DEMOGRAPHIC IMPACT OF HIV/AIDS ON AGEING ON SOUTH AFRICA'S POPULATION

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ABSTRACT

Concomitant to demographic transition from high fertility and mortality to low fertility and mortality is population ageing. Population ageing raises among others demographic, economic and social issues and often perceived as a problem. Ageing and HIV/AIDS pose a challenge for policy makers in the provision of personal care and financial support.

The first HIV/AIDS case in South Africa was reported in 1981. Since then, HIV sero-prevalence as measured by women attending antenatal clinic has steadily increased in the country and currently, South Africa is one of the highest HIV prevalence countries in the world and in the African continent with sero-prevalence above 20% among pregnant women attending antenatal clinics. In 2002, the Nelson Mandela Fund in collaboration with the Human Sciences Research Council carried out a national HIV prevalence, behavioural risks and mass media household survey. Only four other countries in the world have carried out such a national HIV prevalence survey.

Using various national survey/census data that collected information on fertility and mortality, administrative records on migration, HIV sero-prevalence data, and cohort component method, this study examines the demographic impact of HIV/AIDS on ageing on South Africa's population.

INTRODUCTION

Concomitant to demographic transition from high fertility and mortality to low fertility and mortality is population ageing. Fertility, the driving force of population ageing is below replacement level in many industrialised countries and has also declined substantially in the last two decades in a number of sub-Saharan African countries. Mortality, a contributory factor to population ageing declined substantially until recently (i.e before the HIV/AIDS epidemic) in many sub-Saharan countries.

Population ageing raises among others demographic, economic and social issues and often perceived as a problem. Because ageing alters the structure of the population (including excess women over men) this is seen as having consequences for production of and consumption of goods and services in the population: the elderly consume more than they produce (Messkob, 1999), some argue that they are a "burden of depedency" (see Blaikie, 1999 for details). More specifically, Mason (2001) argues that Asia's rapidly ageing population will ultimately mean slower economic growth in the region as policies directed towards the needs of the elderly, including pension issues and health care reform undermine economic growth since they either accelerate the decline in workforce or reduce investment available for new industries and technology.

According to Rabelo (2004), ageing is a problem in the public sector and the consequences include greater benefits payment due to increase longevity,

which lead to smaller capacity to hire new employees or introduce better renumeration packages for existing ones.

Ageing poses a challenge for policy makers in the provision of personal care and financial support (Lee and Mason, 2000) and in this context Blaikie (1999) observes that paradoxically, ageing societies have become victims of their own success. A further challenge in ageing is the HIV/AIDS epidemic. According to an anonymous (2001), the HIV/AIDS epidemic is forcing the elderly, and particularly women, to take on demanding responsibilities just when they have diminished social support and can least afford to do so.

The first HIV/AIDS case in South Africa was reported in 1981. Since then, HIV sero-prevalence as measured by women attending antenatal clinic has steadily increased in the country and currently, South Africa is one of the highest HIV prevalence countries in the world and in the African continent (second, after Botswana, and recently after Swaziland) with sero-prevalence above 20% among pregnant women attending antenatal clinics. According to ILO (2000), South Africa has the largest infected population not only in Africa, but also in the world, and the fastest rate of new infections.

As an insight to the magnitude of some of the issues relating to ageing, this study attempts to examine the demographic impact of HIV/AIDS on ageing on South Africa's population four main population groups (Afrincans, coloureds, Indians and whites) with particular focus on HIV/AIDS Impact on the size of

the elderly (defined as persons aged 60 years and over), dependency burden and sex ratio of the elderly.

DATA

The study utilises various national survey/census data which include information on fertility and mortality, administrative records on migration, and HIV sero-prevalence data.

METHODS

The base population

Because of the controversies about the final results of the 1996 census (see Dorrington, 1999; Sadie 1999; Udjo, 1999; Shell 1999; Phillips et al 1999; criticisms on the recently released 2001 census results have also begun to emerge), the base period of the population estimates in this study is 1970. The 1970 census (the last census that canvassed the entire country during the apartheid era) smoothed age-sex distributions by population group adjusted for undercount were used as the base figures. The smoothing procedure is described in Udjo (2003a). According to Udjo (2004a), Africans, coloured, Indians and whites currently constitute 76.3%, 9.3%, 2.7% and 11.7% respectively of South Africa's population though Statistics South Africa (2004) estimates are 79%, 8.9%, 2.5% and 9.6% respectively.

Sex ratios

Vital registration provides the basis for firmly establishing sex ratios at birth. In South Africa however, vital registration is of varying degree of completeness among the population groups with whites and Africans at both end of the continuum. In view of this and guided by available information, sex ratios at birth of 102, 103, 104 and 105 were assumed among Africans, coloureds, Indians and whites respectively for the population estimates in this study.

Fertility and mortality inputs

The total fertility rates (TFR) and life expectancies at birth (e_0) provided by Udjo (2003b, 2003c, 2003d) were used as the fertility and mortality inputs for the estimates. These are shown in Table 1.

Due to uncertainty about the levels of adult male mortality, among the population groups, a five-year difference in male-female life expectancy at birth was assumed for all except the white population where an eight-year difference was assumed (see Udjo, 1999 for details). It was assumed that the mortality levels have stagnated since 1996.

The model life tables used in the projections are the "UN East Asian pattern" in the case of Africans and coloureds, and the "UN General pattern" in the

case of Indians and whites. It was necessary to use two different model life tables for the population groups because of differences in the mortality pattern between African and coloureds on the one hand, and Indians and whites on the other (see Udjo 2003b for details). The UN East Asian pattern is characterized by high older-age death rates relative to younger-age death rates, while the UN General pattern is an average mortality pattern similar to the Coale-Demeny West family life tables. It has been shown recently by Indepth Network (2002) that the mortality pattern of some southern and East African populations where HIV is recognized but not yet having a catastrophic impact on the population is most similar to the UN East Asian pattern. In an earlier study Udjo (1997) noted the relevance of the UN East Asian pattern for South Africa being characterized by a high incidence of tuberculosis in the past, which is still evident among adult males in the population (UN, 1982).

Net migration

The most problematic aspect of population estimation is in developing migration assumptions due to lack of reliable data. Immigration and emigration statistics are available from the Department of Home Affairs through Statistics South Africa for the estimation period (1970-2001). There is however a number of problems with the statistics as follow. (1) The statistics are not broken down by population group. (2) The number of documented emigrants appears to understate the true extent of the phenomenon. For example, estimates of the ratio of South African emigrants (reported in major receiving countries) to South Africa's Home Affairs figures was estimated as

1.4 by Bah (1999) for the period 1970-96, 2.8 by Kaplan et al (1999) for the period 1989-97, and 1.4 – 4.7 by the Interim Statistics Council. (3) The scale of undocumented immigration is unknown. These make mandatory, development of assumptions about international migration if this component of population change were to be incorporated into the population estimates.

In the present study, net migration was estimated based on the following assumptions: (1) the number of documented immigration is accurate. (2) The percentage distribution of documented immigrants by population group is similar to the percentage distribution of non-South Africans by population group and sex as reported in the 1996 census (though the number may not be accurate). (3) The number of documented emigrants is inaccurate. (4) Prior to 1994, the percentage distribution of documented emigrants by population group is similar to the percentage distribution of non-South Africans by population group as reported in the 1996 census. Only whites have been emigrating since 1994 (the year of the new political dispensation). (5) The age distribution of documented immigrants for the period 1996-2001 is a reasonable estimate of the age distribution of net migrants for the estimation period.

On the basis of the above assumptions, the documented volume of immigration during the period 1970-2001 was split by population group and sex. Regarding emigration, a correction factor of 1.4 was used to adjust the number of male female documented number of emigrants for the period 1970-93 while for the period 1994 to 2001, a correction factor of 2.7 was applied.

The adjusted figures for the period 1970-93 by sex were then split by population group on the basis of the above assumption. The adjusted figures by sex for the period 1994 to 2001 however, were attributed to the white population. Net migration was then computed as the difference between the estimated number of immigrants and emigrants by population group and sex. An average of the male-female age distribution of documented immigrants for the period 1996-2001 was used as the best estimate of net migrants for the entire estimation period.

HIV/AIDS

Many studies on the impact of HIV/AIDS tend to utilize fertility, mortality and antenatal data as primary inputs (usually ignoring net migration due to lack of data). There is inherent danger in this approach as the impact might be exaggerated. This is because antenatal data might contain many potential biases including representativeness of pregnant women who attend antenatal clinics of all pregnant women, reduction of fertility in HIV-1-infected women, selection for sexual activity and absence of contraceptive use, and under-representation of smaller rural sites in surveillance systems (Boerma, Ghys and Walker, 2003).

In 2002, the Nelson Mandela Fund in collaboration with the Human Sciences Research Council (HSRC) carried out a national HIV prevalence, behavioural risks and mass media household survey. Only four other countries in Africa: Mali, Zambia, Kenya (as part of the Demographic and Health Survey), and

Zimbabwe (among the youths) have carried out such a national HIV prevalence survey. In view of the potential biases regarding antenatal data, the HIV prevalence used in this study are based on the Nelson Mandela Fund and Human Sciences Research Council's study

The AIDS impact model (AIM) developed by the Futures Group was used to incorporate the impact of HIV/AIDS in the population estimates. The method is described by Stover (1999). Estimation of the basic parameters required by AIM was based on the following assumptions. First it was assumed that the Nelson Mandela/HSRC (2002) data provide a reasonable measure of HIV sero-prevalence at the national level and hence the Department of Health's antenatal sero-prevalence for the period 1990-2001 calibrated by Rehle and Shisana (2003) provide a reasonable measure of national adult HIV sero-prevalence for the period 1990-2001. Second, it was assumed that the distribution of national adult HIV sero-prevalence by population group in 2002 as measured by Nelson Mandela/HSRC study is similar to the distribution of adult sero-prevalence by population group in previous years. On this basis, the ratio of the adult HIV sero-prevalence of each population to the total adult prevalence in 2002 was used as weight on the prevalence for each year to obtain an estimate of each population group for each year during the period 1990-2002. Lastly, it was assumed that the age specific sero-prevalence among adults in the Nelson Mandela/HSRC data is similar for all population groups and is a reasonable measure of age-specific sero-prevalence in 1990-2002.

Estimation models

Two sets of population estimates were computed for each population group to enable the examination of the demographic impact of HIV/AIDS on the elderly in each population group in South Africa. These are denoted, "No AIDS" and "With AIDS". "No AIDS" incorporates fertility, mortality and net migration but excludes the effect of HIV/AIDS while "With AIDS" incorporates the effect of HIV/AIDS.

The population estimates were based on the cohort component method using the SPECTRUM software.

RESULTS

Impact of AIDS on the size and growth of the elderly population

One of the summary indicators of ageing of population is the median age of the population. According to Shryock, Siegal and Associates (1976), populations with medians under 20 may be described as "young", those with medians 30 or over as "old" and those with medians 20 to 29 as of "intermediate" age. Table 2 shows the estimated trends in the median age of each of the population group of South Africa with and without the impact of AIDS. Using the above crieteria, by 1970, the white population was already ageing, and presently may described as an "old" population. On the other, hand the other three population groups were "young" populations in 1970 but

presently are at an intermediate stage of ageing. Currently, on average, AIDS appears to have no impact on ageing except among the African population where AIDS appears to have reduced the median age of the population as of May 2004 from 23 years (in the absence of AIDS) to 22 years.

Figure 1 shows the trend in size of the elderly population (persons aged 60 years and above) without and with AIDS. As seen from the graph, the size of the elderly has been growing rapidly in the African population since the 1980s while the growth of the size of the elderly population has been modest in the other three population groups. For example, the elderly in the African population grew at an estimated average of about 3.6% per annum between 1970 and 1990 and by 3.4% per annum between 1990 and 2003 taking into account AIDS. Without AIDS, the growth rate of the elderly would still have been 3.4% per annum in the African population between 1990 and 2003. Thus, AIDS makes very little difference currently in the rapid growth of the elderly population in the African population. At current rate of growth, the size of the elderly in the African population (1.9 million in 2003) would double in about tweny years.

In conrast, the size of the elderly in the white population grew at an estimated average of about 1.7% per annum between 1990 and 2003 taking into account AIDS, and would double its current size of 0.56 million in about 41 years If current rates continue.

Althoughy the relative size of the elderly population is still small in South Africa (currently about 7%) except in the white population (currently about 14%), it is growing relative to the total population. For example, among Africans, the elderly constitued about 4% of the total African population in 1970, but increased to about 6% as of May 2004. It appears that in the African population, AIDS is increasing the relative size of the elderly population (see Table 3).

Impact of AIDS on sex ratios of the elderly population

The trends in sex ratios of the elderly poppulation Table 4 are shown in Table 4. As seen from the table, the sex ratio of the elderly has declined substantially in all population groups which implies that there is an increasing excess of elderly females over elderly males in all population groups to the extent that currently, for every 100 elderly females, there are probably about 73 elderly males in the South African population compared to 89 elderly males for every100 elderly females in 1970. It appears from the table that AIDS has some impact (though neglible) on the sex ratio of the elderly in the African and coloured population - AIDS appears to be increasing the sex ratio slightly.

Impact of HIV/AIDS on "dependency burden"

Dependency burden was computed as the ratio of the number of persons aged 65 years and over to the number of persons aged 15-64 as an indicator of the economic effect of a changing age-distribution (see Cox, 1978). The

retirement age for those employed before 1995 in the public sector is now 65 years for both men and womends in South Africa and 60 years for those employed in 1995 and thereafter. The retirement age in some organizations in South Africa is 60 years for men and women irrespective of the date of employment.

Using the above index and as seen in Table 5, ageing appears to have increased the depedency burden in South Africa from a level of 5 elderly persons for every 100 persons in the labour market in 1970, to a current level of 7 elderly person for every 100 persons in the labour market. Not surprising, the depedency burden is more substantial in the white population compared to the other popualation groups because the former as noted above, is a more "aged" population. Table 5 also indicates that AIDS is increasing the dependency burden among the African, coloured and white populations although the increase is currently neglible.

DISCUSSION AND CONCLUSION

The results presented above raise a number of policy implications especially with regard to sustainability. The rapidly growing population of the elderly in South Africa implies that more resources would be required in the future to sustain and improve the quality of life of the elderly population among others in the following areas.

Pension payout: The increasing number of the elderly (doubling every 20 years at current rate in the African population) despite the AIDS epidemic implies that employers in the public and private sectors would have to plan for increased magnitude of pension payments in the future. There are a number of pension funds and permanent employees are usually members of a pension fund by employers. The investment of employee's contributions to pension fund could mitigate the effect of increasing demand on pension funds due to ageing.

Housing: With increasing modernization, individualism and break down of traditional safety nets especially in the African population, there is likely to be increasing demand for old age homes for pensioners in the future due to the increasing number of the elderly. This is likely to put more pressure on existing housing stock. Unchecked soaring prices in the housing market are more likely to affect the elderly at retirement and reduce their quality of life due to reduced income if their housing mortagages are not fully paid by the time they retire.

Medical care: Disability increases with age (see Udjo and Petsoane, 1998). The cost of medical aid has risen substantially in recent years and is likely to be unaffordable by a substantial number of the elderly at retirment. Existing public health care facilities are therefore likely to be put under more pressure in the future due to the rapid growth of the elderly, this is further compounded by the AIDS epidemic.

The increasing excess number of elderly women over men was noted above, since poverty as measured by income is generally more marked among women than men, and also generally more marked among Africans than the other population groups (see Central Statistics, 1997 and Statistics South Africa, 2000) the adverse consequences of the rapid growth of the elderly are more likely to be felt by elderly women and elderly Africans in South Africa. Appropriate policy measures however, can mitigate the adverse consequences.

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Table 1: Period estimates of total fertility rate, female life expectancy at birth and HIV prevalence

Total fertility rate*

	1970	1975	1980	1985	1990	1995	1996	1998	2001
African	5.4	5.1	4.7	4.1	3.9	3.6	3.7	3.5	3.2
Coloured	5.1	4.2	3.2	3.2	2.9	2.8	2.8	2.6	2.6
Indian	4.1	3.7	3.2	2.7	2.9	2.5	2.7	2.5	2.5
White	3.1	2.8	2.5	2.2	2.1	2	1.9	1.9	1.9
National	**4.9**	**4.6**	**4.3**	**3.5**	**3.3**	**3.2**	**3.2**	**3.2**	**3.0**

Estimated female life expectancy at birth without HIV/AIDS*

	1970	1975	1980	1985	1990	1995	1996	1998	2001
African	57.5	59.3	61.0	62.7	64.3	64.6	64.6		66.4
Coloured	59.5	61.1	62.8	64.3	65.8	66.2	66.2		68.0
Indian	63.9	64.6	65.3	66.0	66.7	67.1	67.1		67.9
White	71.5	72.0	72.5	72.9	73.4	73.7	73.7		74.2
National	**57.6**	**59.1**	**60.6**	**62.0**	**63.4**	**64.5**	**64.5**		**65.9**

Overall HIV prevalence, 2002**

	% +
African	12.9
Coloured	6.2
Indian	6.1
White	1.6
National	11.4

Estimated HIV adult (15-49) prevalence, 1990-2001***

Year	1990	1991	1992	1993	1994	1995	1996	1998	2001
% prevalence	0.5	1.2	1.5	2.8	5.3	7.3	9.9	14.4	17.2

Source: * Udjo (2003b,2003c, 200d, 2004b)
** Nelson Mandela/HSRC
*** Rehle and Shisana (2003).

Table 2: Trend in median age of the population by population Population group with and without AIDS

	1970		2004	
	No AIDS	**With AIDS**	**No AIDS**	**With AIDS**
African	18	18	23	22
Coloured	17	17	26	26
Indian	19	19	27	27
White	26	26	33	33
National	19	19	25	24

Table 3: Trend in the percentage of the elderly

	1970		2004	
	No AIDS	With AIDS	No AIDS	With AIDS
African	3.8	3.8	5.6	5.7
Coloured	3.1	3.1	6.4	6.4
Indian	3.7	3.7	7.8	7.8
White	10.3	10.3	14.0	14.1
National	4.9	4.9	6.7	6.8

Table 4: Trend in sex ratios of the elderly

	1970		2004	
	No AIDS	With AIDS	No AIDS	With AIDS
African	87.9	87.9	72.9	73.2
Coloured	87.5	87.5	72.4	72.5
Indian	106.3	106.3	76.7	76.7
White	91.6	91.6	70.3	70.3
National	89.1	89.1	72.6	72.9

Table 5: Trend in depedency burden

	1970		2004	
	No AIDS	With AIDS	No AIDS	With AIDS
African	3.9	3.9	5.6	5.8
Coloured	3.2	3.2	5.9	6.0
Indian	3.7	3.7	7.2	7.2
White	11.1	11.1	13.9	14.1
National	5.1	5.1	6.7	6.8

Figure 1: Trend in size of the elderly population (persons aged 60 yrs and above) without AIDS (NA) and with AIDS (WA) in South Africa