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Demographic and socio-economic consequences of HIV/AIDS in sub-Saharan Africa

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Because sub-Saharan African society is characterized by extended families, the horrendous effects of the HIV/AIDS pandemic are felt at individual, household, community, and national levels. The pandemic has been spreading rapidly in rural and urban areas, reversing previous achievements in reducing mortality and increasing life expectancy since the 1950s. It appears to strike at the most productive and reproductive segments of the population. But underlying socio-economic and cultural environments appear to favour the perpetuation of high fertility. This implies that the reproductive power of the African population will remain superior to the effects of HIV/AIDS during the foreseeable future, except in certain hard-hit small sub-national areas of some countries. National survival campaigns against HIV/AIDS are needed to sensitize and raise individual awareness and behavioural change, to improve institutional capacities, to undertake continuing analysis of demographic, socio-economic and epidemiological processes. Research on fertility in particular should question prior assumptions and consider antecedent variables other than HIV/AIDS.

Introduction

Reciprocity between the urban and rural areas of sub-Saharan Africa in the exchange of HIV/AIDS, and linkages of the pandemic with other communicable and infectious opportunistic illnesses, are well documented.[1] HIV/AIDS-related mortality has recently become the second important cause of death in sub-Saharan Africa, surpassing both measles and malaria—and in most African states jeopardising positive gains in health status brought about by primary health care programmes of immunization, child survival strategies, and efforts to reduce adult mortality levels (OAU 1994:2; UN 1994:10-11).

The pandemic has undermined theories and assumptions about epidemiological and demographic transition of the world's population (Rogers et al. 1997: 243-245). Its rapid urban/rural spread seems to have overcame all efforts at control and prevention. World-wide HIV infection increased from an estimated 854,000 in 1993 to 34.4 million by the end of 1998 and 47.3 million by the end of 1999. By then the number of countries affected by HIV/AIDS stood at 208.[2] The World Health Organisation suggested that between 40 and 50 million adults—the productive and reproductive segment of a population—and between 150 and 200 million children, would become HIV/AIDS victims in the 21st century. Many families would disintegrate in sub-Saharan Africa. HIV/AIDS prevalence would reach as high as 23 per 1000 adult population in East Africa and 27 per 1000 adult population in Southern Africa.[3]

Sub-Saharan Africa appears to have 65 percent of the world's total of HIV/AIDS cases, and the worst figures in all population categories—70 percent of world HIV infections and 80 percent of world AIDS deaths, 90 of world child HIV infections and 94 per cent of world child AIDS deaths. Sub-Saharan Africa has 68 per cent of world HIV infection in the age group of 15-24, and 90 percent of world HIV among children less than 15 years.[4]

However, the current status of records at global, continental and national levels is far from showing a complete picture. Developing countries have consistently underestimated the actual trends of the pandemic. Inonge reckons that while about 90 percent of actual HIV/AIDS cases are recorded in industrialized countries, less than 10 percent are recorded

in developing countries (Kamungoma-Dada 1990). Incomplete records in health institutions, inaccuracies in blood-testing due to human error or to non-standardised diagnostic testing procedures, and other uncertainties in estimates and projections of HIV/AIDS in developing countries, are well documented.[5] If data from countries still in the long HIV incubation period, yet to experience AIDS deaths, and yet unknown data from other sources were added, the demographic consequences for the world would be enormous (Panos Institute 1992).

The study is concerned with the rapidity of the spread of the pandemic in sub-Saharan Africa. The pandemic intersects with widespread poverty in all aspects of life, and with patterns of high demographic growth in almost all sub-Saharan African states. Because it affects individuals, family households, communities, and whole nations, we need to assess the pandemic at all levels and assess its demographic, familial, and socio-economic consequences. Specifically we need to assess the dimensions of the demographic consequences of the pandemic; to investigate the socio-economic correlates and macro-economic implications of HIV/AIDS; and to assess the extent of health implications of the pandemic.

This paper addresses two major themes: (a) demographic consequences, focusing on population size, growth, age/sex structure, mortality and fertility levels and patterns, and (b) micro/macro socio-economic correlates, including the implied costs of health provision resulting from the pandemic.

Demographic consequences of HIV/AIDS in sub-Saharan Africa

Population size and HIV/AIDS: The population of sub-Saharan Africa was estimated to be 621.9 million in 1999. At the current growth rate of 2.8 percent per annum, it would double in a matter of 25 years, reaching 1243.8 million in the year 2024. However, HIV/AIDS has undermined such projections.

Every sub-Saharan African country has been experiencing the pandemic at varying levels in recent years. HIV prevalence between 1992 and 1997 has risen fast in almost every country. As presented in **Table 1**, HIV/AIDS cases in sub-Saharan Africa were estimated to have reached about 19.2 million at the end of 1997, and to have increased to about 22.5 million by the end of 1998. The African Development Bank (ADB 1993: 1-2) speculates that HIV/AIDS cases in sub-Saharan Africa will climb to a plateau of between 28 and 35 million adult victims. The consequent disintegration of families will leave large number of orphans under the custody of elderly people or of young people acting as heads of households, or will cause surviving household members to scatter homelessly.

The most outstanding rates of HIV increase are reported for countries in the Southern African sub-region, ranging from about 14 percent of adult population for Malawi to 22 percent for Botswana and Zimbabwe. The next most seriously affected countries are in the East African sub-region, where the highest rates were recorded for Uganda (12 percent), Rwanda (12 percent) and Kenya and Ethiopia (12 and 9 percent respectively). Countries in the Middle and West African sub-regions were relatively less affected. The prevalence rates for urban areas range from about 19 percent for Zimbabwe to about 28 percent for Botswana in the Southern African sub-region; and from about 11 percent for Ethiopia to about 15 percent for Burundi in the East African sub-region

Population growth and HIV/AIDS: Consistent with the data in Table 1, estimates of overall population growth rates for 1998 indicate that the Southern sub-region faces a striking decline—ranging from 1.1 percent in Botswana and Zambia, 1.4 in Namibia, 1.6 and 1.7 percent in Malawi and Lesotho respectively; 1.7 in Kenya, and as high as 2.0 percent in South Africa (see **Table 2**).

Table 1: ***HIV prevalence levels (percent) by African sub-regions and countries***
(1993, 1995 and 1997)

Sub-Region/ Country		1992/1993	1995		1997	1997 Total cases (in '000)
East:						
1.	Eritrea	2.6	2.6	-	2. 6	49
2.	Ethiopia	2.6	*(10.7)*		8.7	2,500
3.	Kenya	5.7	11.6	*(14.7)*	11.6	1,600
4.	Uganda	10.4	12.0	*(24.0)*	12.3	870
5.	Rwanda	9.9	12.2	*(26.7)*	12.2	350
6.	Burundi	3.1	7.6	*(14.7)*	7.6	242
7.	Tanzania	9.7	6.4	-	8.2	1,400
Sub-Total		6.4	10.5	-	10.9	7,011
Middle:						
	Cameroon	2.8	4.8	-	4.8	310
	Gabon	-	-	-	3.1	22
	CAR	6.4	6.9	-	8.6	170
	Congo (Br.)	6.7	7.2	*(6.9)*	7.2	900
	Congo (K)	4.7	3.7	-	3.7	95
	Chad	-	-	-	2.2	83
Sub-Total		6.1	6.9	-	7.3	1,580
Southern:						
	Botswana	9.5	18.0			190
	South Africa	4.2	*(27.8)*		22.1	2,800
	Zambia	18.3	10.0			730
4.	Zimbabwe	12.8	-		11.8	1,400
5.	Malawi	14.9	17.1	*(24.5)*	17.1	670
6.	Mozambique	-	22.0	*(18.7)*	22.1	1,200
7.	Lesotho	5.8	13.6	*(22.0)*	13.6	82
8.	Swaziland	-	-	-	11.9	-
9.	Namibia	-	4.4	-	6.7	150
			18.0	*(21.9)*		
			18.0			
			19.8	-	19. 8	
Sub-Total:		9.4	14.5	-	14.9	7,222
West:						
	Cote d'Ivoire	6.1	7.7	*(10.3)*	8.5	670
	Togo	-	-	-	6.9	160
	Burkinafaso	4.5	6.7	*(7..8)*	6.7	350
	Nigeria	1.1	2.2	-	3.4	2,200
Sub-Total		2.5	3.8	-	4.9	3,380
Grand Total		6.8	10.5	-	10.9	19,190

Figures in the parentheses are for urban areas

Source: Compiled/Computed from:
(a) US/AID and US Census Bureau: *HIV/AIDS in the Developing World*, USA, May 1999 P Annex-A, Table A-1.
(b) UNAIDS: The Demographic Impact of HIV/AIDS; Report on the Technical meeting, Impact New York, 10 November 1998, p.28.
(c) Karen A. Stanecki et a.l, *The Demographic Impact of HIV/AIDS: Perspectives from the world Population Profile 1996*, IPC, Population Division, US Bureau of the census, Washington, DC, March 1997.

Table 2: ***Estimated population growth rates (in percent) with and without HIV/AIDS for sub-Saharan Africa for 1998 and 2010 by sub-region and country***

Sub-Region/Country	*1998 Growth Rates*		*2010 Growth Rates*	
	Normal	*With AIDS*	*Normal*	*With AIDS*
East Africa:				
Ethiopia	2.9	2.2	2.9	1.9
Kenya	2.5	1.7	1.8	0.6
Uganda	3.5	2.8	3.5	3.1
Tanzania	2.6	2.1	2.6	1.8
Burundi	3.0	2.3	3.0	2.3
Rwanda	3.2	2.5	2.9	1.4
Middle Africa:				
Cameroon	3.2	2.8	3.0	2.5
Central African Rep.	2.5	2.0	2.3	1.9
Congo (Brazzaville)	2.7	2.2	2.3	1.7
Congo (Kinshasa)	3.3	3.0	3.3	2.9
Southern Africa :				
Botswana	1.9	1.1	1.9	0.2
Lesotho	2.7	1.7	1.9	0.8
Malawi	2.9	1.6	2.2	0.7
Namibia	1.9	1.4	2.8	1.2
South Africa	3.2	2.0	1.4	0.4
Swaziland	3.3	2.5	3.1	1.7
Zambia	2.5	1.1	3.1	2.0
Zimbabwe	-	-	3.2	0.3
West Africa:				
Burkina Faso	3.2	2.7	3.1	2.4
Cote d'Ivoire	3.0	2.2	2.9	2.2
Nigeria	3.2	3.0	3.0	2.1

Source: Compiled from: US/AID and Bureau of the Census, *HIV/AIDS in the Developing World* Bureau for Global Programmes, US Government Printing Office, Washingron, DC, 1999 pp. 8-9.

Table . 3: ***Age- specific HIV prevalence among pregnant women (Botswana 1994 & 1997)***

Age Group	*Sample Size*				*HIV Prevalence (in percent)*	
	Total		HIV- Infected cases			
	1994	1997	1994	1997	*1994*	*1997*
15-19	634	540	131	151	20.7	28.0
20-29	1902	1543	590	637	31.0	41.3
30-39	694	641	120	194	17.3	30.0
40+	87	121	7	28	8.0	23.1
Total	3317	2845	848	1010	25.6	35.5

Source : Compiled and computed from:
(a) Ministry of Health , Clinical Records *Third HIV Sentinel Surveillance in Botswana*, AIDS /STD Unit , June 1994 Report , p.11; (b) Innocent Mbo Modisaotsile, *Population Growth and HIV/ AIDS The case of Botswana*, Paper presented at the workshop of the Demography of Botswana, December 9-11, 1997, p.6.

Bongaarts' model suggests that—at an HIV infection rate of 20 percent of total population—the population growth rates of countries with high fertility levels, such as those in the East and Middle African sub-regions, would not fall below half of their current growth rates.[6] However, the estimates of population growth for the year 2010 (0.2 percent for Botswana, 0.3 for Zimbabwe, 0.4 for South Africa, 0.7 and 0.8 percent for Malawi and Lesotho respectively and 0.2 percent for Kenya) do not appear to be realistic. The assumptions behind them do not accommodate the possibility of eventual decline in the rates of HIV prevalence.

Anderson—working on a HIV infection rate of 50 percent of total population—conjectures a future negative rate of population growth in Africa (Anderson 1991: 581-589). Taking into account the epidemiological nature of the pandemic, Anderson's model assumes that the behavioural process of men and women will remain unchanged—as reflected in the networking patterns of their sexual relationships, and in the present patterns of sexually-transmitted diseases (STDs).

However, the current HIV prevalence rate is not generally more than 25 percent of adult population in sub-Saharan Africa, and successful action to control the pandemic has already started in some countries—notably Uganda. For HIV/AIDS to reduce population growth rates considerably, it must dramatically increase the death rate and/or reduce the birth rate. To achieve negative population growth either the birth and death rates must cancel each other out at zero, or the death rate must exceed the birth rate.

Age structure and HIV/AIDS: The age selectivity of the HIV/AIDS pandemic has highly significant demographic implications. In Ethiopia, 94 percent of 10,374 reported HIV/AIDS cases were in the age bracket of 15 to 49 years; and the comparable figure for Botswana was about 86 percent out of 10,775 cases. But, while about 5 percent of the reported cases in Ethiopia were 50 years or more, there was a rather different pattern in Botswana—where 11 percent of HIV/AIDS victims were found to be infants and children less than five years old (Ethiopia 1994; Republic of Botswana 1997: 8).

Further examination of the impact of HIV/AIDS among pregnant women is made in **Table 3**. The peak infection rate is shown to be for the age group 20-29, increasing from 31 percent of pregnant women in that age cohort in 1994, to 41 percent in 1997. Among adolescent pregnant girls, between the ages of 15 and 19, the HIV prevalence rate increased from about 21 percent in 1994 to about 28 percent in 1997. Among adult pregnant women, the rate increased from 17 to 30 percent for the age group 30-39, and from 8 to 23 percent for those aged 40 years and over. The overall increase of HIV infection among pregnant women was from about 26 percent in 1994 to about 36 percent in 1997.

Similar patterns were observed in Rakai District of Uganda: of HIV-infected women who visited health institutions 21 percent fell into the age group15-19, about 42 percent in the age group 20-24, and 39 percent in the age group 25-29, and 30 percent for the age group 30-34 (Ntozi et al. 1997: 33). Similar age patterns among males would suggest that, if no action is taken immediately to counter the pandemic, there will be dramatic depletion in future among economically active and reproductive age groups—especially in Botswana, Zambia, Zimbabwe, Uganda, Tanzania, Kenya, and Ethiopia.

The age patterns of HIV prevalence suggest that the proportion of children less than 15 years in the total population of sub-Saharan countries will probably increase, or at least maintain its present level. The loss of children under 15 will be less proportionately than the loss of people aged between 15 and 49. Similarly, as the old aged population will not be seriously affected. So the dependency ratio of the old and the very young, on the productive and reproductive part of the population, will remain as high, if not higher, as in pre-HIV/AIDS days.

Table 4: ***Mortality levels of sub-Saharan African countries with and without AIDS (1998 by sub-region and country)***

Sub-Region/Country	*CDR*		*IMR*	
	With AIDS	*without AIDS*	*With AIDS*	*Without AIDS*
East Africa:				
Ethiopia	21.3	15.0	125.7	115.4
Kenya	14.2	6.2	59.4	44.7
Uganda	19.0	12.5	92.9	81.3
Rwanda	19.0	12.2	113.3	101.3
Burundi	16.	17.4	101.2	92.1
Tanzania	17.4	12.2	96.9	96.9
		16.7	89.2	
	16.7	12.1		
Middle Africa:				
Cameroon	14.0		76.9	70.7
Central African Republic	10.6		105.7	97.7
Congo(Brazzaville)	16.8	12.0	102.7	94.0
Congo (Kinshasa)	16.5	11.3	101.6	101.6
	15.2	12.7	97.1	
Southern Africa:				
Botswana	20.9	8.6	59.3	36.4
Zambia	22.6	11.4	92.6	72.0
Zimbabwe	20.1	6.2	61.8	35.9
South Africa	12.3	7.8	52.0	43.3
Lesotho	12.8	9.2	78.3	71.2
Swaziland	21.4	10.1	103.4	83.8
Malawi	23.7	14.4	133.8	117.9
Namibia	19.8	7.5	66.8	44.0
West Africa:				
Cote d'Ivoire	16.1	10.7	95.7	86.7
Nigeria	13.0	10.9	70.7	65.9
Burkina Faso	17.7	13.1	101.1	101.1
			101.1	

Note : *CDR = Crude Death Rate and IMR= Infant Mortality Rate*
Source : Compiled from : US/AID & US /Bureau of the Census (1999) : *HIV/AIDS in the Developing World* US Government Printing Office , Washington DC. May 1999, pp.8 -9

Mortality consequences of HIV/AIDS pandemic: Comparison of the mortality levels as measured by crude death rates (CDR) and infant mortality rate (IMR) with AIDS and without AIDS is made in **Table 4.** The Table shows that mortality levels are increasing in almost all sub-Saharan African countries—with most glaring reversal of previous decline in Botswana, Zimbabwe, South Africa, Lesotho, and Namibia.

The high increase in mortality apparent in the Table implies that the global and national aspirations of 'Health for All by the Year 2000', and of child-survival targets, have already been reversed in all sub-Saharan African countries—particularly the East and Southern Africa sub-regions which had performed remarkably in reducing mortality rates before the advent of HIV/AIDS.

Levels of life-expectancy, as estimated for 1998 and projected for 2010, have been cut cruelly by HIV/AIDS in sub-Saharan Africa. The pandemic has cut between 29 and 31 years off the life-expectancy projected for the year 2010 in Botswana, Zimbabwe and Namibia. In the East African sub-region it has cut off from 12 years for Uganda to 26 years for Kenya (refer to **Table 5**).

Fertility consequences of HIV/AIDS: Since the 1950s, the patterns and trends of population growth and fertility levels in sub-Saharan African countries have been very high with no sign of drastic decline. Between 1950 and 1990 a total fertility rate of 6.7 births per 1000 population per annum was reported for the East and West African sub-regions, though it showed some decline to 6.4 for the period 1995-2000. The level of fertility appeared to decline in both the North and the Southern African sub-regions from 6.5 and 6.8 between 1950 and 1985, to 4.7 and 5.3 respectively during 1985-95. Further estimates have shown a decline to about 4 during 1995-2000—though still high compared with more developed societies where it dropped from 2.8 in 1950-1955 to 1.6 in the years 1995-2000 (ECA 1989: 14).

The high fertility conditions of sub-Saharan African women have been characterized by the continuation of such levels and patterns until the end of their menopause; start childbearing at early age accompanied by short birth spacing and achievement of too many births by the end of their reproductive age, with a desired family size ranging from 6.0 children for Ghana, 5.9 children for Botswana and Burundi to 8.8 children in Mauritania (ECA 1989:19).

Such high and almost constant fertility performance indicates that the 'Marginal Utility Theory of Consumer Behaviour' do not appear to be inconsonant with the fertility behaviour and performance of sub-Saharan African women. The main underlying factors which have motivated the fertility to remain high include the prevailing demographic structure, socio-economic status, the psychological and socio-cultural environments which favour the perpetuation of high and constant fertility levels. In African society, a large number of children is perceived as social security and prestige, economic assets and as perpetuation of lineages. Furthermore, the performance of high fertility is perceived as replacement effect to compensate the prevailing high infant and childhood mortality levels.

Against the above background, examination of the likely counteracting conditions of HIV/AIDS pandemic on the high fertility levels of the African societies is examined by considering the likely biological and behavioural aspects of the pandemic which could be depressing and motivating factors of fertility.

Firstly, women may die young or before completing their childbearing ages due to HIV/AIDS and this could have negative effect on their total fertility performance; secondly, widely used condom to prevent HIV/AIDS pandemic and STDs may eventually have depressant effect on fertility; thirdly, HIV/AIDS-induced pregnancy, wastage such as

Table 5: ***Estimates of life expectancy between 1998 and 2010 with and without AIDS for sub-Saharan African countries by sub-region and country***

	Life Expectancy					
Sub-	*With AIDS*		*Without AIDS*		*Number of years to be lost*	
Region/Country	*1998*	*2010*	*1998*	*2010*	*1998*	*2010*
East Africa:						
Ethiopia	40.9	38.6	50.9	54.7	10	16
Kenya	47.7	43.7	65.9	69.2	18	26
Uganda	42.6	47.6	54.1	59.5	12	12
Rwanda	41.9	37.6	53.9	59.1	12	22
Burundi	45.6	45.3	55.4	60.8	10	16
Tanzania	46.4	46.1	55.2	60.7	9	15
Middle Africa:						
Cameroon	51.4	49.8	58.6	63.2	7	13
CAR	46.8	50.9	56.3	61.9	10	11
Congo(Braz.)	47.1	49.0	57.2	62.4	10	13
Congo (Kin.)	49.3	51.9	54.4	59.8	5	8
Southern Africa:						
Botswana	40.1	37.8	61.5	66.3	21	29
Zambia	37.1	37.8	56.2	60.1	19	22
Zimbabwe	39.2	38.8	64.9	64.5	26	31
South Africa	55.7	48	65.4	68.2	11	20
Lesotho	54.0	44.7	62.0	65.9	8	21
Swaziland	38.5	37.1	58.1	63.2	20	16
Malawi	36.6	34.8	51.1	56.8	15	22
Namibia	41.5	38.9	65.3	70.1	24	31
West Africa:						
Cote d'Ivoire	46.2	46.7	56.1	61.8	10	15
Nigeria	53.6	46.3	57.8	64.9	4	19
Burkina Faso	46.1	45.6	55.4	60.7	9	15

Source: Martha Ainsworth et al. *The Economic Impact of AIDS-Shocks,Responses and Outcomes* The World Bank, 4 June 1992.

Table 6 : ***Educational and marital status correlates of HIV/AIDS (Rakai district, Uganda 1992, and rural Zimbabwe 1996)***

Indicators	*B-Coefficient*	*Odds Ratio*[1]
Education:		
- No Education (R.C.)	0.0000	1.0000
- Some Primary Education	.5013	1.6509
- Completed Primary Education	.5797	1.7855*
- Secondary Education +	.6972	2.0000*
Type of Marriage:		
- Monogamy (R.C.)	0.0000	1.0000
- 2-5 Partners	.8689	2.3843*
- More than 5 partners	.7757	2.1721*
Marital Status:		
- Married	0.0000	1.0000
-- Single	1.3083	3.6999*
- Divorced	1.6292	5.0998*

R.C = Reference Category. Figures with asterisks are significant at 5 percent level

Source: as Table 8

[1] *Odds Ratio is estimated using e^B where B is coefficient of dermination and "e" is the natural logarithm.*

miscarriages, spontaneous and induced abortions, stillbirths and menstrual disturbance may depress the fecund period of women at any age of reproductive period; and fourthly, women with HIV-infection may refrain from sexual activities for fear of leaving orphan children, thereby contributing to the reduction in fertility.

In the context of the objective realities of the African societies where illiteracy has been rampant, communications are very limited with low levels of urbanization and industrialization and widespread poverty in all aspects of life, the proposition that HIV-infected women would quit childbearing for fear of leaving orphan children doesn't appear to have any scientific validity. Due to ignorance or deprivation of health services, HIV-infected women may think that the HIV/AIDS could be any of the opportunistic illnesses. Consequently, reduction of sexual activities or abstinence may not be practical and the Malthusian proposition of the 'Law of Nature', which states that the passion of heterosexuality is the biological urge and that assumes constant interaction in the rural environments, where the overwhelming African societies live. Under such environments, HIV-infected women could continue to be sexually active during the long incubation period, likely giving births.

The contraceptive prevalence rate has generally been very low in rural and urban sub-Saharan African countries, especially in the case of condom use. It ranges from 0.2 percent for Burundi to 13 percent for Ghana for all women ever users; from 0.3 percent for Burundi to 17 percent for Zimbabwe for married women ever users; from 0.1 percent for Burundi and Niger to 2.6 percent for Ghana for current use of all women and less than 1 percent for all currently married women and for Uganda, rate has been as low as 0.8 percent among married women and 2.5 percent among men (ECA 1995: 38-41; Ntozi 1997: 145-150).

Since rural HIV prevalence has been relatively lower than in urban environments, especially in areas where monogamous marriage systems prevail, it may not seem likely to face significant reduction in fertility until at least in the foreseeable future. Even in urban areas, most condom users were the educated ones and the middle class people who had already low fertility levels due to their socio-economic status and their number has been too small to affect the overall fertility levels. Furthermore, recent studies have indicated that even if the fertility levels of HIV-infected women would be reduced by as much as 40 percent, the decline in the national fertility rate would be less than 10 percent.

Obviously, the consequences of miscarriages, spontaneous abortions, stillbirths and menstrual disturbances, which impede regular ovulatory processes, could be instigated by HIV/AIDS and STDs and reduce the expected number of fertility performance of women if the pandemic and STDs spread rapidly, covering large areas of a country. Also, if a large proportion of young women die due to HIV/AIDS, the pandemic could definitely have negative effect on the total fertility performance of women

Thus, in view of the above arguments, it is difficult to say that HIV/AIDS would have a great impact on the fertility levels and that assumptions on contraceptive usage and breastfeeding would be much more plausible as determinants of fertility decline in sub-Saharan Africa (UN AIDS 1998:S34; Basia et al.: S41-42).

Micro/macro level considerations of the impact of HIV/AIDS

Socio-economic correlates of HIV/AIDS: A study was carried out in Uganda by Christine (1992) and Simon (1996), covering 1784 respondents to investigate the correlation of education, wealth and type of marriage with HIV/AIDS and showed that the proportion of HIV-infected persons relatively increases from about 11 percent for those with 'no education' to about 30 percent for those who 'completed secondary education and above'. Similar patterns of positive relationship occur with respect to wealth, which tends to increase from about 17 percent for the low income to about 36 percent for the high income

groups. Pertaining to type of marriages, the proportion increases from about 19 percent for monogamous marriages to about 36 percent for persons having multiple sexual partnership.

Based on the collected data, advanced Logistic (loglinear) regression model was carried out. Accordingly, **Table 6** summarises the odds ratios showing that persons who completed secondary education and over would acquire HIV infection two times more likely than those illiterates and persons with multiple partnership acquire between 2.2 to 2.4 times more likely than those in monogamous marriages. In connection with marital status, the same Table indicates that people whose marriages were dissolved would tend to acquire HIV/AIDS five times more likely than those in intact marriages.

The correlation between HIV/AIDS and Skilled Human Resources Capital has also been examined. For example, 20 percent of primary school teachers in Zambia (1996/97) were HIV-positive, and the HIV-infection prevalence rate among teachers in Malawi was 30 percent which accounts for 67 percent of the annual supply of trained teachers in all teacher training institutions in the country. Consequently, a disequilibrium of assignment of teachers among localities has already been created where the rural/urban service delivery system appears to be disturbed, because teachers with HIV/AIDS pandemic used to be assigned in the nearby hospitals (Kelley 1999:2). Another interesting observation was noted by Kelley for Zambia in relation to the school system in that the pandemic has already created some mistrust between teachers and parents whose daughters were HIV-infected, supposedly alleged to teachers' erratic sexual behaviour. This has become common and feared to be another serious dimension of socio-psychological impact of the pandemic in the African school systems

Further interesting findings show that the HIV/AIDS pandemic does not only strike at the general working age and reproductive population, but also selectively at the human capital with the highest levels of education with productive experiences and skills on whom African Nations have put substantial investments. **Table 7** presents some evidence showing that the pandemic appears to have been positively correlated with some selected socio-economic variables. For example, among the 5951 textile factory employees in Zaire, the HIV-infection rate appears to rise relatively from 2.8 percent for lower status workers to 4.6 percent for foremen and 5.3 percent for the managerial and related workers. This Table further depicts that the HIV-infection rates of wives and their husband's educational qualifications as well as income levels and occupational categories appear to be positively correlated. Furthermore, in Rwanda, the HIV-infection rates of wives rose relatively from 22 percent when husband's income was at lower status to 35 percent when husband's income was at higher level and also appears to increase from 9 percent in the case of farming occupation to 38 percent for those husbands who have been employed by government.

Similarly, certain studies undertaken in Cameroon, Tanzania, Uganda and Kenya have shown that the HIV/AIDS pandemic has been striking at those with the highest levels of education and productive capacity to which governments spent substantial investment in human capital development.[7]

Table 7: ***Selected socio-economic correlates of HIV-infection in three African countries***

Country/Year	Socio-economic Indicators[2]	Level of Socio-economic Status (in percent)		
		Lower	Middle	Higher
Zaire/1987 (n=5951)	Job	2.8	4.6	5.3
Rwanda/1987	Husband's Education	18.0	32.0	34.0
	Husband's Income	22.0	25.0	35.0
	Husband's Job Education	9.0	22.0	32.0(38.0)
Zambia/1985 (n=1078)		8.0	14.7	24.1(33.1)

Source: Martha Ainsworth et al. *The Economic Impacts of AIDS: Shocks, Responses and Outcomes*, The World Bank, June 16, 1992, p.6.

Table 8: ***Direct costs per HIV/AIDS patient for some selected African countries***

Country	Low (a)	Mean (b)	High (c)
South Africa (1991)	1850	a.n	11,800
Zimbabwe (1991)	64	614	2,574
Zaire (1987/1988)	132	n.a	1,585
Rwanda (1988/1990	n.a	358	n.a
Tanzania (1988/1991)	104	290(195)	631

n.a=not available.The figure in parenthesis for Tanzania is cost for pediatrics (infants).

Source: Martha Ainsworth et al *The Economic Impact of AIDS-Shocks Responses and Outcomes* The World Bank 4 June 1992.

Note: (a) ALow@ mean for ALow Income@ patients
(b) AMean@ means for AMedium Income@ patients
(c) AHigh@ means for AHigh Income

Table 9: ***Estimates of HIV/AIDS treatment costs as percentages of public health budget***

Country	For treating HIV/AIDS alone	For treating HIV/AIDS and its opportunistic illness
Rwanda	30.8	65.5
Tanzania	22.5	40.6
Malawi	11.0	35.3
Kenya	3.8	23.0
Zimbabwe	3.1	26.5

Source: Compiled and computed from: Martha Ainsworth et al: *The Economic Impact of HIV/AIDS: Shocks, Responses and Outcomes*, The World Bank, June 16, 1992, p.15 (fig. 5).

2

(a) In Zaire, Job Category in a Textile factory was classified as "worker@ Aforeman@, AExecutive@ , as ALower@, AMiddle@ and AHigher@ respectively.
(b) In Rwanda, Husband's' Education was categorized as 0-4 years and 8+years.
(c) Husbands' Income per month was classified as ANone@ ,<10,000 and 10,000+.
(d) Husbands' Job as A farmer@, soldier private and Government Employee (the figure in parenthesis);
(e) In Zambia, Education denotes 0-4 , 5-9 years and 10-14 years and the one in parenthesis denotes 14+ years of Education.

These findings can be argued in two points: one is tempted to conclude that illiteracy and poverty could have been more correlated with HIV/AIDS than those of higher status, who could likely have the means to protect themselves; the second counter argument is that persons of higher status can have the means to flirt more and could have multiple partnership which would make them more vulnerable to the pandemic. Hence, the two propositions should further be tested as we increase our scope and capacity of data collection and analysis.

In connection with the socio-economic implications, the effects of the pandemic on capital/labour ratio and capital accumulations, productivity and profitability, the burden of affected employees on employers, and the issues of remittance income and limiting cultivation, in many sub-Saharan countries have been well documented.[8] Specifically, the pandemic appears to affect the GDP and GDP per capita growth rates by striking at the economically active population and trained and experienced human resources.

HIV/AIDS consequences on health provision: Several pockets of case studies have been carried out to estimate the direct costs of medical treatment in African countries. In Botswana, for example, it was reported that at least 60 percent of all bed occupancy in medical wards has been accounted for HIV/AIDS patients and related opportunistic illnesses and STDs with an average of 6.5 bed use-days per admission with hospital bed occupancy rate per case ranging from two days for patients with HIV-related gastro-enteritis to as high as three months for a patient with complicated drug-sensitive tuberculosis (Makhema 1997: 18). Similarly, as high as 30 percent of inpatient beds of hospitals in Uganda, Malawi and Zaire were occupied by HIV/AIDS patients (Hope 1995: 80-89). Thus, the total cost of health care of HIV/AIDS patients has been high in many African countries. In Kenya, for example, the total annual health care and hospitalization cost for persons with HIV/AIDS for all age groups has been estimated to increase by eight folds, between 1990 and 2010. It was further estimated that if only 25 percent of the HIV/AIDS patients in Kenya would be admitted, patients of HIV/AIDS would still occupy over 60 percent of all available hospitals in a matter of 15 years (Family Health International, Kenya 1996: 67-69). Similarly, Abdulhamid conducted a survey on five major hospitals in Ethiopia to investigate the dimensions of the direct and indirect costs of health care service demands and his analysis showed that the consequences of the pandemic, classified as direct and indirect costs, has been multidimensional: social, psychological and economic ramifications (Abdulhamid 1998:193-98).

The magnitude of direct per capita costs of HIV/AIDS patients for some selected African countries is shown in **Table 8**. It is shown that the direct cost for a South African HIV/AIDS patient increases ranging between US $1850 for low income in-patient and US $11,8000 for high income inpatient to as low as between US$ 195 to 290 *per capita* for nursing and drugs for adults and children including treatments for 17 episodes of opportunistic illnesses for a Tanzanian in-patient.

The consequences of the financial positions for HIV/AIDS treatments alone and for treating the associated opportunistic illnesses out of the total public health budget of some African countries have become very high (refer to **Table 9**). For instance, for Rwandan inpatients, about 31 percent and 66 percent of the total health expenditure were reported to have been spent for treating the HIV/AIDS alone and for HIV/AIDS and its associated opportunistic illnesses, respectively. The treatment costs for Tanzania accounted for about 23 percent and 41 percent respectively and the amount for Malawi (11 and 35 percent); Kenya (4 and 23 percent); and Zimbabwe (3 and 27 percent) were also considerably high.

These figures should be taken as minimum because serious underestimation of the direct costs for the provision of health care in Africa is obvious for many reasons. Firstly, many AIDS patients do not use modern health facilities and remain unreported. Secondly, many episodes of illnesses are resorted to traditional healers/herbalists or patients remain at respective homes for fear of exposure to the public and/or due to lack of adequate funds for hospital treatment. Thirdly, many opportunistic illnesses could be diagnosed wrongly and treated in hospitals without being known to have been HIV/AIDS OR instigated by HIV/AIDS. If these inaccuracies of reporting were corrected or treated in the modern health centres, HIV/AIDS treatment costs would be very tremendous and unaffordable with a great impact on family life and socio-economic development of sub-Saharan African countries which have already faced limitations in medical and infrastructural capacities, even to address the major and longstanding health problems.

Conclusion

The consequence of the HIV/AIDS pandemic on family disintegration has increasingly become serious, especially in certain East and Southern African countries. Evidence show that cases of orphanhood are being handled by either too young members of a household when either or both parents were afflicted and died or by a single parent or by too old guardian (grandparents), aggravating the psychological, economic and social problems of the remaining members. The fact that African society is characterized by extended familial relationship, the consequence of HIV/AIDS has been felt at all levels of the society: individual, household, community and national.

Since the incubation period of HIV/AIDS is long, ranging between 5-10 years, the direct cost of hospitalization in certain areas in Africa has become so exorbitant that HIV/AIDS patients could not afford to pay from own resources and hence, the extended family, and the public or government have to face the direct and indirect burden sharing of the costs of the pandemic. The increase in expenditure for the treatment of HIV/AIDS pandemic and associated opportunistic illnesses and STDs implies reduction in the purchasing power at household and national levels with consequential effect on the outcome of universal health for all and child survival which were targeted to be achieved by the year 2000.

Besides striking at the economically active and reproductive age segments of a population, the pandemic appears to be positively correlated with education and income status, occupational levels and number of sex partners. Although the reduction in output due to a decline in the workforce could be compensated by the slower but positive population growth rates during the coming few years in most African countries, an eventual decline in per capita income and subsequent increase in the general poverty of the population would be imminent.

Suggested measures follow.

HIV infection from blood transfusions and intravenous injections can be prevented by medical management and administration, while sexually transmitted HIV/AIDS, being behavioural in nature, calls for serious decision-making at individual levels—with institutional support. Specific measures should include:

- reduction of casual sexual partnerships;
- minimizing or eliminating multiple sexual networking;
- delaying the onset of sexual activities among youth;
- increasing quality and quantity of condom usage among the sexually active;
- control of Sexually Transmitted Diseases (STDs) which facilitate the spread of HIV/AIDS and other opportunistic illnesses;

- incorporating HIV/AIDS education into agricultural extension programmes that reach the rural hinterland;
- involving religious groups in campaigns against the pandemic; and
- organizing and implementing programmes to alleviate female poverty and thus make women less vulnerable to sexual exploitation.

The following research activities are suggested, in conjunction with institutional capacity building, to fight the disease effectively:

- develop research capacity with respect to the nature and epidemiological aspects of the disease and continue search for curative measures;
- establish and strengthen any clinical surveys by keeping the records of health Institutions (clinics, hospitals etc.) systematically, focusing on the information pertaining to the characteristics and consequences of the HIV/AIDS;
- incorporate indirect questions relating to HIV/AIDS issues such as knowledge information and access to family planning services in any demographic and health surveys and carry out special investigation on the antecedent variables of fertility, including fertility linkage with HIV/AIDS;
- carry out studies on socio-cultural, socio-psychological and socio-economic correlates of the pandemic; and
- efforts should be made to standardize blood testing procedures and exiting models to minimize wide range variations in the results of estimations and projections;

Since knowledge and available evidence show that fertility consequence of HIV/AIDS has not been conclusive, there is a need for further investigation by taking statistically representative samples, cross-sectional in coverage with longitudinal timeframe.

Notes

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1. Refer to Kandell, 1989: 7-8; Anarfi, 1989; Rahman, 1995: 311; World Bank 1998; Hadgu 1988: 4.1.17; Kare et al., 1998; Sangare, M. 1993 ; Weinreb 1999: 417; Barnet et al. 1999: 211.
2. Addis Ababa University 1990; WHO 1993; UN AIDS 1998:1,15; Kamungoma 1990
3. ADB 1993: 1-2; UNDP 1993:11; UNDP 1994: 38-67.
4. OAU, 1992, 1994 & 1999; UNAIDS 1998: 1, 15-16 ; 1993:6-10 ; Caldwell 1989: 185-186.
5. Refer to UNAIDS 1998: 6-12 ; UNAIDS, 1998: S31-S35S ; Weinreb 1999: 417; Kidane 1994:11-16; Adgboyega 1997: 2-6; Greener et al, 1999:42-53; Abdulhamid, 1998:192-200; Stauffer 1999:23-24.
6. Bongaarts 1990:103-120; Boerma 1998: S12; Standley, et al. 1991:13-15; Oluwole 1997:13; World Bank, 1992.
7. World Bank 1993: 25; UNDP 1993: 21; Kenya National AIDS Control Programme n.d.: 3-20.
8. UNDP 1993: 17-23 ; Green et al. 1999: 13; Kidane 1994: 40-46; World Bank, 1992:25; Family Perspectives, 1993 :16; Abdulhamid 1998: 197-198; Botswana NPC, 1999: 9; Caldwell, 1993: 7-10; World Bank 1992: 25

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