Humanities, Arts, and Social Sciences Research Journal
ISSN 3064-7304
Volume 12 Issue 3
July-September 2024
Impact Factor: 6.51
Enquiry: contact@continentalpub.online
Published by Continental Publication | https://continentalpub.online/index.php/Humanities-Arts-Social-Sciences

FIGHTING TWO FRONTS: THE IMPACT OF HIV-TUBERCULOSIS COINFECTIONS IN KENYA

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Abstract: *Human immunodeficiency virus (HIV) infection significantly increases the risk of tuberculosis (TB) infection, leading to heightened concerns regarding disease progression and mortality rates. HIV-infected individuals face a substantially elevated risk of reactivating latent Mycobacterium tuberculosis infection and experiencing rapid disease progression post-infection or reinfection with TB. Extensive research underscores the synergistic impact of HIV on TB infection dynamics, with co-infected individuals facing an annual risk factor that may exceed 10%. While individuals infected with TB alone have a relatively lower lifetime risk of developing TB, the risk is substantially heightened in the context of HIV co-infection.*

This paper delves into the complex interplay between HIV and TB infection, examining the mechanisms underlying the heightened susceptibility to TB among HIV-infected individuals. Drawing upon empirical evidence from studies by Bucker et al. (1999), Corbett et al. (2003), Vynnicky (1997), and Girardi (2000), it highlights the significant disparities in disease risk and progression between individuals with TB-only infection and those co-infected with HIV/TB.

By elucidating the synergistic effects of HIV on TB infection dynamics, the paper aims to inform public health policies and interventions aimed at reducing the burden of TB among HIV-infected populations. It underscores the urgent need for integrated approaches to TB and HIV prevention, diagnosis, and treatment, as well as efforts to address underlying social determinants and structural barriers exacerbating the dual burden of disease.

Keywords: *HIV, Tuberculosis, Co-infection, Disease progression, public health.*

INTRODUCTION

Human immunodeficiency virus (HIV) infection is a potent risk factor for tuberculosis (TB) infection. HIV increases the risk of reactivating latent Mycobacterium tuberculosis infection and the rapid progression after infection or reinfection with TB (Bucker et al., 1999: 501 - 507; Corbett et al., 2003). While persons infected with TB only have a 20 - 30% life time risk of developing TB (Vynnicky, 1997; Girardi, 2000), those co-infected with TB/HIV have an annual risk factor that may exceed 10% (Bucher et al., 1999; Lewis et al., 1989).

Kenya is considered to have one of the highest coinfection prevalence rates of HIV/AIDS/TB in the world, accompanied by indescribable human suffering and socio-economic helplessness, with little hope of rapid change in sight. The objective of the following study conducted by the three authors trained in public health, social work and history, is to analyze the

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089
actual rates of incidence and prevalence of the disease burden in the country based on the most accurate data and literature available; examine historically the cultural and globalizing risk factors affecting Kenya; gauge the impact of the current pathogenesis on people's economic and social conditions; highlight the response of the Kenyan government and the international agencies to the crisis from the mid-1980s to the present period; and suggest strategies toward a better understanding of the association between disease and culture in Kenya. Given the correlation inconsistency between low income- poverty-illiteracy and HIV/TB co-infection rates in Kenya, where the upper class is at high risk, the authors suggest that more research and health-related strategies be focused on culture, if the spread of HIV/AIDS/TB is to be understood properly and reduced.

METHODOLOGY

This work is a critical analysis of the state and the social determinants of HIV/AIDS/TB in Kenya, using transdisciplinary sociobehavioral and public health methodology that assesses disease burden's incidence, prevalence and relative risk, while weighing its socio-economic impact. Unlike the process followed in a clinical study or laboratory experiment, the authors collected the study's primary data, June - July 2007, using a purposive (snowball) sample of experts in the field of HIV/AIDS and tuberculosis in Kenya. Guided open-ended interviews were held with experts from the
Kenyan Ministry of Health, the University of Nairobi Medical School,
Kenyatta National Hospital, Aga Khan Hospital in Mombasa, the Medical Training College in Nairobi and other health care institutions in the country. The authors also held non-IRB required interviews with several government officials, including the Public Health Chief Officer, Dr. Kepha M. Ombacho, Ministry of Health, Ministry of Health Epidemiologist, Mr. John G. Kariuki, Water and Sanitation Head, Dr. Wilfred Ndegwa, World Health Organization representative in Kenya, Dr. Walter Jaoko, University of Nairobi Medical School, a leading scientist in the HIV vaccine trials currently being underway in the country, Dr. Gidraph Wairire, Social Work Program, University of Nairobi, Consolata Omandi, Epidemiology Lecturer at the Medical Training College, Dr. C. Macau, diabetes expert at Aga Khan Hospital in Mombasa and Ms. Salome Lima, nurse at Aga Khan Hospital as well. The guided discussions with the experts noted above included such issues as: Views on the spread of HIV/AIDS/TB in Kenya; the impact of culture and ethnicity; the status of the projected HIV clinical trials; the role of government and non-governmental organizations; reasons why prevalence rates are higher in some regions and ethnic groups than in others; the impact of the Nairobi sex workers study on the clinical trials; the factors contributing to the spread of tuberculosis.

Secondary data and materials were obtained from the literature in the various medical libraries in the United States and Kenya. The transdisciplinary approach allowed a qualitative and quantitative detailed analysis based on frequencies, percentages, crosstabulations and association inferences common in socio-behavioral sciences and public health disciplines.

RESULTS

Kenya in the context of Africa's disease environment

Sub-Saharan Africa suffers from many illnesses, many of which stem from tropical environmental factors and human-caused conditions. The adult literacy rate is estimated at 35 and 75% of the sub-Saharan African population, which makes less than US $2 a day. The World Bank classifies 303 million people in sub-Saharan Africa as poor or making only US $1 a day or less, and expects this number to

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089
rise to 340 million by 2015. About 50% of sub-Saharan Africa, including Kenya, does not have access to clean water, and malaria continues to decimate more people than any other disease. The Kenyan govern- ment notes that "approximately 8.5 million Kenyans are at risk of contracting malaria, and the disease is a leading cause of morbidity and mortality." Malaria causes 34,000 deaths a year in Kenya (Republic of Kenya, 2006 - 2007).

Tuberculosis is on the rise as a disease on its own as well as a sequel of HIV/ AIDS. Indeed, the Global Tuberculosis Control of the World Health Organization (WHO) notes that sub-Saharan Africa is "one of the six regions" of the world still experiencing the greatest number of TB infections (Africa: South of the Sahara, 2007). In 2005, the rise in TB incidence compelled African Ministries of Health to declare TB a continental emergency. About 30% of all HIV-infected persons live in East Africa. Even though sub-Saharan Africa contains only 10% of the world's population, it harbors two-thirds of those currently infected with HIV, or 20 million or more adults and children (Nelson et al., 2001). While more than 90% of the HIV-positive adults here have been infected through heterosexual contact, most children are infected by their mothers, and eventually, become orphans (12 million in 2007, to rise to 15.7 million by 2010).

The figure below shows the African governments' daunting task of stamping out HIV/AIDS from the continent.It is clear that Kenya is among the countries with an HIV rate higher than five percent of its 15 - 49 year-old citizens, despite the fact that it ranks much lower than such countries as Malawi, Botswana, Lesotho, South Africa, Swaziland, Mozambique, Namibia, Zambia and

Zimbabwe. Even though Kenya has done as well as Uganda or Senegal in combating HIV/AIDS, government officials were unpleasantly surprised when, in August 2008, a study of 18,000 Kenyans, ages 15 - 64 years, conducted by the CDC, WHO and the Kenya Medical and Research Institute concluded that the HIV/AIDS prevalence was on the increase, from 6.7% in 2003 to 7.8% (1.4 million) in 2008.

The CDC study also revealed that 57% of Kenyans had never been tested for HIV; 26% had been declared negative but later found positive; 16% of the tested refused to know the results; 14% were unaware as to where to get tested; and 5% claimed that the health center was too distant. Yet, among the tested, only 20% had used a condom during their last sexual act. Thus, as of January 2009, the government was still trying to discredit the study, claiming that the data included those who lived under anti-retroviral drugs and that a second study was needed (Daily Nation, 1/2/09). Government officials continued to declare, even in 2010, that actual rate did not exceed 5 - 6%.

This also fueled renewal of the debate over a 2006 law, which, by January 2009, the govern-ment had not yet implemented, criminalizing "the willful transmission of HIV" and mandating notification of the family but, in January 2010, it established the first HIV/AIDS national tribunal whose responsibility was to hear cases related to "transmission of HIV, confidentiality, testing, access to health care services, discriminatory acts and policies and HIV-related research" (Plus News, 2010).

The health status of Kenyans

The population of Kenya was estimated at 34.3 million in 2003 - 2007, with about 41.6% residing in Nairobi,

Mombasa, Kisumu, Nyeri, Eldoret, Kakamega and

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089
Nakuru. Life expectancy at birth was then 50 years. Between 1963 and 1991, infant mortality rate declined from 126 to 52 per 1,000 live births, while under-five mortality fell from 211 to 75 per 1,000 live births. The crude death rate dropped from 20 to 12 deaths per 1,000 in 1993. Immunization coverage increased from less than 30% in 1963 to 76% in 1993. According to the latest Economic Survey (Economic Survey, 1994), there were 5,170 health facilities in Kenya in 2006, compared to 4,912 in 2005. Between 2005 and 2006, more than 1,200 health workers joined the labor force, bringing the total to 67,126 in 2006. Today unemployment is over 50% and many families' incomes have been wiped out by infectious diseases.

Earlier hopeful trends in health indicators were eventually slowed down. For example, according to the 1998 Kenya Demographic Health Survey, the infant mortality rate rose from 51 in 1992 to 74 per 1,000 live births in 1998. The under-five mortality rate increased from 74 in 1992 to 112 per 1,000 live births in 1998. Immunization coverage declined from 79% in 1993 to 65% in 1998, remaining stagnant thereafter.

This reversal has been attributed to deterioration in the quality and scope of health services, poor people's reduced utilization of services following the introduction of user fees under pressure from the World Bank and the International Monetary Fund (IFM), an overall reduction in food availability and nutrition, increased incidence of HIV/AIDS and poverty (Government of Kenya, 1998). Yet, the number of health facilities increased from 2,131 in 1990 to 4,235 in 1999. The number of beds and cots in health facilities was estimated to be 52,186 in 1998 (Figures for 2008 - 2010 not available), much less than the number needed. More than 50% of these are occupied by AIDS patients. In fact, it is common to find hospital beds being shared by more than one patient or patients sleeping on the floor (Kimalu, 2007). In 2004, a Kenyan Human Resource Assessment Model examined four facilities in the country and found a 50% vacancy rate in staffing areas, and one facility that needed 600 nurses had only 314 on hand (Management Sciences for Health, 2004).

HIV/AIDS/TB in Kenya

About 95% of the 30 million people with HIV/AIDS live in developing countries, and nearly two–thirds are in sub- Saharan Africa (Table 1). In this region, where HIV is mainly spread through heterosexual contact, prevalence rates exceed 20% in the most-affected countries, and the epidemic disproportionately affects young women. In the 15 – 24-year-old group, three young women in subSaharan Africa are infected for every young man. From the evidence available, the first case in Kenya was diagnosed in 1983. During the following year, the first Kenyan was diagnosed as HIV positive in the small town of Kakamega. According to the 1999 Kenya Human Development Report, the total number of people infected with HIV in the country rose from 629,319 in 1992 to 1,506,000 in 1997. The prevalence rate over that same period rose from 7.4 to 11.8% (Government of Kenya, 1999). In 2003, HIV morbidity prevalence among the 15- to 49-year-olds was 6.7% and remained unchanged in 2009.

Figure 1 shows that, for urban areas, the prevalence peak occurred in 1995, almost 10 years following government admission that HIV had become one of the new disease viruses in the country. For the rural areas, the peak was reached two years later, in 1997, giving Kenya a prevalence rate of 8.5%. The peak year for the new HIV infections in Kenya, almost 180,000, was 1992, just 10 years following the first positive diagnosed case in the country, while the peak for the resulting AIDS-related deaths, 110,000, occurred in 2002, having begun to drop by 2004, according to government statistics.

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089

For years, the government of Kenya has maintained that the reduction in the prevalence of HIV/AIDS-related deaths since 2003 is attributed to access to anti-retroviral drugs at no cost (The Nation, 2007), which lowered the death rates from 120,000 - 150,000 in 2003 to 57,000 in 2006 - 2007. The change may also be partly attributed to President Kabuki's 2003 "total war" against HIV/AIDS and his directive to the National AIDS Control Council to "coordinate and manage the implementation of a multisectoral approach to HIV/AIDS." Yet, currently, 233 Kenyans die every day from AIDS-related illnesses, even though, since 2003, prevalence rates seem to have decreased, according to Mr. Allys Orago, Director of Kenya's National AIDS Control Council, from 6.1% in 2004 to 5.1% in 2006 (East African Standard, 2007), a reduction of 1.0%.

Orago also claimed that, as of August 2007, HIV prevalence among men in Kenya was 3.5 and 6.7% among women, a difference of 3.20% lower for men than for women. The number of cases was said to have decreased from 85,000 in 2004 to 55,000 in 2006, a reduction of 35%. However, among the nearly one million HIV/AIDS positive Kenyans in 2007, 934,000 were between the ages of 15 and 24 years, of whom 102,000 were younger than 14 years, including orphans, who number approximately 1.1 million. The number was projected to rise to 2.3 million by 2010 (National Estimates of HIV/AIDS in Kenya, 2003 - 2004), with the urban areas showing an HIV/AIDS prevalence rate of 8.3% versus 4% for the rural areas (East African Standard, 2007). This represents a risk factor of 4.3% higher in the city.

While fighting HIV/AIDS, Kenya has also had to face the rapid spread of tuberculosis (TB). In 2004, TB prevalence was 888/100,000, with an incidence rate of 619/100,000 (WHO, 2005). Estimates reveal that about one in two persons infected with both TB and HIV, in the country, sometimes known as "the terrible twins" or "Bonnie and Clyde," will develop active TB. About 52% of those infected with TB also suffer from HIV (Press Release, 2007). The mortality rate attributed to TB was 133 deaths per 100,000. WHO estimated in 2007 that the number of TB cases, or the "case detection rate," reported to the TB Control Program of the Kenyan Ministry of Health, represented only half of the actual annual number of cases (Press Release, 2007). Consequently, at the 2000 Millennium Summit, world leaders proposed to target several problems occurring globally and reverse the spread of HIV in the country (Kimalu, 2007).

To enhance immunization coverage and prioritize preventive health services to reduce the prevalence of malaria, tuberculosis and HIV/AIDS, the budgetary allocation to the Health Ministry in Kenya was increased from 33.3 billion Kenyan Shillings to 44.4 billion during the 2007 - 2008 financial year (Mwaniki, 2007). This represented 15% of the total budget allocated to health care expenditures. The government has often acknowledged that "The HIV/AIDS epidemic has brought an escalating tuberculosis caseload" (Republic of Kenya, Ministry of Health, 2006). Indeed, TB continues to fuel the HIV epidemic in Kenya due in part to the lack of TB diagnostic tests, particularly for sputum smear-negative and extra pulmonary TB, and poor laboratory infrastructure, delayed diagnosis of TB and commencement of TB treatment. To address the HIV/TB crisis, Kenya has implemented the following strategies: (1) Collaborative HIV/TB activities with inclusion of HIV data in TB surveillance data country-wide; (2) development of a TB/HIV guide for standardized training of health care workers and (3) funding to continue routine surveillance for drug resistant TB. This plan has, however, encountered several challenges such as: (1) difficulty in improving the human resource capacity for collaborative TB/HIV activities; (2) shortages of HIV tests and anti-retroviral drugs; (3) inability to improve

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089

diagnostic counseling and testing for HIV and (4) overcoming the stigma of TB/HIV (Press Release, 2007).

Been aware of the shortcomings of its HIV/AIDS program, the govern-ment admits: The severity of the HIV/AIDS epidemic in Kenya presents many challenges, even though the 2003 KDHS indicated a decline in prevalence. Among other things, the number of trained personnel and the infra-structure are inadequate to cope with the scale of HIV-related services…and HIV stigma among health care workers and the community remains high" (Republic of Kenya, 2006).

Table 1. Estimated HIV/AIDS in sub-Saharan Africa, 2007.

	People living with AIDS	Adult (15 - 49)	Women with	Children with	AIDS
Country	**HIV/AIDS**	**rate %**	**HIV/AIDS**	**HIV/AIDS**	**deaths**	**Orphans**
Angola	190,000	2.1	110,000	17,000	11,000	50,000
Benin	64,000	1.2	37,000	5,400	3,300	29,000
Botswana	300,000	23.9	170,000	15,000	11,000	95,000
Burkina Faso	130,000	1.6	61,000	10,000	9,200	100,000
Burundi	110,000	2.0	53,000	15,000	11,000	120,000
Cameroon	540,000	5.1	300,000	45,000	39,000	300,000
Central African Republic	160,000	6.3	91,000	14,000	11,000	72,000
Chad	200,000	3.5	110,000	19,000	14,000	85,000
Comoros	<200	<0.1	<100	<100	<100	<100
Congo	120,000	3.5	43,000	6,600	6,400	69,000
Côte d'Ivoire	480,000	3.9	250,000	52,000	38,000	420,000
Dem. Republic of Congo	400,000-500,000	1.2-1.5	210,000-270,000	37,000-52,000	24,000-34,000	270,000-380,000
Djibouti	16,000	3.1	8,700	1,100	1,100	5,200
Equatorial Guinea	11,000	3.4	5,900	<1,000	<1,000	4,800
Eritrea	38,000	1.3	21,000	3,100	2,600	18,000
Ethiopia	980,000	2.1	530,000	92,000	67,000	650,000
Gabon	49,000	5.9	27,000	2,300	2,300	18,000
Gambia	8,200	0.9	4,500	<1,000	<1,000	2,700
Ghana	260,000	1.9	150,000	17,000	21,000	160,000
Guinea	87,000	1.6	48,000	6,300	4,500	25,000
Guinea-Bissau	16,000	1.8	8,700	1,500	1,100	6,200
Kenya	1,500,000-2,000,000	7.1-8.5	800,000-1,100,000	130,000-180,000	85,000-130,000	990,000-1,400,000
Lesotho	270,000	23.2	150,000	12,000	18,000	110,000
Liberia	35,000	1.7	19,000	3,100	2,300	15,000
Madagascar	14,000	0.1	3,400	<500	<1,000	3,400
Malawi	930,000	11.9	490,000	91,000	68,000	560,000

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089

Mali	100,000	1.5	56,000	9,400	5,800	44,000
Mauritania	14,000	0.8	3,900	<500	<1,000	3,000
Mauritius	13,000	1.7	3,800	<100	<1,000	<500
Mozambique	1,500,000	12.5	810,000	100,000	81,000	400,000
Namibia	200,000	15.3	110,000	14,000	5,100	66,000
Niger	60,000	0.8	17,000	3,200	4,000	25,000
Nigeria	2,600,000	3.1	1,400,000	220,000	170,000	1,200,000
Rwanda	150,000	2.8	78,000	19,000	7,800	220,000
Senegal	67,000	1.0	38,000	3,100	1,800	8,400
Sierra Leone	55,000	1.7	30,000	4,000	3,300	16,000
Somalia	24,000	0.5	6,700	<1,000	1,600	8,800
South Africa	5,700,000	18.1	3,200,000	280,000	350,000	1,400,000
Swaziland	190,000	26.1	100,000	15,000	10,000	56,000
Togo	130,000	3.3	69,000	10,000	9,100	68,000
Uganda	1,000,000	6.7	520,000	110,000	91,000	1,000,000
United Rep. of Tanzania	940,000	5.4	480,000	130,000	77,000	1,200,000
Zambia	1,100,000	15.2	560,000	95,000	56,000	600,000
Zimbabwe	1,300,000	15.3	680,000	120,000	140,000	1,000,000
Total	22,000,000	5.0	12,000,000	1,800,000	1,500,000	11,600,000

Source: UNAIDS/WHO 2008 Report on the Global AIDS Epidemic. New York, United Nations, 2008.

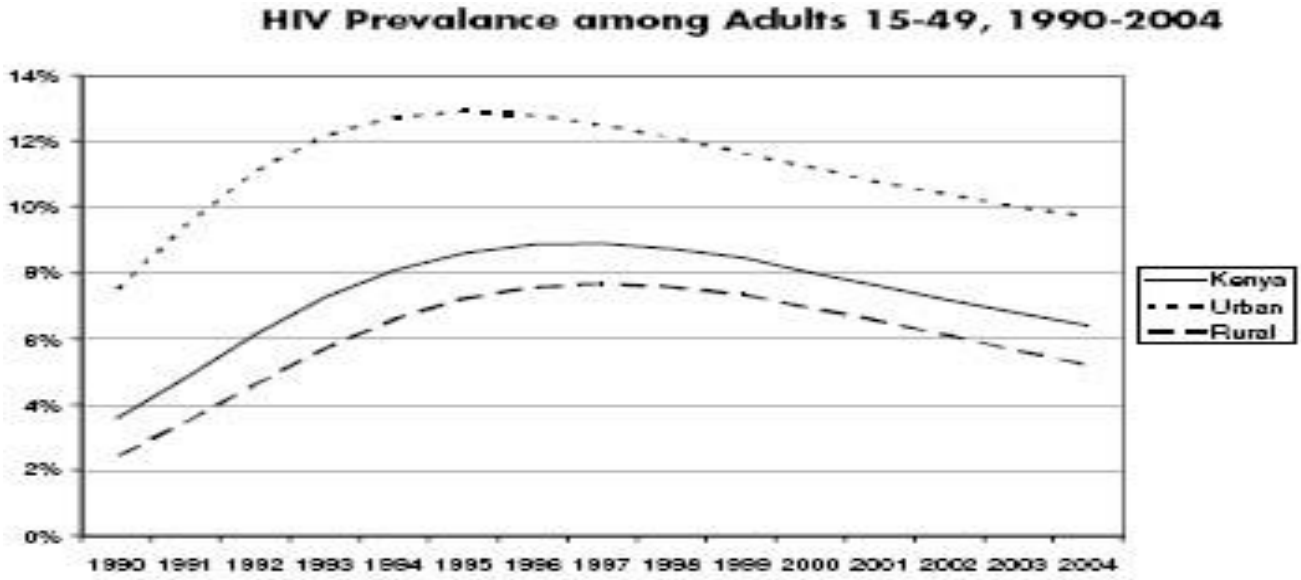

Figure 1. HIV prevalence percentages, Kenya, 1990 – 2004. Source: Kenya HIV/AIDS Data booklet, NACC, 2005.

Table 2. Pre-marital sexual activity in Kenya

Reasons	**Number of cases**	**%ages**

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089

Money (Economic)		4,635	44.8
Gifts (Economic)	989		9.6
Sexual experience	818		7.9
Leisure (Social satisfaction)		1,128	10.9
Love (socio-psycho-instinctual)		1,010	9.8
Socio-cultural motive	751		7.2
Do not know		1,009	9.8

The spread OF HIV/AIDS/TB IN Kenya

One of the main reasons for the severity of Africa's HIV/AIDS epidemic seems to be the large number of individuals carrying other sexually transmitted infections (STIs) and the inadequacy of STI services. In addition, increased sexual violence against women and girls, including rape, is fuelling the spread of HIV/AIDS among females in Kenya. A 2006 - 2007 study indicated that "one of every four young girls and young women lose their virginity through force" (National Correspondent, 2007). Government reports also note that 2,308 women were raped in 2003, 2,908 in 2004 and 2,867 in 2005, this figures representing only 30% of the actual number. Child prostitution has also assumed alarming proportions (Wairire, 2001). For raped women, anti-HIV treatment, as a "post-exposure prophylaxis," is available in only 73 district hospitals and in only one of the eight provincial hospitals (National Correspondent, 2007).

Overall, women and children suffer more from infections than other groups (Mcfarlane, 2000). Per capita income in Kenya is about $600 a year. High poverty and illiteracy levels contribute to the high burden of HIV/TB, forcing people to adopt unhealthy sexual behaviors. For centuries, the backbone of agriculture, Kenyan rural women have been hit hard, a situation that has been exacerbated by the structural adjustment programs (Kiluva-Ndunda, 2005). Revealing is a 2001 study, which solicited the reasons for young girls having sex with men. The economic motive topped the list (Table 2), 54.4%, declaring it as the most important reason for early sexual activity.

Relative to HIV/AIDS and TB, blood transfusion safety is a major challenge for Kenya. The Ministry of Health has reported that "The demand for blood has continued to outstrip the supply, leading to hospitals' reliance on family donations…The blood is also three times more likely to test positive for infectious agents than is blood sourced from voluntary donors" ("Reversing the Trends," 2006 - 2007). Noteworthy is the fact that a Phase I AIDS vaccine trial, IAVI V001, sponsored by The International AIDS Vaccine Initiative (IAVI), in collaboration with the Vaccine Research Center (VRC) at the National Institute of Allergies and Infectious Diseases (NIAID) in Washington, D.C., began enrolling volunteers in January 2006. The trial has also enlisted the collaboration of the Kenya AIDS Vaccine Initiative (KAVI) at the University of Nairobi. The trial staff promoted initiatives to recruit women volunteers, including holding community seminars within homes or offices targeting only women. This is one of many ongoing trials testing the safety and immunogenicity induced by a "prime-boost" vaccination regimen with a DNA plasmid vaccine and an adenovirus serotype 5

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089
(Ad5) vector that was developed at the VRC. The vaccine KAVI is specifically designed for Kenya because it is based on the most common type of HIV in the country
(Yaoko, 2007). The first results of the vaccine were expected in 2012. Unfortunately, the Microcides Development Program (MDP) trials, which began in September 2005 and recruited 9,385 participants mainly in Zambia, Uganda, Tanzania, South Africa and parts of Kenya, using placebo and a vaginal gel called PRO2000, was discontinued in 2009 due to its ineffectiveness and the fact that 46 - 50 of the Zambian participants became infected with HIV. This has become a major issue confronting the government authorities involved in the effort.

One important shortcoming of STI research in Africa is that it has, for obvious reasons, targeted the poor, especially women. As a result, the data remain skewed, allowing only inferences about the rate of HIV/AIDS/TB among members of the upper class, government officials and professionals. Death registries tend not to reveal HIV/AIDS/TB-related causes in this social stratum, which are often simply listed as “respiratory infections” or “long” illnesses.

On Kenya’s resource management, it is important to recall that health services and programs in Kenya are financed primarily by three main sources: (1) the government, both directly and indirectly through the National Council of Population and Development, Ministry of Water Development and Culture and Social Services; (2) external donors and (3) the private sector and nongovernmental organizations (NGOs). A 1999 Kenyan Human Development Report noted that the government was spending only about 60% on the minimum basic health services needed. Close to 50% of recurrent health care costs were financed by the government; 42% privately financed (through insurance and individually) and 6% by NGOs and institutions (Kimalu, 2007). Thus, more drugs and testing will require more resources (Omandi, 2007). Presently, 1.5 million pregnant women need testing to prevent vertical HIV transmission and will require 68,000 anti-retroviral therapy drugs (The Nation, 8/14/07). The government intended to make antiretroviral drugs available to all Kenyans at $3.00 or 325 Kenyan Shillings by December 1, 2007 but that target was never reached. In 2006 - 2007, 760,000 adult Kenyans were tested and, as a result, 110,000 or 35% received treatment, an increase from the 60,000 - 72,000 tested in 2005 or 24% of the HIV positive Kenyans. Among the 440 health facilities in the country designated for such, only 37% provide it.

To alleviate the plight of the poor, the government has abolished user fees at primary health-care facilities and has, as well, positioned all public sector laboratories under the jurisdiction of the National Public Services of the Ministry of Health. The elimination of a co-payment has provided some reprieve to Kenya’s poor, but basic drugs are not always available and even middle class families struggle to care for members (Lime, 2007). Kenya’s choice to respect patents has rendered some drugs highly expensive. An expert on Kenya writes: “The difference in cost may be based on whether the cost of observing patents is included or not. This is illustrated by comparing the costs of flucanizole (used to treat AIDSrelated meningitis) in Thailand (which does not observe patents, where the drug costs US $0.30 and Kenya (that observes patents) where it costs US $18” (Kimani, 2000).

The preceding findings suggest that a combination of environment, government policies and inefficient resource management, cultural resilience and historical legacies account for Kenya’s crisis. The issue of homosexuality, proven to be a conduit of HIV/TB transmission, and drug use, limited circumcision,

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089
"dry sex," prostitution and breastfeeding, as major contributors to the spread of HIV in Kenya, remain either controversial or unproven, as the following discussion will demonstrate.

DISCUSSION

History and cultural health practices in Kenya

Following independence in 1963, the Kenyan government reversed the colonial health care system that was catered primarily to the health needs of the colonial administrators and its staff, army recruits and labor migrant workers. Post-independence Kenya aimed at providing free care to all, increasing the health care budget, building more hospitals and other facilities, making essential drugs available at no cost and ensuring that primary health care would be a right of all Kenyans. As a result, during the 1990s, Kenya was heralded as having the best health care system in East Africa (Ofcansky, 2000). However, economic problems during the 1980s - 1990s and the impact of the World Bank and the International Monetary Fund (IMF) policies caused a reversal for the worse. In general, the IMF compels the loans recipients to curtail all "socialized" programs, including health, introduce co-payments for health care and privatize state or parastatal enterprises. In most countries, the brunt of the IMF conditionalities has fallen on the poor. As Ndage (2001) aptly put it: "Faced with daunting internal economic problems as well, the state was forced to renounce its early investment in the economy, health and education. This forced retreat coincided with the expan- sion of the AIDS pandemic."

A better understanding of the rapid spread of the HIV epidemic in Kenya seems to require a careful look at the impact of culture (Hardy, 2006). Resistance to the use of preventive devices, such as condoms and the continuation of cultural practices such as polygamy and breastfeeding cannot be stopped overnight. On condoms, men feel that intercourse while wearing one equates to eating wrapped candy. This is said by one nurse in Kenya: "Condoms do not work because men are drunk so they tear the condom to get skin to skin." Another nurse declares: "He (the male partner) tears it to prove that it is so weak, that they (condoms) do burst" (Booth, 2004). Among the Maasai, once circumcised at around 14 years old, a young warrior or moran is expected to have unprotected intercourse with as many girls as possible. Using a condom, a foreign "thing," as the elders make it known, is to waste semen and "to abuse culture, which is punishable in our community." Furthermore, in Kenya, some men still believe that sex with a virgin is medicinal (Booth, 2004).

Ironically, among African countries, Kenya has one of the highest numbers of people who are knowledgeable about contraceptive methods. Some 96% of women respondents report knowing at least one method of family planning. Of the currently married women, 97% say they know at least one modern method of contraception, and 94% are knowledgeable about where they could obtain family planning services. Beyond the impact of polygamy, as will be shown below and other cultural practices that have contributed to higher HIV incidence rates, casual sex with or without a condom is common in Kenya. A recent study showed that the rate of casual sex with a partner was about 84% among men and 25% among women and that, among those aged 15 - 24, 47% of the men used a condom and only 25 of the women did so.

In East Africa, including Kenya, unhealthy behaviors are reinforced by many women's preference for what is called "dry sex," which is designed to tighten the vagina during sexual intercourse and please the male partner. Indeed, women believe that, just as a monkey or a dog tends to urinate in the same spot, men will be so pleased with "dry sex" that they will want to return to the same woman. By applying

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089
agents such as Vicks, love drops, cold water, dettol (antiseptic), tiger balm, sugar and salt, toothpaste/colgate, women seem to successfully retain their vaginas dry. However, "dry sex" agents make condoms ineffective by punching holes and rendering a combination of ineffective condoms and sores acquired during intercourse, a favorable ecology for the spread of the virus (Civic and Wilson, 1996).

In Kenya, most mothers breastfeed and, as a result, do transmit HIV vertically, but the extent and length of breastfeeding are points of contention among clinical trial epidemiologists. Studies have shown that maternal fetal transmission is enhanced by the advanced state of HIV and its heavy viral load in the mother. Currently, Inter- national guidelines state that HIV infected mothers "should avoid all breastfeeding when replacement feeding is acceptable, feasible, affordable, sustainable and safe. Otherwise, HIV mothers are advised to breastfeed exclusively during the first months of life and to stop breastfeeding as soon as the conditions for replacement feeding are met" (Piowz et al., 2007). However, Piwoz's studies findings in Zvitambo, Zimbabwe, concluded that: "…exclusive breastfeeding for at least three months was associated with significantly lower postnatal transmission and higher HIV-free survival compared with partial breastfeeding."

Homosexuality in Africa is illegal, and is often labeled criminal, un-natural, un-African and sinful. President Robert Mugabe of Zimbabwe has called homosexuals "pigs" and "dogs." In Kenya, sex between men can land one in jail for 14 years, the reason why many remain closet homosexuals. A recent study has shown that, in Kenya, homosexuality is preferred by 18.4% of males in Kisumu, 18% in Malindi, and 4.0% in Mombasa. However, the extent of its association with HIV is unknown, and government health care has reached only 2% of the homosexuals in the country. UNAIDS notes that "injecting drug use, sex work and sex between men are illegal in Kenya, so it has been difficult to reliably assess the extent of these practices and their impact on the HIV epidemic" (www.unaids.org/. en/Regions_countries/countries/Kenya.asp).

Given its coastal location, the tourist attraction of its countryside and the country's high level of poverty, Kenya is known for its prostitution activities in Nairobi, Mombasa, Kisumu, Malindi, Eldoret and Nyeri carried out by women euphemistically known as "sex workers." Sex workers have been made famous by studies that have shown that some, notably in Nairobi, were HIV-resistant. The vaccine being tested now has attempted to test whether the anti-HIV resistant cells could assist in the development of a vaccine that elicits similar human biological responses. The unfortunate aspect of these HIV resistant sex workers is that, once they cease their profession, they lose immunity, which presents a moral dilemma to health professionals (Jaoko, 2007). The government's prevention program for the most at–risk population has reached only 17% of the sex workers. On young women's prostitution, UNICEF notes that many girls, 30,000 under the age of 19 years, have as many as five encounters with different men on the same day, but using only a condom 40% of the time. WHO/UNICEF on Kenya says: "…Some street children are involved in sniffing glue or solvents, and their level of sexual activity is high, bringing the risk of sexually transmitted diseases, including AIDS" (Human Rights Watch, 2007).

Circumcision and the spread of HIV have also become controversial issues. The three most cited clinical cohort trials conducted in South Africa, Uganda and Kenya, between 2002 and 2007, seem to indicate that circumcised men had a 60 - 70% infection reduction rate, higher than the 30% estimated rate for an HIV vaccine efficacy. Consequently, circumcising all African males in sub-Saharan Africa, the studies

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089
claim, would prevent 5.7 million new HIV cases and three million deaths over a 20-year period. The studies defenders also point out that the differences in HIV prevalence rates, only 5% in West Africa, where 90% of the males are circumcised in contrast to East Africa, where only 20% undergo the rite, with an accompanying HIV prevalence rate of 30% are due to the number of circumcisions. In the Kenya study, the alleged reduced prevalence of HIV in circumcised men was 53%. The same researchers noted that, among Kenya's 48 ethnic groups, the highest rate of HIV/AIDS is found among the Luo of the Nyanza and Western Provinces, who constitute only 12.38% of the population but account for 29.2% of the cases, compared to the Kikuyu of Central Kenya (20% of the population) and the Luhya of Western Kenya (14.8% of the population), who show a prevalence rate of 9.2 and 9.1, respectively. Researchers claim that the high rate among the Luo is due to the virtually non-existent practice of circumcision. Dr. Stephen Mosses says: "Ethnic groups where adult HIV levels were below 1% in sub-Saharan Africa, 97% of the males were circumcised, and where the levels were above 10%, only 6% of males are circumcised" (Circumcision Info, 2010).

Generally, in Africa, 70% of the males are routinely circumcised either at birth or during the rites-of-passage at the onset of puberty. Some epidemiologists claim that, cutting the penis foreskin, said to be rich in white blood cells, which are "favorite" targets of HIV, would reduce HIV portals. Thus, 1,500 Zambian men and 2,700 male Kenyans (in Kisumu) have so far volunteered to be circumcised. Currently, the Kenyan government is on record as repudiating the researchers' claims. Given that circumcised Americans have been in the forefront of the studies and herald the results as scientifically indisputable, the Cochrane Collaboration, an international "independent source…of health care information," has noted that "circumcision practices are largely culturally determined" (Siegfried et al., 2003).

Other contrary arguments include the fact that, even though most American males are circumcised, the US has the highest HIV rate among the developed countries, and that those who do not practice circumcision have lower rates. This has compelled national medical organizations not to recommend mass circumcisions on the continent, which can cost as much as $200 per operation. Cultural practices, such as hygiene and cleanliness, as is the case in Muslim Africa, may be attributed to the studies results and not to circumcisions (Nicoll, 1997). To the critics, circumcision causes severe pain unnecessarily and gives a false sense of security. They point out that, if circumcision wounds are not completely cured, they can contribute to further HIV infections should the circumcised male engage in sexual activity with an HIV positive partner. In their 1994 study of circumcision, Dr. Isabelle Vencenzi and Dr. Thiery Mertins noted: The association between HIV and circumcision is weakened when factors such as contact with commercial sex workers, ethnic origin and birth place are adjusted for. Such inconsistent findings suggest that researchers cannot, at this stage, recommend male circumcision as a policy in controlling HIV infection (http://www. circumcisioninfo.com/nation_kenya.htm, 1994).

The issue of polygamy has been controversial among scholars and Africans. All Kenyan ethnic groups allow polygamy, affecting 23% of the households. The practice is higher among the 3.0 million Luo of the Lake Tanganyka area, where the rate is about 30% of the households and bigamy being the most prevalent practice. The Luo have the highest rate of polygamy and live along one of the busiest "STIs highways", the Lake area, where there is a constant movement of soldiers and war refugees (Uganda, Rwanda and Democratic Republic of Congo) and the various commercial and fishing opportunities the

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089
region has offered for centuries. These risk factors, rather than circumcision, may account for the high AIDS prevalence rate among them. Speaking on the factors contributing to the early spread of HIV in the EastCentral African Great Lake area (Tanganyika, Victoria, Kivu), where the Luo live, Laurie Garrett wrote about her experience in the area: "…a social pattern emerged from those willing to discuss their lives before AIDS struck: Most of the men were former combatants in the UgandaTanzania war and/or traveling salesmen and smugglers who regularly crossed the region's borders to trade with counterparts in the neighboring countries; most of the women had worked at some recent time as 'disco girls,' barmaids, or prostitutes and several, like Noticia, had traveled outside the Kagera District to ply their trades" (Garrett, 1994).

Few credible arguments link female circumcision or infibulation (pharaonic or otherwise) to increased HIV transmission, since areas with heavy female circumcision, as Northern Kenya, tend to be least infected. The presence of lesions in the vagina may enhance male-tofemale transmission but not vice-versa (Hardy, 2006). However, practices such as scarification, group circumcision, genital tattooing and blood brotherhood (as among the Maasai), where razors and knives are shared, represent risks factors. To explain the high rates of HIV/AIDS rates in Africa, some researchers, including Hardy, claim that Africans are "sexually promiscuous." What is promiscuity? How does one characterize the fact that, in the US, 63% of the Democrats and 51 of the Republicans find no problem with sex outside marriage (Parker, 2006)? Is marrying many wives "promiscuous" in a society that permits it? Are Americans, whose rate of divorce is 60%, less "promiscuous" than Kenyans?

Interestingly, Africa, including Kenya, was once said to be free of drugs. Today, not only has Africa become a drug traffickers' route, but also more and more Africans, whose rate of consumption is unclear, use drugs.

Kenya's geographic location makes it a major portal of drug trafficking. Various focus group interviews involving over 2,300 respondents in 1994 showed that many Kenyans were involved in intravenous use of some of the most potent drugs, which has probably contributed to the HIV incidence rate in the country, the most common drugs being bhang, alcohol, glue, petrol, miraa, cigarettes, mandrax, heroin and cocaine.

Disparities and inequities with deep cultural and ethnic roots may better explain most of what is going on in Africa and specifically Kenya today. Recent studies and our analysis have shown that, while, in the developed countries, the epidemic remains largely among the poor, in the developing countries, the "male political leaders, teachers, and government bureaucrats are contracting the disease and dying at very high rates," with the "largest single group comprising civil servants" (Kunitz, 2007).

Kenya's weak drug procurement and supply management systems, poor laboratory infrastructure and severe human resource shortages have been identified as major constraints. Kenya is one of the 15 countries included in former U.S. President George Bush's Emergency Plan for Aids Relief. Under the US Emergency Plan, Kenya received $92.5 million in fiscal year 2004, more than $142.9 million in 2005, $208.3 in 2006, $368.1 million in
2007 and $534.4 million in 2008 to cover "comprehensive
HIV/AIDS, treatment and 'core' programs."

Finally, it is important to note that the spread of HIV/AIDS/TB must also be seen in the context of international contexts. As expressed by Booth (2004), "A global ethnography of the HIV/AIDS then has

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089

to focus on how the crisis has been fueled by transnational migration, international tourism and the production and export of military technology, war and refugees". As Barnett and Whiteside note, "Globalization is an ideology that suggests distribution through the market is the best way. The challenge is to find arrangements whereby the production and distribution of international public goods such as primary health care and public health provision may be managed within a multilateral system" (Barnett and Whiteside, 2002).

CONCLUSION AND PUBLIC POLICY IMPLICATIONS

If Kenya wishes to stem the advance of HIV/AIDS/TB, it must continue to muster all its human and economic resources, including people's access to traditional "medical" practice, which permeates its villages and communities (Azevedo et al., 1991). However, charlatans also do exist, and some traditional healers claim that they can cure any disease (Ndage, 2001). As one expert put it, "The ideal climate for reform of the health sector is one in which there is a strategic alliance among key stakeholders: The civil society, the government, the private sector, health professionals and other partners, including traditional healers" (Lucas, 2007).

Emphasis on gender-specific programs has been Kenya's pattern in the past. This approach has raised questions among behavioral health professionals. As some experts point out, "where men appear, they do so as in deviant sexual guise, as promiscuous truckers, soldiers and sugar daddies, in much the same way that sex workers predominate in accounts of women and HIV" (Baylies and Bujra, 2000). Recently, as the Chief Public

Health Officer in the Kenyan Ministry of Health (Okisa, 07) noted, health professionals and the government have acknowledged the ineffectiveness of HIV/AIDS programs that target women or men separately.

Coordination at the community and district levels is now viewed by the Kenyan government as prerequisites for health care improvement. An all-out media campaign in communities, schools, workplaces, churches and theater halls, and through entertainment activities, including plays, movies and videos, needs to be accelerated throughout the country, to induce behavioral changes and render effectively the social marketing of condoms, while promoting abstinence and delayed sexual activity, providing counseling and testing, enacting preventive measures against mother-to-child HIV-transmission and lessening the social stigma associated with AIDS. As one travels through Kenya, one notices some billboard signs targeting the youth, reminding them that: "Sex Can Wait, But My Future Can Not," "Abstinence is the Best Way to Prevent HIV/AIDS, STIs and Unwanted Pregnancies," "Sex? Not Now, Tume Chill," and "Ni Poa Ku Chill." The good news (coming out of the CDC 2009 study) is that 50% of the population seems to use condoms.

Impeding progress is Kenya's long-term dependence on foreign assistance. As Laurie Garrett puts it: "…Donor fatigue will set in within five to 10 years if the wealthy world feels that all this money has failed to slow HIV, failed to stop the spread of (extremely drug-resistant tuberculosis), failed to close any of the life expectancy gaps in the world…" (The Nation's Health, 2007). Preventing transmission in health care settings, ensuring blood safety and reducing vulnerability, are also major challenges. Some 43 out of 50 employees (or 86%) of the Kenya Revenue authorities who died in 1998 were victims of AIDS (Barnet and Whiteside, 2002).

Vol. 12 No. 3 | Imp. Factor: 7.4919
DOI: https//doi.org/10.5281/zenodo.14179089

As the World Bank declares, "The most immediate threat to Kenya's anti-AIDS efforts may be the country's endemic corruption." President Kibaki created an anticorruption "Czar." However, a move to investigate and prosecute corrupt senior government officials forced the Czar to resign and flee the country in 2005, after the indictment of NACC Director Margaret Cachara in August 2004 for "enriching herself with HIV funds." As a result, in February 2006, the World Bank decided to withhold a $24 million-loan to Kenya. Angrily, the government raided the offices of the Standard Group media for reporting the "graft scandals." Important is the fact that, without comprehensive surveillance, countries cannot appropriately estimate the burden of HIV/AIDS/TB. Kenya still struggles to collect the most basic data. Finally, while globalization may contribute to the elimination of political and economic barriers, Kenyans must watch its other face, the further spread of "alien" cultural practices that may contribute to the spread of HIV/AIDS. As one expert puts it, "AIDS is a product of contemporary globalization because it erupted simultaneously with, and was exacerbated by the economic crisis that engulfed many poor countries" (Kunitz, 2007).

Finally, the reality seems to suggest that the usual theories based on lower income, illiteracy and overall poverty do not adequately explain the rise in HIV prevalence in Kenya since political leaders, teachers and government bureaucrats are contracting the disease and dying at very high rates. Our study findings call for more focused research by scholars on deep-seated cultural beliefs and practices and the government's strategic rethinking of resource allocation and effective management to better control the spread of HIV and tuberculosis.

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