



**UNITED NATIONS
ECONOMIC AND SOCIAL COUNCIL**

69 390



Distr.: LIMITED

E/ECA/PHSD/SDU/95/1
October, 1995

Original: ENGLISH

ECONOMIC COMMISSION FOR AFRICA

**Senior Policy Seminar
on the Social Impact of
HIV/AIDS in Households
and Families in Africa**

Addis Ababa, Ethiopia

2 - 4th October, 1995

THE SOCIO-DEMOGRAPHIC IMPACT OF HIV/AIDS IN AFRICA

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The Impact of HIV/AIDS on Demographic Phenomena in Africa

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I. Introduction

There has been quite a lot of discussion about the demographic impact of HIV/AIDS in Africa. The initial interest arose because there was much concern, and perhaps excitement, that AIDS might act as a Malthusian positive check to reduce the high population growth rates in the region, and possibly result in reductions in the sizes of the populations of some countries. These concerns resulted in a number of studies that focussed on projecting the prevalence of HIV/AIDS and its mortality over time, and assessing the effect of assumed levels and patterns of the progression of the disease on standard population projections. Other studies have approached the issue from a broader perspective and have attempted to assess the impact of HIV/AIDS on societal mechanisms for coping with the human and economic losses precipitated by the AIDS.

Whatever their focus, the intense interest in assessing the impact of AIDS in Africa has been driven by evidence which suggests that although the number of AIDS cases and deaths reported globally continues to increase, the prevalence of the disease and the resultant mortality in Africa are more alarming than in any other world region.

This paper explores information on HIV/AIDS in Africa in an effort to demonstrate the extent of the disease and its potential impact on demographic and, in turn, social phenomena in African countries. Although the discussions refer to Africa the emphasis of the discussions is on sub-saharan Africa. The next section briefly describes the extent and pattern of HIV/AIDS in Africa. Section III draws attention to some of the underlying environmental and socio-cultural factors which determine the nature and outcome of HIV infection in Africa. In Section IV theoretical relations between HIV/AIDS and demographic phenomena are explored and issues related to data availability and measurement are also addressed. Finally Section V reports the findings of selected studies of the demographic impact of AIDS in Africa.

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The views and ideas expressed in this paper are those of the author and do not necessarily reflect the views of the United Nations or any of its Agencies

II. The level and pattern of HIV/AIDS in Africa

Africa contains less than 10 percent of the world's population but according to current estimates the continent accounts for 80 percent of current HIV cases. Mertens and others (1995) have observed that by the end of 1994 there had been 346,944 cumulative adult and pediatric AIDS cases in sub-Saharan Africa. The WHO estimates that this number understates the actual number of cases which it estimates to exceeds 3 million, or two-thirds of the world total cases. About one half of the infected adults are women, the majority of whom contracted the disease through heterosexual contact. More than 700,000 children have also contracted HIV mostly through vertical through their mothers.

Data from individual countries and various geographical areas in Africa present even more alarming statistics than are portrayed by the regional aggregate. More than one-half of all HIV infections in Africa have occurred in East and Central Africa which has only 15 percent of the population of the sub-continent (Mertens, 1994). Uganda, Tanzania, Zaire, Zambia, Rwanda Congo and Malawi are amongst the countries that have the highest prevalence in Africa. A number of estimates of the extent of HIV morbidity and mortality exist for various smaller geographical areas. Sewankambo and others (1994), for example, found adult HIV prevalence of 13 percent and HIV mortality of 52 percent in a rural district of Uganda. Although initial cases of HIV in Africa were confined largely to Eastern and Central Africa data from other areas suggest that HIV is spreading in a south and westward direction. There has been rapid increase in the prevalence of HIV and associated mortality in Zimbabwe where surveillance systems have recorded HIV sero-prevalence rates of more than 20 percent among women attending rural antenatal clinics. In one small town in Manicaland Province, 46 percent of women attending antenatal clinics were found to be HIV positive. An alternative strain -- HIV-2 -- is also being reported in several West African countries. HIV prevalence in West Africa appears to be lower than in East and Central Africa but the rate of increase in West Africa is higher. Ivory Coast, and to a lesser extent Burkina Faso and Ghana are the more affected countries within West Africa (Amat-Roze, 1993). Countries in the Sahelian region have, until recently, been areas of relatively lower risk compared with the rest of Africa. However in these countries also, the prevalence of HIV is increasing, possibly reflecting the impact of seasonal male population movement to the more endemic coastal cities of Ivory Coast, Ghana, Togo and Benin (World Bank, 1995).

There is a much higher prevalence of HIV/AIDS among those in the reproductive age groups (15 - 50) than at other ages. Higher prevalence is also generally found among special risk subgroups such as prostitutes. There

is also considerable evidence that HIV sero-prevalence is much higher among urban dwellers and among the educated elite in Africa (Troare, 1991). This finding contrasts with the HIV patterns in industrialized countries where the disease appears to be concentrated in lower socioeconomic status groups. Other studies have, however, found higher HIV infection risks among the lowest socioeconomic groups in Africa (see Seeley and others, 1994). Merson (1995) has reported that HIV sero-prevalence rates may be as high as 25 to 30 percent in Kampala. A rate of 12.3 percent has been reported elsewhere for rural areas in Uganda (Over, 1990). Similarly Over (1990) reports a rate of 20.1 for cities in Rwanda and only 2.2 percent for rural areas. Data presented by De Cock and others also suggest that AIDS has become the leading cause of death among adults in Abidjan, the capital city of Ivory Coast. The sex distribution of HIV/AIDS in Africa also differs from the distribution observed in industrialized countries. In Africa there are probably as many female as male HIV victims, and it is likely that five out of every six female sero-positive females and of all sero-positive children are in sub-Saharan Africa (Caldwell and others, 1993).

High rates of HIV infections among reproductive age women in a context where fertility rates are very high, implies that the risks of vertical transmission of HIV probably account for the large pool of young children who are HIV positive, and who will eventually develop and die from full blown AIDS. In summary the picture of AIDS in Africa is one of a disease which, though being more common in certain groups, exerts a direct and significant impact across a broad range of population subgroups. It afflicts infants, those in sexually active and reproductive ages -- males and females alike. The educated and the urban elite are also affected. The potential for a devastating impact on African populations is thus high. Based on the known pattern and prevalence of the disease in Africa, Caldwell and others (1993) write that "sub-Saharan Africa may well lose as many people to AIDS over the next half century as the Black Death killed in 14th century Europe".

III. The public health and socio-cultural context

Various factors account for the observed levels and pattern of HIV infection in Africa and also for the high levels of AIDS morbidity and mortality. These include poorer socioeconomic performance of Africa relative to other world regions, unfavorable health environments, high fertility and associated high risks of the vertical transmission of HIV, and a number of traditional practices that elevate the risk of exposure to the HIV virus.

In general the demographic and health status of Africa is one that is conducive to the occurrence and transmission of infectious and parasitic diseases. Despite marked improvements in overall health conditions and reduction in mortality since the 1950s, the region still has the world's poorest demographic and health indicators. Data showing the status of Africa on a few selected demographic and health indicators, in relation to other world regions are presented in Table 1. The table shows that relative to other world regions Africa is performing poorly on a number of indicators of national development. The proportions of Africa's population that is urban is lower than in other world regions. Even though urbanization in developed countries may imply growing access of the population to basic services, in much of Africa and the developing world increased urbanization often means the migration of rural dwellers to one or two large cities which already have poorly-developed infrastructure and sanitation. Urbanization may thus imply increased growth of squatter settlements and may imply higher exposure of the population to various health risks.

Access to health services, to education, and to safe water are also lowest in Africa. In practically all countries in the sub-continent, large pockets of the population do not have access to basic health care. Immunization for basic coverage for basic EPI diseases is low and highly dependent on the flow of donor assistance. The disease environment is also highly unfavorable. Warm and humid temperatures and poor sanitation, coupled with poor quality and access to curative health services, promote the dominance of infectious and parasitic diseases. Thus epidemics of the more common infectious diseases such as measles and cholera are common throughout sub-Saharan Africa and, as in the case of HIV/AIDS, the risk of mortality from these diseases is much higher in Africa than in other world regions. The endemicity of diseases of infectious and parasitic origin in Africa creates a fertile context for the progression of HIV to AIDS by providing a host of pathogens to capitalize on the immune-deficient status of HIV patients.

The volume and tempo of child-bearing in Africa imposes further strains on an already difficult health environment. Child bearing in Africa generally starts early and continues over much of the reproductive life of women. Contraceptive prevalence, especially of modern methods, is low and is largely confined to married women in reproductive groups. However, high levels of unwanted fertility and induced abortions suggest that there is a much wider need for contraception than the current coverage of services suggests. High fertility results not only in heavy demands on households and community resources but it also takes its toll on the health of women who bear these children and provide care for them through most of their childhood years.

For many women, prenatal care and medical assistance at delivery are poor. Many must be assisted at delivery by untrained health attendants or traditional birth attendants who may operate in environments which subject women to increased risks of maternal mortality or post-partum infection, including STDS and HIV. In many African contexts, routine gynecological care is uncommon and even where it is available, the quality may be poor. Women may not seek treatment for problems which they perceive to be private and whose treatment may be considered stigmatizing. Yet, there is evidence from Africa that lack of treatment for various STDS and genital ulcers in both males and females markedly increases the chances of HIV infection in the region (see Kapiga and others, 1994, Hunter 1993).

Various norms and practices have direct relevance to the incidence and spread of HIV/AIDS in Africa. The equitable distribution of HIV cases between males and females is a reflection of underlying patterns of social organization and the rules and mores that govern the formation and maintenance of sexual unions. Important factors in this regard are polygyny and concubinage. Other practices such as post-partum abstinence which reportedly sometimes forces men to seek non-regular sex partners (Caldwell and Caldwell, 1981) work to increase the prevalence of STDs and HIV/AIDS. Caldwell and others (1993) discussing aspects of the African family, have also noted that women are nevertheless not "supposed to concern themselves with, or know about their husband's sexual activities outside marriage". They note, also, that "wives are not supposed to talk to their husbands as if they assumed that they were engaged in extra-marital sexual relations, or imply this by demanding the use of condoms within marriage". Thus, even where women may be aware of the risks of HIV infection, they are often powerless to control their exposure.

Other aspects of African culture may account for higher risks of HIV infection than is observed elsewhere. Africa is rich in various ethnic, cultural and religious practices, many of which involve rituals which result in the scarring of the human body. Such practices include the making of ethnic identification marks, circumcision and puberty rites for both males and females, and ear piercing. The risks of HIV infection resulting from these practices is high, as many invasive procedures may be performed with unsterilized instruments. During puberty rites, for example, an entire cohort may be circumcised using the same instruments. It should be noted that actual data on circumcision and the incidence of HIV in Africa suggests that uncircumcised males are more likely to have HIV infection than circumcised males and that wives of uncircumcised males are also more likely to be affected (see Cameron and others, 1989; Mertens, Hayes and Smith, 1990).

IV. The Impact of HIV on Demographic Phenomena: theoretical relationships.

The demographic impact of AIDS can be assessed by examining how the disease influences the levels and trends of basic demographic indicators. Demographic variables of key interest include population growth and size, fertility, morbidity and mortality and population movement and distribution. Also of particular interest are changes in household composition, and in the demographic status of individuals in the household. Issues related to the nature, estimation and measurement of these indicators are discussed below:

Morbidity and mortality

Morbidity and mortality are the demographic variables most directly related to the AIDS epidemic. Simply put, HIV/AIDS causes illness which eventually results in death of those afflicted. How much morbidity and mortality? What the age and sex selection of incidence and mortality are, and what segments of the population contribute cases and deaths are important considerations in understanding the mortality and morbidity impact of HIV/AIDS.

Addressing these questions requires the measurement of mortality and morbidity in the presence of HIV/AIDS, and in its absence. Where good vital and continuous registration systems exist, and where they are backed by good medical diagnosis of diseases and causes of death, the estimation of morbidity and mortality from HIV/AIDS is likely to be relatively easy. Even in that case, however, silent HIV cases (those which are still in the latent asymptomatic phase) are likely to be missed. In Africa vital registration systems are either very weak or largely non-existent. Further, poor access to medical facilities and the dependence of a large sector of the population on traditional healers are likely to result in many cases of HIV/AIDS being missed. Much of the data on morbidity and mortality from AIDS in Africa have thus been derived, not from representative populations, but from those who have come in contact with modern medical services for one reason or other, and have been routinely tested. Women in childbearing ages have been a frequently studied cohort because they often present themselves to health facilities for family planning services and for obstetric and prenatal care. Some data have also been drawn from specific studies of high risk group such as prostitutes. These data, combined with facts about the progression and transmission of the HIV virus, have been used to estimate or approximate the current and future levels of HIV in Africa.

Changes in mortality can be measured by changes in crude death rates, in age-specific mortality rates or in the summary indicator -- life expectancy at birth. Given the high risks during the reproductive ages, the age specific mortality risk at ages 15-49 is likely to be the most sensitive mortality

indicator. Similarly age-specific morbidity changes are likely to be most evident for these age groups. Difficulties with the collection of age-specific morbidity and mortality data in Africa however constrain the availability of these data.

Orphanhood, Widowhood and other changes in the status of individuals

Closely related to the increased mortality that results from HIV/AIDS is change in the status of surviving members of the household. In all African societies the family as an institution remains at the center of social organization. HIV/AIDS has far reaching demographic and social impact by removing key members of the family prematurely through death from AIDS, or by causing prolonged periods of illness, thus necessitating major changes in the traditional role of family members. With relatively higher risks of infection and death in adult age groups, HIV/AIDS is likely to produce large numbers of orphans, widows and widowers in Africa in the coming decades. There is some evidence that there is a tendency for AIDS cases to cluster in households (Foster, 1993) implying extensive changes in the household composition of families that do get affected by HIV/AIDS. The heterosexual transmission of HIV in Africa also increases the chances that children will lose both mother and father as a result of HIV/AIDS. Increasing orphanhood will also result in changes in the sizes, numbers and composition of households as they try to absorb orphaned children, and provide for the care of sick family members. Heads of households are likely to get younger, or perhaps much older as responsibilities for the household pass to orphaned children or to much older members of the extended family. This will have important implications for the availability and distribution of resources within the household. Deaths or debilitation of working age adults will leave households poorer, require young children to enter the labor force sooner, and probably have negative impact on the education achievements of the young, especially girls, who might be expected to make major contributions to the care of ailing family members.

Data on changes in the household as a result of HIV/AIDS are fairly easy to collect from small scale surveys and some attempt has been made to collect such data (see Seeley and others, 1995, Over 1990 and Foster and others, 1995). These data confirm the existence of high levels of stress on household members as a result of sickness or death from AIDS.

Fertility

HIV/AIDS can influence fertility indirectly, primarily by reducing the number of reproductive years of life lived. If the timing of childbearing is not consciously altered to compensate for anticipated shortened reproductive

life spans, then HIV/AIDS will possibly result in lower fertility in Africa. It will result in lower numbers of children born to an average woman completing her reproductive life (total fertility rate), and depending on the mean age at death from HIV/AIDS, it will result in earlier and sharper tapering of age-specific fertility. The total number of births annually are however likely to continue to increase, as African population structures are heavy at the base and continue to feed larger and larger successive cohorts of women into the childbearing ages. Even if adult lives are shortened by the impact of HIV/AIDS, currently available data suggests that survivorship into the reproductive ages are not as jeopardized as are survivorship to older adult ages.

As in the case of mortality and morbidity, age specific fertility rates are likely to provide the most sensitive data on the impact of HIV on fertility. Retrospective surveys of fertility such as the Demographic and Health Surveys and the World Fertility Surveys have been used to obtain age specific fertility data for a number of countries with poor vital statistics on births. Given the recency of the AIDS epidemic, however, these data cannot yet be used to derive estimates of changes in age specific fertility rates resulting from the AIDS epidemic.

Although it is also a mortality indicator, the estimates of the number of reproductive life years that are lost because of AIDS, is also a good indicator of the potential change in fertility as a result of AIDS. The longer the number of years lost the more likely it is that fertility will be lower. However, this index is not directly observable but needs to be derived from the experience of a real or synthetic cohort passing through the reproductive ages.

There are various other aspects of fertility that could change in response to HIV/AIDS. Ages at first birth could decline as individuals and couples attempt to bear children before their own lives are terminated. It is premature to predict what will happen to the practice of polygyny and to ascertain what impact any change might have on fertility. It is reasonable to assume, however, that in communities that are hardest hit by the AIDS epidemic and where there is sufficient understanding of the modes of transmission, changes in practices within and outside marital unions may occur with possible impacts on fertility.

Population movement and distribution

There has been little discussion in the literature of the impact of the AIDS epidemic on population movement and distribution. However, the consequences of complete disintegration of families -- and possibly whole communities -- has potential to alter the geographic distribution of population in Africa. Small communities which are severely affected may totally disintegrate as the most productive members of the community and a large proportion of births (which will be HIV positive) are wiped out. Similarly new settlements may arise from the migration of survivors to find new settlements.

One impact of the AIDS epidemic is the institution of tougher immigration policies by some countries to bar the immigration of those who are HIV positive. Although there has been some public outcry especially in industrialized countries against these policies, they are likely to become more popular, and be directed at restricting migration options for Africans, if the spread of HIV in the continent continues at current rates.

IV. The Impact of HIV on Demographic Phenomena: Some findings.

Various attempts have been made to estimate the demographic impact of HIV in Africa. These studies have largely been based on population projections with various assumptions about HIV prevalence and mortality. These projections are then compared with standard projections which assume no HIV and the differences in various demographic indicators between the two projections are compared. Key findings of some of these exercises are presented here.

It is important while going through these results, to acknowledge the difficulties that exist in modelling the impact of AIDS, especially in Africa. Some of the weaknesses in available data have already been discussed earlier. It is important to note also, that as social organization changes and as improvements or deterioration occurs in the global economy, the pattern and level of prevalence of HIV in Africa will be affected. Also, Barnett and Blaikie (1992) note problems such as the short period over which the epidemic has been followed, the lack of analogous pandemics upon which to base estimates, a lack of knowledge about specific sexual practices which may affect the progression of the disease, and the fact that most methods and data are based on HIV-1 and not HIV-2. Inaccuracies in current assumptions about any of the above parameters will probably alter the future course of the epidemic and its demographic impact in ways not foreseen in any of the projections exercises.

One of the early attempts to estimate the demographic impact of HIV/AIDS is presented by Bongaarts (1988). The Bongaarts approach involves simulating the impact of AIDS on the assumption that the population is heterogeneous and is composed of various sexual behavior groups, each with different rates of HIV infection. The simulation considers altogether 33 parameters that are hypothesized to have impact on the outcome of the epidemic. Non-sexual modes of transmission (eg. transmission from an infected mother) are also considered. Simulations are performed for assumed HIV prevalence levels ranging from 0 to 30 percent.

The results of the simulations suggested that the annual number of cases in the AIDS epidemic will rise through the first 25 years of the epidemic and stabilize thereafter. Although there will be a negative impact of the epidemic on population growth rates, these rates would remain positive even in the severely affected areas of Central and Eastern Africa. Bongaarts argued that the prevalence of HIV in Africa as a whole by the year 2000, would be about 5 percent and Africa's population growth rate would be reduced by only a few tenths of one percent.

A number of other demographic models have been applied to attempt to estimate the demographic impact of HIV/AIDS. Way (1992) reports on the application of various such models to sub-Saharan African data. Under one model -- the iwgAIDS model developed by the United States Department of State -- a decrease in the population growth rate in Africa by 0.5 percent was predicted, assuming that the epidemic affected 8 percent of the total population. Under assumptions of more severe prevalence (25 percent infection of sexually active adults infected) total population growth rate was projected to decrease only by one percent and the death rate to increase by about 10 per thousand. Modelling results suggest that although the growth rate will remain positive for Africa there will be considerable mortality. The survival of infants and children will be particularly affected. Virtually all HIV positive infants will die before their fifth birthday implying elevated under-five mortality rates (possibly 50 percent higher than rates without AIDS) for the region. The impact of AIDS on life expectancy will also be extreme, reducing urban life expectancy at birth by some 17 years where the epidemic is severe.

World Health Organization (WHO) projections of HIV-1 and AIDS likewise predict a high mortality impact. There will be some 10 to 15 million new adult HIV-1 cases during the 1990s, with cumulative adult AIDS case up to the year 2000 estimated at about 10 million. The WHO estimates of prevalence for world regions are shown in Table 2. The WHO forecasts a major increase in the population of orphans by the end of this decade. The majority of these 5 million children under the age of 10 years will be in Africa.

More recently there has been a much more comprehensive effort at estimating the impact of HIV/AIDS on demographic variables. The United Nations (1994) has incorporated the impact of HIV/AIDS in its biennial population projections for countries where the HIV sero-prevalence was estimated at 1 percent or higher. Fifteen sub-Saharan African countries and only one other country -- Thailand -- fit this criterion. The estimation exercise used an epidemiological model developed by the WHO to estimate the epidemiology of AIDS, and standard population projections were based on demographic projection models used by the Population Division.

The impact of AIDS on population size, population growth, fertility, mortality and orphanhood are assessed for all 15 African countries, for 3 countries (Uganda, Zambia and Zimbabwe) with sero-prevalence exceeding 8 percent, and for some individual countries are reported here. The highlights of the findings of this exercise are summarized below.

Population size and growth

1. The 15-country population total is 2 million persons less than it would have been today without AIDS.
2. By 2025 this population will be 12 million persons less than it would have been without AIDS.
3. Population sizes are most affected in the 3 high-prevalence countries where AIDS will account for 4 million lower population in 2005 than otherwise would have been.
4. Although there will be fewer people than forecast under non-AIDS assumptions, populations in all countries will grow rapidly. Ivory Coast, a hard hit country, will have an increase in its population by 140 percent between 1980 and the year 2005.
5. Because of advances in the demographic transition reductions in population growth rates were predicted, in the absence of AIDS, for most countries. With AIDS the decline in the growth rate will be steeper. Growth rates will however remain positive even for the Uganda, Zambia and Zimbabwe.

Mortality

6. The impact on mortality will be the most pronounced of the demographic changes. The crude death rate for the 3 country aggregate was 16.1 per thousand in 1975-80. By 1995 AIDS had increased the deaths to 19.1 per thousand and by 2000-2005 the CDR will be up by 57 percent.

7. The most significant impact is projected for Zimbabwe which had attained very impressive rates of mortality by 1990 but whose CDR is projected to be double what it would have been without AIDS by the year 2005.

8. Projected deaths will be correspondingly affected with between 19 and 39 percent more deaths by 2005 with AIDS than without AIDS.

9. Life expectancy will be affected also, with up to 7.5 years lost due to HIV/AIDS in Zambia and Zimbabwe by 2005.

Fertility

10. On average women going through the reproductive ages will live between 0.5 and 3.2 years shorter by 2005.

11. The United Nations projections assume declining trends in fertility for most countries under non-AIDS assumptions. This trend is not predicted to change much as a result of AIDS.

Orphanhood

12. Because of the extreme effect of AIDS on mortality, the United Nations projections also attempt to estimate the extent of orphanhood in the HIV prevalent countries. The data show that the number of orphaned children in the 15 countries will be roughly double what they would have been without AIDS by the year 2005.

13. For the 3-country aggregate there will be 154 percent more orphans with AIDS than without by 2005 and for the worst hit country, Zimbabwe, there will be almost three more orphans in 2015 than there would have been without AIDS. For the year 2000 there will be at least 2 more orphans than there should have been without AIDS.

CONCLUSIONS

The implications of these demographic impacts for broader social and economic development will be far-reaching. There will be major demands on families and households to care for the sick and dying. The emotional and financial costs to individuals and households will be high and there is potential for further demographic repercussions of the social changes that will take place to accommodate the extent of mortality and orphanhood.

For African Governments and policy makers the implications of the demographic and social impact of AIDS are sobering. Practically all projections and simulations agree that there will be little decline in

fertility. All projections also agree that the mortality response will be extensive. This means that demands for basic health and education services will probably continue to rise to meet the needs of additions to the population through births. However, much of the investment in human resources will yield short-lived results as the lives of young children and young adults are cut short by AIDS. Demands on health systems will also escalate, in a continent where existing health needs are still far from being met. Policy-makers must begin to put in place now, the programmes and projects which might help modify the intensity of the impact of AIDS, and which will begin to deal with already distinct problems with orphanhood in the countries most affected by the epidemic.

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