regional HIV screening laboratories until very recently. Therefore,
periodic assessment and status analysis of HIV prevalence had to depend. on available data at the time of compilation. A vailabJe data collected and updated retrospectively from these different sites as of December 31. 1990 were used. The data on scholarship v.Anners going abroad (usually tested in July al}d August of each year as the requests come from offices concerned) were compiled. The study results on 300 hospital outpatients in Assela town in 1989 were compared with the data of a similar survey made by Kefene et al in 1985-86 (6).

Other available data on blood donors, tuberculosis patients, and other groups had been used to monitor trends of the HIV epidemic. Sera were tested by ELISA (Wellcozyme). Repeated ELISA positive blood samples were tested by Western Blot (BIORAD) for confirmation, an exception being blood donors samples, whose testing was limited to double ELISA tests. The data were analyzed using "EPIINFO" software, supplied by the WHO Global Programme on AIDS.

RFSULTS

Between July and December 1989, 1987 female sex worker practicing MPSC were tested in seven towns selected for monitoring HIV trends in the country .The sample size for each town ranged from 109 in Adamitu to 346 in Bahrdar and Nazareth.

The mean age of the females studied in these cities ranged from 20.8 years in Bahrdar to 26.2 years in Asmara and the mean age for all towns was 23.4 years. Marital status revealed that 56.0% of the group members were divorced, 38.7% had never been married, 1.9% were widowed, and only 1.7% were married. 61.9% of the females had practiced MPSC for less than 4 years. 55.8% of the females had no children, 27.6% had one child, and 9.9% had 2 children. Only 4.5% of women always or often used condoms as a protective means for sms and pregnancies. The corresponding figure of condom users in 1988 was 1.8% .The social an,d behavioural data basically matched the results received during the previous survey carried out in the same groups (27). The over all prevalence rate for the seven towns was 29.2% (Table 1) with the highest in Bahrdar (49.1 %) and

the lowest in Asmara (6.9%). The progression rates depended on the initial HIV prevalence rates (figure 1). Progression = 1.42 -3.19 x prevalence). The progression rates are shown in table 1.

Age specific prevalence rates were found highest in the youngest females: 33.7% in the age group 15-19 years; 32.2% in the age group 20-24 years; and 27.8% in the age group 25-29 years ($p > 0.1$). Beyond thirty years of age the prevalence rates significantly decreased as age increases ($p < 0.01$). The prevalence rates were significantly lower among married women (5.9%) than in those who were divorced (28.6%), ($p < 0.003$). 87.2% of women who wl.ire positive for HIV antibodies had practiced multi-partner sexual contacts for less than 4 years.

Table I. C~rison of the HIV prevalence rates
8IOOng females practicing MPSC, in 1988 and 1989

	1988*		1989	
,Town/City	S~le sIze	X size	S~le size	X ~ate of Increase
0 - Ada i tu	116	32.8	109	42.2 28.6X
Asmara	386	2.3	318	6.9 200.0X
BahrDar	324	35.9	346	49.1 36.8X
DireDawa	361	18.0	343	32.1 78.3X
Metu	262	5.3	236	12.1 128.3X
Nazareth	333	19.8	346	31.8 60.6X
Nekemt	274	15.3	289	31.8 107.8X
00 -- All towns	2056	18.5	1987	29.2 57.8X

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* (Reference 27)

The second round of the survey of the EFTC employees revealed that the mean ages of drivers and technicians were 38.2 years and 31.4 years respectively. On an average 5.1% of the drivers and their assistants had 2 or more sexual partners per week, while only 1.9% of the technicians had this number. 10.4% of drivers and assistants had experienced STDs within 12 months preceding the second survey, as compared to 1.2% reported by the technicians.

78.6% of drivers (including assistants) were married while the corresponding figure for the technicians was 45.1 %. The prevalence rates were 17.3% in the drivers and their assistants, and 7.3 % among the technicians (fable 2). The 1989 survey showed that the HIV prevalence had increased by 33.0% in the drivers and their assistants, and by 78.0% in the technicians, (fable 2).

Out of 250 tested sero-negative individuals in the 1988 round, who were also included in the 1989 sample, 18 (7.2%) sero-converted.

Based on a compiled report of the department of AIDS Control on AIDS situation in Ethiopia, the HIV prevalence in 1987 mainly from blood donors in Addis Ababa was 2.3%, (n = 24,768). In 1988 this figure as collected from 7 blood screening laboratories, was 3.7% (n = 20,462). The figure in 1989 from 7 sites was the same as for 1988 (n = 19,658). The figure compiled on scholarship winners going abroad had a similar pattern. In 1988 it was 3.2% (n = 1087) and in 1989 it was 3.8%. In the Assela hospital outpatient department all 300 persons tested in 1985-86 were found to be negative by Western Blot; while in 1989, 3.5% of the OPD visitors were infected by HIV-1. Similarly the studies done on Tuberculosis patients in Addis Ababa in January 1988; and August -December 1988 revealed prevalence rate$ of 4.5% and 6.6% respectively (13,26).

A summary of the HIV prevalence rates in various population groups between 1984 and 1989 is shown in figure

2. Table 2. C~arison of the HIV prevalence rates of the 1988 and 1989 studies among drivers and technicians

1988* 1989
Town Sa~le Preva- S~le Preva- Rate of
size lence size lence increase
X X
, -.
DrIvers .
& 677 13.D 391 17.3 33.0X
Assistants
Technicians 318 4.1 164 7.3 78.0X
Total 995 555
~ * (Reference 10)

DISCUSSION

Serial studies conducted in several countries have shown the rapid increase of HIV infection among various population groups particularly in Central Africa and adjacent countries in east and southern Africa (20-23). The virus is being detected in areas of Africa previously thought to be free of infection. The surveillance data available until 1989 in Ethiopia have also revealed the real magnitude of the epidemic among different
population groups (1-10). In the study done in 1985 among female sex workers in Addis Ababa the prevalence of HIV infection was 0.6% (8). Another study, 2 years later on the
high risk females, documented a HIV-1 prevalence of 6.7% (2). Comprehensive surveys of the females practicing MPSC in 23 urban areas of Ethiopia and long distance truck drivers in 1988 have provided a wide spectrum of data on the HIV epidemic, including information on social status and sexual practices and behaviour (9,10). Interval sero-surveys a year later revaled that HIV infection is progressing at a fast rate among these groups (11,12). The overall progression rate among MPSC females in seven towns was 60% in 12 months time, but the rate varied in each town. The rate of increase of HIV-1 infection was higher in the towns with lower prevalence; being a three fold increase in Asmara, double in Metu and Nekemte. Towns with high prevalence rates

like Bahrdar and Adaitu had a relatively lower progression rate of HIV infection (36.8% and 28.6% respectively). The rate of progression depended on the initial prevalence rates, i.e high in low prevalence areas. The difference in the epidemic progression in the areas of various initial prevalence rates is indicative that no discrimination should be made while selecting areas for intervention; the activities are equally important in both high and low prevalence areas.

Longitudinal studies on HIV sero-prevalence among female prostitutes in Nairobi have shown an increase from 4% to 90% between 1980 and 1987 and in Zaire, the prevalence grew from 27% in 1985 to 50% in 1988, both demonstrating the rapid dissemination of HIV infection in a high risk group in Africa (14). The HIV progression among female sex workers is also similar in Ethiopia; but the increase of the prevalence is not uniform in all areas as described in the other countries (14). The major geographical differences in the epidemiology of heterosexually acquired HIV may be determined by the period of introduction of the virus into a given community, the pattern of sexual behaviour, and by population migration and its subsequent effect on sexual behaviour (14).

The progression of the epidemic among employees of EFTC showed a similar pattern. The rate increased by 33.0% in the drivers group {from 13.0% to 17.3%) while among the technicians the prevalence almost doubled {from 4.1% to 7.3%) in the same 12 month period {12) indicating as in the case of MPSC females, that the epidemic progresses faster in the groups with a lower prevalence.

The prevalence of F.IV infection among tuberculosis patients was also significant in both studies {13,26) which calls for a further consideration of their risk factors. In a survey on antenatal clinic attendants in the towns of central Ethiopia in 1989 the HIV prevalence rate was between 2.1% and 3.6% {15). There is no other previous data with which to compare. Sentinel surveillance sites established in 1990 at antenatal clinics will give further information.

Results of the screening of blood donors have also served as useful surveillance data in many countries {16,18). The relatively slow but steady increase in sero-prevalence among blood donors in Ethiopia, from 2.1% in 1986 to 2.3% in 1987, {13), and in the OPD attendants {6,17), from zero in 1985-86 to 3.5% in 1989 (6,17), indicates a steady spread of HIV infection to the general population in the country. Similar observations have also been reported in other countries of Africa {18). Sero-surveys of HIV infection in the general population carried out of in 1986 emphasized the wide variation of HIV infection in Africa, demonstrating a sero-prevalence of 1% in Cameroon, 4% in the Central African Republic, 15% in Uganda, and 5% in the Congo {19). Reasons for these large regional differences in HIV sero-prevalence have not been elaborated and some have t been attributed to bias in sample collection.

An initial sero-survey in Ethiopia in 1985-86 on 5265 military recruits who were , mainly rural residents showed a prevalence of 0.07% (6). No study has been done in later 11 years but considering the experience of other countries {18), the progression of the epidemic It into the rural population of Ethiopia is thought to be lower (24). Special efforts are required for the prevention of HIV spread in this population which represent 90% of the whole country population in order to prevent the devastating effect of AIDS observed now in some countries of Central Africa.

Young adults in the most productive age of 15-35 years are at the highest risk as was also documented in other African countries (19).

Post-test counselling and health education on the safe sexual behaviour and condom promotion have been applied continuously during the last two years in both risk groups. The outcome of these interventions, however, cannot be measured within this short period of time. At present the development of the HIV epidemic is a few years behind (5) as compared to some neighboring countries but the patterns of HIV spread among different population groups are similar .The higher prevalence and progression rates observed in the populations which practice multi-partner sexual contacts, both females and males as compared to low risk general population, (represented at large by blood donors and pregnant women), indicates that in Ethiopia HIV is transmitted mainly through heterosexual contacts.

CONCLUSION

The sero-surveys conducted on HIV infection between 1984 and 1989 have contributed a great deal to understanding the HIV epidemic in the urban areas of Ethiopia. At first they indicated that the infection, inspite of its relatively recent introduction, had spread allover the country .So far HIV has been concentrated in the urban settlements affecting predominantly young adults through the heterosexual route. The epidemic in the cities and towns of Ethiopia progresses more rapidly among people practicing multipartner sexual contacts and the HIV prevalence rates increased by more than 57.8 % in a one year period in these groups. Progression of the epidemic in the populations with no identified risk behaviours has also been noticed, though at a lower pace. Very little is known on HIV infection in children and rural dwellers. This calls for further expansion of the surveillance to the general population both in urban and rural areas. In addition to the HIV prevalence data, quantitative information on the rates of change of sexual partners in different communities is needed. Prevention of HIV infection requires continued publicity campaigns as well as intensive efforts targeted to particular groups at high risk, such as sex workers and their clients, long distance drivers, youth, and the public at large.

Future control will continue to depend on encouraging condom use and reducing the number of sexual partners. A preliminary report on the condom promotion and social mobilization of high risk groups has shown successful results on condom use (25). While
the control of HIV should be targeted particularly at sex workers and their clients other population groups must not be neglected.

FIGURE 2. ETHIOPIA, HIV-1 PREVALENCE RATES IN VARIOUS POPULATION GROUPS, 1984-1989

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