SOCIO-DEMOGRAPHIC VARIABLES ASSOCIATED WITH AIDS EPIDEMIC: EVIDENCE FROM THE ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT AND THE AFRICAN COUNTRIES

El-Asfahani AM[1]* and JT Girvan[2]

Aída El-Asfahani

*Corresponding author Email: elasfahani@yahoo.com

[1] Aida M. El-Asfahani, PhD, RD, Professor of Nutrition and Dietetic, Department of Agricultural Economics & Extension, Faculty of Science and Agriculture, The University of the West Indies, St. Augustine, Trinidad, West Indies.

[2] James T. Girvan, Professor and Dean, College of Health Sciences, Boise State University, Boise, 1910 University Drive, Boise Idaho, 83725, USA.

Published by Rural Outreach Program
KARI-NARL Complex, Westlands, off Waiyaki Way
P.O. Box 29086-00625 TEL: +254-20-4444030 FAX: +254-20-4444030
Nairobi, KENYA
Email: oniango@iconnect.co.ke   OR   info@ajfand.net   www.ropkenya.org

Rural Outreach Program
=ROP=
Kenya

1

ABSTRACT

The Human Immunodeficiency Virus (HIV) has been spreading rapidly worldwide for the past two decades, causing a variety of symptoms known as the Acquired Immune Deficiency Syndrome (AIDS), which has killed millions of people, and which looks likely to kill millions more. Generally, HIV infection rates are currently decreasing in several countries, but globally the number of people living with HIV/AIDS continues to rise both geographically and among specific demographic groups. For example, despite the remarkable efforts that are being made throughout Africa to avert the spread of HIV and reduce its impact, the HIV/AIDS pandemic in Africa continues to spread obstinately.

Among the vexing issues related to the AIDS epidemic are the insufficient provisions of planners, policy makers and the public in general in curbing its devastating consequences to the health sector, households, schools, workplaces, economies and the quality of life as a whole. This paper presents information on the association between socio-demographic variables and AIDS prevalence in some African and the Organization for Economic Cooperation and Development (OECD) countries.

The studied variables included size of population; population density; urbanization; average life expectancy; average female life expectancy; average male life expectancy; literacy; female and male literacy; population increase; infant mortality; average daily calorie intake; gross domestic product (GDP) per capita; religion; fertility rates; death rates; and AIDS-rate. Several parametric and nonparametric statistical techniques were adopted including Kruskal-Wallis, Mann-Whitney and Chi-square tests.

Insignificant difference in the means of AIDS-rates between the OECD countries and the African group was found, but the difference was significant when the USA was excluded from the analysis. As initially expected, life expectancy in the OECD countries was significantly higher than that of the African group while the average rates of infant mortality, population growth, fertility, and death were significantly higher within the African group.

Significant association between AIDS-rate and life expectancy was only found for African males, while association with fertility, infant mortality, population density, and calorie intakes was statistically insignificant. No clear difference between urban and rural areas with respect to AIDS-rates was discerned. Communities of Muslims were less subject to the AIDS problem. In conclusion, future studies should devote more attention toward impacts on HIV/AIDS prevalence of other equally important variables such as access to social and health care services, cultural norms, ethnic diversity, and educational facilities.

Key words: Human Immunodeficiency Virus, Africa, Mortality

Published by Rural Outreach Program
KARI-NARL Complex, Westlands, off Waiyaki Way
P.O. Box 29086-00625 TEL: +254-20-4444030 FAX: +254-20-4444030
Nairobi, KENYA
Email: oniango@iconnect.co.ke   OR   info@ajfand.net   www.ropkenya.org

=ROP=

2

INTRODUCTION

Recent data show that, rates of people living with Human Immune-Deficiency Virus (HIV), the virus causing AIDS disease, continue to increase worldwide despite the efforts of governments and international organizations to prevent and reduce this trend. In 2005, the Joint United Nations Programme on HIV/AIDS (UNAIDS) indicated that globally about 40 million adults and children are living with HIV/AIDS, while 3.1 million people died of AIDS-related illnesses, bringing up the total death toll of AIDS since 1981 to about 25 million. An additional 4.9 million people globally became infected with HIV during 2005, indicating that the death cost will rise steeply in future years [1, 2].

The prevalence of HIV/AIDS was also shown to follow a regional pattern. Although sub-Saharan Africa (SSA) shares just over 10% of the world's population, it is home to nearly two-thirds of the world's HIV-positive cases - almost 25.4 million. In 2004, approximately 3.1 million new infections occurred, while 2.3 million adults and children died from AIDS [1].

The United States Bureau of Census reported that the percentage of infected people in southern African cities of Zimbabwe, Botswana, Namibia, South Africa, and Swaziland almost quadrupled between 1993 and 1997, almost reaching a fourth of the population. In the same period, the HIV infection rate almost doubled in provincial areas to reach 16% of the population, which was not expected by researchers [3, 4].

As a growing number of people falling ill and eventually dying from AIDS goes up, there will be a tremendous impact on many parts of the society. The literature indicates that several socio-demographic variables such as literacy [1], population size [5-7], population natural increase rate [8], fertility [9], life expectancy [8, 10, 11], infant mortality [12, 13], religion [14], and urbanization [15-17] are associated with levels of HIV infection and the subsequent number of deaths from AIDS among young adults and children. Other variables may be relevant as well including population density. This is since "crowds" and overpopulated areas would logically enhance the spread of endemic diseases, AIDS included [18].

Considering the grave and serious worldwide situation of HIV/AIDS prevalence, particularly in Africa, this study will devote its attention to exploring the relative African conditions compared to those of a group of the most developed countries. In this respect the study will investigate the socio-demographic variables associated with rates of AIDS disease in countries of both the Organization for Economic Cooperation and Development (OECD) group and selected African countries.

METHODS

Data source

Data used in this study was drawn from the file "world95.sav" which is a sample data set, supplied by SPSS, containing social, economic and demographic information for 109 countries worldwide [19]. For the purpose of this study some socio-demographic variables of selected African and OECD countries were extracted from the "World95.sav" data set. The OECD countries include: Finland, Norway, Greece, Iceland, Ireland, Sweden, New Zealand, Germany, Austria, United Kingdom, Belgium, Portugal, Netherlands, Denmark, Canada, Italy, France, Switzerland, Spain, Australia, and the United States. The socio-demographic variables in some countries, such as Japan, have not been studied and as such, this information has been excluded. The selected African groups include: Somalia, Morocco, Nigeria, Liberia, South Africa, Senegal, Cameroon, Ethiopia, Gambia, Gabon, Burkina Faso, Botswana, Kenya, Central African Republic, Burundi, Tanzania, and Rwanda.

This study examined socio-demographic variables, whether affecting or affected by AIDS-rate (number of AIDS cases per 100,000 people) including: size of population (in 1000); density (number of people/sq. kilometer); urbanization (percentage of people living in the cities); average life expectancy (years); average female life expectancy (years); average male life expectancy (years); literacy (percentage of people who can read); female literacy; male literacy; natural population increase (percentage per year); infant mortality (deaths per 1000 live births); average daily calorie intakes; gross domestic product (GDP) per capita; religion; fertility rates (average number of children); and death rates per 1000 people.

For the purpose of analyses, the AIDS-rate and urbanization variables were methodologically reclassified into categorical variables. AIDS-rate categories were low (<20 per 100,000), medium (20 - 100 per 100,000), and high (>100 per 100,000). Urban categories were low (<20%), medium-(21-40%), high (41-80%), and very high (81-100%). Religion was indicated through the use of three dummy variables: "1, 0, 0" for countries with dominant Islamic religion; "0, 1, 0" for countries with dominant Christianity; and "0, 0, 1" for "other" dominant religions (Tribal, Buddhism, Taoism, Hinduism, Judaism, and Animism).

Statistical Analysis Mode

Standard parametric and nonparametric statistical techniques were applied wherever deemed useful. The *t*-test, Kruskal-Wallis, and Mann-Whitney were used to examine the differences in means among groups. The Chi-square independence test was applied to test differences between distributions of African and OEDC countries among AIDS-rate categories.

Pearson correlation coefficient was calculated to study strength of the linear relationship between AIDS-rate and the socio-demographic variables. Statistical

Published by Rural Outreach Program
KARI-NARL Complex, Westlands, off Waiyaki Way
P.O. Box 29086-00625 TEL: +254-20-4444030 FAX: +254-20-4444030
Nairobi, KENYA
Email: oniango@iconnect.co.ke OR info@ajfand.net www.ropkenya.org

=ROP=

4

Formerly AJFNS
Volume 8 No. 1 2008
March 2008
ISSN 1684-5374
AFRICAN JOURNAL OF FOOD AGRICULTURE
NUTRITION AND DEVELOPMENT

analyses were performed using the Statistical Package of Social Science for Windows, version 10.0.5 (SPSS, Chicago, IL, U.S.A.).

RESULTS

The OECD group had statistically significant (P=0.005) higher mean rates of urbanization, literacy, female life expectancy, and male life expectancy than those of the African group. Conversely, infant mortality, population growth, fertility, and death rates were significantly (P=0.005) higher in the African nations. It seems that the relatively high AIDS-rate in the USA has affected the statistical difference between the average estimate for the OECD countries and the corresponding estimate of the African group (P=0.547). When the USA data was excluded (see table 1), there was a significant difference between the OECD countries and the African group (P=0.02).

Table (2) reveals that the African countries were almost equally distributed among the three AIDS-rates categories. Countries of low AIDS-rate category (n=6, 35.3%) included Somalia, Morocco, Nigeria, Liberia, South Africa, and Senegal. The medium AIDS-rate category (n=5, 29.4%) involved Cameroon, Ethiopia, Gambia, Gabon, and Burkina Faso. Countries with the high AIDS-rate category (n=6, 35.3%) were Botswana, Kenya, Central African Republic, Burundi, Tanzania, and Rwanda.

On the other hand, about 62% of the countries in the OECD group fell in the low AIDS-rate category including Finland, Norway, Greece, Iceland, Ireland, Sweden, New Zealand, Germany, Austria, United Kingdom, Belgium, Portugal, Netherlands, and Australia. Countries (n=6, 33.3%) with the medium AIDS-rate levels were: Denmark, Canada, Italy, France, Switzerland, and Spain. Only the United States of America fell in the highest AIDS rate category.

The Chi-Square test proved a statistically significant difference (P=0.047) between the OECD and African groups with respect to the low- and high-AIDS-rate categories A much lower percentage of OECD countries fell within the lowest AIDS-rate category, while the relative importance of African higher AIDS-rate was statistically proven.

Table (3) shows that in all of the OECD countries the average life expectancy of males exceeded 70 years of age, while falling below this figure in all of the African countries. Furthermore, in African nations, 82% of the male and 53% of the female life expectancies was below 55 years of age. Using the Kruskal-Wallis test, the relationship between AIDS-rate categories and life expectancy indicated that the differences in life expectancy levels according to AIDS-rate categories were only statistically significant (P=0.024) for males in the African group.

The Mann-Whitney test shows that the lowest AIDS-rate category advantaged a statistically significant higher life expectancy level than that of the medium and high AIDS-rate categories (P=0.03, P=0.026, respectively), while the last two were

AJFAND ONLINE Formerly AJFNS

Volume 8 No. 1 2008
March 2008

ISSN 1684-5374

AFRICAN JOURNAL OF FOOD AGRICULTURE
NUTRITION AND DEVELOPMENT

indifferent in this respect, as shown in table 4. Accordingly, the hypothesis of AIDS negative impact upon life expectancy is accepted for the sole case of African males.

Table 5 shows that literacy rate is about 85% or above in all OECD countries and is 76% or below in all of the studied African countries. Furthermore, a literacy rate of less than 60% occurred for men in 50% of selected African countries, and in 100% for women. Moreover, Kruskal-Wallis test showed that the differences in the means of literacy rates among AIDS-rate categories were statistically insignificant (P>0.05) in all cases. As such, a hypothesis of AIDS-rate strong link to illiteracy should be rejected.

As for urbanization, as presented in table 6, 42.4% of OECD group populations live in the highest urbanized class, while the lowest urbanized category included 23.5% of the African population and none of the OECD. Testing the association between urbanization categories and AIDS-rate categories of the two country groups combined was found to be significant (P=0.004). However, this result was not reached when testing for each country group separately (P>0.05). Hence, the significant overall relationship may be elusive, and an assumed AIDS-rate link to urbanization should be rejected for the country groups being studied.

Considering infant mortality, assuming the influence of AIDS, tests revealed negative results. Where overall samples for the two groups combined presented statistically significant (P=0.045) results, it was proved to be a statistical illusion, similar to urbanization effect. Analyses for the OECD and African country groups separately reveal statistically insignificant (P>0.05) impact of AIDS-rate categories on infant mortality. Therefore, a hypothesized positive impact of AIDS-rate on infant mortality should also be rejected. Likewise, tests for impact of population density on AIDS-rate were statistically insignificant (P>0.05).

Considering religion distribution in the OECD group and African countries separately, it was found that all the OECD countries are predominantly Christian, while in the African group six countries (37.5%) are predominately Islamic, five countries (31.25%) are predominately Christian, and the rest fall in the "other" religion group (South Africa was excluded due to missing religion classification). A combined detailed analysis of the two country groups shows that the difference in the means of AIDS-rates between Muslim and Christian communities was statistically significant (P=0.032). Also, the difference in the means of AIDS-rates between countries with predominately Islamic and the countries that fall in the "other" religion group was statistically significant (P=0.002). A statistically significant (P=0.012) difference in AIDS-rates between the three religion groups was discerned. Moreover, Mann-Whitney test shows that the difference in the means of AIDS-rates between countries with a predominantly Muslim population and those countries with a predominantly Christian population was statistically significant (P=0.004). On the other hand, detailed analyses revealed that followers in the "other" religious group are not distinguished from Christian communities with respect to levels of AIDS-rate. As such, Muslim communities seem to suffer the least from the AIDS outspread. This

Published by Rural Outreach Program
KARI-NARL Complex, Westlands, off Waiyaki Way
P.O. Box 29086-00625 TEL: +254-20-4444030 FAX: +254-20-4444030
Nairobi, KENYA
Email: oniango@iconnect.co.ke OR info@ajfand.net www.ropkenya.org

ROP
Rural Outreach Program
Kenya

6

Formerly AJFNS
Volume 8 No. 1 2008
March 2008
ISSN 1684-5374
AFRICAN JOURNAL OF FOOD AGRICULTURE
NUTRITION AND DEVELOPMENT

was verified using Pearson correlation coefficient between AIDS-rate and either number of Islam or Christianity followers, reaching almost -0.68 for the first and 0.64 for the second. Likewise, there were negative significant correlations between AIDS-rates and each of urbanization (r=-0.51, P=0.05), female life expectancy (r=-0.51, P=0.05), and male life expectancy (r=-0.65, P=0.01). On the other hand, AIDS-rate relationships with infant mortality, fertility, literacy, or average daily calorie intake variables were found to be statistically insignificant for both the OECD countries and the African group.

DISCUSSION

The objective of this study was to identify socio-demographic variables associated with AIDS-rates in selected African countries, compared to USA, Canada and Western Europe. Although not all the highly HIV infected African countries were included, AIDS-rates were found significantly higher in the African group than in the OECD countries without the USA. Such results coincide with other studies indicating that Africa remains the most affected region of the world by HIV/AIDS epidemic [1, 20, 21].

The revealed drop of African male's life expectancy with increased AIDS-rates, in the current study, is compatible with earlier studies emphasizing the impact of such fatal disease on lives of many adults in the African regions [11, 22, 23]. In Swaziland, Zambia, and Zimbabwe, it is projected that the average life expectancy of people born during the next decade will decline below 35 years, levels not seen since the end of the 19th Century [24].

The strong influence religion has in traditional societies seems to have played a key role in combating AIDS. The difference between Muslim and Christian dominant communities concerning AIDS-rates in favor of the first may be due to Islamic religious injunctions for strict avoidance of any extramarital sexual contacts, or abnormal contacts not targeting reproduction as being considered sinful. It also relates to the necessity of physical purification during Muslims' daily prayers [14, 25, 26].

One of the most dramatic demographic consequences of AIDS is the increase in deaths, coinciding with previous studies [27, 28]. In the current study, the link between the death rate and AIDS-rate among the African group will most likely be significant in diminishing the size of the African population. It is worth mentioning that the United Nations Population Division indicated that unless AIDS disease is tackled rapidly, the size of 38 African countries will decrease in the following years by 14% [24].

When observing patterns of HIV/AIDS disease burden in relation to urbanization, the present study found an inverse significant correlation between urbanization and AIDS levels in the African countries. This result is inconsistent with other studies which indicated that urban areas and trading centers along the main roads generally show considerably higher prevalence of HIV infection than rural areas [28]. In developing

countries, possible biases that should be considered when interpreting this result include rural poverty motivating people to migrate to urban areas in the hope of finding improved economic opportunities [29, 30]. They live in slums in large cities where they are at higher risk to become infected with HIV virus [31].

Indeed, seriously ill individuals return to their village of birth to die, as such the migration back to rural areas may interpret the underestimation of AIDS levels in urban areas and the high AIDS-related deaths among the rural Africans [23, 30]. Moreover, as statistics are often curtailed to simple urban –rural dichotomies, it is difficult to examine differences in AIDS rates among or within urban areas. This is due to the fact that the population in the city includes extremes of both wealthy people and those who are very poor. Recent research has demonstrated that residents of a small city and/or a slum have inferior access to public facilities compared to living in larger settlements; likewise the poor are at a disadvantage compared to those who are in better living conditions [18]. Urbanization, according to the present study, has a negative influence on African people with respect to the AIDS epidemic.

Where crowded and high density areas are expected to be more suitable for the outspread of diseases, AIDS included, the insignificance of the population density effect in this study was unexpected. This contradicts Zieler *et al.* study which has shown that in Massachusetts as poverty increased (from 84 to 411 cases per 100,000) and as population density grew (from 66 to 746 cases per 100,000) the incidence of AIDS among white men rose steadily[18]. The general density figure the African countries in this study could be illusive, as based on the inclusion of vast uninhabited jungles and forests beside highly populated villages and cities. This may explain the revealed positive relationship between population increase and AIDS prevalence, in the current study, which most likely has reflected the population distribution more than the population density variable.

In Africa, the drop in life expectancy reflects not only the death of people in young adulthood, but also an increase in infant mortality, as recent projections have shown that in Zimbabwe, South Africa and Namibia, more infants will die from HIV infection in 2010 than from all other causes [32]. However, the absent linkage between infant mortality and AIDS-rate in this study has contradicted findings of earlier studies [13, 33]. This could be explained by the interfering of many other infectious diseases such as malaria, measles, and diarrhea, particularly in the African countries [34].

In addition, because a precise monitoring of infant and child deaths is difficult in developing countries, they are more likely to be under-reported, Sub-Saharan Africa included. However, susceptibility to HIV/ AIDS in respect to poverty, ignorance, and illiteracy is expected in many developing countries including those in Africa [35]. Moreover, literacy in this study does not reflect a level of education permitting higher health consciousness or any educational protective measures against AIDS epidemic.

Illiterate people do not have an adequate awareness to help protect them from HIV infection [36]. In fact, literacy, as just being able to read, though fairly prevalent for African people, is not enough to equip and empower them to combat AIDS disease. However, evidence shows a decline in HIV infection rates occurring among people with primary and post-primary education, even in countries where the overall HIV prevalence rate is still escalating [37]. A higher level of education will facilitate the understanding of HIV/AIDS specific information, and thus contributing to reduction of the risk of the disease [38].

It seems that including the USA, characterized by the highest both individual income and AIDS incidence among the OECD group has led to an expected positive correlation between per capita income and AIDS rate. On the contrary, in the most affected developing countries, there is a direct correlation between the extent of AIDS prevalence and the severity of negative GDP per capita trend [39- 41]. Cuddington [42] suggests that due to AIDS positive impact on morbidity and mortality rates, a reduction in the GDP in Tanzania in 2010 by 15 to 20 percent might occur compared to the no-AIDS scenario.

CONCLUSION

Several findings in this study were compatible with those of previous studies. Even where some results contradicted earlier findings, they could be at least partially explained by the interference of other factors beyond the scope of this study. They may include the spread of many fatal communicable diseases, the lack of public awareness of HIV/AIDS and dire poverty as in the African country group. Given the lack of epidemiological data, this study suggests that future detailed statistics concerning the complex environmental factors interrelated with HIV/AIDS epidemic are warranted in order to better control the spread of the disease globally. For example, it is necessary to neutralize, as far as possible, the interfering impacts of other endemic diseases such as malaria and diarrhea. Likewise the negative impact of crowdedness in urbanized areas should be separated from the positive impact of quality of life in urban areas. Characteristics of urban areas counteract each other with respect to the AIDS outspread.

ACKNOWLEDGEMENT

Published by Rural Outreach Program
KARI-NARL Complex, Westlands, off Waiyaki Way
P.O. Box 29086-00625 TEL: +254-20-4444030 FAX: +254-20-4444030
Nairobi, KENYA
Email: oniango@iconnect.co.ke OR info@ajfand.net   www.ropkenya.org

9

AJFAND ONLINE
Formerly AJFNS
Volume 8 No. 1 2008
March 2008
ISSN 1684-5374
AFRICAN JOURNAL OF FOOD AGRICULTURE NUTRITION AND DEVELOPMENT

Table 1: **Comparison between African and OECD countries with respect to AIDS-rate and socio-demographic variables**

Variables	Africa (n = 17)[*]		OECD (n = 21)[*]		P
	Mean	±SD	Mean	±SD	
AIDS-rate[1]	52.4	52.5	29.1	33.6	0.547
AIDS-rate (w/o the USA)[1]	52.4	52.5	22.7	16.5	0.02
Population Density[2]	64.4	81.5	108	107.9	0.223
Urbanization[3]	29.6	15	74.7	14.9	0.005
Population increase[4]	2.7	0.5	0.5	0.3	0.005
Male life expectancy[5]	51.8	7	73.7	1.2	0.005
Female life expectancy[5]	55.5	7.5	80.1	1.2	0.005
Literacy[6]	45.7	17.8	97.7	3.4	0.005
Daily calorie intake[7]	2157.6	222.6	3435.7	229.5	0.005
Fertility[8]	6	1.2	1.8	0.3	0.005
Infant mortality[9]	93.7	30	6.9	1.2	0.005
Death rate[10]	*14*	*4.7*	*9.6*	*1.3*	0.001

*n=number of selected countries.
[1]number of AIDS cases per 100,000 people; [2]number of people/sq. kilometer; [3]percentage of people living in the cities; [4]percentage per year; [5]average life expectancy (years); [6]percentage of people who can read; [7]average daily calorie intake; [8]average number of children; [9]deaths per 1000 live births; [10]deaths per 1000 people.

Table 2: **Distribution of African and OECD countries by AIDS-rate categories**

AIDS-rate categories	Africa % (n=17)	OECD % (n=21)
Low (<20)[*]	35.3	61.9
Medium (20-100)	29.4	33.3
High (>100)[*]	35.3	4.8

*The Chi-Square test proved statistically significant difference (P=0.047) between the two groups with respect to the low- and high-AIDS-rate categories.

Published by Rural Outreach Program
KARI-NARL Complex, Westlands, off Waiyaki Way
P.O. Box 29086-00625 TEL: +254-20-4444030 FAX: +254-20-4444030
Nairobi, KENYA
Email: oniango@iconnect.co.ke   OR   info@ajfand.net   www.ropkenya.org
=ROP=
Rural Outreach Program
Kenya
10

Table 3: Classification of males and females life expectancy of OECD and African countries.

Life expectancy categories (years)	Males		Females	
	OECD % (n=21)	Africa % (n=17)	OECD % (n=21)	Africa % (n=17)
40 – 45	0	17.65	0	11.8
46 – 50	0	17.65	0	17.65
51 – 55	0	47.1	0	23.5
56 – 70	0	17.65	0	47.1
71 – 75	95.2	0	0	0
76 – 80	4.8	0	57.14	0
81+	0	0	42.86	0

Table 4: Mann-Whitney mean ranks (R) results for AIDS–rate categories and male life expectancy in the African countries

AIDS-rate categories	$R_{l,m}$ ** (P=0.030)	$R_{l,h}$ ** (P=0.026)	$R_{m,h}$ (P=0.177)
Low "l" (<20)	7.9	8.8	0.0
Medium "m" (20-100)	3.7	0.0	7.5
High "h" (>100)	0.0	4.2	4.8

**P<0.05

Table 5:	Classification of OECD and African countries by literacy categories.			
Literacy categories (%)*	OECD**		Africa	
	Males % (n=6)	Females % (n=6)	Males % (n=16)	Females % (n=16)
<20	0	0	0	37.5
20─	0	0	37.5	31.3
40─	0	0	12.5	31.3
60─	0	0	43.8	0
80─	100	100	16.7	0

*Percentages of population's literacy categories
**For OECD, most included countries (n=15) submitted no data of literacy, as illiteracy remained an absent phenomenon not warranting investigation.

Table 6:	Distribution of African and OECD Countries according to urban categories	
Urban categories (% of people living in cities)	Africa % (n=17)	OECD % (n=21)
Low (< 20)	23.5	0
Medium (21-40)	47.1	4.8
High (41-80)	29.4	52.4
Very high (>81)	0	42.4

Published by Rural Outreach Program
KARI-NARL Complex, Westlands, off Waiyaki Way
P.O. Box 29086-00625 TEL: +254-20-4444030 FAX: +254-20-4444030
Nairobi, KENYA
Email: oniango@iconnect.co.ke OR info@ajfand.net   www.ropkenya.org

ROP

12

REFERENCES

1. **UNAIDS.** United Nations-World Health Organization. AIDS epidemic updates, December, 2005. WHO, Geneva, 2005.

2. **UNAIDS.** United Nations-World Health Organization. AIDS epidemic updates: Global summary of the HIV/AIDS epidemic, December 2000. WHO, Geneva, 2000.

3. **Health Studies Branch** Recent HIV seroprevalence levels by country: December 1993. Research Note 11. Washington DC: Center for International Research, US Bureau of the Census.

4. **Health Studies Branch** Recent HIV seroprevalence levels by country: January 1997. Research Note 23. Washington DC: International Programs Center, Population Division, US Bureau of the Census.

5. **Stover I** The Impact of HIV/AIDS on Population Growth in Africa. Washington, DC: African Population Advisory Committee Secretariat, 1993.

6. **Garnett GP and RM Anderson** No reason for complacency about the potential demographic impact of AIDS. *Trans Roy Soc Trop Med Hyg* 1993; 87(suppl 1): S 19-S22.

7. **Way PO** Demographic impact of HIV in less-developed countries. VIII International Conference on AIDS. Amsterdam, July 1992.

8. **McDevit TM** World Population Profile: 1996. Washington, DC: US Department of Commerce, 1996.

9. **Carpenter LM, Nakiyingi JS, Ruberantwari A, Malamba SS, Kamali A and JAG Whitworth** Estimates of the impact of HIV infection on fertility in a rural Ugandan cohort. *Health Trans Rev* 1997; 7(Suppl. 2): 113-126

10. **Way PO and KA Stanecki** The impact of HIV/AIDS on World Population. Washugnton DC: US Bureau of Census, 1994.

11. **Stanecki KA and PO Way** The Demographic Impact Perspectives from the World Population Profile: 1996 Washington, DC: International Program Center. Population Division, Bureau of the Census, 1997.

12. **Bryson YJ** Perinatal HIV-1 transmission: recent advances and therapeutic interventions. *AIDS*; 10(Suppl 3): S33-S42.

Published by Rural Outreach Program
KARI-NARL Complex, Westlands, off Waiyaki Way
P.O. Box 29086-00625 TEL: +254-20-4444030 FAX: +254-20-4444030
Nairobi, KENYA
Email: oniango@iconnect.co.ke   OR   info@ajfand.net   www.ropkenya.org

=ROP=

13

13. **Cohen B and J Trussel** (Eds). Preventing and Mitigating AIDS in Sub-Saharan Africa: Research and Data Priorities for the Social and Behavioral Sciences. Washington, DC: National Academy Press, 1996:96.

14. **Gray PB** HIV and Islam: is HIV prevalence lower among Muslims? *Soc Sci Med* 2004; 58(9):1751-6.

15. **Wawer M** Urban-rural movement and HIV dynamics. In: Mann J and Tarantola D (Eds). AIDS in the world II. Oxford: Oxford University Press, 1996:48-50.

16. **Nzilambi N, De Cock KM, Forthal DN, Francis H, Ryder RW, Malebe I, Getchell J, Laga M, Piot P and JB McCormick** The prevalence of infection with human immunodeficiency virus over a 10-year period in rural Zaire. *N Engl J Med* 1988; 318: 276-9.

17. **Nadine S, Agnes D, Opare Kaitoo B, Ekow E, Nzambi K, Myrto M, Bekoe V and P Jacques** The Price of Development: HIV Infection in a Semiurban Community of Ghana. *JAIDS* 2002; 29(4):402-408

18. **Zierler S, Krieger N, Tang Y, Coady W, Siegfried E, DeMaria A and J Auerbach** Economic deprivation and AIDS incidence in Massachusetts. *Am J Pub Heal* 2000; 90(7):1064-1073.

19. **World Bank.** World Bank Data Set (World95.sav) for 1995 World Survey, NY, USA, 1995.

20. **United Nations.** World Health Organization. UNAIDS. AIDS Epidemic Update – December 1999. WHO, Geneva, 1999.

21. **Timaeus I and M Jassen** Adult mortality in sub-Saharan Africa: evidence from the demographic and health surveys. Paper presented to Conference on Empirical Evidence for the Demographic and Socio-Economic Impact of AIDS. Durban, 26–28 March, 2003.

22. **Stanecki KA** The AIDS Pandemic in the 21st century, Draft Report, July 2002, XIV International Conference on AIDS, Barcelona, US Census Bureau.

23. **Nunn AJ, Mulder DW, Ruberantwi A, Kengeya-Kayondo JF and J Whitworth** Mortality associated with HIV-1 infection over five years in rural Ugandian population: Cohort study. *Br Med J* 1997; 315: 767-771.

24. **United Nations.** Population Division, The HIV/AIDS epidemic and its social and economic implications. New York. September, 2003.

Published by Rural Outreach Program
KARI-NARL Complex, Westlands, off Waiyaki Way
P.O. Box 29086-00625 TEL: +254-20-4444030 FAX: +254-20-4444030
Nairobi, KENYA
Email: oniango@iconnect.co.ke OR info@ajfand.net www.ropkenya.org

Rural Outreach Program
=ROP=
Kenya

14

25. **Gibney L, Choudhury P, Khawaja Z, Sarker M and SH Vermund** Behavioural risk factors for HIV/AIDS in a low-HIV prevalence Muslim nation: Bangladesh. *Int J STD AIDS* 2000; 11(2):133-4.

26. **Kengeya-Kayondo JF, Kamali A, Nunn A, Ruberantwari A, Wagner H and D Mulder** Incidence of HIV-1 infection in adults and socio-demographic characteristics of seroconverters in a rural population in Uganda: 1990-1994. *Int J Epidemiol* 1996; 25(5):1077-1082

27. **Hosegood Victoria AB, Vanneste Anna-Maria A and MB Timaeus Ian** Levels and causes of adult mortality in rural South Africa: the impact of AIDS. *AIDS* 2004; 18(4):663-671.

28. **Brundtland GH and P Piot** The Global Fund to Fight AIDS, Tuberculosis and Malaria, Pre-Board Meeting. World Health Organization, Geneva, 2002.

29. **Hunt CW** Migrant labour and sexually transmitted disease: AIDS in Africa. *J Health Soc Behav* 1989; 30:353–73.

30. **Boerma JT, Urassa M, Nnko S, Ng'weshemi J, Isingo R, Zaba B and G Mwaluko** Sociodemographic context of the AIDS epidemic in a rural area in Tanzania with a focus on people's mobility and marriage. *Sex Transm Inf* 2002; 78:i97-i105.

31. **Nunn AJ, Wagner HU, Kamali A, Kengeya-Kayondo JF and DW Mulder** Migration and HIV-1 seroprevalence in a rural Uganda population. *AIDS* 1995; 9: 503-506.

32. **Health Studies Branch** Trends and patterns of HIV/AIDS infection in selected developing countries. Research Note 12. Washington DC: Center for International Research. US Bureau of the Census, 1993.

33. **ET Taho T, Dallabetta GA, Canner JK, Chiphanhwi JD, Lipmba G, Hoover DR and PG Miotti** The effect of human immunodeficiency virus infection on birth weight, and infant and child mortality in urban Malaw. *Int J Epid* 1995; 24 (5): 1022-1029.

34. **Ntozi JPM and IM Nakanoabi** AIDS epidemic and infant and child mortality in six districts of Uganda. Socio-Demographic impact of AIDS in Africa Conference. Durban, February, 1997.

35. **Brown D** AIDS Shortening Life in 51 Nations. Global Forum, Barcelona, July 7, 2002. http://www.washingtonpost.com/wp-dyn/articles/A36452-2002Jul7.html.

Published by Rural Outreach Program
KARI-NARL Complex, Westlands, off Waiyaki Way
P.O. Box 29086-00625 TEL: +254-20-4444030 FAX: +254-20-4444030
Nairobi, KENYA
Email: oniango@iconnect.co.ke   OR   info@ajfand.net   www.ropkenya.org

15

=ROP=

36. **Struble MB and LL Aomari** Position of the American Dietetic Association: Addressing world hunger, malnutrition, and food insecurity. *J Am Diet Assoc* 2003; 103(8):1046-57.

37. **Vandemoortele J and E Delamonica** Deadly Education: The Spread of HIV/AIDS-The "Education Vaccine" Against HIV. *CICE-J Arch* 2000; 3(1). http://www.tc.columbia.edu/cice/articles/jved131.htm.

38. **UNICEF.** Progress of nations. New York, NY: UNICEF, 2000.

39. **IFPRI.** International Food Policy Research Institute. 2020 Vision News & Views, Washington, DC: International Food Policy Research Institute; December 2000.

40. **Bell C, Devarajan S and H Gersbach** The long-run economic costs of AIDS: theory and application to South Africa. Washington, DC, World Bank, 2003.

41. **McPherson M and A Goldsmith** Africa: on the move? *SAIS Rev* 1998; 28:153–167

42. **Cuddington JT** Modeling the Macroeconomic Effects of AIDS, with Application to Tanzania, *The World Bank Economic Review* 1993; 7(2):173.

Published by Rural Outreach Program
KARI-NARL Complex, Westlands, off Waiyaki Way
P.O. Box 29086-00625 TEL: +254-20-4444030 FAX: +254-20-4444030
Nairobi, KENYA
Email: oniango@iconnect.co.ke OR info@ajfand.net   www.ropkenya.org

ROP
Rural Outreach Program
Kenya

16