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# Governance and HIV Prevalence in African Countries

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**ABSTRACT**

Lod C. Hambanou
Governance and HIV Prevalence in African Countries
( Under the direction of Michael P. Eriksen, Sc. D.)

Previous studies based on data from the World Bank have shown a negative association between governance and HIV prevalence. Using the Index of African Governance, this study investigates the correlation between governance and HIV prevalence in all African countries (N = 53) in order to determine which dimension of governance is more predictive of this relationship. No statistically significant association was found between governance and HIV prevalence across the whole spectrum of countries. In the multivariate analysis, the most predictive dimension of governance, "Rule of Law, Transparency and Corruption" was found to be positively associated with HIV prevalence across all African countries ($p < .001$), Beta =.816 .When grouped by clusters, only two regions (North and West Africa) out of five showed negative significant associations between governance and HIV prevalence. The analysis of socio cultural and geographical factors revealed significant associations with HIV prevalence; religion and HIV prevalence ( $p < .003$), region, and HIV prevalence ( $p < .001$). French colonial heritage was found to be negatively associated with HIV prevalence. This study suggests that geographical location and religion predict HIV prevalence rather than governance. International organizations and public health program managers should consider these findings in the implementation of large multi-country and regional HIV programs in Africa.

KEYWORDS: African, governance, HIV prevalence, region, religion, colonial heritage, Christian, Muslim.

**GOVERNANCE AND HIV PREVALENCE IN AFRICAN COUNTRIES**

By

Lod C. HAMBANOU

BA, MA, Université Marien Ngouabi , Congo Brazzaville

A Thesis Submitted to the Graduate Faculty
Of Georgia State University in Partial Fulfillment
Of the
Requirements for the Degree

MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA
2010

GOVERNANCE AND HIV PREVALENCE IN AFRICAN COUNTRIES

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- Counseled the Executive Coordinator.
- Coordinated and monitored main projects in process.
- Elaborated new strategies on peer education, life skills and sexually transmitted diseases.
- Designed the budget for the program funding and implementation of activities.
- Wrote financial and data analysis reports.

Dec. 2001–Oct.2004 **UNDP-PRESIEC** **Brazzaville**

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- Trained teachers and student peer educators on HIV/AIDS/STDs and violence prevention in schools.
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**ACKNOWLEDGEMENTS**

I hereby express my thanks to my Thesis Chair, Dr Michael P. Eriksen , for his guidance, feedback and insight in the progress of this thesis. His support and trust in me made me come through this project. My thanks also go to Dr Ike Okosun for his guidance and reviews on the statistical analyses. With respect and devotion, I thank papa Simon Kimbangu for his vision, and influence on me. I am indebted to my family for supporting and assisting me throughout this project in various ways. I owe a debt of gratitude to my friend Julie Jabaley for her relentless support, assistance and encouragement. Last but not least, I thank my fellow Fulbright scholars and colleagues at the Institute of Public Health for everything we shared together.

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# CHAPTER I

# INTRODUCTION

## 1.1 Background

It has been three decades now since the first cases of HIV/AIDS were diagnosed in the United States [1].In the early years following its discovery in the 1980's, HIV/AIDS raised great epidemiological, and socio-political concerns as the ep1idemic broke out in other regions of the world.[2]Through out these decades, a great number of countries, especially those in the Western world, have made significant efforts to prevent and control HIV/AIDS within reasonable levels of prevalence [1,3].Yet, in developing countries, especially in Africa, the HIV/AIDS epidemic has gradually exploded and become a threat to economic and socio-political development, security, and stability. Of the 33.4 million people living with HIV/AIDS in the world, 22.4 million live in Sub-Saharan African countries, accounting for more than 67% of the total percentage [3,4]. Though the number of new infections has moderately decreased by 25% and the prevalence in adults (15-49) has slightly declined from 5.8 % to 5.2 % since the end of last decade, the impact of HIV/AIDS is deeply entrenched in societal structures. The HIV pandemic in African countries has damaged the demographic structure by affecting mainly young adults who represent an enormous and precious labor force [4].Consequently, in many countries such as Zimbabwe life expectancy has declined by more than 25 years. In Botswana, Lesotho, Malawi, Mozambique, Rwanda, and Zambia life expectancies have fallen bellow 40 years due to HIV/AIDS [4]. These dramatic losses illustrate how HIV/AIDS destroys human capital, and accumulated life expectancies. Economically, consequences are huge and ruin the quality of life of future generations. According to the Commission on HIV/AIDS and Governance in Africa, the menace of HIV/AIDS to the labor force weakens countries' tax base and jeopardizes their

resources and capabilities to finance public expenditures related to human development over time [4]. Politically, there is evidence that HIV/AIDS pandemic has become a security threat in many African countries [5].According to policy-makers, armed forces would be destabilized because of massive troop deaths attributable to HIV/AIDS [6].Numerous studies estimate the prevalence of HIV within African militaries as high as 90%, sparking worries about security and instability [6].

In attempt to provide a response to HIV/AIDS, many countries in Africa, supported by international organizations have focused on strategies aimed at changing personal behaviors

[4,7]. Despite considerable allocation of resources and efforts through funding and capacity building to prevent HIV, the epidemiological situation of AIDS in Africa has not changed positively overall [8]. As the same strategies and approaches used in western countries do not produce significant and efficient results in Africa, many researchers have begun to examine other dimensions of social life beyond the individual realm to determine the root causes of HIV infection in the African context [9]. A strong body of literature has pointed to poverty, wars, lack of justice, gender inequality, and income as risk factors for HIV/AIDS without a conceptual framework or paradigm that links each risk factor to one another in a thorough and comprehensive manner [11]. Toward the end of last century, the emergence of a new health discourse based of the social determinants of health brought to light certain unrevealed underlying factors that determine populations' health [12]. There is now evidence that the social determinants of health - that is, the conditions in which people are born, live, work and age - shape their health status. In other words, political, social, and economic forces drive and determine people's health [13]. Few studies have scrutinized this relationship between social determinants and HIV/AIDS. Based on the dimensions of governance as defined by the World

Bank, Menon-Johnsson has shown an association between good governance and HIV/AIDS [14]. Another project of the World Health Organization [15] has highlighted to some extent the relationship between Governance and HIV/AIDS. These studies have laid the groundwork for better understanding the impact of governance on HIV in Africa, but remain insufficient to fully explicate the phenomenon, particularly with respect to all dimensions of governance.

**1.2 Purpose of the study**

The purpose of this study is to investigate how the social determinants of health or societal structures affect the spread of HIV/AIDS. Specially, this study aims to build on the evidence and data provided by the Index of African Governance to better understand and evaluate the association between governance and the prevalence of HIV/AIDS in 53 African countries. The impact of governance on HIV prevalence will be assessed globally and individually through each of its dimensions: safety and security, rule of law, transparence, and corruption, participation and human rights, sustainable economic opportunity and human development

**1.3 Research questions**

This study is built upon the following questions:

1-Using the Index of African Governance, is there an association between governance and the prevalence of HIV/AIDS in African countries?

2- Which dimension of governance is more predictive of prevalence of HIV/AIDS?

3-Are religion, regional location, and colonial heritage associated with HIV prevalence?

# CHAPTER II

# LITERATURE REVIEW

## 2.1Governance

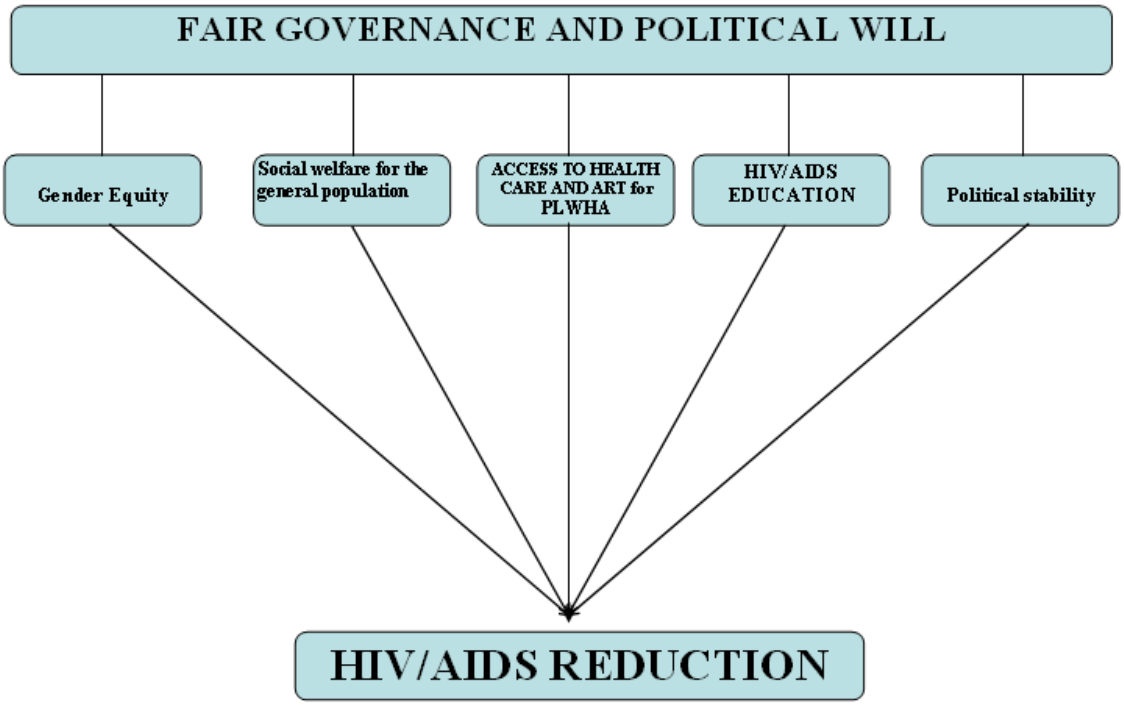
There are various definitions of governance that differ according to context and field of interest [16]. The United Nations Development Programme (UNDP) has defined governance as ``the exercise of political, economic and, administrative authority in the management of a country's affairs at all levels. It comprises complex mechanisms, processes and institutions, through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences''[17].The Canadian International Development Agency (CIDA), conceptualized governance as`` the manner in which power is exercised by governments in the management of a country's social and economic resources''[ 9,18].On the other hand, the World Bank defines governance as`` the manner in which public officials and institutions acquire and exercise the authority to shape public policy and provide public goods and services'' [19].

Despite the different definitions, all seem to agree on the outcomes of governance as a political or public good [9].This conception is also shared by the Kennedy School of Government at Harvard University[20].Governance can include various dimensions[17].The World Bank has divided governance in six major dimensions, Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law and the Control of Corruption[17].In designing the Index of African Governance, the Kennedy School of Government and the World Peace Foundation have divided governance into five main dimensions: Safety and

Security, Rule of Law, Transparency, and Corruption, Participation and Human Rights, Sustainable Economic Opportunity and Human Development[20].

Delimited as such, governance affects social structures under the realm of public authority. There is evidence that governance is closely related to the quality of health. A extensive literature has pointed to social structures as root causes of diseases [21].The World Health Organization report on Social Determinants of Health has demonstrated the relationship between health inequities and bad governance [13].Navarro showed that populations' health around the world is affected by the exploitation of the poor by their governing bodies and dominant economic classes [22]. Rasanathan and Hambanou argued that the correlation between staggering economy and poor population health outcomes is a result of ineffective governance and mismanagement of political authority [15]. Menon-Johansson has pinpointed the relationship between governance and the prevalence of HIV/AIDS. Using data from various sources including the World Bank, he demonstrated that poorly governed countries are more affected by HIV/AIDS than well-governed countries [14]. In this study, he also showed that there is a correlation between each governance dimension and HIV prevalence. However, it is noteworthy to highlight some limitations of this study.1) Data on governance did not come from a unique source and the same year, 2) Eleven African countries were excluded from the study, 3) Different of types of countries (developed and non- developed) were compared, 4) the study did not control for several extraneous variables. The present study seeks to address the aforementioned limitations and propose a better model explaining the implications of governance in Africa.

Figure 2.1: Relationship between Governance and HIV/AIDS, from Hambanou and Kumanan Social Determinants of Health and HIV/AIDS,WHO, 2009[15].




**2.2 Safety and security**

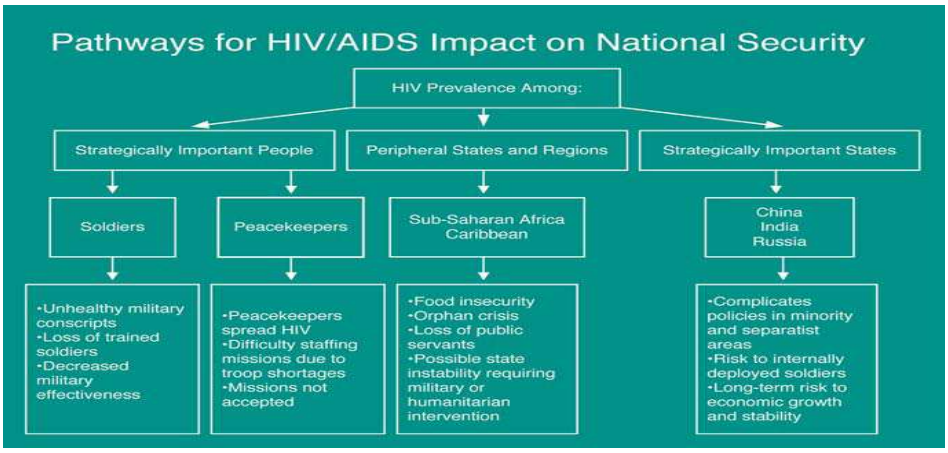
National security is regarded as the 'protection of state's territory, population, and interests against external threats'' [23].In this study aspects of HIV/AIDS will be reviewed as they affect states and impede the military, political and economic stability to respond to basic sustainable functions of a nation.

Indeed, there are diverse opinions in literature as to how Safety and Security influence or contribute to the spread of HIV/AIDS [24].Waal suggested that conventional indicators to measure the relationship between HIV/AIDS and conflict fail to capture this association [24].On the other hand, the literature reflects a belief that high HIV rates among soldiers are often been overstated [24]. Still, many studies have managed to highlight the relationship between security

and HIV/AIDS [5], including a report published by the U.S. National Intelligence Council (NIC) in January 2000 [24].

Two executive directors of large HIV/AIDS international programs, Richard Feachem of Global Funds to Fight AIDS, Tuberculosis and Malaria and Peter Piot of the Joint United Nations Programme on HIV/AIDS(UNAIDS), also considered the HIV/AIDS pandemic to be an 'extraordinary national security threat'[ 25]. Feldbaum et al. have conceptualized the global pathway for HIV/AIDS impact on national security as shown in Figure 1.2 [25].

Figure 2. 2: Pathway through which HIV/AIDS has an impact on national security [25].




They developed three arguments: 1) key individuals such as soldiers and peace keepers responsible for maintaining national and international security are more vulnerable; 2) the impact of HIV/AIDS on sub-Saharan African would jeopardize their security and lead to failure; 3) In three main countries of strategic importance, China, India and Russia, the HIV pandemic has potentially damaging effects on security [25]. As far as Africa is concerned, there is growing evidence that HIV/AIDS is having a serious impact on armed forces, police, and peacekeepers from many countries around the world, and this threatens political and social stability [24, 26 ].

Rates of HIV/AIDS and other infectious diseases are estimated to be two to five times higher among armed and police forces than in civilian populations [24,25]. According to Felbaum et al., HIV/AIDS is the primary cause of death in military and police forces [25].Many studies have documented the vulnerability of soldiers as key vectors of HIV because of their mobility and deployment in various conflict areas for peacekeeping duties or missions [25]. The rate of HIV/AIDS among military is a function of time spent on deployment in conflict regions and may be 50 times higher than in peacetime [27].

Table 2. 1: Estimated HIV/AIDS infection by country. Prevalence within national armed forces, and percentage gross domestic product (GDP) for Southern Africa [27].

| *Country* | *Size of population -2001* | *HIV/AIDS (%) -1999* | *Size of forces -2001* | *HIV prevalence armed forces (%) for year indicated* | *Defence budget as (%) of GDP* |
|---|---|---|---|---|---|
| Angola | 10 860 000 | 2.78 | 113 000 | 50 (1999) | 16.5 |
| Botswana | 1 450 000 | 35.8 | 7 800 | 33 (1999) | 5.2 |
| DRC | 50 340 000 | 6.43 | 31 100 | 50 (1999) | 7.8 |
| Lesotho | 20 090 000 | 23.57 | 2 050 | 40 (1999) | 4.2 |
| Malawi | 9 840 000 | 15.96 | 10 800 | 50 (1999) | 1.8 |
| Mozambique | 16 700 000 | 13.22 | 6 100 | Not available | 4.1 |
| Namibia | 1 880 000 | 19.54 | 8 100 | 16 (1996) | 4.4 |
| South Africa | 42 830 000 | 19.94 | 90 500 | 15-20 (2000) | 1.3 |
| Swaziland | 970 000 | 25.25 | 3 000 | 48 (1997) | 2.5 |
| Zambia | 10 240 000 | 19.95 | 21 500 | 60 (1998) | 2.5 |
| Zimbabwe | 12 290 000 | 25.06 | 36 000 | 55 (1999) | 6.1 |
| Sources: UNAIDS and WHO, 1999, Du Plessis, 2001,32 South African Defence Intelligence Assessment. | | | | | |

In the battle fields or conflict areas, many soldiers indulge in uncontrolled sexual activities and rapes [27]. Moreover, during wars some rebel armies and military forces use mass rape as a weapon. Consequently, the interaction of soldiers or peacekeeping forces and the host population is generally a major risk factor for HIV[26].During conflicts in Africa, many women use sex as a survival strategy, trading sexual intercourses for cash.[26, 28].A study by Smallman-Raynor and Cliff documented the correlation between army location and the spread of HIV/AIDS among neighboring populations [29].Soldiers coming from war zones or conflicts often have high rates of HIV prevalence [29].Numerous study have pointed out internal and

external population migrations due to wars, denoting lack of safety and unstable national security as major factors for the spread of HIV virus [29,30].The collapse of education and employment opportunities due to national unstable safety and security has been flagged as reverse contributing factors [31].

Large rates of HIV infection and deaths attributable to AIDS among military forces ruin the moral and psychology of their members, decreasing army efficiency[25, 29].Some studies have argued that HIV infected soldiers are unable to perform their duties because of AIDS. As a result, the loss of experienced, skilled, and highly trained soldiers has a negative impact on the army and creates a shortage of healthy individuals available to serve [25]. This vulnerability decreases nations' potential to respond to eventual attacks.

In a speech to the United Nation Security Council, former Secretary General Kofi Annan suggested that, given the spectrum of its impact on all societal layers in the African continent, HIV/AIDS is a major threat to political stability [32]. Because of this, HIV/AIDS is considered to be a major challenge in the implementation of peacekeeping operations in south Saharan Africa [32].However, the recent study by Waal [24] herewith mentioned concludes that there is no association between AIDS, security and conflict. The context and variables used to come to this conclusion remain questionable.

### 2.3 Rule of law, transparency and corruption.

#### 2.3.1 Rule of law

The Harvard Kennedy School defines "rule of law" as "any codified, transparent method of adjudicating personal disputes, formal and informal contractual obligations, and disputes between citizens and the nation-state, without resort to violence"[ 20].The rule of law as defined plays an important part in strengthening governance [33].The issue of rule of law

has caught the attention of many international development institutions in recent years [ 34].The World Bank's Comprehensive Development Framework (CDF) highlights the rule of law as a critical social, structural, and human dimension for development and poverty reduction[ 34]. A great number of authors have shown that absence and lack of respect for the rule of law leads to degradation of political institutions and their outcomes [35].Sachiko et al. have argued that without compliance, Rule of law has no efficiency. In this regards, they consider Rule of law as the corner stone in its relationship with good governance and sustainable development [34]. Consequently, Rule of law is the foundation of social justice and sustainable development [34, 36].Levine on the other hand has argued that legal and regulatory environment determines financial intermediary development. He has shown that systems of law inherited through occupation and colonization vary by origin: English, French, German, or Scandinavian [35].There is a recognition that a lack of respect for Rule of law led to institutional and developmental failure in many countries of the world, especially in Sub-Saharan African countries [33, 34].

**2.3.2 Corruption**

Corruption is a universal and well known phenomenon .It exists both in centralized planned and democratic governments. In rich as in poor countries as well [36]. "Corruption is defined as the misused of public power for private benefit" [37].Acts of corruption have been categorized by Tanzi in different components as follows[36];

- bureaucratic or political
- cost reducing or benefit enhancing
- bribery initiated or bribe initiated
- coercive or collusive

- centralized or decentralized
- predictable or arbitrary, and
- involving cash or not.

In developing countries, the monopoly power linked to regulations and authorizations such as licenses gives government officials opportunities to extract bribes from regular users [36].Tax and customs administrations have been reported to be more likely to suffer from corruption [36]. Also, corruption affects public expenditure through investment projects, procurement spending, and extra budgetary accounts [36] Corruption can also affect the mechanisms through which political parties are financed[38].Many economists have argued that the degree of corruption is a function of level of salary: the lower the level of salary, the higher the degree of corruption[ 36 ]. Akcay suggested that corruption is a consequence of institutional weakness resulting in inefficient economic, social, and political outcomes that hinder government performance at all levels [37].

In African countries, particularly in Sub-Saharan Africa, corruption seems is a major problem of governance [1]. In her study , Pisani, for instance mentioned that there were more than 50,000 cases of fraud pending trial in South Africa, and US $ 875 million deficit for misappropriation in Kenya [1].As corruption deeply affects human development, the relationship between HIV/AIDS and corruption has been established and is widely recognized[37].Based on existing literature, corruption is pervasive in all sub component fields of HIV/AIDS from global funding mechanisms to local implementation of prevention activities[39].

Tayler Liz and Dickinson have stated that corruption ruins efforts of HIV prevention and treatment towards HIV positive individuals around the world [40].In Nigeria, Malawi and Kenya cases of abuse involving monetary favors in the distribution and provision of Anti Retro

Virals initially provided for free by internal donor- funded programs to people living with HIV/AIDS have been reported [39].In Uganda, more than $ 1.6 million from Global Fund grants was pilfered in 2008[39]. Udoh et al., and Johnson showed that corruption in the Delda of Niger, in Nigeria has exacerbated the prevalence of HIV, and Mozambique has become the epicenter of AIDS epidemic due to corruption[41,42].Transparency International classifies all African countries under 6.00 in its 2009 corruption perception index.

**2.3.3 Transparency**

Lack of transparency is a serious problem in many countries around the world [43,44].Many authors have shown how transparency affect fiscal, budget performance, and public expenditures [ 45]. Benito and Batista have investigated the correlation between budget transparency, fiscal achievement, and political turn out. The results of their study suggest a positive association between political turn out and transparency [45].

Transparency can also affect mid size and small businesses. According to the Center for Political Accountability, opacity, lack of transparency, and accountability can negatively distorts shareholder value [44].Millar et al. argued that transparency determines the success of corporate governance in the economy of markets and may differ from one country to another according to the financial markets. In developing markets, institutional transparency relies solely on governments' will [43].

Overall, Stasavage concludes that monetary transparency positively contributes to more economic desirable outcomes [46].Consequently, market transparency is thought to be critical to reducing information asymmetry between the market participants. Transparency is the best indicated tool for public investor to monitor enterprises and back the capital market development [ 44].

As for public health, Sridhar and Batniji have noted opacity in the way health resources flows are distributed among donors and recipients. They argued that lack of transparent information leads to inaccurate evaluation of activities. Examining many sources of funding, they noted an absence of credible data reflecting commitment to transparency and accountability [47].Chadlen has pointed out the lack of transparency in the market of ARV drugs involving intellectual property, political interest and pharmaceutical companies[48,49]. Poku on the other hand pin pointed pharmaceutical companies' malpractice evidenced by the differential in pricing of the same Highly Active Anti Retroviral Therapy (HAART) product in various countries attributed to the lack of transparency [10] .

**2.4 Participation , and Human Rights.**

Participation as defined by the Kennedy School of Government at Harvard University and the World Peace Foundation, refers to ''participation in free and fair election'' with basic standards of respect for basic human rights and commitment to all social stakeholders [20]. Indeed, Participation and Human rights intertwine and involve a great spectrum of social dimensions. It is noteworthy that participation in election is per se a human right [46].Therefore, Human Rights have been be grouped in two categories, civil and political rights, and economic and social rights[50]They are essential for real democracy. De Mequista et al. argued that political participation is the most important dimension of democracy in preserving human rights integrity [ 51]. However, there has been controversy between proponents of Liberal democracy and Socialists and Marxists about the priority over the individual rights and the economic equality and emancipation of the working classes [52].Wagle maintains that electoral participation is guaranteed by civic engagement [53] while, Niemeyer has postulated that in weak civil society, human rights are subject to violations. He further suggested that political

agreement and ratification of international human rights treaties do not necessarily guarantee the protection of individual rights. [54]. Policies based on promoting human rights prevent abuses from a various array of socio economic and political layers including the right to freedom of expression, assembly and association, the right to information, and political and economic rights [51].Still, some researchers have argued that the western perspective of Human Rights should not be applied to African realities.

Addressing this issue, Mojekwu , cited by Hollenbach maintained that Communalism and Communal rights are more important to understanding African realities; they frame African culture, politics and society [52]. Likewise, Howard and Donnelly contend that the notion of Human Rights varies across societies, and is more linked to liberalism as a political regime. They maintained that human rights are incompatible to communitarian regimes whose conception is centered on human dignity [55].However, Franco et al. have shown a relationship between respect of human rights and health. They suggested that people living in less oppressed countries have better health outcomes [56].A great number of studies have highlighted a relationship between human rights, and HIV/AIDS[57].Discrimination for instance affects and worsens the plight of people living with HIV[58].Yet, there is evidence that a number of non democratized countries where human rights are abused have low prevalence of HIV/AIDS[20].This evidence sparks the need to look for other underlying factors to explain that reality.

**2.5 Sustainable Economic Opportunity.**

Sustainable Economic Opportunity is a set of mechanisms and regulatory frameworks that can ease economic and entrepreneurial activities that help encourage the individual and national wealth [20].Many economists have theorized on economic development, and this question has been addressed differently. It has long been shown that countries with sound

economic freedom, infrastructures, and regulations have stronger economic growth [59]. Schulbeck has noted that justice is the pillar of economic freedom that binds stakeholder in a society [61].Therefore, countries turned to implementing reforms in the form of market justice are likely to benefit from economic prosperity. Vega Gordillo et al. supported that freedom is the main trigger of economic opportunity [62]. Prokovichevic has maintained that creating a business environment with liberal markets results in economic opportunities compared to other alternatives [63]. Depken has identified an asymmetric benefit in economic opportunities at international level, suggesting that developed countries yield more profit than developing counties [64].Using the meta analysis approach, Weichselmaumer and Winter-Ebmer showed that competition and equal opportunity guaranteed by laws reduce the wage gender gap [64] Economic opportunities have also been recognized to boost governmental credentials, bringing civil society and the private sector together [65]. A number of studies, however, have also stressed the importance of economic opportunities as they relate to health outcomes. In many African countries, the lack of economic opportunity has resulted in "brain drain" [66] and has been associated with low educational outcomes [67].

**2.6 Human Development**

Human development is a concept developed by the United Nations Development Programme (UNDP). It aims to measure the basic assets of human life. The typical Human Development Index comprises three main components; Life Expectancy at Birth, Education, and the Standard of Living [68].There is a considerable body of literature on Human Development with a multitude of implications. Various studies have used the Human Development Index to compare different countries and explain variations in health outcomes and other issues related to sustainable development. Borrel et al. have shown the association between the level of education,

income and self- perceived health [69].There is also growing evidence that income, level of education, standard of living, and health are a function of a social gradient in various countries of the world [13].Studies analyzing each dimension of Human development separately have reported positive associations with social outcomes. Memoona suggested that uneducated women are ignorant of their basic civil, legal , and sexual rights, which exacerbates their vulnerability and makes them economically dependant on men, who, in turn abuse them [70].

Though the relationship of human development to health has been established, there is yet a reverse effect of health on Human development. Boutayeb has addressed that relationship with regard to HIV/AIDS in African countries [71]. Poku stressed the importance of addressing societal structures responsible for HIV/AIDS through the enhancement of human development assets [10]. Another study conducted in South Africa has shown that gender inequality relating to education to the detriment of women results in higher differential prevalence of HIV/AIDS as shown in Table 2.2 [72].

Table 2. 2: Difference of HIV prevalence among men and women [72]

| | **HIV/AIDS Prevalence in percentage (%)** | | |
|---|---|---|---|
| **Age** | **Men** | **Women** | **Difference (%)** |
| 15 | 0.2 | 8.00 | 7.98 |
| 20 | 11 | 47 | 36 |
| 25 | 39 | 58 | 19 |

Whiteside argued that the standard of living greatly influences the individual behaviors from macro factors to an individual's immune system [15,73].Limited financial resources

prevent sick individuals from having access to health care [74].There is also evidence that health is per se an economic input [75], implying a reverse effect between HIV/AIDS and human development[24,69 ].

**2.7 Religion**

Many studies have explored the relationship between religion and HIV/ AIDS. Gray has shown that Islamic tenets and percentage of Muslims within Sub-Saharan African Countries negatively predict HIV prevalence compared to non Muslim countries [76]. Hlongwana and Mkhize have argued that Christianity, for instance, plays an important role in the construction of peoples' identity, which in, turn impacts their sexual attitudes [77]. In a study conducted in Tanzania, Zou et al. noted that attitudes like stigma were strongly associated with religious beliefs in Christian churches [78].

Some other studies have shown that Islamic values, and relative public policies play a protective role against HIV/AIDS in North Africa [79].Another study conducted in South Africa among students has revealed a relative variance in attitudes according to religious affiliation [80]. Thege suggested that religion is an important factor in women's cultural and sexual subordination [80]. A study conducted in Uganda among women infected with HIV/AIDS showed that religious beliefs, mainly spirituality, was an important strategy for coping with HIV positive status [81,82].

Some studies also underlined the protective factor of religion [83]. Benton for instance, argued that religion can play a transformational role in preventing HIV and bringing support to people living with HIV/AIDS[84] .This finding has been confirmed by Koffi and Kawahara in a study conducted in Cote d'Ivoire. Comparing sexual abstinence behavior among never- married youths, they found that animist males who had no religion or with religion other than Christianity

or Islam were significantly more inclined to not practice abstinence [85].Macintosh and Thomas have suggested that conservative religions such as Islam and Christian orthodox reduce the spread of HIV/AIDS through their social control [86].

**2.8 Region or Regional location**

Globally, there is evidence that HIV/AIDS is geographically and unequally distributed. [87].According to UNAIDS, HIV/AIDS rates vary across continents, regions , and countries.[2].Yet, various studies have shown variability in HIV prevalence in cities and areas within countries [88].Borrel et al. attribute these variations to socioeconomic realities[69]. In Africa, geographical entities interact with various socioeconomic and political realities. These factors play an important role in the dissemination of the HIV virus [79].

Differences in strategies, approaches, policies, and funds allocated to implementation of HIV programs account for differences in prevalence within countries and regions [89]. A large body of literature unveiled the relationship between geographic regions and male circumcisions [88].The World Health Organization reported that Sub-Saharan African regions where males commonly practice circumcision have relatively low prevalence of HIV/AIDS as compared to regions where males are uncircumcised [90].

Koffi and Kawahara came to similar conclusions in their study ,showing that young females living in rural areas in Cote d'Ivoire, were significantly 0.42 times more likely to practice sexual abstinence as compared to those living in urban areas [ 85].

**2. 9 Colonial Heritage**

Few studies have theorized on the importance of colonial heritage in explaining the patterns of diseases in Africa. However, it is critical to review some existing literature for evidence and more understanding of the underlying factors that govern the epidemic of

HIV/AIDS in Africa. There is a theory that holds colonialism responsible for triggering the HIV virus from Central Africa at the end of 19th century [91].The hypothesis relative to this theory accounts that the arrival of Belgian colonialists in the Congo ,now known as the Democratic Republic of Congo(ex Zaire), caused a major transformation of socioeconomic ,political, cultural, and traditional patterns.

The mingling of different populations and cultures because of urbanization and the dire conditions in which indigenous labor forces were forced to work in camps, resulted in indiscriminate new sexual behaviors and practices that help the virus to spread through out the region [91].Velayati et al. suggested that the colonial heritage heavily impacted the African continent through the development paradigm imposed by colonial powers at the expense of multiple indigenous populations [79, 92]. Policies implemented by metropolitan rulers, the French, the British, the Dutch, the Belgians, and the Portuguese varied in magnitude [92]. Obviously, there are similarities of cultural traits, and administrative practices inherited from the former colonial powers in African countries.

Language and administrative patterns contribute to the colonial heritage that impacts African cultures, norms and values [92]. Assessing the impact of the colonial cultural heritage on HIV/AIDS could yield more insight in explaining fundamental causes of HIV epidemiological trend in Africa.

**2.10 HIV / AIDS Prevalence in Africa.**

Africa is the second largest continent [93]. Its population is estimated at 885 million [94] and projected to reach one billion by 2050. It comprises 53 countries, including Madagascar, Comoros, and other islands as members of the United Nations [95] . This study covers 53

countries as a population of interest. Western Sahara, the 54th country of the continent, was excluded because of a lack of available data.

Being one of the developing regions of the world, Africa is the hardest hit continent by HIV/AIDS. According to UNAIDS, 67 % of people were living with HIV/AIDS in Africa in 2008, with 68 % of new infections occurring among adults, and 91% among children. Moreover, 72% of the world's deaths attributable to HIV/AIDS occurred in Africa [96]. Yet, Africa is a huge continent with diverse populations, cultural diversity, and multifaceted socioeconomic and political realities. There is evidence that HIV/AIDS across the continent is not equally distributed with respect to countries and regions [88].

To better assess the dynamics that drive the HIV /AIDS epidemic in Africa, it is critical to scrutinize this vast continent by regional clusters that best represent some commonalities. Country members of these regional clusters share historical, ethnic, religious, and socio economic and political backgrounds that shaped their identities that can bring up evidence on HIV prevalence throughout the Africa continent.

Five regional clusters have been identified with respect to their geographical location; these regional clusters are: North Africa, West Africa, Central Africa, Southern Africa, and Eastern Africa. It is noteworthy that regional clusters in Africa overlap as far as socio economic and political integration communities are concerned [97]. Though geographical distribution of regions has been given importance in splitting these clusters, socioeconomic and political integration communities were also considered for more objectivity and balance in the analysis of data.

### 2.10.1 North Africa

North Africa consists of five countries: Algeria, Egypt, Libya, Morocco (including Western Sahara), and Tunisia. Yet, in this study, Sudan has been included in the Northern cluster

as a substitute for Western Sahara for statistical analysis purposes. Socioeconomically and politically, Sudan shares some commonalities with Egypt, and Libya such as religion, and the membership in the Common Market for Eastern and Southern Africa (COMESA) [98].

Indeed, North Africa is a homogenous region both by its ethnic group, Arab, and religious belief, Islam. Though there are some Christian entities throughout its country members, Islam remains the predominant religion by more than 89% [99].Except for Sudan, all countries in North Africa adopted Islam as the State religion, endorsed by their governments [99].In many of these countries, "Sharia ," the "Islamic way," has a major influence on socioeconomic, and political matters, as well as sexuality [100,101].Most of these countries were Latin colonies ; Algeria, Morocco, Tunisia were colonized by France and Libya by Italy. The region has the lowest HIV rates in Africa, [99] with prevalence rates less than 1%, as shown in Table 2.3**.** Though HIV prevalence may be underscored, studies and behavioral surveys on HIV are subject to serious challenges due to cultural values [96].

Table 2. 3: North Africa region by socioeconomic characteristics and HIV prevalence.

| Country | Population | Religion | Colony | Governance Index | HIV prevalence % |
|---|---|---|---|---|---|
| Algeria | 34,895,000 | Muslim | Latin | 70.2 | 0.1 |
| Egypt | 78,039,000 | Muslim | Anglo Saxon | 61.9 | 0.1 |
| Libya | 6,420,000 | Muslim | Latin | 61.2 | 0.3 |
| Morocco | 31,761,000 | Muslim | Latin | 65.9 | 0.1 |
| Sudan | 39,154,490 | Muslim | Anglo Saxon | 34.8 | 1.4 |
| Tunisia | 10,432,500 | Muslim | Latin | 71.5 | 0.1 |
| N= 6 | | | | | |

### 2.10.2 West Africa

West Africa consists of 17 countries and includes Cape Verde, and Sao Tome, which are both islands located on the west coast of the continent. In these islands, populations are more modest than in mainland countries, which number in the millions. All these countries, with the exception of Sao Tome and Principe, and Mauritania, are grouped around the Economic Community of West African States (ECOWAS) [98].

Except for Ghana, Liberia, Sao Tome and Principe and Togo which are Christian majority countries, other countries in the West Africa region are Muslim. Eleven countries out of 17 were Latin colonies whose principal colonizer was France. Cape Verde, Sao Tome and Principe, and Guinea Bissau, were colonized by Portugal [99]. All other countries were British colonies. Various studies have documented a predominant presence of HIV-2 in West Africa [92]. This type of virus is less easily transmitted and has a longer incubation period compared to HIV-1.Consequently, in this region HIV/AIDS rates over around 0.8- 3.9 %.

Table 2.4: West Africa region by socioeconomic characteristics, and HIV/AIDS prevalence.

| Country | Population | Religion | Colony | Governance Index | HIV prevalence % |
|---|---|---|---|---|---|
| Benin | 8,935,000 | Muslim | Latin | 64.0 | 1.2 |
| Burkina Faso | 15,757,000 | Muslim | Latin | 61.6 | 1.6 |
| Cape Verde | 506,000 | Muslim | Latin | 77.4 | 1.0 |
| Cote d'Ivoire | 21,075,000 | Muslim | Latin | 42.7 | 3.9 |
| Gambia | 1,705,000 | Muslim | Anglo Saxon | 62.8 | 0.9 |
| Ghana | 23,837,000 | Christian | Anglo Saxon | 70.6 | 1.9 |
| Guinea | 10,069,000 | Muslim | Latin | 47.4 | 1.6 |
| Guinea Bissau | 1,611,000 | Muslim | Anglo Saxon | 51.5 | 1.8 |

| | | | | | |
|---|---|---|---|---|---|
| Liberia | 3,476,608 | Christian | Anglo Saxon | 50.0 | 1.7 |
| Mali | 14,517,176 | Muslim | Latin | 57.2 | 1.5 |
| Mauritania | 3,291,000 | Muslim | Latin | 61.0 | 0.8 |
| Niger | 15,290,000 | Muslim | Latin | 57.8 | 0.8 |
| Nigeria | 154,729,000 | Muslim | Anglo Saxon | 50.3 | 3.1 |
| Sao tome Principe | 163,000 | Christian | Latin | 68.2 | 1.5 |
| Senegal | 12,534,000 | Muslim | Latin | 62.7 | 1.00 |
| Sierra Leone | 5,696,000 | Muslim | Anglo Saxon | 51.6 | 1.7 |
| Togo | 6,619,000 | Christian | Latin | 52.7 | 3.3 |
| N= 17 | | | | | |

### 2.10.3 Central Africa

Central Africa comprises eight countries .The main regional socioeconomic and political integration community in Central Africa is the Economic and Monitory Community of Central Africa (CEMAC) [98].Yet, DRC and Angola are members of Southern Africa Development Community (SADC).Central Africa has long been under the influence of France since the colonial period. Still, Angola, the Democratic Republic of Congo (DRC), and Equatorial Guinea were colonized by Portugal, Belgium and Spain respectively. The dominant main religion throughout Central Africa is Christian though there are some local independent religious beliefs. Various studies have documented the central African origin of HIV virus. According to various sources, HIV virus crossed over from chimpanzee to human being in the French Equatorial Africa, and the Belgium Congo [91]. In this region, cases of HIV infections were discovered in the early 80's [102]. Local customs and beliefs and ethnic mix have been reported as factors of

HIV/AIDS [102]. Central Africa is the region with the highest prevalence of HIV after Southern Africa [96]. The highest prevalence in the region average 6% as shown in Table 2.5.

Table 2.5: Central Africa region by socioeconomic characteristics, and HIV prevalence.

| Country | Population | Religion | Colony | Governance Index | HIV prevalence% |
|---|---|---|---|---|---|
| Angola | 18,498,000 | Christian | Latin | 45.9 | 2.1 |
| Cameroon | 19,522,000 | Christian | Latin | 54.4 | 5.1 |
| Central African Republic | 4,422,000 | Christian | Latin | 43.0 | 6.3 |
| Chad | 11,274,106 | Muslim | Latin | 36.7 | 4.8 |
| Congo | 3,683,000 | Christian | Latin | 48.7 | 3.5 |
| Congo, Democratic Republic | 66,020,000 | Christian | Latin | 37.3 | 4.2 |
| Equatorial Guinea | 676,000 | Christian | Latin | 49.5 | 3.4 |
| Gabon | 1,475,000 | Christian | Latin | 66.5 | 5.9 |
| N=8 | | | | | |

**2.10.4 Southern Africa**

Southern Africa is the most severely hit region of Africa by HIV/AIDS [1, 96].This region consist of 10 countries. All of these countries were colonized by Britain and are all Christian except for Tanzania. Most countries of the Southern Africa region are members of Southern African Development Community (SADC).Yet, some country members from other regions such as DRC, Angola, and Madagascar are also members of this Economic Community [97]. The highest prevalence in the region is that of Swaziland, 26.1 %, while the lowest is that of Tanzania; 6.2% as shown in the table below [96]. Various HIV risk factors have been identified in the existing literature.

In South Africa for instance, population density has been associated with high HIV/AIDS prevalence [1].Population mobility due to migration from countries such Malawi, Zimbabwe are also termed as major social determinants for HIV prevalence in the region [97]. It is noteworthy that some of these countries namely Zimbabwe, Namibia and South Africa only acceded to independence in the last decades. The changes brought about by democratization and new lifestyle patterns have inevitably occasioned a growing number of risk factors that resulted in highly increase of HIV/AIDS rates in the region[1,97].

Table 2.6: Southern Africa region by socioeconomic characteristics and HIV prevalence

| Country | Population | Religion | Colony | Governance Index | HIV prevalence % |
|---|---|---|---|---|---|
| Botswana | 1,950,000 | Christian | Anglo Saxon | 72.7 | 23.9 |
| Lesotho | 2,067,000 | Christian | Anglo Saxon | 60.0 | 23.2 |
| Malawi | 15,263,000 | Christian | Anglo Saxon | 63.3 | 11.9 |
| Mozambique | 20,226,296 | Christian | Anglo Saxon | 56.8 | 12.5 |
| Namibia | 2,171,000 | Christian | Anglo Saxon | 69.2 | 15.3 |
| South Africa | 49,320,500 | Christian | Anglo Saxon | 68.4 | 18.1 |
| Swaziland | 1,185,000 | Christian | Anglo Saxon | 49.4 | 26.1 |
| Tanzania | 43,739,000 | Muslim | Anglo Saxon | 61.5 | 6.2 |
| Zambia | 12,935,000 | Christian | Anglo Saxon | 59.6 | 15.2 |
| Zimbabwe | 12,523,000 | Christian | Anglo Saxon | 47.3 | 15.3 |
| N=10 | | | | | |

### 2.10.5 Eastern Africa

East Africa is the second largest region of Africa after West Africa. 12 countries make this region. There are 7 Christian and 5 Muslim countries which have mostly been colonized by Latin metropolises, especially, France, with the exception of Rwanda and Burundi. Somalia,

Uganda, and Kenya were British colonies while Eritrea has been under Anglo Saxon influence of Britain [99].Ethiopia has never been a colony. The prevalence of HIV/AIDS is relatively low compared to Central and Southern Africa. Yet, HIV/AIDS and Tuberculosis are major causes of deaths. Main interstate corridors of transportation are major risk factor venues through with HIV virus spread throughout the region [103].

Moreover, a lack of decent health care system along with gender inequality are also contributing factors for the prevalence of HIV/AIDS in the region [104].The instability caused by major ethnic group conflicts during the past decades in some countries such as Rwanda, Somalia, and Eritrea, have engendered internally displaced populations that seem to drive the epidemic of AIDS in the region.

Table 2.7: Eastern Africa region by socioeconomic characteristics and HIV prevalence

| Country | Population | Religion | Colony | Governance Index | HIV prevalence % |
|---|---|---|---|---|---|
| Burundi | 8,303,000 | Christian | Latin | 50.0 | 2.0 |
| Comoros | 676,000 | Muslim | Latin | 58.7 | 0.1 |
| Djibouti | 864,000 | Muslim | Latin | 56.7 | 3.1 |
| Eritrea | 5,073,000 | Muslim | Latin/Anglo-Saxon | 44.4 | 1.3 |
| Ethiopia | 79,221,000 | Christian | N/A | 51.1 | 2.0 |
| Kenya | 39,802,000 | Muslim | Anglo Saxon | 58.2 | 6.7 |
| Madagascar | 19,625,000 | Christian | Latin | 62.4 | 0.1 |
| Mauritius | 1,288,000 | Christian | Latin | 85.7 | 1.7 |
| Rwanda | 9,998,000 | Christian | Latin | 58.6 | 2.8 |
| Seychelles | 84,000 | Christian | Latin | 79.8 | 0.2 |

| | | | | | |
|---|---|---|---|---|---|
| Somalia | 9,133,000 | Muslim | Anglo Saxon | 16.3 | 0.5 |
| Uganda | 32,710,000 | Christian | Anglo Saxon | 57.8 | 5.4 |
| N=12 | | | | | |

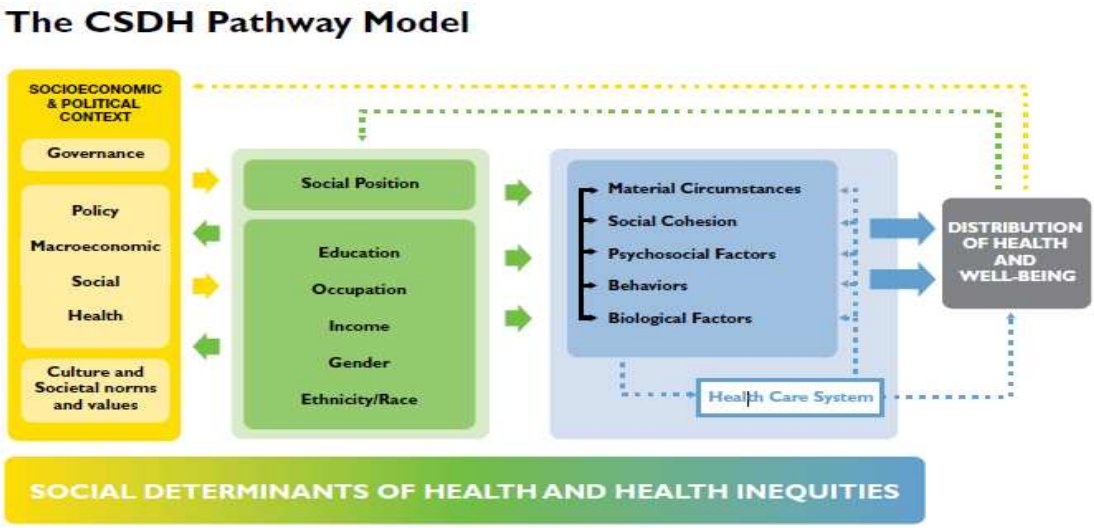
**2.11 Theoretical Framework: the Social Determinants of Health Approach.**

This study lies in the logical model developed by the World Health Organization (WHO) called the SDH (Social Determents of Health) Pathway Model as illustrated in Figure 3.This model posits that health is determined by the structural determinants which are the socioeconomic and political context driven by governance [11, 13].

Social position or social stratification or inequity is generated by socioeconomic and governmental policies in place in different countries in the world. Social position in turn determines access to material resources which results in differential health outcomes.

This model explains why a child born in Japan and Sweden can expect to live more than 80 years, and 72 and 63 years in Brazil and India respectively, and in many African countries, less than 50 years [13].It is obvious that since all African countries do not have the same level of governance, this results in differential life expectancies and other health outcomes across the continent. This framework drives the logic of the present study and helps interpret the results and findings.HIV/AIDS prevalence or the dependant variable, is the unit of differential outcome and ‘’country’’ is conceptualized as a unit of observation.

Figure 2. 3: Framework of Social Determinants of health [13].




Amended from Solar & Irwin, 2007[7] , in CSDH (2008 in press). Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health. Geneva, World Health Organization.

# CHAPTER III

# METHODS AND PROCEDURES

This chapter tells about the dependant and independent variables, the sources of data and the types of statistical analyses used to compute the data and interpret the results.

## 3.1 Data Source

The data used in this study came from the Kennedy School of Government at Harvard University and the World Peace Foundation, including the report entitled, Strengthening African Governance, Index of African Governance, Results and Rankings 2009[20].The report lists the index of governance of 53 African countries along with all their rankings and the 5 component variables used to measure the index as a composite metric.

Data on the prevalence of HIV/AIDS were obtained from the Joint United Nations Programme on AIDS' (UNAIDS) country reports, Epidemiological Fact Sheet on HIV and AIDS 2008[2].Data on religion came from the CIA World Factbook [99] while information on regional country membership were obtained from Economic Commission for Africa[105]

## 3.2 Missing Data

UNAIDS reports relating to a certain number of countries, Comoros, Mauritius, Seychelles, Morocco had missing information of interest for our study. To remediate this situation, we resorted to other sources such as, United Nations International Children's Emergency Funds (UNICEF), and CIA, the World FACTBOOK [99,106]. All data obtained from these sources were from 2007, which matched with our previous data from UNAIDS.

### 3.3 Dependent Variable

This study is an ecological type of study. Therefore, as mentioned previously, country is the unit of observation but country-specific rates of HIV prevalence of individuals aged 15-49 years old were used as the dependant variable. Though not coming from the same sources, most of the data were of the same year; 2007.

### 3.4 Independent variables

This study used 9 independent variables which will be described separately for clarity purpose. In addition to the Index of African Governance comprising five different variables, 3 other variables, religion (religious belief) and regional country membership or region and Colonial Heritage were used as independent variables.

### 3.5.1 Index of African Governance

The Index of African Governance is the main independent variable. It is a composite measure made of 5 main variables that ranks all African countries except Western Sahara, based on their performance on governance.

The total number of countries included in the index is 53. The Index value is the average sum of the scores of the 5 variables that comprise it [20].These 5 main variables are in turn broken down into sub-categories as illustrated in the table below.

Table 3.1: Basic structure of the Index of African Governance [20].

| Category | Sub-Category |
|---|---|
| I. SAFETY AND SECURITY | 1. National Security *(2/3rds of the Safety and Security Category)* |
| | 2. Public Safety *(1/3rd of the Safety and Security Category)* |
| II. RULE OF LAW, TRANSPARENCY, AND CORRUPTION | 1. Ratification of Critical Legal Norms |
| | 2. Judicial Independence and Efficiency |
| | 3. Corruption |
| III. PARTICIPATION AND HUMAN RIGHTS | 1. Participation in Elections |
| | 2. Respect for Civil and Political Rights |
| IV. SUSTAINABLE ECONOMIC OPPORTUNITY | 1. Wealth Creation |
| | 2. Macroeconomic Stability and Financial Integrity |
| | 3. The Arteries of Commerce |
| V. HUMAN DEVELOPMENT | 1. Poverty |
| | 2. Health and Sanitation |
| | 3. Education |

There are other indicators used to compute governance [19].The World Bank uses six similar dimensions to the Index of African Governance. Yet, various reasons motivated our choice for using the Index of African Governance.

First, this index is specific to Africa in that it takes into account many African realities such as armed conflicts, refugees and asylum seekers, and internally-displaced people. Second, the method used by its promoters is purely diagnostic, based on objective data and not on surveys or experts' perceptions nor judgment .Third, it does not measure the resources invested by each country's government but the results, that is the index is based on output not input[20]. It seeks to determine how well each country has performed through government activities throughout a year.

Finally, it is noteworthy that as governance was computed based on objective data reflecting performance, and not on invested resources, it would be logical to assess whether there is a correlation between governments' achievement and the prevalence of HIV. The index of African governance is a continuous value varying from [0-100].Each sub-category is an average

sum of the scores of its sub-sub-categories expect for Safety and Security where the two sub-categories, National Security and Public Safety respectively counts for two-thirds and one-third.

### 3.5.2 Safety and Security.

Safety and Security is a continuous variable varying from [0-100].In the index, Safety and Security was computed as a composite measure comprising two main sub-categories as shown in Table 1 and 7 sub-sub-categories as follows:

1. Government involvement in Armed conflict
2. Number of Battle Deaths
3. Number of Civilian Deaths Due to One-Sided Violence
4. Refugees and Asylum seekers Originating From the Country
5. Internally Displaced People
6. Ease of Access to Small Arms and Light Weapons
7. Level of Violent Crime (Homicide Rate)

This variable is comprehensive of different aspects relative to the notion of security and safety susceptible to capture the relationship between national security and HIV/AIDS.

### 3.5.3 Rule of Law, Transparency and Corruption

Like Safety and Security, Rule of Law, Transparency and Corruption is also a continuous variable varying from [0-100].it consists of three main sub-categories illustrated in Table 1.These three categories are further broken down into 7 following sub-sub-categories;

1. Ratification of Core International Human Rights Conventions

2. International Sanctions

3. Property Rights

4. Judicial Independence

5. Efficiency of the Courts, based on the Pre-Trial Detainees

6. Number of Days to Settle a Contract Dispute

7. Public Sector Corruption

### 3. 5.4 Participation and Human Rights

Participation and Human Rights consists of two sub-categories as shown in Table 1, and they are;

1. Participation in Election

2. Respect for Civil and Political Rights

It refers to the ability for governments to organize free and fair elections with the participation of the entire society and respect of basic human rights. This variable is a critical proxy for governments' outcomes.

### 3. 5.5 Sustainable Economic Opportunity

Broken down into three sub-categories as illustrated in Table 1, Sustainable Economic Opportunity is comprised of 10 sub-sub-categories as follows;

1. GDP per Capita(PPP)

2. GDP per Capita Growth

3. Inflation
4. Government Surplus/Deficits a Percentage of GDP
5. Reliability of Financial Institutions(Contact Intensive Money)
6. Business Environment (Number of Days Start a Business)
7. Density of Paved Road Network
8. Electricity Installed Capacity per Capita
9. Phone Subscriber per 100 Inhabitants
10. Internet Usage per 100 Inhabitants

Like other variables of the Index of African Governance, Sustainable Economic Opportunity is a continuous value ranging from [0-100].

**3.5.6 Human Development**

Many authors recognize that the notion of Human Development is "open ended", susceptible to include various indicators [68].The United Nations Development Programme considers 3 main variables, life expectancy, education and poverty to calculate the Human Development Index [68]. However, Human Development in the Index of African Governance consists of three sub-categories, Poverty, Health and Sanitation, and Education. These sub-categories are further broken down into 22 sub-sub-categories as shown in Appendix 1.Human Development like previous independent variables is a continuous value that varies from [0-100].

**3.5.7 Religion or religious belief**

Religious belief refers to the predominant religion in a country based on the percentage in a dichotomous relationship. Two main religions, Christian and Islam were considered. Christian was coded 1 and Islam 2.All the fifty-three countries were therefore categorized in 2 groups: Christian and Muslim countries.

**3.5 8 Regional location/Region**

Region was defined with regards to regional economic membership and country location based on geographical parameters of each African Sub-region. There is evidence that all African countries do not pursue the same strategies for development [97].Each region lends itself to specific policies according to its regional opportunities, sub-cultures and social realities [97].

Countries have been grouped in 5 clusters or groups coded as follows, North Africa=1, West Africa =2, Central Africa=3, Southern Africa=4, East Africa= 5

**3.5 9: Colonial Heritage**

Colonial heritage refers to the culture and practices of former colonial powers inherited by African countries. In most African countries, educational systems, administrative delimitation of territories, and major infrastructures are mostly part of colonial heritage. As these entities defer from one former colonial power to another, two main country groups have been identified: Latin and Anglo-Saxon. Yet these two groups have sub categories that are, French, Italian, Portuguese, Spain for Latin group and British and American for Anglo Saxon group [107]. These countries were coded as follows, French=1, British=2 Portuguese=3, Italian= 4 Spain= 5 and Belgium=6, Italian = 7, American = 8

**3. 5. 10 Statistical Analyses**

SPSS for Windows, version 17.0 was used for data analysis. An Excel data set file of the Index of African Governance from the National Bureau of Economic Research [108] comprising

all the 53 countries of interest was merged with a separate file containing country- specific HIV prevalence to form a unique SPSS file.

Country, the study population was recoded into regions and descriptive analyses of the study population were conducted to determine countries' counts by regions, religion, HIV prevalence and Governance means. The results were classified into two Tables ( 4.1 and 4.2), and one dot plot ( Figure 2.1) . A bivariate analysis of independent variables and dependent variable was computed to identify any eventual collinearity between different variables. Thus, a bivariate correlation analysis between the Index of Governance and HIV prevalence was conducted in order to identify any association.

A univariate linear regression analysis was performed between each component variable of the Index of Governance and HIV prevalence to assess any association and predict the effect of independent variables on the dependent variable. The Pearson correlation coefficient was selected to gauge the strength of the association. To determine the significance of each association, the p-value was reported. For the prediction of the effect of the independent variable on the outcome and the measurement of how well the model was fit for the analysis, Beta and R-square were respectively used.

Multiple linear regression analysis between all components of the Index of Governance at once and HIV prevalence was conducted to determine which Independent variable was most predictive after controlling for other independent variables. Again, like in univariate analysis, R-Square, Beta and p-value were the units of assessment to respectively gauge the goodness of fit of the model, the extent of prediction and the strength of the association between the independent and dependent variables. The relationship between the independent variables and the dependent

variable was further scrutinized by means of partial correlation analysis in order to eliminate the linear effect of each independent variable on other variables.

The association between the Index of Governance and HIV prevalence was further explored by breaking down the analyses by clusters; region, colonial heritage and religion were used. A bivariate correlation analysis was thus conducted to assess the association between the Index of Governance and HIV prevalence by region. The Pearson correlation was used to read the strength of the association.

In order to be able to predict the effect of each explanatory variable on the dependent variable in each region, a univariate regression analysis between the Index of Governance and HIV prevalence was computed and R-Square, Beta and p-value were respectively referred to for the fitness of the model, prediction and strength of the associations. This relationship was further examined by running a univariate regression analysis, one independent variable at a time, between all component independent variables of the Index of Governance and HIV prevalence, and thus a multiple regression analysis between all components of the Index of Governance and HIV prevalence whose results were reported in a unique table for comparison purposes.

A univariate linear regression analysis of the Index of Governance and HIV prevalence was conducted by comparing clusters by colonial heritage. Four clusters, French, Belgian, British and Portuguese were considered .Italian and Spain were removed from the analysis because the number of each member in these clusters was less than two. R-square, Beta and P-value were used accordingly.

The relationship and difference between religious beliefs and HIV prevalence were analyzed by conducting an Independent Sample T- test, supplemented by a Chi Square test for

better evidence. An independent T-test was computed to determine whether there is a difference in HIV prevalence within Muslim and Christian countries. Mean, standard deviation, and p-value were reported to read the level of difference. To compute Chi square, HIV prevalence rates were recoded into two categories; high and low. For this purpose, 0 - 2.8 % was considered low, and 2.8 - 26.1 % high. These HIV prevalence rates levels and counts for each religion were thus cross tabulated. P-value was reported and used to determine the level of significance.

In order to examine the association between region and HIV prevalence, another Chi Square test was performed. HIV prevalence rates levels and counts for each region were cross tabulated and p-value was used to determine the level of significance.

The association between Colonial heritage and HIV prevalence was also assessed using Chi square test.HIV prevalence rates levels and categories of country groups with regards to colonial heritage, French, Belgian, British, Italian, Spain and Portuguese were cross tabulated. In order to have an expected value not less than six in a cell, countries were grouped into two distinctive clusters based on historical and linguistic characteristics;  first between Latin and Anglo Saxon and then between French and British.

The association between governance and HIV prevalence was further explored through religion. Therefore, a univariate regression analysis between governance and HIV prevalence by religion was conducted. Two main religions were considered: Christian (N=29) and Muslim ( N=24). Beta, p-value and R-square values were used to interpret the results. This analysis was conducted regardless of regional location of countries. Furthermore, this relationship was explored by controlling for region in a partial correlation analysis. Pearson correlation was used to interpret the results.

# CHAPTER IV
# RESULTS

This chapter provides the results of the statistical analyses. Table 4.1 illustrates the descriptive statistics of the population of interest by sub-region, HIV range, and mean prevalence. Data have been organized in five African sub-regions to facilitate comprehension, comparison and interpretation. The statistics shows a population size N = 53, and indicates that data are unequally distributed across sub-regions. North Africa has the least country members and West Africa the most country members. It is noteworthy that prevalence ranges differ from one region to another.

Table 4.1: descriptive statistics of study population by, sub-regions, HIV range, and mean prevalence

| Region | N | Prevalence range (%) | | Mean prevalence (%) |
|---|---|---|---|---|
| | | Minimum | Maximum | |
| North Africa | 6 | .1 | 1.4 | .350 |
| West Africa | 17 | .8 | 3.9 | 1.724 |
| Central Africa | 8 | 2.1 | 6.3 | 4.675 |
| Southern Africa | 10 | 6.1 | 26.1 | 16.760 |
| East Africa | 12 | .1 | 6.7 | 2.158 |
| Total | 53 | | | |

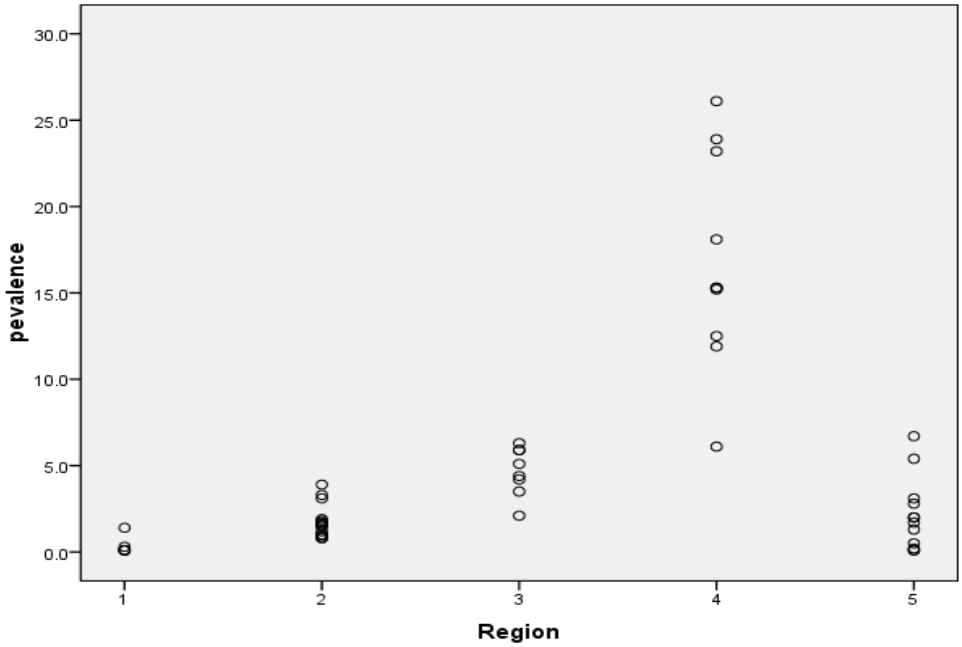
Table 4.2 shows the population of interest by region, Religion, HIV prevalence and mean Governance Index. The data indicate that regions with Muslim majority countries have the least HIV mean prevalence and the highest mean Governance Index scores. This suggests a difference in HIV prevalence between Muslim and Christian countries.

Table 4. 2: Study population by sub-region, religion, mean HIV prevalence and Governance Index

| Sub-region | Religion | | N | Mean prevalence (%) | Mean Governance Index |
|---|---|---|---|---|---|
| | Muslim | Christian | | | |
| North Africa | 6 | 0 | 6 | .350 | 60.915 |
| West Africa | 12 | 5 | 17 | 1.724 | 58.206 |
| Central Africa | 1 | 7 | 8 | 4.675 | 47.765 |
| Southern Africa | 1 | 9 | 10 | 16.760 | 60.825 |
| East Africa | 4 | 8 | 12 | 2.158 | 56.651 |
| Total | 24 | 29 | 53 | | |

Figure 4.3 shows the distribution of HIV prevalence across sub-regions. The dot plot was used because it is best fit to illustrate visual differences between variables across the population of interest. The dot plot suggests that the distribution of HIV prevalence varies across sub-regions. North Africa has the lowest maximum HIV/AIDS prevalence (1.4%), while Southern Africa has the highest minimum prevalence (6.1%) and the highest maximum prevalence (26.1%).

**Figure 4. 1 Dot Plot of HIV prevalence by sub-region**




pr = prevalence range (%)

| 1= North Africa | 2 = West Africa | 3 = Central Africa | 4= Southern Africa | 5 = East Africa |
|---|---|---|---|---|
| pr = .1-1.4 % | pr = .8 - 3.9 % | pr = 2.1- 6.3 % | pr = 6.1- 26.1 % | pr =.1- 6.7 % |

Prior to performing statistical analysis, a correlation analysis of selected variables was conducted to determine the strength of correlation between selected variables. Table 4.3 shows that correlation between variables varies from .068 to .756, all populations of interest included (N= 53). Human Development (HD) and Socio Economic Opportunity (SEO) were highly correlated (-756). Yet, Rule of Law, Transparency, and Corruption (RoLTaC) was more highly correlated with Socio Economic Opportunity (.598), compared to Human Development (.586).Safety and Security (SaS), and Participation and Human Rights (PaHuR) were moderately correlated with other variables.

Table 4. 3: Correlations between selected variables

| Variables | SaS | RoLTaC | PaHuR | SEO | HD | HIV prevalence |
|---|---|---|---|---|---|---|
| SaS | 1 | .527** | .292* | .448** | .451** | -.207 |
| RoLTaC | | 1 | .537** | .598** | .586** | .291* |
| PaHuR | | | 1 | .177 | .097 | .107 |
| SEO | | | | 1 | .756** | .068 |
| HD | | | | | 1 | -.084 |
| HIV Prevalence | | | | | | 1 |

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05(2-tailed)

**4.1-Overall analysis of selected variables**

A bivariate correlation analysis was conducted between the Index of Governance and HIV prevalence to determine whether there is an association between the two variables across all African countries. No statistically significant association was found ($p > .05$).

In order to determine whether there is any association between each selected independent variable making the Index of Governance or dimension of governance and HIV prevalence, a unvivariate regression analysis was conducted. Each independent variable was tested separately. Except for Rule of Law, Transparency and Corruption, other independent variables did not show a statistically significant association as shown in Table 4.4.The results indicate that as Rule of

Law, Transparency and Corruption increases by 1 unit, HIV prevalence also increases by .291units.

However, the results indicate that only 8.5% of the variance of HIV prevalence can be explained by Rule of Law, Transparency and Corruption in the model.

Table 4.4: Univariate regression analysis of the association of independent variables and HIV prevalence

| Variables | R-square | Beta | P-value |
|---|---|---|---|
| Safety and security | .043 | -.207 | .136 |
| Rule of Law, TaC | .085 | .291 | .034 |
| Participation and Human Rights | .011 | .107 | .446 |
| Socio economic opportunity | .005 | .068 | .629 |
| Human development | .007 | -.084 | .552 |

To determine which independent variable is more predictive of HIV prevalence after controlling for other independent variables, a multiple regression analysis was conducted. Socio Economic Opportunity was removed from the model because of multicollinearity effect.
The results as reported in Table 4.5 show that 3 independent variables out of 4 were significantly associated with HIV prevalence. Rule of Law, Transparency and Corruption was the most statistically significant ( $p < .05$) after adjusting for Safety and Security, Human Development, and Participation and Human Rights.

Consequently, controlling for other independent variables has increased Beta from .291 to .816, keeping the association positive and consistent with previous results. Contrary to Rule of Law, Transparency, and Corruption, both Safety and Security, and Human Development are negatively associated with HIV prevalence. This suggests that an increase of both variables by 1 unit, decreases HIV prevalence respectively by .429 and .352 units.

The results also indicate that, overall; only 33% of the variance in the dependent variable can be explained by the three independent variables that have shown statistically significant association.

Table 4.5:Multiple Regression Analysis of the association between the independent variables and HIV Prevalence.

| **Independent variables** All (N=53) | **R-Square** | **Beta** | **P-value** |
|---|---|---|---|
| | .338 | | |
| Safety and security | | -.429 | .004 |
| Rule of law, TaC | | .816 | <.001 |
| Participation and Human Rights | | -.172 | .249 |
| Socioeconomic Opportunity | | - | - |
| Human Development | | -.352 | .030 |

To further analyze the relationship between Governance Index and HIV prevalence, a partial correlation analysis was conducted in order to remove the linear effects of other independent variables as reported in Table 4.6. As shown in the table, the results of all variables have remained consistent with previous results.

Still, Rule of Law, Transparency, and Corruption remained the most predictive variable in the model (Beta= .816).It is noteworthy that only 33% of the variance in the dependent variable can be explained by the independent variables in the model.

Table 4.6 : Partial correlation analysis between the independent variables and HIV prevalence

| **Independent variables** All (N=53) | **R-Square** | **Beta** | **P-value** |
|---|---|---|---|
| | .338 | | |
| Safety and security | | -.429 | .004 |
| Rule of law, TaC | | .816 | <.001 |
| Participation and Human Rights | | -.172 | .249 |
| Socioeconomic Opportunity | | - | - |
| Human Development | | -.352 | .030 |

## 4.2 -Analysis of selected variables by Clusters

To further investigate the relationship between the Index of Governance and HIV prevalence, the analysis was broken into clusters, using regions as comparison groups. Table 7 indicates that only two regions, North and West Africa show a statistically significant association between governance and HIV prevalence ($p<.05$).

Table 4. 7: Bivariate correlation analysis between GI and HIV prevalence.

| | | variables | |
|---|---|---|---|
| Regions | variables | Governance | HIV prevalence |
| North Africa | Governance | 1 | -.967** |
| | HIV prevalence | | 1 |
| West Africa | Governance | 1 | -.599* |
| | HIV prevalence | | 1 |
| Central Africa | Governance | 1 | .130 |
| | HIV prevalence | | 1 |
| Southern Africa | Governance | 1 | -.011 |
| | HIV prevalence | | 1 |
| East Africa | Governance | 1 | .042 |
| | HIV prevalence | | 1 |

**.Correlation is significant at the 0.01 level (2-tailed).

*.Correlation is significant at the 0.05 level (2-tailed).

To determine the goodness of fit and the proportion of HIV prevalence that could be predicted by the independent variable in the regions that showed statistically significant association between governance and HIV prevalence, a univariate analysis of the variables of interest was performed.

Table 4.8 shows that the results are consistent with the previous outcomes in Table 4.7. There is a statistically significant negative association between governance and HIV prevalence in North and West African regions. The results indicate that governance in North Africa is highly associated with HIV prevalence compared to West Africa ($p < .05$).

The results also indicate that an increase in Governance by one standard deviation in North Africa is associated with a decrease of HIV prevalence by .967 standard deviation units, which is relatively higher, compared to .599 standard deviation units for West Africa. Overall, 93% of the variance in HIV prevalence for North Africa can be explained by the model compared to only 35% for West Africa.

Table 4. 8: Univariate analysis between Index of Governance and HIV prevalence

| Variables | R-square | Beta | P-value |
|---|---|---|---|
| North Africa | .936 | -.967 | .002 |
| West Africa | .359 | -.599 | .011 |
| Central Africa | .017 | .130 | .759 |
| Southern Africa | .000 | .-011 | .976 |
| East Africa | .002 | -.042 | .897 |

Table 4.9 shows side by side tables of univariate and multiple regression analyses of the association between Governance and HIV prevalence by regions. For the univariate analysis, 4 regions, namely North, West, Southern, and Eastern Africa show some statistically significant associations.

As for North Africa, except for Participation, Human Right and Corruption, and Socio Economic Opportunity other variables are significantly associated with HIV prevalence. Safety and Security is the most predictive variable with a p-value =.001 and Beta = -.980, suggesting that when Safety and Security increases by one unit, HIV prevalence decreases by.-980 units. The results indicate that 96 % of the variance in the dependant variable can be explained by the model, which is extremely fit. However, after controlling for other variables, none of them was statistically significant.

As regards West Africa, only Safety and Security and Participation, Human Rights and Corruption were significantly associated with HIV prevalence for the univariate analysis. After controlling for other variables, only Participation and Human Rights showed a statistically significant association ($p<.05$) with HIV prevalence. This suggests that in West Africa, when Participation, Human Right and Corruption increases by one unit, HIV prevalence decreases by -.531 units. The model is relatively fit for 57 % of the variance in the dependent variable can be explained by Participation Human Right and Corruption.

For Central Africa, only Human Development was significantly associated with HIV prevalence in the univariate analysis ($p = 0.20$). After controlling for other variables, no association was found to be statistically significant. This suggests that governance does not impact HIV prevalence in Central Africa as far as its dimensions are concerned.

As far as Southern Africa is concerned, except for Safety and Security, no other variable showed a statistically significant association with HIV prevalence for the univariate analysis. After controlling for other variables, 3 variables out of 4; Safety and Security, Rule of Law, Transparency and Corruption, and Participation and Human Right showed statistically significant associations with HIV prevalence.

Rule of Law, Transparency and Corruption was found to be the most predictive independent variable and positively associated with HIV prevalence ($p<.05$).This finding indicates that when Rule of Law, Transparency and Corruption improves by one unit, HIV prevalence in turn increases by 1.270 units. The finding also indicates that 83 % of the variance in HIV prevalence can be explained by the model.

In the univariate and multivariate analyses as far as East Africa is concerned, none of the 4 variables was significantly associated with HIV prevalence, suggesting no association between governance and HIV prevalence.

Table 4. 9: Univariate and Multivariate association between the Independent Variables and HIV prevalence

| Region | Variable | **Univariate** | | | **Multivariate** | | |
|---|---|---|---|---|---|---|---|
| | | Beta | p-value | R-square | Beta | p-value | R-square |
| North Africa | Safety and Security | -.980 | **.001** | .960 | -.816 | .216 | .990 |
| | Rule of Law, TaC | -.857 | **.029** | .734 | -.151 | .653 | |
| | PaHR | -.589 | .219 | .347 | .097 | .686 | |
| | Socioeconomic Opportunity | -.612 | .194 | .375 | - | - | |
| | Human Development | -.889 | **.018** | .791 | -.004 | .989 | |
| West Africa | Safety and Security | -543 | **.024** | .295 | -.300 | .248 | .568 |
| | Rule of Law, TaC | -.352 | .165 | .124 | -.287 | .341 | |
| | PaHR | -651 | **.005** | .424 | -.531 | **.025** | |
| | Socioeconomic Opportunity | -.145 | .580 | .021 | - | - | |
| | Human Development | -.140 | .591 | .020 | -.342 | .340 | |
| Central Africa | Safety and Security | -.188 | .655 | .035 | -.138 | .881 | .713 |
| | Rule of Law, TaC | .387 | .344 | .150 | .877 | .202 | |
| | PaHR | .568 | .142 | .322 | .639 | .363 | |
| | Socioeconomic Opportunity | -.201 | 633 | .375 | - | - | |
| | Human Development | **.020** | .962 | .000 | -.693 | .376 | |

PaHR = Participation and Human Rights

TaC = Transparency and Corruption

| Region | Independent variable | Univariate | | | Multivariate | | |
|---|---|---|---|---|---|---|---|
| | | **Beta** | **p-value** | **r-square** | **Beta** | **p-value** | **r-square** |
| Southern Africa | Safety and Security | -694 | **.026** | .482 | -.626 | **.037** | .835 |
| | Rule of Law, Transparency and Corruption | .391 | .263 | .153 | 1.270 | **.026** | |
| | Participation and Human Rights | -.191 | .549 | .036 | -.653 | **.056** | |
| | Socioeconomic Opportunity | .365 | .299 | .365 | - | - | |
| | Human Development | .290 | .416 | .084 | -.765 | **.**097 | |
| | | | | | | | |
| East Africa | Safety and security | -.004 | .990 | .000 | .009 | .957 | .013 |
| | Rule of law, Transparency and Corruption | .035 | .112 | .001 | -.059 | .983 | |
| | Participation and Human Rights | .081 | .801 | .007 | .168 | .810 | |
| | Socioeconomic Opportunity | .002 | .996 | .000 | - | - | |
| | Human Development | .049 | .879 | .002 | .062 | .945 | |

In order to better scrutinize the association between governance and HIV prevalence, the analysis was further broken down into clusters, using Colonial Heritage as comparison groups to determine in which countries, the traditions and observance of the colonial heritage have influence on both variables. American, Italian, Spanish were removed from the analysis because

country member was constant (n=1). Three countries, Namibia, Eritrea and Ethiopia were excluded because they did not fall into either category.

### 4.2.1 Analysis by colonial heritage

The results in Table 4.10 show that only French colonial heritage is significantly associated with HIV prevalence. This indicates that in former French colonies, governance is negatively associated with HIV prevalence, suggesting that when governance improves by removing the effect of colonial heritage by one unit, HIV prevalence decreases by .645 units.

The effect of colonial heritage is pervasive in many sectors of governance such as the education system, law and constitution, and the financial system that most francophone countries inherited from the colonial period. These inherited institutional practices are instruments of neo colonialism that prevent African countries from fully exercising their right to self determination as nations.

41% of the variance in HIV prevalence can be explained by the model. This result sparked the need to investigate other factors that can explain what the model failed to capture.

Table 4.10: Univariate analysis between governance and HIV prevalence by Colonial Heritage

| Variables | N | R-square | Beta | P-value |
|---|---|---|---|---|
| French | 21 | .417 | -.645 | .002 |
| British | 19 | .012 | .108 | .651 |
| Portuguese | 4 | .398 | .040 | .960 |
| Belgian | 3 | .073 | -.711 | .497 |
| Total | 47 | | | |

### 4.2.2 Analysis by religion

The analysis between governance and HIV prevalence was further investigated by religion to determine whether religion makes a difference .Table 4.11 shows that there is no statistically significant association between governance and HIV prevalence in Christian and Muslim countries. This suggests that religion does not affect the relationship between governance and HIV prevalence in Africa.

Table 4.11: Univariate regression analysis between governance and HIV prevalence by religion

| Variables | N | R-square | Beta | P-value |
|---|---|---|---|---|
| Christian | 29 | .002 | .041 | .832 |
| Muslim | 24 | .087 | -.294 | .163 |
| Total | 53 | | | |

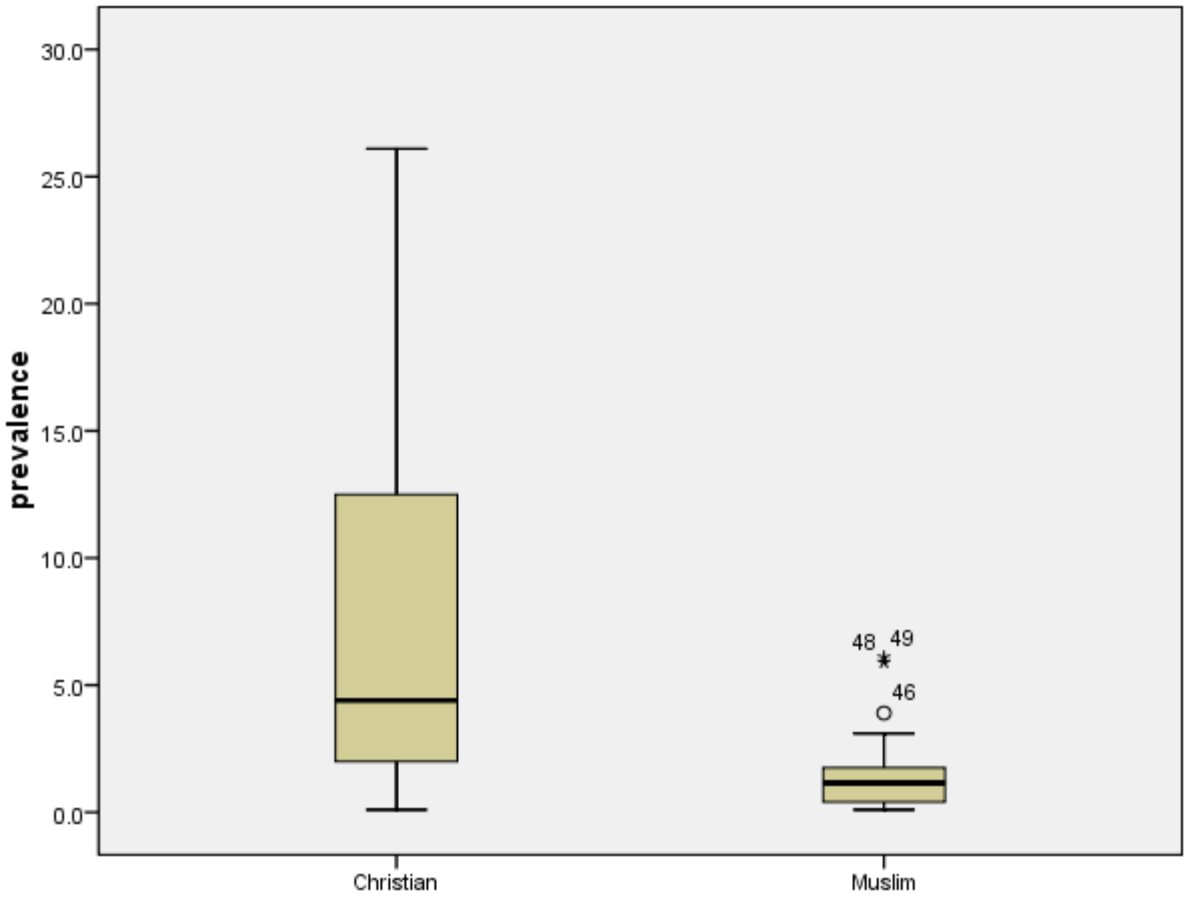
The relationship between governance and HIV prevalence by religion was further examined by controlling for region in a partial correlation analysis. No significant association ( $p > 0.5$) was found in both groups of interest ;Christian and Muslim. Therefore, this result suggests that controlling for region does not affect governance on HIV prevalence. In other words, region does not seem to affect governance, directly or indirectly throughout Africa.

Figure 4.2 illustrates HIV prevalence by religious beliefs. The box plots depict the summary of the distribution of HIV prevalence by religious beliefs across Christian and Muslim African countries. The comparison of both box plots suggests that Christian countries are more affected by HIV as compared to Muslim countries. Moreover, they indicate more variability of HIV prevalence across countries and sub-regions among Christian countries as compared to

Muslims'. With the same minimum HIV prevalence (.1%) both in Christian and Muslim countries, Christian countries , however , show higher prevalence rates, the maximum being (26.1%), while in Muslim countries the highest prevalence is 6.1%.

As the box plots may be misleading in drawing conclusions, an Independent Sample T-test was conducted to further examine the difference of HIV prevalence among both groups.

**Figure 4.2: Box plot of HIV Prevalence and religious beliefs.**




| Christian: N= 29 | Muslim: N= 24 |
|---|---|

An independent sample T- test conducted was designed to determine whether the results shown in the box plots were valid. A statistically significant difference was observed between both groups, Christian (M = 7.707, SD = 7.7019), and Muslim (M = 1.617, SD = 1.6857); t (51) = 3.79, $p < 0.001$. As for the association between religion and HIV prevalence, a Chi-square test was thus conducted between religion and HIV prevalence. The results reported in Table 12 show a statistically significant association between the two variables of interest ($p < 0.05$). These results suggest that religion has an impact on HIV prevalence in African countries. Yet, it is noteworthy that there are some outliers among Muslim countries from West Africa, Central Africa, and Southern Africa. This will be discussed further in the next chapter.

Table 4. 12: Chi Square test between religion and HIV prevalence

| | **Religion** | | | | |
|---|---|---|---|---|---|
| **Prevalence** | **Christian** | **Muslim** | **Total** | $x^2$ | **P-value** |
| **Low** | 11 | 19 | 30 | | |
| **High** | 18 | 05 | 23 | 9.090 | .003 |
| **Total** | 29 | 24 | 53 | | |

### 4.2.3 Analysis by Region

In order to investigate the relationship between Region or regional location and HIV prevalence, an ANOVA test was conducted , it indicates a statistically significant difference observed within and between groups (F= 51.156; <.001).This relationship was explored further through a Chi-square test of association between the two variables . The test turned out to be highly statistically significant ($p< .001$), indicating a very strong association as reported in Table

13.These results imply that region is an important factor that determines HIV prevalence and its magnitude throughout countries across Africa.

Table 4. 13: Distribution of countries according to degree of HIV prevalence

| | Region | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **prevalence** | North Africa | West Africa | Central Africa | Southern Africa | Eastern Africa | Total | $x^2$ | p-value |
| Low | 6 | 14 | 1 | 0 | 9 | 30 | | |
| High | 0 | 3 | 7 | 10 | 3 | 23 | 30.220 | <.001 |
| **Total** | **6** | **17** | **8** | **10** | **12** | **53** | | |

**Low prevalence (0.1 – 2.8%); High prevalence (2.8 - 26.1)**

To examine the association between Colonial Heritage and HIV prevalence, Chi-square test was performed .The test failed to show statistically significant results( p>.05).This suggests that there is no association between Colonial Heritage and HIV prevalence in African countries. A comparison of the p-values obtained from all Chi-square tests' results suggest that the association between Region and HIV prevalence is more significant and provides better evidence than the association between religion and HIV prevalence.

# CHAPTER V

# DISCUSSION

The purpose of this study was to investigate how the social determinants of health or societal structures affect the prevalence of HIV/AIDS in Africa. The study examined a dataset representing 53 African countries as recognized by the United Nations. The examination of the association between governance and HIV prevalence through the Index of African Governance ,and its dimensions, individually, was the main focus of this study. Some additional items external to the Index of African Governance were also scrutinized to better understand the dynamics of the HIV epidemic in Africa. This study built on the following questions;

1-Using the Index of African Governance, is there an association between governance and the prevalence of HIV/AIDS in African countries?

2- Which dimension of governance (safety and security, rule of law, transparency, and corruption, participation and human rights, sustainable economic opportunity and human development) is more predictive of prevalence of HIV/AIDS?

3-Are religion, regional location/region, and colonial heritage associated with HIV prevalence?

The analyses of descriptive statistics revealed discrepancies across regions with regards to religious beliefs (Christian and Muslim), mean HIV prevalence and Governance Index score. These differences across regions explain the dynamics of the epidemic of HIV/AIDS throughout Africa.

## 5.1-Overall analyses

5.1.1- Association between governance and HIV prevalence in African countries.

Overall, including the whole population of interest, the bivariate correlation analysis did not show a statistically significant association between governance and HIV prevalence. This finding is not consistent with previous studies, especially the one conducted by Menon-Johansson that claimed that poor governance is significantly associated with HIV prevalence [14]. This conclusion is not valid as far as African countries are concerned, since the worst governed African country, Somalia, has a lower HIV prevalence than the best governed African country, Mauritius, and Botswana, ranking 4$^{th}$ as shown in the table below.

**Table 5.1**: Sample of a few Country rankings by Governance Index and HIV prevalence

| Ranking | Countries | Governance Index | HIV prevalence (%) |
|---|---|---|---|
| 1 | Mauritius | 85.70 | 1.7 |
| 2 | Seychelles | 79.80 | .2 |
| 3 | Cap verde | 77.40 | 1.0 |
| **4** | **Botwana** | **72.70** | **23.9** |
| 5 | Tunisia | 71.50 | .1 |
| 6 | Ghana | 70.60 | 1.9 |
| 7 | Algeria | 70.20 | .1 |
| 8 | Namibia | 69.20 | 15.3 |
| 9 | South Africa | 68.40 | 18.1 |
| 10 | Sao Tome | 68.20 | 1.5 |
| **53** | **Somalia** | **16.30** | **.5** |

The assertion according to which lowest governance countries have elevated HIV prevalence as documented by some studies [13,14] is somewhat biased with regards to the

evidence provided in the table above. Somalia as the worst governed country has an HIV prevalence that is lower than that of 70% of the top ten best governed countries in the Index of African Governance.

While there might have been a bias in the collection of data used by previous studies, it is worth mentioning that Africa is a complex developing continent that lends itself to many specific realities that do not correspond to the western social paradigm. That is, there are other multiple various factors that drive the epidemic of HIV/AIDS in Africa. Overall, Governance is not associated with HIV/AIDS in all African countries as shown by the results of the bivariate analysis.

### 5.1.2 Most predictive dimension of Governance

The univariate analysis intended to determine which dimension of governance is more predictive of HIV prevalence than others. Rule of Law, Transparency and Corruption was found to be the most predictive dimension.

#### 5.1.2.1 Rule of Law, Transparency and Corruption

As shown by the univariate analysis, Rule of Law, Transparency and Corruption is the unique predictive dimension of governance. The positive value, Beta = .291 suggests that when Rule of Law, Transparency and Corruption improves by 1 unit, HIV prevalence increases by .291 units. Controlling for other variables in a multivariate analysis increased its value from Beta= .291 to Beta = 816 , becoming highly significant ( $p<.001$). This finding is not consistent with previous studies[13].Contrary, many studies have praised the virtue of Rule of Law as a panacea for social development[34,36].However, it is well documented that countries in transition, generally from dictatorship regimes to democracy go through transformational process that results in a change of behaviors brought about by new liberties and freedoms. Russia

is the most perfect example as far as the post soviet transition is concerned. Apropos ,many authors argued that the dislocation of the Soviet Union and the geographic mobility engendered by this socioeconomic and political transformation led to new freedoms such as extramarital sex, prostitution, intravenous drug use ( IDU) which inevitably set the stage for the spread of HIV/AIDS[108-111].

Likewise, in Africa, most countries with very few exceptions are in a transitional phase where democracy, implemented by Rule of Law, Transparency and Corruption, tends to change traditional and conservative values. The notion of Rule of Law as viewed by the Liberal perspective seems to be incompatible with traditional African values [52, 55]. In this context, improving Rule of Law, which equals to guaranteeing individuals rights seem to be hurtful for African populations as far as HIV/AIDS, is concerned [52].

**5.1.2.2 Safety and Security**

Safety and Security was the second more significant, and therefore predictive dimension of governance of HIV prevalence with a p-value = .004. It is important to stress that there has been divergence of opinions and arguments in the literature as to how HIV/AIDS represents a threat to security. Yet, a large body of literature has documented the relationship between Safety and Security, and HIV/AIDS in Africa [23, 24]. As reported in the literature, during armed conflicts women are subject to sexual violations and mass rapes [26-30].Insurgents and soldiers are vectors of HIV [30]. Consequently, the number (150) of minor and major instances of violent conflicts that occurred in Africa between 1946 and 2004 [116], might account for the magnitude of the impact of Safety and Security on HIV prevalence throughout the continent. This finding brings more evidence to the controversy and confirms the association between Safety and Security and HIV prevalence.

#### 5.1.2.3 Human Development

Human Development was negatively associated with HIV prevalence indicating that when this governance dimension improves by one unit, HIV prevalence decreases by .352 units. This outcome is not surprising for a great number of previous studies came to the same conclusion [68-70]. In Africa, in Christian or Muslim societies, there is an unequal distribution of human development resources among population classes in relation with its major components; standard of living, health and sanitation, and education [112].

The gender inequality that prevails in the education sector for instance, accounts for an enormous differential prevalence of HIV/AIDS at the expense of women [109]. In many societies across Africa, women still hold traditional roles as housewives, which prevent them from having access to some critical resources. Moreover many societies are still gender based where men have the primarily role in all spectrum of social activities [72]. Across Africa, inadequate standard of living and disempowerment among women have played a critical role in the spread of HIV [112].

Individual income which determines the standard of living is very low in most countries in Africa. Moreover, many households live below the poverty line [68, 69]. Consequently, poverty, resulting in poor nutrients; less calories and protein intake, has been shown to be highly correlated with HIV prevalence[10,113].Another important element of human development is related to access to adequate and safe health care facilities. The lack of health care facilities that can provide the quality of services needed, especially in terms of infectious diseases is certainly an important contributing social determinant of health.

## 5.2 Analysis by cluster

### 5.2.1 Association between governance, and HIV prevalence by region.

The bivariate correlation analysis between governance and HIV prevalence by region turned out to be statistically significant for North and West Africa with p-values; 0.01 and 0.05, respectively. In North Africa, the Pearson correlation coefficient,-967 indicates that the association between governance and HIV prevalence is highly significant compared to.-599 for West Africa. The negative directionality suggests that when governance improves, HIV prevalence decreases. The difference between both regions can be explained by their governance mean scores, 60.915 and 58.206 for North Africa and West Africa respectively. On the other hand, West Africa has a higher mean HIV prevalence; 1.724 %, compared to North Africa which is .350 %.

Compared with other regions, in the univariate regression analysis, North Africa differs from one major dimension of governance associated with HIV prevalence; Rule of Law, Transparency and Corruption. This dimension might explain the negative association of governance with HIV prevalence in North Africa.

While this finding is consistent with previous research, this relationship seems to find its roots in the Islamic faith, rules and social practices. Indeed, the review of literature unveiled that most of North African countries are Islamic State [99]. In fact, these countries observe and practice certain rules relative to “sharia” which is the foundation for political institutions [99-101]. Therefore, the concept of “rule of law, transparency and corruption” for instance, as seen through the lenses of western civilization may be biased, resulting in misinterpretation of data by the promoters of the Index of African Governance. In the Muslim world, rule of law, liberty and freedom are tied to consultation and consensus of community leaders rather than to individual

rights [100,101]. The degree of fit for the model to explain 96 % of the variance in HIV prevalence in North African countries portray the magnitude of the entrenchment of Rule of Law, Transparency and Corruption in societal values in North Africa.

As for Safety and Security, and Human Development, the negative associations found are consistent with previous studies. The presence of some armed conflicts in Western Sahara and Sudan, and the social turmoil caused by some Islamic groups in the region explain these findings. As for Human Development, various factors such as, roles, values and customs in Muslim countries predict this outcome. Women in general have fewer priorities to access human resources. Moreover, primary school completion rates are unequal among boys and girls [114].

In West Africa, the association between governance and HIV prevalence is explained by the negative associations of Safety and Security, and Participation and Human Rights with HIV prevalence in the univariate analysis. During the past decade, West Africa has been wrecked by major civil wars, in Serra Leone, Liberia and Cote d'Ivoire [115]. According to USAID, these conflicts have caused the deterioration of socioeconomic and political structures creating internally and externally displaced populations [116].As found in the literature, soldiers and other migrant populations are vectors of HIV. This contributes to the spread of HIV throughout the region. This confirms previous studies.

In other regions, namely Central, Southern and Eastern Africa, no association between governance and HIV prevalence was found. This suggests that there are other multiple factors driving the HIV epidemic.

### 5.2.2 Most predictive dimension of governance of HIV prevalence by region

The multivariate regression analysis conducted to determine which dimension of governance is more predictive of HIV prevalence by region showed that only 2 regions, West Africa and Southern Africa, displayed some significant associations after controlling for confounders. This suggests that after holding every single dimension of governance in the model constant, only Participation and Human Rights for West Africa, and Safety and Security, Rule of Law, Transparency and Corruption, and Participation and Human Rights for Southern Africa were statistically significant.

In West Africa, as Participation and Human Rights improves by 1 unit, HIV prevalence decreases by .531 units. Fifty six percent of the variance in HIV prevalence throughout the region can be explained by Participation and Human Rights alone in the model. In other words, as the democratization process (participation in elections), often materialized by free and fair election and respect of Human Rights improve in quality, this contributes to the decrease of HIV prevalence. As mentioned previously, the political instability in the region characterized by various social instabilities do set favorable conditions for the spread of HIV. This finding confirms previous studies as to why participation, Human Rights and Corruption is associated with HIV prevalence.

As for Southern Africa, 3 dimensions were significantly associated with HIV prevalence;

### 5.2.3 Safety and security,

The association between Safety and Security and HIV prevalence was negative, implying that when Safety and Security decreases by 1 unit, HIV prevalence increases by .626 units. Moreover 83 % of the variance in HIV prevalence can be explained by Safety and Security and other variables that showed significant associations in the model.

In fact, Southern Africa has a bloody and recent colonial past relating to independence liberation. Country members gained their full independence after the first half of the 1970's. As previously mentioned, the region has been wrecked by long term internal armed conflicts, and involved in external conflicts where country members' troops sought to assist non core members of the regional economic community, SADC. Indeed, countries such as Zimbabwe, Mozambique, Namibia and South Africa gained their independence in 1980, 1981, 1991 and 1994, respectively [97]. SADC troops took part in conflicts in Angola and DRC until 2002 [97].All these wars and political instabilities occurred in the twentieth century when first cases of HIV/AIDS had already been diagnosed in some African countries. With regards to these socio political instabilities, it is understandable that Safety and Security might have unexpectedly caused an exponential spread of HIV virus through migrations, immigration and the mingling of soldiers and host populations [1, 97].

**5.2.4 Rule of Law, Transparency and Corruption,**

Rule of Law, Transparency and Corruption was positively associated with HIV prevalence. The magnitude of prediction is considerable because HIV prevalence increases by 1.270 units when ''Rule of Law, Transparency and Corruption'' increases by 1 unit. As mentioned previously, this finding is not consistent with previous studies. Yet, the socio political and historical background of Southern Africa helps explain this epidemiological situation. Studies have shown that socio economic and political transition results in much change in behaviors, norms, values and regulations framed by a new political system, especially when a country moves from an oppressive to a democratic regime. Freedom often brings about sexual promiscuity, prostitution, injection drug use, and new sexual orientations that contribute to the spread of HIV/AIDS, and other Sexual Transmitted Diseases [109 -111].

In South Africa, for instance, there existed some apartheid land planning legislations, controlling migrations and internal mobility of black populations, known as Influx Control, and Group Areas Acts [97]. At the end of apartheid, the ban on those discriminatory laws, resulted in massive trends of migrants both from internal rural areas, and neighboring countries such as Malawi, Zimbabwe, and Lesotho to large urban cities where economic activities are prosperous. As a result, HIV prevalence in South Africa increased ten-fold in six years from 1994 to 2000, following the independence [1].

In Zimbabwe, the post independence period also resulted in much transformational change affecting many sectors. New laws introduced by the Zimbabwean authorities for the appropriation of land from whites led to the decline of the agriculture sector, which is one of the main economic activities. Moreover, Structural Adjustment Programs mandated by the World Bank in the 1990s resulted in a big failure in the region [97].

As for Corruption, its effect on HIV/AIDS might be illusive and inverse for various reasons. Many studies have shown that Corruption in Southern Africa is rampant [1].Since most HAART provision programs are government subsidies, corruption would deeply affect the supply of ARV treatments for PLWHA. Curbing corruption in the field of HIV/AIDS is therefore synonymous with good use of resources, more funds for HIV/AIDS, substantial support and adequate health care services, and better ART treatments for people living with HIV/AIDS. Consequently, when lives of PLWHA are prolonged due to more patients on ARV drugs, case fatality rates (the number of deaths due to HIV/AIDS) decreases, while the incidence of new cases results in an increase of HIV prevalence overall. This phenomenon might have been captured because of the high HIV prevalence in the region. This finding reveals some major underlying factors that remained unclear in the field of HIV/AIDS.

### 5.2.5 The effect of ARV drugs on HIV prevalence

It is important to mention that the provision of Anti retroviral drugs in many countries has boosted life expectancy for many people living with HIV in the world since the discovery of HAART. In Africa, as many programs, namely the US President's Emergency Plan for AIDS Relief (PEPFAR), Global Fund to Fight AIDS, Tuberculosis and Malaria, provide free ART, life expectancy of HIV infected individuals has been prolonged considerably. This factor deeply influences the prevalence of HIV/AIDS and case fatality rates in many African countries. Thus, higher prevalence in some countries might be a function of prolonged life expectancy for PLWHA.

### 5.2.6 Participation and Human Rights

Participation and Human Rights was found to be negatively associated with HIV prevalence. In Southern Africa, when participation in elections or the democratic process and respect of human rights improve, HIV prevalence decreases. This finding is consistent with previous studies and its impact is often termed to be less severe [14].The issue of human rights in the region is however critical. Some studies have tied it to the political unrest in the region [97].However, political decision-making processes relating to ARV treatment issues in South Africa and other countries in the region have jeopardized individual rights of PLWHA in the last decade. Stigmatization and discrimination are still persistent despite large protest movements of NGOs of individuals living with HIV/AIDS.

This finding reiterates the momentum that any alternative process in choosing national and public authorities and respects of human rights is critical to fighting against HIV/AIDS in the regions. This finding does not only apply to developing countries. Mennon-Johanson came to the same conclusion in a study involving developed and developing countries [14].

### 5.2.7 Association between governance and HIV prevalence by Colonial Heritage

The univariate analysis between governance and HIV prevalence by Colonial Heritage showed that except for former French colonies, in former British, Belgian and Portuguese colonies, governance is not associated with HIV prevalence. In former French colonies, however, the finding indicates that removing the Colonial Heritage effect from governance improves governance performance, and decreases HIV prevalence. Previous studies have documented colonial past or history as one of the factors contributing to the spread of HIV [79].Yet, the implication of Colonial Heritage in governance as a structural determinant in HIV prevalence remained unclear so far. This finding sheds lights on governance identities and traditions as inherited by African countries from former colonial powers, France, Britain, Portugal, and Belgium.

The tradition and influence of French governance on French speaking countries is still vivid and has been maintained through some political and cultural links and institutions between the former colonial powers and the now independent African countries [92]. Law and administrative regulations in most Francophone countries derived from the French constitution [92,].The francophone organization is one of those political instruments used by France to manipulate its members, preventing sometimes African countries from exercising their right to self determination which is one of the basic human rights. Many studies have documented this influence. In his article on Francophone culture in Africa, Kamal Salhi wrote, “Institutions have the power to shape the attitudes and behaviors of the people who operate within them, since they prescribe norms and rules of conduct’’ [92].The French have indeed imprinted their ideology and education to all French speaking countries, especially African countries [117,118].

### 5.2.8 Association between governance and HIV prevalence by religion

The association between governance and HIV prevalence by religion did not yield significant association. This suggests that regardless of religion, governance in African countries is not associated with HIV prevalence. This can be explained by the fact that many states in Africa are laic, both within Christian and Muslim groups. Religious matters are separate from the states' affairs and do not influence the delivery of the governments' services. Yet, some countries in North Africa abide by the Muslim rules referred to as "sharia" but their influence does not seem to be perceptible when countries are grouped in a lager cluster of Muslim countries.

### 5.2.9 Association between Religion and HIV prevalence

Independent Sample T-test and CHI-Square tests were conducted to explore the difference between both religious beliefs and the association between religion and HIV prevalence. Comparing Christian countries (N = 29) and Muslim countries (N = 24), Independent Sample T-test showed a statistically significant difference between both clusters ($p < 0.001$) and particularly within Christian countries. This finding suggests that Christian countries are more affected by HIV compared to Muslim countries. Previous studies have documented the association between religion and HIV prevalence [77-79]. Islamic restrictions and tenets on sex such as abstinence until marriage account for the lower HIV prevalence found in Muslim countries.

The observance of these religious practices in Muslim countries is rendered more conventional by certain Islamic laws and regulations such "sharia" adopted by Islamic States [79, 99]. Consequently, these principles and laws play a protective function in the spread of HIV [79, 85]. Other factors explaining this finding are certainly the prohibition on sexual relationship

outside marriage and the fact that in Islamic states women often get married at younger age.This prevents young Muslim from having multiple sex partners and sexual relationship prior to marriage. A higher prevalence of circumcision among Muslim communities was also identified as a contributing protective factor against HIV infection [79, 88].

The results of Chi-Square showing a significance of association lower than the one showed by the Independent T-test indicates that when comparing Christian and Muslim countries by degrees of HIV prevalence, variations between and within clusters differ significantly. This is certainly due to the influence of neighboring countries in the regions, be they Christian or Muslim as evidenced by the presence of outliers such as Chad, Tanzania and Cote d'Ivoire in the Muslim cluster.

**5.2.10 Association between Region and HIV prevalence**

The analysis of variance using ANOVA has shown a highly statistically significant difference in HIV prevalence between regions. The association between region and HIV prevalence was also highly significant. While these findings are consistent with previous studies [79], less was known about the entire African continent as far as this correlation is concerned. North Africa has the lowest mean HIV prevalence. West, Central, and Eastern Africa have relatively lower HIV prevalence as compared to Southern Africa which is also part of sub-Saharan Africa.

The distribution of HIV/AIDS across regions suggests that the observed differences across regions are a function of socio-political and economic structures that prevail in those different regions [97]. Indeed, geographic entities delimited by sub-regions lend themselves to different historical backgrounds that have shaped each specific region [97]. Historically, North Africa has less been subject to external and internal migrations compared to other regions of

Africa .Many authors have pointed out migrations as a major factor of HIV prevalence, while displaced people both internally and externally are regarded as vectors of HIV virus in the host population [29,30].The homogeneity of populations in North Africa pertaining to the same culture certainly plays a major hampering function compared to other regions where heterogeneity of ethnic group , race and subculture is an antecedent contributing factor.

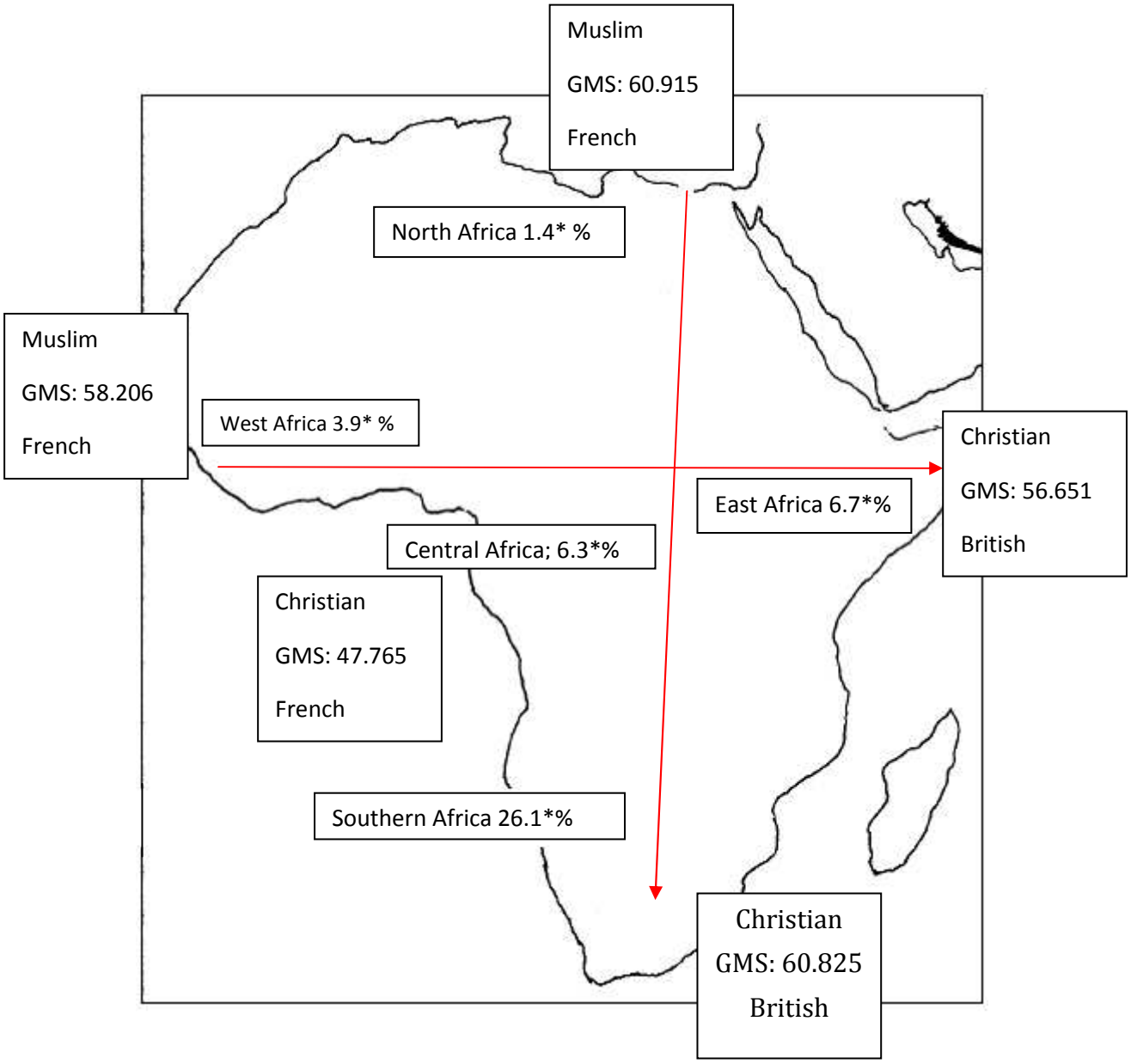
On the other hand, politically, socioeconomic policies differ from one region to another. Development strategies, regulations, and economic opportunities within regions are not similar in all regions. The review of literature has revealed that the interrelations of non governmental and private sectors within a region frame the regional identity which explains multiple changes [97].Region which is a delimitation of geographic entities is subject to multiple socio economic and political interactions. In this context, region appears to be like a crossroad of multiple factors. Considering Region as a piece of a puzzle in the dynamics of HIV prevalence, bringing all information relative to each region together shows the big picture of HIV trends in Africa as illustrated in Figure 5.1.

As shown by the descriptive statistics in Tables 4. 1 and 4.2, HIV prevalence increases exponentionally from North Africa to Southern Africa with respect to governance mean score, religion and colonial heritage. The same trend is observed from West Africa to East Africa. Obviously, socioeconomic, political and historic backgrounds drive the epidemic of HIV/AIDS in Africa. In other words, Religion, Regional location, Colonial Heritage seem to be the main Structural determinants that drive HIV prevalence in Africa.

Therefore, Muslim and French speaking majority regions are less affected by HIV/AIDS compared to Christian English speaking majority regions. In this context, vulnerability is relative to geographical location increasing or decreasing according to regions. Governance regardless of

region and religion does not significantly impact the prevalence of HIV. Yet, it is worth mentioning that one dimension of governance, namely Rule of Law, Transparency and Corruption is the strongest predictor of HIV prevalence in Africa.

**Figure 5.2:** *Geo-prevalence* of HIV by religion, mean governance score and Colonial heritage.




| | | |
|---|---|---|
| *maximum regional HIV prevalence | Christian / Muslim = predominant religion | French /British = predominant former colonies |
| ↓ from North to Southern Africa | from West to East Africa → | GMS= region mean governance score |

Original map from Johnson CW, 2006 [119].

### 5.2.11 Association between colonial heritage and HIV prevalence

Though the CHI-Square test conducted between Colonial Heritage and HIV prevalence did not show statistically significance association, it is noteworthy mentioning that in former French colonies colonial heritage does contribute to the spread of HIV virus. Moreover, the trend of HIV prevalence varies when moving from a French speaking majority region to an English majority speaking majority region as illustrated in Figure 3. Though this finding is consistent with previous studies, it is important to notice that governance is the vector of the association between Colonial heritage and HIV prevalence. Less was known about this relationship and that is certainly the main reason why most studies failed to explicate the association between Colonial heritage and HIV prevalence.

## 5. 3 Limitations

This study as an ecological study suffered from various limitations. The effect of multicollinearity identified between some variables was certainly a major limitation. By removing one variable, namely Socio-Economic Opportunity, some relevant information contributing to the multivariate regression analysis was lost. The applicability of this study being strictly restricted to African populations is another limitation that needs to be considered. Moreover, this study as an ecological study could not be generalized at the individual level for fear of an ecological fallacy. The notion of "rule of law" bears some ideological perceptions which may contrast with some African realities and norms, creating therefore a bias in the interpretation of the analysis and results.

### 5.4 Implications

This study unveiled some critical factors that need to be considered in the design of large HIV/AIDS programs across the African continent. While some findings confirm previous studies, a great number of them are quite surprising and novel. It is important and necessary to take into account these findings for a better understanding of the dynamics of HIV epidemics in Africa. The regional delimitation used by UNAIDS strips Africa of the North Africa region which is usually identified with the Middle East.

This delimitation deprives researchers of critical analytical elements and evidence that can help better understand the underlying factors of HIV prevalence in Africa. The importance of region, religion, and colonial heritage can only and fully be understood when the African continent is analyzed wholly as one, with much emphasis and consideration for its regional diversity that can serve as contrastive features of comparison in order to determine why one particular region (group of countries) is less or more affected by HIV/AIDS than another. Social Ecology helps understand that a country is an element of a vast "microcosm" of which realities are better perceived when taken together with neighboring countries with which it interacts through socioeconomic, and political multilateral relationships. The example of Southern Africa provides valuable insights on how structural change within one country can affect the future of an entire region. Being aware of these structural changes and consequences can help develop better strategies at local and international levels to avoid worst scenarios.

Therefore, large programs in the field of HIV/AIDS such as Multi-Country HIV/AIDS program (MAP), funded by the World Bank, and PEPFAR should be region-specific, focusing on local social norms and values that can act as protective factors against HIV virus. This study, moreover, confirmed that religion is an important protective and predictive factor. Thus,

considering religious values in HIV prevention could have a major positive impact in Africa. In this regard, strategies relative to HIV prevention should also be designed in partnership with Faith Based Organizations (FBOs) that need to be empowered and funded, institutionally.

Further more, this study has underlined the fact that governance has relatively less to do with HIV prevalence in Africa compared to socio-cultural structures. Contrary, some governance dimensions such as "Rule of Law, Transparency and Corruption" are positively associated with HIV prevalence. This should call on the attention of governmental bodies and major international funding organizations such as International Monetary Fund (IMF) to review their strategies and plans designed for the African continent. Consequently, much effort should be invested in other areas of research to shed more lights on other factors often associated with HIV prevalence such as circumcision, and malnutrition.

**5.5 Conclusion**

In summary, despite some limitations, this study has shown that any conceptual or theoretical framework must be understood and applied within a socio political and historical context to yield better results. The association between governance and HIV prevalence as demonstrated in previous studies is undeniable in the western context. Yet, this finding is not valid in African context, especially, when data come from objective sources and indicators such as performance and outcomes, rather than surveys that are generally subject to experts' opinion. The findings of this study should provide international health program managers and policy makers with more insights and preventive alternatives in designing HIV/AIDS programs for African countries. While improving governance is critical to curbing HIV prevalence, regional identities, religion and Colonial heritage are equally important and should be taken into account. One of the factors that have received less consideration in the literature is certainly the impact of

colonial heritage on African societies. Though, no association was found between colonial heritage and HIV prevalence alone, it is worth mentioning that French colonial heritage is negatively associated with governance and HIV prevalence. This sparks the need of more research to highlight its hidden implications. Yet, the directionality of HIV prevalence throughout Africa suggests the implication of Colonial heritage in the spread of HIV/AIDS.

## REFERENCES


1. Pisani E. AIDS Into the 21st Century: Some Critical Considerations. Reproductive Health Matters, 2000.8(15):63-76.
2. UNAIDS, 2008 Report on Global Epidemic, Executive Summary. UNAIDS.[online].Available from: http://www.unaids.org/en/KnowledgeCentre/HIVData/GlobalReport/2008/2008_Global_report.asp.
3. Cohen MS, Hellmann N, Levy JA, DeCock K, Lange J. The spread, treatment, and prevention of HIV-1: evolution of a global pandemic. J Clin Invest. 2008 Apr 1; 118(4):1244–1254.
4. Economic Commission for Africa: Africa: The Socio-Economic Impact of HIV/AIDS. [online]Available from.www.uneca.org.
5. Becker JU, Theodosis C., Kulkarni R. HIV/AIDS, Conflict and Security in Africa: rethinking relationships. Journal of the International AIDS Society, 2008.11(3):1-8.
6. Ba O., O'regan C., Nachega J., Cooper C., Anema A. Rachlis B., Mills EJ. HIV/AIDS in African Militaries: an Ecological Analys. Medecine, Conflict and Survival,2008. 24(2): 88-100.
7. Kirby D. Changes in Sexual Behaviour Leading to the Decline in the Prevalence of HIV in Uganda: Confirmation from Multiple Sources of Evidence. Sex Transm Infect, 2008. 84(2): 35-41.
8. Huairou Commission. Governance and the HIV/AIDS Pandemic in Africa. [online]Avalable from www.huairou.org.
9. Ansari Z. et al. A Public Health Model of the Social Determinants of Health. Soz.-Präventivmed , 2003. 48 242–251.
10. Poku NK., Debt and Africa's HIV/AIDS Crisis. International Affairs, 2002.78(4):531-546.
11. WHO. Action on the Social Determinants of Health: Learning from Previous Mistakes, 2005. [Online] Available from: www.who.int/social_determinants/en/.
12. Solar O, Irwin A. A Conceptual Framework for Action on the Social Determinants of Health , 2007 Apr 1; [online] Available from: http://minority-health.pitt.edu/archive/00000757/.
13. WHO | Commission on Social Determinants of Health - final report Closing the gap in a generation [online] Available from: http://www.who.int/social_determinants/thecommission/finalreport/en/index.html.
14. Menon -Johansson AS. Good Governance and Good Health: The Role of Societal Structures in the Human Immunodeficiency Virus Pandemic. Biomedical Health and Human Rights, 2005. 5(4):1-10.
15. Hambanou LC, Rasanathan KI, HIV/AIDS and the Social determinants of Health.WHO,2009.
16. Kaufmann D., Kraay A. Governance Indicators: Where are we, where should be going? 2006 [online]; Available from: http://info.worldbank.org/governance/wgi/pdf/wps4370.pdf.
17. United Nations (Economic and Social Council). Definition of Basic Concepts and Terminologies in Governance and public Administration. Governance [online] Available form: http://mirror.undp.org/magnet/cdrb/slides/sld002.htm.

18. Canadian International Development Agency (CIDA).Redefining the Concept of Governance, 1997.[ online] Available from: http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUImages/HRDG/$file/GovConcept-e.pdf.
19. United Nations Economic and Social Commission for Asia and the Pacific,2010. What is Good Governance? [online] Available from: http://www.unescap.org/pdd/prs/ProjectActivities/Ongoing/gg/governance.pdf.
20. Rotberg RI., Gisselquist RM. Strengthening African Governance. Index of African Governance. Results and Rankings, 2009. [online] Available from: http://www.nber.org/iag/2009/iag2009.pdf.
21. WHO world report. 2004. [online] Available from: http://www.who.int/whr/2004/en/report04_en.pdf
22. Navarro V. The Politics of Health Inequalities, Research in the United States. International Journal of Health Services, 2004. 34 (1): 87–99.
23. Feldbaum H, Lee K. and Patel P. The National Security Implications of HIV/AIDS. Plos Medicine, 2006. 3(6):774-778.
24. Waal A. Reframing Governance, Security and Conflict in the Light of HIV/AIDS: A Synthesis of Findings from the AIDS, Security and Conflict Initiative. Social Science and Medicine, 2009.70 (2010):114-120.
25. Feldbaum H., Kelley L. and Patel P. The National Security Implications of HIV/AIDS. Plos Medicine, 2006. 3(6):774-778.
26. Tripodi P., Patel P. HIV/AIDS, Peacekeeping ,and Conflict Crises in Africa. Medecine Conflict and Survival , 2004. 20 (3):195-208.
27. Heinecken L**.** The Looming Security Threat to Southern Africa. African Security Review. 2001.10(4):1-11.
28. Khaw AJ., Burkholder B., Salama P., Dondero TJ. HIV Risk and Prevention in Emergency-affected Population: A Review, 2000.24(3):181-197.
29. Smalllman - Raynor M R., Cliff AD. Civil War and the Spread of AIDS in Central Africa. Epidemiological Infection, 1991.106:69-80.
30. T. C. Population Migration and the Spread of Types 1 and 2 Human Immunodeficiency Viruses. National Academic of Sciences , 1994. 91(2407-2414.
31. Marshall M.G. and Cole B. R. Global Report 2009. Conflict, Governance, and State Fragility. Center for Global Policy.[ online] Available from: http://www.humansecuritygateway.com/documents/CSP_GlobalReport2009_ConflictGovernanceStateFragility.pdf.
32. Bazergan R. HIV/AIDS: Policies and programmes for blue helmets , 2004.[ online]; Available from: http://www.iss.co.za/pubs/papers/96/Paper96.htm.
33. Sachiko M., and S. Zaelke .Rule of Law, Good Governance, and Sustainable Development, 2005.[ online] Available from: http://www.inece.org/conference/7/vol1/05_Sachiko_Zaelke.pdf.
34. Rittich K. The future of law and development: Second generation reforms and the
35. Incorporation of the social. Michigan Journal of Law , 2006. 26(199):199-242.
36. Ross L. Law, Finance , and Economic Growth. Journal of Financial Intermediation, 1999.8(8):8-35.
37. Tanzi V. Corruption Around the World: Causes, Consequences, Scope, and Cures. Internationally Monetary Fund, 1998. 45(4):559-594.
38. Akcay, C. Corruption and human development. Cato journal , 2006. 26(6):29-48.

39. The CHUB Corporation. Political Transparency and Accountability Profile, 2009.Retrieved from, www. chubb. com.
40. Science. Uganda Confronts Corruption, Slowly. Science, 2008 [cited; available from: www.sciencemag.org.
41. Tayler L. and Dickinson C. The Link between Corruption and HIV/AIDS. IAPAC Monthly.2006 12 (2):37 -39.
42. Udoh IA., Stammen RM., Mantell JE. Corruption and Oil Exploration: Expert Agreement about the Prevention of HIV/AIDS in the Niger Delta of Nigeria. Health Education Research, 2008. 23(4): 670-681.
43. Johnson P. Abuse of HIV/AIDS-relief Funds in Mozambique. The Lancet, 2009.9:523-524.
44. Millar CJM., Eldomiaty TI., Choi CJ., Hilton B. Corporate Governance and International Transparency in Emerging Markets. Journal of Business Ethics , 2005.59:163-174.
45. Perotti E C., Thaden EL. Dominant Investors and Strategic Transparency,2005. Journal of Law Economics and Organization. 21(1):1-11.
46. Benito B., Bastida F., Budget Transparency, Fiscal Performance, and Political Turnout: An International Approach. Public Administration Review, 2009. 403 - 417.
47. Haan J., Oosterloo S. Transparency and Accountability of central Banks in their Role of Financial Stability Supervisor in OECD. European Journal of Law and Economics,2006.22:255-271.
48. Sridhar D., Batniji R. Misfinancing Gobal Health: a Case for Transparency in Disbursements and Decision Making. The Lancet, 2008. 372 (9644):1185-1191.
49. Shadlen KC. The Political Economy of AIDS Treatment: Intellectual Property and the Transformation of Generic Supply. International Studies Quarterly, 2007. 51: 559–581.
50. Kennedy CR., Harris FH., and Lord M. Integrating Public Policy and Public Affairs in a Pharmaceutical Marketing Program: The AIDS Pandemic. Journal of Public Health and Marketing, 2004. 23(2):128-139.
51. Landman T. Measuring Human Rights: Principle, Practice, and Policy .Human Rights Quarterly, 2004. 26 (4): 906-931.
52. Bueno de Maquista et al."Thinking Inside the Box: A Closer Look at Democracy and Human Rights" Paper presented at the annual meeting of the American Political Science Association, Philadelphia.2003. [online] Available from: http://www.allacademic.com/meta/p62749_index.html.
53. Hollenbach D. Solidarity, Development, and Human Rights: The African Challenge. The Journal of Religious Ethics , 1998. 26 (2): 305-317.
54. Wagle U. R. Political Participation and Civic Engagement in Kathmandu: An Empirical Analysis with Structural Equations. International Political Science Review , 2006. 27(3):301-322.
55. Neumayer E. Do International Human Rights Treaties Improve Respect for Human Rights? The Journal of Conflict Resolution , 2005. 9( 6): 925-953.
56. Howard R. E., Donnelly Jack .Human Dignity, Human Rights, and Political Regimes The American Political Science Review, 80( 3): 801-817.
57. Franco A., Álvarez - Dardet and Ruiz M. T. Effect of democracy on health: ecological study. Biomedical Journal, 2004.329:1421-1423.
58. Kumarasamy N, Venkatesh K, Mayer K, Freedberg K. Financial burden of health services for people with HIV/AIDS in India. Indian J Med Res, 2007.126 (6):509–517.

59. Stephenson R. Community factors shaping HIV-related stigma among young people in three African countries. AIDS Care, 2009 .21(4):403–410.
60. Drury AC., Krieckhaus J. Lusztig M. Corruption, Democracy, and Economic Growth. International Political Science Review, 2006.27(2):121-136.
61. Cima LC., Schubeck TL. Self-Interest, Love, and Economic Justice: A Dialogue between Classical Economic Liberalism and Catholic Social Teaching. Journal of Business Ethics, 2001.30 (3):213-231.
62. Gardilloa M. V. Alvarez-Arcec. J. L.The chicken and the egg: economic growth and freedom.[online] Available from: www. circulodeempresarios.org.
63. Prokopijevic M. Does growth further improve Economic freedom.2002.Available from: http://www.icer.it/docs/wp2002/prokopijevic16-02.pdf.
64. Depken C. A. Sonora R. J.The Asymmetric Effects of Economic Freedom on International Trade Flows. Available from : http://www.freetheworld.com/papers/Depken_and_Sonora.pdf
65. Weichselbaumer D., Winter-Ebmer R. The Effects of Competition and Equal Treatment Laws on the Gender Wage Differential.[online]Available from: http://www.ijbe.org/table%20of%20content/pdf/vol4-2/vol4-2-04.pdf.
66. Griswold DT. Trading Tyranny for Freedom: How Open Markets Till the Soil for Democracy.[online] Available from: http://www.cato.org/pub_display.php?pub_id=3630.
67. Chen H-J. International Migration and Economic Growth: A Source Country Perspective. Journal of Population Economics, 2006 19( 4) :725-748.
68. Crosnoe R. Mistry RS., Elder GH. Economic Disadvantage, Family Dynamics, and Adolescent Enrollment in Higher Education Journal of Marriage and Family, 2002. 64 (3):690-702.
69. UNDP. Human Development Report 2009. Overcoming barriers: Human mobility and development. [online] Available from: http://hdr.undp.org/en/media/HDR_2009_EN_Complete.pdf.
70. Borell et al .Analyzing differences in the magnitude of socioeconomic inequalities in self-perceived health by countries of different political tradition in Europe. International journal of health services, 2009. 39(2): 321 -341.
71. Memoona H. Cultural Approach to HIV/AIDS Harm Reduction in Muslim Countries. Harm Reduction Journal, 2005.2(23):1-8.
72. Boutayeb A. The impact of HIV/AIDS on Human Development in African Countries.BMC Public Health, 2009.9 (1): 1- 9.
73. Campbell C, Macphail C. Peer Education, Gender and the Development of Critical Consciousness: participatory HIV Prevention by South African Youth. Social Science and Medicine, 2002 55:331-345.
74. Whiteside A. Poverty and HIV/AIDS in Africa. Third World Quarterly , 2002. 23 (2 ):313–32.
75. Stephenson R. Community factors shaping HIV-related stigma among young people in three African countries. AIDS Care, 2009 .21(4):403–410.
76. Sohler N, Li X, Cunningham C. Perceived Discrimination Among Severely Disadvantaged People with HIV Infection. Public Health Rep, 2007.122(3):347–355.
77. Gray P.B. HIV and Islam: is HIV prevalence lower among Muslim. Social Science & Medicine, 2003.58(2004);1751-1756.

78. Hlongwana K., Mkhize S., HIV/AIDS through the lens of Christianity: Perspective from a South African Urban Support group, 2007. 4(1):556-563.
79. Zou J., Yamanaka Y., John M., Watt M.,et al .Religion and HIV in Tanzania: influence of Religion of Religious beliefs on HIV Stigma, Disclosure, and Treatment Attitudes.BMC Public Health, 2009. 9 (75) :1-12.
80. Velayati AA., Bakayev V., Bahadori M., Tabatabaei SJ., Alaei A., Farahbood A., Masjedi M R. Religious and Cultural Traits in HIV/AIDS Epidemics in Sub-Saharan Africa. Archives of Iranian Medecine , 2007.10(4):486-497.
81. Thege B. Rural black women's agency within intimate partnerships amid the South African HIV epidemic. African Journal of AIDS Research, 2009. 8(4): 455–464.
82. Hodge D R., Rohy J. Sub-Saharan African Women Living with HIV/AIDS: An Exploration of General and Spiritual Coping Strategies. Social Workers, 2010. 55(1):27-37.
83. Morales LS., Lara M., Kington RS., Valdez RO. Escarce JJ. Socioeconomic, cultural, and behavioral factors Affecting Hispanic health outcomes. J Health Care Poor Underserved 2002. 13(4): 477–503.
84. Kabiru CW., Ezeh A. Factors Associated with Sexual Abstinence among Adolescents in Four Sub-Saharan African Countries. African Journal of Reproductive Health, 2007.11(3):111-132.
85. Benton KW. Saints and Sinners: Training Papua New Guinean (PNG) Christian Clergy to Respond to HIV and AIDS Using a Model of Care. Journal of Religious Health , 2008. 47:314–325.
86. Koffi AK., Kawahara K. Sexual Abstinence Behavior Among Never-Maried Youth in a Generalized HIV Epidemic Country: Evidence from the 2005 Cote d'Ivoire AIDS Indicator Survey. BioMedical Central Public Health, 2008.8 (408):1-15.
87. MacIntosh WA., Thomas J. K. Economic and Other Societal Determinants of the Prevalence of HIV: A Test of Competing Hypotheses. The Sociological Quarterly, 2004.45( 2):303-324.
88. Holtgrave .Apparent declines in the global HIV transmission rate. International Journal of STD & AIDS, 2009. 20: 876–878.
89. Drain PK., Halperin DT., Hughes JP., Klausner JD., Baley RC., Male Circumcision, Religion, and Infections Diseases: An Ecological Analysis of 118 Developing Countries. BioMedical Central Infectious Diseases, 2006.6 (172):1-10.
90. World Economic Forum.Global Competitiveness Report 2009-2010.[online]Available from: http://www.weforum.org/pdf/GCR09/GCR20092010fullreport.pdf.
91. WHO. Male circumcision Information Package,2007.[online] Available from: http://www.who.int/hiv/pub/malecircumcision/infopack/en/index.html.
92. AVERT. The origin of HIV and the first Cases of AIDS.[online]Available from: http://www.avert.org/origin-aids-hiv.htm.
93. Kamal S. Rethinking Francophone Culture: Africa and the Caribbean between History and Theory .Research in african literatures, 2004. 35(1):9-29.
94. Connaissez-Vous la vraie superficie de l'Afrique? [online] Available from: http://www.benilubero.com/index.php?option=com_content&task=view&id=967&Itemid=28
95. Nationsonline.Africa. [online] Available from: http://www.nationsonline.org/oneworld/index.html.

96. Africa Rising 2010.Africa's Population Exploding.[online]Available from: http://africarising2010.blogspot.com/2009/09/africas-population-exploding.html.
97. UNAIDS.Sub-Saharan Africa.[online]Available from: http://www.unaids.org/en/CountryResponses/Regions/SubSaharanAfrica.asp.
98. Mckeever M. Regional Institutions and Social Development In Southern Africa. Annual reviews of Sociology, 2008. (34):453-473.
99. Assessing Regional Integration in Africa.[online] Available from: http://www.uneca.org/aria2/.
100. The World Fact Book.[online] Available from: https://www.cia.gov/library/publications/the-world-factbook/.
101. Lauren Vriens.2009.Islam: Governing under Sharia.[online] Available from: http://www.cfr.org/publication/8034/#p2.
102. Islam and Governance.[online]Available from: http://www.ibaradio.org/Islam/living_islam/LIB.htm.
103. Conseil National de Lutte Contre le Sida. Cadre Strategique National de Lutte Contre le VIH/SIDA et le IST 2009-2013.[online]Available from: http://www.cnls-congobrazza.org/downloads/.
104. Decosas J. The Social Ecology of AIDS in Africa , 2002. [online]Available from: http://www.unrisd.org/80256B3C005BCCF9/(httpAuxPages)/E60AAD2EFA4882F4C1256BB8004F2F3F/$file/decosas.pdf.
105. Labov, T. G. , 2005-08-12 "Sociological Consequences of HIV/AIDS in East Africa" Paper presented at the annual meeting of the American Sociological Association, 2009[online]Available from: http://www.allacademic.com/meta/p19679_index.html.
106. Economic Commission for Africa.Sub-regional offices.[online] Avaialble from: http://www.uneca.org/eca_programmes/srdc/default.htm.
107. UNICEF, Statistics.[online] Avalable from: http://www.unicef.org/infobycountry/chad_statistics.html.
108. African Countries and Independence Days,2007.[online]Available from: http://www.japanafricanet.com/directory/presidents/africanindependence.html.
109. The National Bureau of Economic Research .Index of African Governance, 2009.[online]Available from: http://www.nber.org/data/iag.html.
110. Moran D. The Geography of HIV/AIDS in Russia: Risk and Vulnerability in Transition. Eurasian Geography and Economics, 2005. (46) 7: 525-551.
111. Moran D., Jordaan JA. HIV/AIDS in Russia: determinants of regional prevalence. International Journal of Health Geographics 2007, 6 (22) :1-9.
112. Rhodes T., Simic M. Transition and the HIV Risk Environment. British Medical Journal, 2005. 331:220-223.
113. Craddock S. Disease, social identity, and risk: rethinking the geography of Aids. Transactions of British Geographers , 2000. 5(2):153 -163.
114. Stillwaggon E. HIV Transmission in Latin America: Comparison with Africa and Policy Implications. South African Journal of Economics, 2005.68(5):444-454.
115. Elimam D. Political, Economic, Social, and Health-related Correlates of HIV/AIDS Prevalence in the Eastern Mediterranean Region of WHO , 2008.[online]Available from: http://etd.gsu.edu/theses/available/etd-12042008-231234/.
116. War In Africa. Resolving conflicts in Africa, 2004.[online]Available from: http://www.crimesofwar.org/africa-mag/afr_01_porteos.html.

117. USAID.Democracy and Governance, 2007.[online]Available from: http://www.usaid.gov/locations/sub-saharan_africa/sectors/dg/.
118. Gauthier H., George F. Brown .Francophone Countries. Studies in Family Planning, 1975.6( 8): 297-300.
119. Johnson CW. Eventpoint Cosmo Geography, 2006. [online] Available from: http://www.earthmatrix.com/cosmogeography_excerpt.pdf.

**APPENDIX A**

Countries by Religion and Former Colonial Rulers

| Number | Countries | Predominant Religion | Former Colonial Rulers |
|---|---|---|---|
| 1 | Algeria | Muslim | France |
| 2 | Angola | Christian | Portugal |
| 3 | Benin | Muslim | France |
| 4 | Botswana | Christian | Britain |
| 5 | Burkina Faso | Muslim | France |
| 6 | Burundi | Christian | Belgium |
| 7 | Cameroon | Christian | France |
| 8 | Cape Verde | Muslim | Portugal |
| 9 | Central African Republic | Christian | France |
| 10 | Chad | Muslim | France |
| 11 | Comoros | Muslim | France |
| 12 | Congo | Christian | France |
| 13 | Cote d'Ivoire | Muslim | France |
| 14 | Djibouti | Muslim | France |
| 15 | DRC | Christian | Belgium |
| 16 | Egypt | Muslim | Britain |
| 17 | Equatorial guinea | Christian | Spain |
| 18 | Eritrea | Muslim | Italy/Britain |
| 19 | Ethiopia | Christian | Never colonized |
| 20 | Gabon | Christian | France |
| 21 | Gambia | Muslim | Britain |
| 22 | Ghana | Christian | Britain |

| | | | |
|---|---|---|---|
| 23 | Guinea | Muslim | France |
| 24 | Guinea Bissau | Muslim | Portugal |
| 25 | Kenya | Muslim | Britain |
| 26 | Lesotho | Christian | Britain |
| 27 | Liberia | Christian | American colonization society |
| 28 | Libya | Muslim | Italy |
| 29 | Madagascar | Christian | France |
| 30 | Malawi | Christian | Britain |
| 31 | Mali | Muslim | France |
| 32 | Mauritania | Muslim | France |
| 33 | Mauritius | Christian | Britain |
| 34 | Morocco | Muslim | France |
| 35 | Mozambique | Christian | Portugal |
| 36 | Namibia | Christian | South African Mandate |
| 37 | Niger | Muslim | France |
| 38 | Nigeria | Muslim | Britain |
| 39 | Rwanda | Christian | Belgium administered UN trusteeship |
| 40 | Sao tome | Christian | Portugal |
| 41 | Senegal | Muslim | France |
| 42 | Seychelles | Christian | Britain |
| 43 | Sierra Leone | Muslim | Britain |
| 44 | Somalia | Muslim | Britain |
| 45 | South Africa | Christian | Britain |
| 46 | Sudan | Muslim | Britain |
| 47 | Swaziland | Christian | Britain |

| | | | |
|---|---|---|---|
| 48 | Tanzania | Muslim | Britain |
| 49 | Togo | Christian | France |
| 50 | Tunisia | Muslim | France |
| 51 | Uganda | Christian | Britain |
| 52 | Zambia | Christian | Britain |
| 53 | Zimbabwe | Christian | Britain |

## APPENDIX B

Index of African Governance 2009

| Countries | Safety and Security | Rule of Law, Transparency, and Corruption | Participation and Human Rights | Sustainable Economic Opportunity | Human Development | Index of African Governance (score) | Rank |
|---|---|---|---|---|---|---|---|
| **Algeria** | 93.7 | 62.1 | 60.7 | 48.9 | 85.7 | **70.2** | *7* |
| **Angola** | 83.9 | 35.3 | 24.5 | 44.1 | 41.7 | **45.9** | *46* |
| **Benin** | 94.4 | 54.7 | 83.7 | 34.1 | 52.9 | **64.0** | *13* |
| **Botswana** | 77.8 | 84.8 | 84.3 | 50.5 | 66.0 | **72.7** | *4* |
| **Burkina Faso** | 94.4 | 62.7 | 72.3 | 33.2 | 45.6 | **61.6** | *19* |
| **Burundi** | 66.5 | 44.4 | 60.9 | 31.4 | 47.1 | **50.0** | *39* |
| **Cameroon** | 83.2 | 44.1 | 53.7 | 36.3 | 54.9 | **54.4** | *33* |
| **Cape Verde** | 100.0 | 88.5 | 84.8 | 43.2 | 70.6 | **77.4** | *3* |
| **C.A.R** | 50.1 | 40.8 | 61.2 | 30.9 | 32.2 | **43.0** | *48* |
| **Chad** | 55.2 | 37.7 | 33.4 | 25.7 | 31.5 | **36.7** | *51* |
| **Comoros** | 94.4 | 51.2 | 66.5 | 31.0 | 50.5 | **58.7** | *25* |
| **Congo** | 71.4 | 42.8 | 42.5 | 33.0 | 54.1 | **48.7** | *43* |
| **D R C** | 43.3 | 23.2 | 54.2 | 28.0 | 38.0 | **37.3** | *50* |
| **Cote d'Ivoire** | 69.9 | 37.5 | 25.3 | 32.9 | 47.9 | **42.7** | *49* |
| **Djibouti** | 94.4 | 45.0 | 48.9 | 37.2 | 57.9 | **56.7** | *32* |
| **Egypt** | 100.0 | 56.5 | 18.9 | 47.2 | 86.8 | **61.9** | *18* |
| **Equatorial Guinea** | 94.4 | 41.9 | 20.6 | 53.0 | 37.6 | **49.5** | *41* |
| **Eritrea** | 89.4 | 46.0 | 10.3 | 29.6 | 46.6 | **44.4** | *47* |
| **Ethiopia** | 80.3 | 49.2 | 38.1 | 36.2 | 51.8 | **51.1** | *37* |
| **Gabon** | 100.0 | 53.9 | 56.0 | 50.8 | 71.7 | **66.5** | *11* |
| **Gambia** | 94.3 | 52.6 | 68.4 | 39.1 | 59.5 | **62.8** | *15* |
| **Ghana** | 94.4 | 75.1 | 80.5 | 36.7 | 66.3 | **70.6** | *6* |
| **Guinea** | 88.2 | 49.7 | 23.7 | 31.6 | 43.7 | **47.4** | *44* |
| **Guinea-Bissau** | 88.8 | 32.1 | 73.2 | 21.1 | 42.3 | **51.5** | *36* |
| **Kenya** | 76.2 | 52.9 | 59.3 | 38.6 | 63.7 | **58.2** | *27* |
| **Lesotho** | 66.7 | 67.1 | 74.2 | 37.2 | 54.9 | **60.0** | *23* |
| **Liberia** | 63.9 | 26.9 | 87.2 | 32.5 | 39.3 | **50.0** | *40* |
| **Libya** | 100.0 | 41.4 | 15.6 | 60.7 | 88.5 | **61.2** | *21* |
| **Madagascar** | 94.4 | 59.4 | 75.0 | 34.7 | 48.5 | **62.4** | *17* |
| **Malawi** | 94.4 | 63.4 | 70.9 | 34.8 | 53.1 | **63.3** | *14* |
| **Mali** | 79.4 | 56.6 | 74.1 | 32.8 | 43.3 | **57.2** | *30* |
| **Mauritania** | 76.6 | 62.5 | 69.5 | 36.2 | 60.0 | **61.0** | *22* |
| **Mauritius** | 100.0 | 84.6 | 95.5 | 59.8 | 88.8 | **85.7** | *1* |
| **Morocco** | 100.0 | 61.7 | 44.3 | 46.8 | 76.7 | **65.9** | *12* |
| **Mozambique** | 94.4 | 49.5 | 64.8 | 36.9 | 38.4 | **56.8** | *31* |
| **Namibia** | 88.8 | 77.2 | 76.3 | 43.1 | 60.6 | **69.2** | *8* |
| **Niger** | 90.4 | 53.1 | 81.4 | 30.6 | 33.4 | **57.8** | *29* |
| **Nigeria** | 66.4 | 52.3 | 43.3 | 38.9 | 50.6 | **50.3** | *38* |
| Rwanda | 98.3 | 48.4 | 68.4 | 35.1 | 42.9 | 58.6 | *26* |
| **Sao Tome and** | 100.0 | 46.2 | 91.5 | 43.8 | 59.5 | **68.2** | *10* |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Principe** | | | | | | | |
| **Senegal** | 94.1 | 66.3 | 63.8 | 35.8 | 53.7 | **62.7** | *16* |
| **Seychelles** | 88.8 | 74.0 | 74.8 | 73.8 | 87.8 | **79.8** | *2* |
| **Sierra Leone** | 77.1 | 35.3 | 69.2 | 34.7 | 41.7 | **51.6** | *35* |
| **Somalia** | 33.3 | 5.6 | 4.9 | 3.2 | 34.4 | **16.3** | *53* |
| **South Africa** | 61.1 | 77.0 | 82.0 | 56.1 | 65.5 | **68.4** | *9* |
| **Sudan** | 35.5 | 29.0 | 11.9 | 38.2 | 59.4 | **34.8** | *52* |
| **Swaziland** | 72.2 | 59.6 | 23.2 | 40.0 | 52.1 | **49.4** | *42* |
| **Tanzania** | 88.9 | 58.9 | 66.9 | 36.0 | 56.9 | **61.5** | *20* |
| **Togo** | 82.9 | 51.2 | 45.9 | 32.8 | 50.6 | **52.7** | *34* |
| **Tunisia** | 100.0 | 70.5 | 45.3 | 52.5 | 89.0 | **71.5** | *5* |
| **Uganda** | 81.3 | 54.4 | 63.1 | 35.8 | 54.5 | **57.8** | *28* |
| **Zambia** | 83.3 | 60.9 | 65.8 | 39.7 | 48.4 | **59.6** | *24* |
| **Zimbabwe** | 78.9 | 43.1 | 40.8 | 23.5 | 50.1 | **47.3** | *45* |

CAR = Central African Republic
DRC = Democratic Republic of Congo