PROJECTIONS ON THE DEVELOPMENT OF HIV/AIDS EPIDEMICS IN ETHOPIA

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SUMMARY: The accumulated global experience on the duration of HIV latency period and the rates of annual progression to clinical AIDS provided the basis on which to formulate projections on the development of the HIV/AIDS epidemic. Using the data available for 1989 on HIV prevalence in the adult population of Ethiopia and the computer model developed by the WHO Global Programme on AIDS, projections of the epidemic in this country were made. Conservative estimates on the number of STDs infected persons and AIDS cases indicate that Ethiopia is one to three years behind the most AIDS affected countries of Africa in the development of HIV I AIDS epidemic. According to the estimates the national AIDS case surveillance network was able to identify about 10% of the cases which have actually occurred. The progression of the epidemic is threatening, and it requires mobilization of all sectors of the society in order to affect HIV transmission.

INTRODUCTION

The first AIDS case in Ethiopia was recorded in February 1986 (1); as of September 1990 the cumulative number of cases increased to 531. A notable increase of reported cases was observed during 1989-90, following the introduction of a nation wide AIDS case surveillance system. However, several reports from Addis Ababa hospitals and the regions have indicated that some cases have not been registered by local medical institutions; some cases registered at the hospitals were not report- ed to the Department of AIDS Control of the Ministry of Health .

Beginning in early 1988, when the Medium Term Plan for AIDS control was implemented, a series of sero-epidemiological surveys were carried out throughout the country. These surveys determined HIV prevalence rates in various population groups, in a representative sample of urban settlements (2,3). Repeated surveys In similar population groups also revealed the rates of HIV prevalence progressions (4).

With increasing knowledge on the duration of the HIV latency period and the rates of annual progression to clinical disease, it became possible to estimate expected number of AIDS cases on the basis of the present rates of seroprevalence in certain populations (5). Using the methodology of forecasting AIDS cases developed by the Surveillance, Forecasting and Impact Assessment unit of the Global Programme on AIDS, an initiative was developed to make projections on HIV prevalence and AIDS cases among some populations in Ethiopia, which is reported here.

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MATERIALS AND METHODS

A model" AIDS Calculator", developed by the Global Programme on AIDS, was used for the projections. The annual progression rate to clinical AIDS was based on the GPA developed model as follows: 0.005; 0.01; 0.02; 0.04; 0.07; 0.12; 0.2; 0.36. Reports on the prevalence rates of

HIV infection in various population groups do provided the basis for extrapolation of expected prevalence at present. Prevalence was estimated by year retrospectively from 1989 to 1984, when HIV infection was recorded in Ethiopia for the first time. The projection was made by drawing a hypothetical line showing 100% increase in the number of affected persons, annually from zero in 1983.

The population groups involved included: male and female populations with no specified risk behaviours (general) in urban areas, females practicing multi-partner sexual contacts (MPSC), male population of the cities, who spend more than 50% of their time traveling outside of their places of residence (traveling men), as well as the rural population. The
prevalence rates for the general urban population were derived from the survey carried out among women attending antenatal clinics in Addis Ababa and surrounding towns (D. Zewdie, personal communication, 1990), and from the results of blood screening at blood banks in 6 cities. For the females involved in MPSC, we used results of the serosurvey carried out in seven major towns in 1989. Estimates on the infection in the travelling men were made from the results of the survey carried out among truck drivers of the Ethiopian Freight Transport Corporation and finally, the rural population was assessed on the basis of the survey carried out among 5265 army recruits in 1986 (6).

RESULTS

The extrapolations on HIV prevalence rates in various population groups are compiled in table one. The groups are shown under two broad areas of urban and rural populations. of all urban females, 909,500, considered with no identified risk behaviour, were represented by the females screened at numerous antenatal clinics in Addis Ababa and adjoining towns. As it was disclosed by HIV seroprevalence surveys, about 10% or an estimated 100,500 adult females in major urban settlements practice multi-partner sexual contacts (MPSC) at bars and private houses.

The male population was also broken down into two cohort groups: general and travelling men. The general male. population was represented by blood donors m 6 major
blood banks.

The proportion of the travelling men was obtained through a special survey among enterprises in Addis Ababa, (DAC records, 1990) which indicated that 17.8% of all employed men surveyed spend more than half of their time outside of their duty stations, due to occupational needs.

Table 1. Estimated HIV prevalence in Ethiopia
8IOOng sexually active adults, 15-44 years of age
Group No. persons HIV pr. rate No. HIV
infected
Urban
Females 1,005,000

909,500** 3.6% 32,560(26.3)
Males 804,400
672,400** 2.6% 17,500(14.2%)
MPSC
Females
(10%) 100,500 29.2% 29,350(23.1%)
E~loyed
Men
(91.8%) 740,000
Mobile
Men
(17.8%) 132,000 17.3% 22,840(18.5)
Rural 15,303,000 1986-0.07% 21,420(17.3X)
1989 (est)-0.14%
Females 7,908,100 11,070
Males 7,394,900 10,350
Total* 17,112,400 123,670(100.0%)
* The deroographic data used were fran the
'Ethiopia Statistical Abstract', 1986.
** Population with no identified risk

The HIV prevalence rates have been derived from the results of various serosurveys carried out primarily in 1989. The antenatal clinic attendants survey included 1834 females, tested with no preset criteria on their arrival to the clinics. Out of 31, 797 donors tested in six towns, in 1989, 1188 were found HIV positive by double ELISA. Considering 20% false positivity rate of ELISA as confirmed by West. em Blot, (found in the previous surveys in the same population group) the prevalence rate was 2.6%. The 29.2% prevalence rate in the MPSC female, represents an average of the test results of the survey carried out in the largest towns of the country , which included a total of 2030 subjects, selected randomly. The HIV prevalence figure for the traveling men originated from the survey among 393 truck drivers and drivers' assistants, conducted in 1989.

Table 2. Projected nurtler of HIV infected persons
and cases
y;a;:- HIV infected -~UJIjla~
AIDS cases
"i98i: 3865 19 -
1985 mo 76
1986 151,60 229
1987 30920 608
1988 6181,0 11,69
1989 123680 331,0
1990 197888 7019
1991 316621 13997
1992 506591, 25601
1993 810550 1,51,58

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No HIV prevalence survey has been carried out in the rural population in recent years. Therefore, results of VHB/HIV screening among 5265 army recruits, predominantly from rural areas tested in 1986, were utilized (6). As it was observed in other African countries (7) the HIV prevalence rate in general populations double in 3-4 years; the figure 0.07% in 1986 presumably increased to 0.14% by 1989. Since sexual transmission is the dominant mode of HIV transmission among the Ethiopian population, both mal~ and female were considered to be infected at a similar rate.

When the estimated numbers of HIV infected persons in each group were totaled, the resulting figure was 123,670.

Both retrospective and prospective projections on the number of HIV infected persons and the number of AIDS patients are I shown in table 2. 1 Projection of AIDS case (Fig 1) indicates that the cumulative number of case will exceed 7000 in 1990, and it will increase to over 45,000 by the year 1993, if the HIV transmission trend is not changed.

DISCUSSION

The WHO projection model has been tested on AIDS statistics in the USA, a country believed to have one of the better surveillance system on AIDS, where the reported AIDS cases represent 80-90% of the actual cases that have occurred (8). The WHO AIDS projections identified about 20% to 25% more cases per year, than the reported cases. The "pretesting" results gave us the basis for use of the model in Ethiopia. Understandably however, the parameters involved have not been studied in Ethiopia and may differ from those used in the model. These include progression of HIV infection into clinical AIDS, and fatality rates. For the projection from 1989 retrospectively, we have chosen the pattern of doubling the number of HIV cases every year; this provides more conservative figures of AIDS as compared to the linear progression of HIV epidemic (in case of linear progression the number of AIDS cases by 1989 would have been estimated at 17,500).

From 1989 onward, the projection was based on the data received in Ethiopia. In 1989 Mengistu (4) compared the HIV prevalence rates in large groups of prostitutes; the rates were found to have increased by 60% over the period of 12 months. The 60% growth rate was used to project HIV prevalence and AIDS morbidity from 1989 onward. Should the rate of transmission remain the same by 1993, over 80 thousand persons in Ethiopia will be infected by HIV.

The projection allows us to evaluate the efficiency of AIDS case surveillance. The initial steps to identify AIDS cases in Ethiopia were made in 1987, when several clinicians were trained on the AIDS case definitions. The nation-wide surveillance was introduced in March -June 1988, following the training of physicians from 15 regional hospitals. The surveillance was expanded in 1990 to cover nearly all newly created regions. The surveillance is passive -it reaches mainly the population admitted for inpatient diagnosis and treatment. From figure 1 it is obvious that the AIDS case surveillance is steadily advancing.

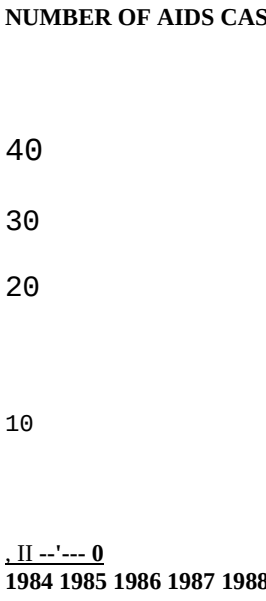
Nevertheless, it reveals only one out of 10 cases and requires further strengthening and expansion to the district level.

Finally, this projection offers a clear picture of the development of the HIV/AIDS epidemic in Ethiopia, in relation to particular African countries.

To-date, Ethiopia has reported 531 AIDS cases, corresponding to the rank (100 to 500 cases) observed for the countries of Zimbabwe (119), Ghana (145), Cote D'Ivoire (250) and Zaire (335) in 1988 (WHO Weekly Epidemiologic Records). By July 1990 .these four countries have reported 3,134, 1252, 3647 and 11732 cases respectively. Thus, in the development of the AIDS epidemic, Ethiopia is one to three years behind the countries which are most heavily affected by AIDS today. As revealed in table 1 almost 83% of HIV infected adults live in cities and towns, containing one tenth of the country population which is comparatively easily approachable for intervention activities. Over 40% of HIV infection is concentrated in the identified risk groups that comprise female prostitutes and travelling men the populations which require immediate intensive intervention. In Ethiopia HIV infection spreads primarily through sexual intercourse. In order to affect this mode of transmission people have to avoid risky sexual behaviors, i.e., practicing multi-partner sexual contacts without condoms. Modification of the behaviour may only be reached through continuous education, requiring mobilization of all sectors of the national administration as well as mass and social organization in the fight against AIDS .

FIGURE 1. REPORTED AND ESTIMATED AIDS CASES. ETHIOPIA. 1984-1990

FIGURE 2. ESTIMATED CUMULATIVE NUMBER OF AIDS CASES IN ETHIOPIA, 1984-1993



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