

**Analysis of Knowledge, Attitude, Behavioural &
Structural Factors Driving HIV Epidemic in Gombe State,
Nigeria**

**Adamu Umar Usman
Nigeria**

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Analysis of Knowledge, Attitude, Behavioural & Structural Factors Driving HIV Epidemic in Gombe State, Nigeria

A thesis submitted in partial fulfilment of the requirement for the degree of Master of Public Health

By:

**Adamu Umar Usman
Nigeria**

Declaration:

Where other people's work has been used (either from a printed source, internet or any other source) this has been carefully acknowledged and referenced in accordance with departmental requirements.

The thesis: Analysis of Knowledge, Attitude, Behavioural Factors and "Drivers" of HIV epidemic in Gombe State, Nigeria is my own work.

Signature:

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Contents:

Contents:	1
Figures:	3
Acknowledgement:	4
Acronyms:	5
Abstract:	6
Glossary:	7
Preface	8
Chapter 1: Background	10
1.1 Geo-political structure	10
1.2 Demography:.....	10
1.3 Religion and ethnic groups:	10
1.4 Socio-economic characteristics:.....	11
1.5 Health Care System:	11
1.6 HIV Response:.....	12
Chapter 2: Problem statement, problem analysis, objectives and methodology	13
2.1 Problem Statement:.....	13
2.2 Setting of the problem:.....	13
2.3 Problem analysis:	14
2.4 General Objective:.....	16
2.5 Specific Objectives:	17
2.6 Target beneficiaries:	17
2.7 Methodology:	17
2.8 Limitation of the thesis:.....	17
Chapter 3: Knowledge & Attitude about HIV: Description of the primary study and findings:	18
3.1 Methodology:	18
3.2 Findings on HIV knowledge and attitude from the primary data:	19
3.2.1 Background characteristics:.....	19
3.2.2 Knowledge and attitude about HIV:.....	20
3.3 Critique of the study on knowledge & attitude on HIV:.....	25
3.3.1 Strength:.....	25
3.3.2 Weaknesses and limitations:.....	26

Chapter 4: Behavioural factors and drivers of the epidemic: Methodology and findings of literature review.....	28
4.1 Methodology:	28
4.2 Results of literature search	29
4.3 Limitations:.....	30
4.4 Findings of literature review:.....	30
4.4.1 HIV Transmission dynamics:	30
4.4.2 Individual factors:.....	31
4.4.3 Social Drivers:.....	36
4.4.4 Structural drivers:.....	39
Chapter 5: Discussion	44
5.1 Knowledge and attitude about HIV:	44
5.2 Individual factors:.....	45
5.3 Social drivers:	48
5.4 Structural drivers:.....	49
Chapter 6: Conclusion & Recommendations	52
6.1 Conclusion:.....	52
6.2 Remarks on adapted framework:	53
6.3 Recommendations:.....	53
6.3.1 Policy & governance:	53
6.3.2 Research/assessments:	53
6.3.3 Interventions:	54
Reference List.....	55
Annexes	65

Figures:

Figure 1: Trend of adult HIV Prevalence, Gombe State.....	14
Figure 2: Absolute numbers of respondents used in calculating percentages of variables, Gombe State. Nigeria 2008.....	19
Figure 3: Age distribution of respondents by sex	20
Figure 4: Proportions of male and female respondents who ever heard of HIV	21
Figure 5: Knowledge on prevention of sexual transmission of HIV by sex and location .	21
Figure 6: Beliefs about HIV by sex of respondents in urban location.....	22
Figure 7: Percentage of urban and rural women having correct knowledge on MTCT....	24
Figure 8: Knowledge on HCT among men and women respondents by location.....	25
Figure 9: Modified heuristic framework of the social epidemiology of HIV	29
Figure 10: Flow chart describing result of literature search.....	30
Figure 11: Box 1- Summary knowledge and Attitude	45
Figure 12: Box 2- Summary individual characteristics and behaviour.....	47
Figure 13: Box 3-Summary social drivers	49
Figure 14: Box 4- Summary structural Drivers	51

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Acronyms:

ART	Anti-Retroviral Therapy
CD₄	Cluster of Differentiation 4
CI	Confidence Interval
CIDA	Canadian International development Agency
CP	Concurrent Partnership
FSW	Female Sex Worker(s)
GomSACA	Gombe State action Committee on AIDS
GUD	Genital Ulcer Disease
HCT	HIV Counselling and Testing
HDR	Human Development Report
HSV 2	Herpes Simplex type 2
IDU	Injecting Drug Use(rs)
LDD	Long Distant Driver(s)
LGA	Local Government Area
MC	Male Circumcision
MP	Multiple Partnership(s)
MSM	Men Having Sex with Men
MTCT	Mother-To-Child Transmission
NACA	National Agency for the Control of AIDS
NARHS	National AIDS & reproductive Health Survey
NDHS	National Demographic Health Survey
NGUD	Non-Genital Ulcer Disease
NIDU	Non-Injecting Drug Use(r)
PAF	Population Attributable Fraction
PEPFAR	Presidential Emergency Plan on AIDS Relief
PLHIV	People Living With HIV
PMTCT	Prevention of Mother-To-Child Transmission
SSA	Sub-Saharan Africa
STI	Sexually Transmitted Infections
UNDP	United Nations development Programme
UNGASS	United Nations General Assembly
USAID	United State International Development Agency
WB-MAP	World Bank-Multi-Country AIDS Programme
WHOLIS	World Health Organization Library Database

Abstract:

Background: Gombe State located in north-eastern Nigeria, continue to experience the brunt of HIV epidemic despite the progress made in access to treatment, care and support services. The State's epidemic is generalized with an adult HIV prevalence of 4.9% sufficient to sustain the epidemic. Equally, high HIV prevalence (urban; 7.0%, rural; 3.1%) among age group 15-24 years suggest recent transmission. (3)

The occurrence of new infections is a manifestation of weak prevention programme. Information on behavioural factors and drivers of the State epidemic is essential for evidence-informed prevention programme, hitherto such information scarcely exists. Hence, this study seeks to assess the level of knowledge and attitude about HIV among the general population, explore the behavioural factors and drivers that fuel the State's epidemic, and recommend interventions and themes for further research.

Methodology: To assess the level of HIV knowledge and attitude data was analyzed from 1,481 men and women age 15-49 years who participated in a cross-sectional survey selected by multistage random sampling. Behavioural factors and drivers of generalized and concentrated epidemic were explored to identify those that influence the State's epidemic by reviewing existing literature.

Result: Over 95% of respondents have heard of HIV with no significance difference between urban-rural location (CI¹, -1.43 to 2.23) and sex (CI, -0.3 to 5.7). Faithful monogamy and condom use is opined by over 95% and 75% of respondents respectively as means of protection against HIV. Most respondents dispelled misconceptions about HIV, but only 30.6% of urban men (CI, 25 to 37) and 28.3% (CI, 20 to 36) of urban women believe that HIV is incurable. Over 80% of respondents expressed accepting attitude towards PLHIV, however, 47.8% (CI, 41 to 55) and 68.1% (CI, 57 to 70) of men and women respectively with higher education opined that HIV status of a family member should remain a secret. Rural respondents have higher knowledge on MTCT than their urban counterpart. Uptake of HCT (10-17.8%) and risk perception are low across background characteristics.

Multiple partnership, concurrent partnership, sexual mixing alcohol/drug use, low condom use, STI, FSW, extramarital sex associated with polygyny pre/post-partum abstinence, early marriage intergenerational sex, neighbourhood factors, mobility/migration, stigma and discrimination, gender inequality, wealth and poverty are the *most likely* drivers of the State's epidemic. The role of male low circumcision in southern part of the State, MSM, IDU, orogenital sex, intravaginal practices, sororate/levirate, widow cleansing, spouse sharing, social capital, militarization in the State's HIV epidemic is uncertain.

¹ All confidence intervals cited in this article refer to 95% level except stated otherwise

Conclusion: While this study has revealed the level of knowledge on HIV, behavioural factors and drivers of the Gombe State epidemic, further research is essential for understanding the dynamics of the epidemic. However, with the available knowledge targeted interventions could curb the spread of the virus.

Key words: HIV, Gombe, State, analysis, knowledge, behaviour, driver.

Words count: 14, 650.

Glossary:

Term/Concept	Definition
Drivers of HIV	Structural (physical, social, cultural, organizational, community, economic, legal or policy physical, social, cultural, organizational, community, economic, legal or policy) factors that are not easily measured that increases people's risk and vulnerability to HIV infection (UNAIDS)
Human Development Index	A composite indicator for human development derived from adult literacy level, primary, secondary and tertiary school enrolment, life expectancy and Purchasing Power Parity (2007/2008 HDR)
Human Poverty Index	Focuses on the proportion of people below poverty threshold level, living a long and healthy life, having access to education, and a decent standard of living (2007/2008 HDR)
Gender Development Index	Measures achievements in the same dimensions using the same indicators as the HDI but captures inequalities in achievement between women and men. HDI adjusted downward for gender inequality (2007/2008 HDR)
Gini Coefficient	Measures income inequality in a society (UN fact sheet)
Susceptibility	Refers to the individual, group, and general social predisposition to HIV infection. (UNAIDS)
Vulnerability	Refers to "structural, social and other contextual factors that enhance risk by limiting people's ability to avoid and/or increasing the likelihood of contracting HIV". (UNAIDS)
Neighborhood effects	Represent the confluence between social networks and physical spatial locations. E.g. IDU and black neighborhood (Epid. Review J.H. Sch. Pub. Health V. 26 2004)
High Risk Sex	Sex with a non-marital, non-cohabiting partner in the last 12 months (UNAIDS)

Preface

HIV remains a global health issue despite increased access to treatment and prevention services especially in resource-limited settings. Sub-Saharan Africa accounts for 67% of 3.0million People Living with HIV (PLHIV) and 75% of AIDS death globally by 2007. Strikingly, 2.7million new infections occurred worldwide in 2007 alone. (1)

The Nigeria's HIV epidemic is generalized, although key populations at higher-risk have a substantial contribution. (2) The latest HIV surveys indicated that the HIV prevalence among adults and female sex workers is 4.4% (3) and 34.5% respectively. (4) By the end of 2007 there were 2.6million PLHIV and 1.2million children affected by AIDS (CABA) in the country. (5)

Gombe State the focus of this thesis is located in the north-eastern part of Nigeria and belongs to the most affected states in the country, with an adult prevalence of 4.9% and over 60,000 PLHIV as at 2005. (3) Similarly, by 2005 HIV claims the lives of over 23, 000 people in the State since the beginning of the epidemic, leaving behind 16,200 orphans. In accordance with the principle of "three ones" Gombe State Action Committee on AIDS (GomSACA) was established to coordinate the State's HIV expanded-multisectoral response. Based on over a decade of my medical experience and programming in HIV and TB & Leprosy control I was appointed the Programme manager of the committee.

The choice of this topic was influenced by the global drive to strengthen HIV prevention efforts through the understanding of HIV transmission dynamics at all levels **"Know your epidemic, know your response"** (6) which seems to be not only rational but compelling for Gombe State response. Over the years, the State response was guided by 2006 to 2009 Strategic plan, which was built on feeble evidence. This expensive but avoidable mistake leads to misplacement of priorities and waste of resources while the epidemic expands. As a manager I feel obliged to take the lead in "*know your epidemic*" crusade, hence my fashion for the topic.

In this thesis an attempt has been made to assess the level of knowledge and attitude on HIV among adult population in Gombe State by analyzing a quantitative data of a research conducted in August 2008. In addition, most-likely and inconclusive behavioural factors and "drivers" influencing the State's epidemic were explored by reviewing existing literature on generalized HIV epidemic with substantial contribution of key population. Equally, recommendations on interventions and themes for HIV research in the State were proposed.

GomSACA and its partners will use information generated from this thesis in the development of Gombe State Strategic Plan 2010-2015, prevention plan and advocacy.

Chapter 1: Background

1.1 Geo-political structure

Nigeria is located in West Africa, bordering Gulf of Guinea, Cameroon (HIV prevalence 5.1%), Niger (HIV prevalence 0.8%), and Benin (HIV prevalence 1.2%) republics. (1) The borders allow free bi-directional crossing, hence cross-border transmission of HIV. The country has six geo-political zones that are divided into 36 States and Federal capital territory. Each State is partitioned into Local Government Areas (LGAs). Administratively, the country operates autonomous three tier governments; Federal, State and LGA. (7)

Gombe State, the focus of this thesis is located in the northeast zone of the country. It is divided into eleven autonomous LGAs, reflecting its multiethnic and diverse sociocultural background. The southern part of the State share boundary with a high-grade HIV prevalent State that is near the epicentre of the Nigeria's epidemic (north central zone), while the northern part shares boundaries with States having low-grade HIV prevalence (below 5%). See annex 1

1.2 Demography:

Nigeria has a population of about 169million² and about two-third live in rural areas. Almost 75% of the population is under the age of 30years "reverse demographic transition" because of high fertility rates (5.9 children per woman) and stagnant crude death rate. (14 deaths/1,000 people per annum) (8;9) The implication of this population pattern is that the overall number of PLHIV will be high because of high HIV prevalence in the age band 20-29years (4.7 to 4.9%). (3)

Gombe State has an estimated population of 2.6million for 2009 (10) and a population density of 128 persons per km². The population structure is similar to the national picture. Rapid urbanization of the major towns through intra and interstate migration lead to cultural transformations and resultant HIV consequences. (11)

1.3 Religion and ethnic groups:

There are over 374 ethnic groups in the country with diverse cultures and traditions. (7) This geo-cultural feature contributes to the heterogeneous characteristics of the country's epidemic. Gombe State has over 15 ethnic groups; Hausa/Fulani predominantly Muslims are found in the north and Tangale-Waja, who mostly practice Christianity and in few instances traditional religions are located in southern part of the State. (17) The practices inherent to these cultures and religions affect the dynamics of the epidemic.

² This is a projected population based on 2006 population census, which is 140million and a growth rate of 3.2%

1.4 Socio-economic characteristics:

Over 70% of the Nigeria's population lives below poverty line with limited access to good health and social services. (7) The Human Development Index (2006) is 0.499, Human Poverty Index is 37%, Gender Development Index 0.485, (12) and Gini coefficient is 0.506. (13) These composite indicators signify soaring level of poverty, gender inequality, and inequity of wealth distribution amid the Nigeria's populace. Collectively, they imply poor wellbeing including heightened susceptibility and vulnerability to HIV.

In addition, the population is highly mobile increasing the risk of HIV transmission. Junction towns, railways, and bus stations provide a sanctuary for high-risk behaviours. International airports and ports provide route for illicit drug trade, hence increase availability of illicit drug for local use. (14)

Gombe State ranked 7th in the list of Nigeria's ten poorest States (15) and over 80% of its populace are rural dwellers engaged in subsistence farming as a predominant source of income. The central location of the State, commercial and agricultural activities made it attractive to Long Distant Drivers (LDD), traders, sex workers and seasonal labour migrants. (17)

1.5 Health Care System:

The health care system in Nigeria is devolved; each tier of government is the custodian of corresponding level of health care. The public health care system is weak, poorly funded and overstretched especially with HIV epidemic. Poorly regulated private and traditional health sectors provide chunk of health services ensuing unethical practices with HIV consequences. (16)

Revenue generation for health system financing is mainly through internally generated revenues and user-fees. Community insurance (Bamako Initiative), social insurance (National Health Insurance Scheme) and donor support contributes a meagre proportion. In 2006, the per-capita expenditure on health and out-of-pocket expenditure (OPE) as percentage of private expenditure on health³ were estimated at international USD 44 and 91.2% respectively. (8) High OPE entails catastrophic financial consequences for PLHIV and households.

Human resource for health is inadequate, poorly distributed and ill-motivated. Task shifting is employed to lessen the work overload brought about by HIV epidemic.

Gombe State health care structure, financing and challenges are akin to the national picture. There is one Tertiary, 10 secondary and 470 Primary

³ Private Expenditure on Health as % Total Expenditure on Health is 74.5%

Health facilities. The health indicators are worse than the national average. Maternal Mortality Ratio is 1000/100,000 live births and Infant Mortality Rate is 124/1000 live births. (17)

1.6 HIV Response:

Nigeria has gone through the phases of denial, health, and now multisectoral response in the history of HIV epidemic. In 1988 National Expert Advisory Committee on AIDS was formed, latter transformed National AIDS/STI Control Programme.

In 2000 the Presidential Advisory Committee on AIDS and National Action Committee on AIDS (NACA) were established to coordinate the nation's multisectoral response. Currently, public, private-for-profit and not-for-profit organizations support 1,142, 252 and 597 facilities providing HIV Counselling and Testing (HCT), Prevention of Mother To Child Transmission (PMTCT) and Anti-Retroviral Therapy (ART) services respectively (5) in addition to other prevention, care and support interventions. The national prevention programme is guided by prevention plan and Behavioural Change Communication Strategy. (2)

The epidemic is monitored through "second generation surveillance" Antenatal-based HIV/Syphilis surveillance, Integrated Bio-Behavioural Survey (IBBS) and case reporting/programme reporting under the M&E platform "Nigeria, National Management Information System" (NNRIMS). Knowledge and behaviours about HIV is monitored by National Demographic and Health Survey (NDHS) and National Reproductive Health Survey (NARHS). (2)

GomSACA coordinates the State HIV response and oversees the Local Action Committees on AIDS. The State response is guided by State Strategic Plan 2006-2009 and other national instruments. The second quarter 2009 programme report indicated that eighty-one and 9 facilities provide PMTCT/HCT and ART services respectively. HIV mainstreaming is in the pipeline in 5 key line ministries that work with over 100 local NGOs in prevention, care and support programmes. (17) Apart from case and programme reporting there is no active HIV/STI surveillance system in place.

Bulk of financing and technical assistance of the State's HIV programme comes from World Bank MAP, PEPFAR, UN system, CIDA, and USAID.

Chapter 2: Problem statement, problem analysis, objectives and methodology

2.1 Problem Statement:

HIV epidemic is a public health challenge and a threat to the socioeconomic development of Gombe State. While a lot is being done to curb the spread of the virus and mitigates its impact, the prevention effort is bedevilled by inadequate understanding of the dynamic of the State's epidemic ensuing occurrence of new infections.

Information on behavioural factors and "drivers" required to analyze and monitor the epidemic scarcely exist. The State's surveillance system heavily focuses on case reporting and relies on national surveys, which are short of meeting the State's needs owing to the heterogeneity of Nigeria's epidemic. Analysis of the local epidemic will provide data for evidence-informed planning and targeted interventions, which hopefully will bring transmission to a halt.

2.2 Setting of the problem:

The global effort in reducing the spread and impact of HIV by providing prevention, treatment, and care support services is phenomenal. However, about 2.7 million new infections occurred globally in 2007 alone underscoring the need for strategic prevention programmes. (1)

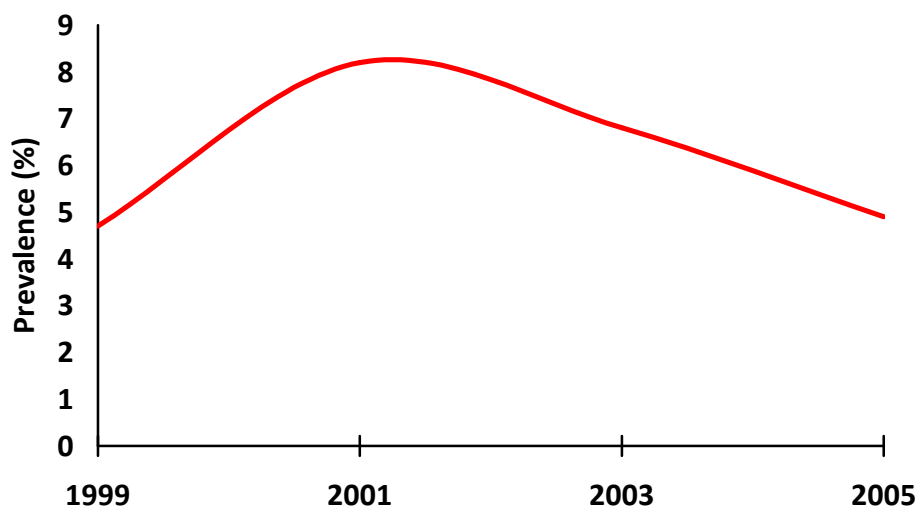
The Nigeria's HIV epidemic is a generalized type (2) as the HIV prevalence (4.4%) among the general population is sufficient to sustain the epidemic through sexual networking. Also, a key population at higher-risk overlap with the general population and has contributed 30% of the 240,000 new infections that occurred in 2008 (see annex 2). (18) This underscores their significance in the dynamics of the country's HIV epidemic. Gombe State is likely to have a similar epidemic pattern.

Nigeria, like many other countries realized its failure to prevent the occurrence of new HIV infections partly due to inadequate understanding of who is becoming infected and how, for targeted interventions. (19) This sobering realization inspired the first attempt to analyze the patterns of new infections in the country in 2008. However, the usefulness of the analysis is limited by its failure to provide picture of the epidemic at operational levels, which could have been more useful owing to the heterogeneity of the country's epidemic "multitude of epidemics". (See Annex 1)

Conversely, analysis at sub-national level will be confronted by inadequate State level data as the case of Gombe State. This is due to lumping of figures into zones by national surveys, which is not be very useful owing to the variation of drivers and magnitude of the epidemic between States of the same zone. Hence, the analysis will not give a true picture of the epidemic in the States. Equally, States lacks the capacity to generate quality data.

The seductive graph in figure 1 below depicts a decline of Gombe State adult HIV prevalence from 8.2% in 2001 to 4.9%. Although, the decline is statistically significant (CI: 0.7 to 5.9) but flawed by the addition of two low-prevalence rural sentinel sites in the 2005 survey. (3) In addition, new HIV infections continue to occur in the State, evident by high HIV prevalence (7.0%) among urban women age 15 to 24years, which is a proxy for measuring HIV incidence. This is a testimony of ineffectiveness of the State’s HIV prevention programme.

Figure 1: Trend of adult HIV Prevalence, Gombe State.



For the State to make a meaningful progress in curbing the spread an evidence-informed prevention programme has to be in place, which heavily relies on clear understanding of the dynamics of the State’s epidemic. Currently, the State programme is not conversant with the level of knowledge about HIV, behavioural factors and structural drivers of the epidemic, hence the need for an urgent investigation. The outcome of the investigation and a little step further will provide an understanding of “who is becoming infected and how?” Consequently, informing the development and implementation of evidence-informed planning and interventions.

The implementation of Gombe State strategic plan 2005-2009 was built on shaky evidence and generalized prescriptions from the national programme. This resulted to untargeted interventions and waste of limited resources.

2.3 Problem analysis:

Available literatures revealed that there was only one study conducted to assess the HIV knowledge since 2004 in the history Gombe State HIV epidemic. Even though, UNGASS proposed biennial assessment of HIV knowledge and behaviours, (17) hence the need to evaluate the current level of HIV knowledge & behaviour in the State.

Heterosexual intercourse is the main driving force of HIV epidemic in Nigeria. However, because of diversity of the epidemic key population at higher-risk like FSW, MSM and drug users contribute substantially. (2)

Multiple sexual partnerships (MP), concurrent partnerships (CP) and sexual mixing⁴ plays a central role in sexual transmission of HIV in general population. It has been argued that concurrency coupled with high viral load in acute phase of HIV infection has contributed to the explosive nature of Africa's HIV epidemic (20;21), although a different study has found no association between concurrency and HIV prevalence. (22) Closely, associated with MP is early sexual debut and premarital sex. While multiple sexual partnerships is widely practiced and documented in Nigeria, study on concurrency has not been found in literature searched. Data on MP, CP, age for sexual initiation and premarital sex is unavailable for Gombe State.

Consistent condom use protect against sexual transmission HIV by 60-96% (23;24), hence low condom use in high-risk sex will enhance the spread of HIV. Condom use in high-risk sex is low in northeast Nigeria. Likewise, low condom use with high prevalence of STI accentuates the transmission of HIV within a population; about a third of HIV infections in within general population in some African counties are attributed to Herpes Simplex-2 (HSV-2) infection (25), and more half of HIV infection in FSW in Kenya is attributed to genital ulcer disease (GUD). The prevalence of symptomatic syphilis is 1.2% in Gombe State, the prevalence of other STIs, condom use and its barriers are not documented for Gombe State.

Similarly, the prevalence of other sexual practices like douching and dry sex (intra-vaginal practices) anecdotally linked to increase transmission of HIV is not documented in Gombe State.

In Nigeria, FSWs has the highest HIV prevalence, (34.5%) while their clients have a prevalence of 7.7% (4) which is higher than the national median. Transactional sex is widely practiced by university students and street traders in Nigeria. (26) The population size of FSW, HIV prevalence and their role in Gombe State HIV epidemic is not documented.

Anal sex and needle sharing have higher risk of HIV transmission per act. The role of MSM and drug users in Nigeria's HIV epidemic is increasingly being appreciated, their HIV prevalence is 13.5% and 5.6% respectively. (4) These key populations at higher risk overlap among each other and with the general population, therefore fuelling the epidemic further. (4) The HIV dynamics in these sub-populations is unknown in Gombe State.

Harmful and protective behaviours are directly or indirectly influenced by distal structural factors, referred as "drivers". Culture and religion plays a vital role in people's lives. Polygyny, alcohol use, postpartum and

⁴ *Sexual mixing refers to the probabilities of sexual contact between varying degrees of similarity with regard demographic or social characteristics (Hatog, S, America STD Ass. 2007)*

peripartum abstinence are associated with extra-marital sex. (26-30) Different studies have shown early marriage,⁵ frequent divorce, re-marriages, sororate, levirate, (31) late marriage (32) and spouse sharing (33) are practiced in Nigeria and associated with heightened risk of HIV infection. However, these studies were conducted in southern zones of the country, for this reason Mistunaga et al (27) call for local contextualization of this factors because of the Nigeria's ethnic and religious diversity. Sexuality and gender inequality are at the heart of the aforementioned harmful cultural practices. Uvulectomy, tooth extirpation (34) and circumcision done by traditional barbers (31) using unsterilized instruments as risk factors of HIV transmission is biologically plausible.

Low level of male circumcision partly explains the hyperendemic scenario of east and southern Africa in contrast to low-endemicity of West African epidemic. (35) Circumcision rate is high in Nigeria but some low circumcision pockets exist and coincides with epicentre of the epidemic (See annex 3). Few communities in Southern part of Gombe State do not circumcise, although the population size and HIV prevalence among the group has not been studied.

Poverty, wealth and education are cited as drivers of HIV epidemic from various perspectives. Their relationship is complex, intermediating the association are gamut of contextual factors (36-43). Stigma and discrimination is a cause and catalyst of HIV epidemic. (44) Neighbourhood effects like community wealth status (42), high mobility and unaccommodating laws, human right violations and some policy issues contributes to the spread of HIV.

Inadequate understanding of aforementioned behavioural factors and drivers in the context of Gombe State HIV epidemic contributed to the failure of prevention efforts. In an attempt to gain a clear focus of HIV epidemic in the State, I launched a study in 2008 to assess HIV knowledge and attitude among men and women of 15-49years in the State, but it could not be completed because of time and technical inadequacy. Therefore, with this opportunity and the new competency acquired I intend to take the study further by analyzing/interpreting the study data and exploring the behavioural factors and "drivers" of HIV epidemic. This will provide a better insight on the factors that drive the State's epidemic and inform the development of recommendations for further research and interventions.

2.4 General Objective:

To assess the level of knowledge on HIV among men and women of age 15 to 49 years, explore the behavioural factors and drivers that fuel HIV epidemic in Gombe State. And provide recommendations for interventions and themes for research/assessment.

⁵ *The definition of early sex is context specific, but in Nigeria is defined as marriage before the age of consent (18years)*

2.5 Specific Objectives:

- i. To determine the level of knowledge and attitude on HIV among the men and women age 15 to 49 years in the State.
- ii. To critique the study conducted to assess knowledge and attitude on HIV among the men and women age 15 to 49 years in the State.
- iii. To explore drivers and behavioural determinants of a “generalized” and to a lesser extent concentrated HIV epidemic. And identify factors that may influence Gombe State HIV epidemic.
- iv. To provide recommendations for interventions on identified factors and themes/issues for further research on the State’s HIV epidemic.

2.6 Target beneficiaries:

The result of this study will benefit the communities, GomSACA, policy makers, programme planners, funders and implementing partners.

2.7 Methodology:

Analysis of data collected from a cross-sectional survey conducted between June and August 2008 was used to determine the level of knowledge on HIV among men and women age 15-49 years in the State. The study was critically analyzed to discover its strengths, weaknesses and solutions are proffered to the latter. Details on the methodology of the study and the critique will be found in chapter 3.

To achieve objectives 3 and 4 literature review was conducted. The findings are systematically presented using an adapted heuristic framework of the social epidemiology of HIV developed by K.E Pounstone et al (see figure 9). The methodology, description of the adapted framework and the findings of the literature review are presented in Chapter 3.

2.8 Limitation of the thesis:

The thesis could not explore proven interventions for the behavioural factors and drivers of the State epidemic identified. Therefore, it failed short in giving specific recommendations. Limitations of the primary study and literature review are giving in chapter 3 and 4 respectively.

Chapter 3: Knowledge & Attitude about HIV: Description of the primary study and findings:

This chapter describes the methodology, findings and critique of the primary study conducted to assess the level of knowledge and attitude among the study population. A cross sectional survey was conducted between June 19, 2008 and August 8, 2008 for the purpose.

3.1 Methodology:

The 11 LGAs in the State constitute the study area. The study population consists of men and women of age 15-49 years residing in the sampled communities. A multistage random sampling technique was adopted for the study.

The State was clustered into 11 LGAs; each LGA is stratified into urban and rural areas. Headquarter of each LGA was conveniently selected as urban community except headquarters of Shongom and Kwami LGAs⁶, which is considered a rural area. Two rural communities per LGA were selected at random. Two enumeration areas (EAs) per settlement were selected at random from list of EAs of 1991 national census. Systematic random sampling was used to select households in the selected EAs based on the prior knowledge that each EA has about 112 households. Thus, the first household was randomly selected and subsequently every third household was selected until the designated sample size was reached. Finally, man or woman within 15-49 years age bracket who reside in the household was interviewed as an eligible respondent.

With the help of a statistician, a sample size of 1,650 from 66 secondary units (clusters) was estimated for the survey.

A coded structured questionnaire consisting of 39 questions divided into 4 sections covering knowledge and attitude about HIV was used to collect the data. Sixty nine percent of the questions were adapted from NDHS/NARHS questionnaires. (See annex 4) The tool was not translated but modified after pre-testing. Thirty-three staffs (only 3 were females) of Local Action Committee on AIDS were recruited as interviewers. They were trained on the survey in three batches for four hours each using presentation, discussion and practical demonstration.

In each community 50 questionnaires were administered by one interviewer over a period of 7 to 10 days. The interviewers were supervised on their first day only. Returned questionnaires were checked, cleaned before entry into SPSS version 13.0. The initial entry was done by only one person but latter explored using computer generated summaries.

All questionnaires were administered but 169 cases, which are randomly distributed, were eliminated because of inconsistencies reducing the

⁶ *Shongom and Kwami LGAs are located in the southern and northern part of the State respectively, There headquarter has a population of less than 20,000 hence considered rural area*

response rate to 89.8%. The cleaned raw data was analyzed using SPSS to generate frequency tables and cross tabulations. Adjustment for non-response and different probabilities of selection was not done.

3.2 Findings on HIV knowledge and attitude from the primary data:

For the purpose of eliciting the level of knowledge and attitude about HIV in the State, 7 components of the questionnaire were analyzed; 1) Background characteristics 2) Knowledge on preventing transmission 3) beliefs 4) Attitudes towards PLHIV 5) Mother-To-Child-Transmission (MTCT) 6) HIV Counselling and Testing (HCT) and 7) Risk perception.

3.2.1 Background characteristics:

This section describes the geographical distribution, sex, age, educational attainment, and religious affiliation of the respondents. Knowledge on these characteristics will help in understanding the distribution of the study variables in different sub-populations.

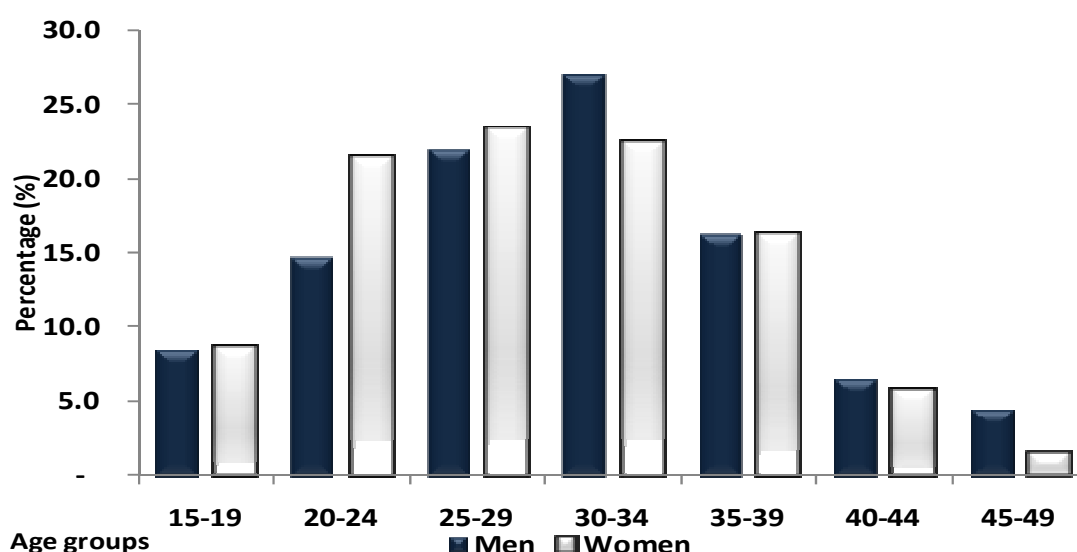
Figure 2: Absolute numbers of respondents used in calculating percentages of variables, Gombe State. Nigeria 2008

Characteristics	Total number of respondents		Number ever heard of HIV		No. know HCT Site		No. tested		No. not tested	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Location										
Urban	231	119	229	113	221	105	20	12	201	93
Rural	790	341	772	329	664	269	74	48	590	221
Total	1021	460	1001	442	885	374	94	60	791	314
Age (years)										
15-19	88	40	87	38	82	34	3	2	79	32
20-24	150	99	149	93	128	79	11	11	117	68
25-29	225	108	218	105	196	94	24	18	172	76
30-34	277	104	271	103	229	79	28	12	201	67
35-39	166	75	163	70	150	58	11	7	139	51
40-44	68	27	67	27	59	24	12	9	47	15
45-49	47	7	46	6	41	6	5	1	36	5
Total	1021	460	1001	442	885	374	94	60	791	314
Highest level of education										
*None	14	23	12	20	2	5	0	1	2	4
Quranic	119	44	112	34	95	29	1	4	94	25
*Non formal	12	1	9	1	6	0	0	0	6	0
Primary	267	134	260	129	229	108	7	4	222	104
Secondary	431	186	430	186	390	166	30	17	360	149
Higher	178	72	178	72	163	66	56	34	107	32
Total	1021	460	1001	442	885	374	94	60	791	314
Religion										
Christianity	262	142	269	140	241	118	29	23	212	95
Islam	756	318	731	302	644	256	65	37	579	219
*Traditional	3	0	1	0	0	0	0	0	0	0
Total	1021	460	1001	442	885	374	94	60	791	314

**Percentages derived from absolute numbers less than 15 are excluded from interpretation*

- i. **Sex:** Men and women constitute 68.9% and 31.1% of the respondents respectively not reflecting the 1.1:1 male to female ratio in the State, implying that men are favoured in the sampling. See table 1
- ii. **Age:** The age pattern of the respondents is skewed to the right (see figure 3); two-thirds of the respondents are below 35 years reflecting the predominantly young population of the State. The mean age is 29.9years (SD, 7.7), which does not vary much with the median (24.5years) and modal age (27years)

Figure 3: Age distribution of respondents by sex



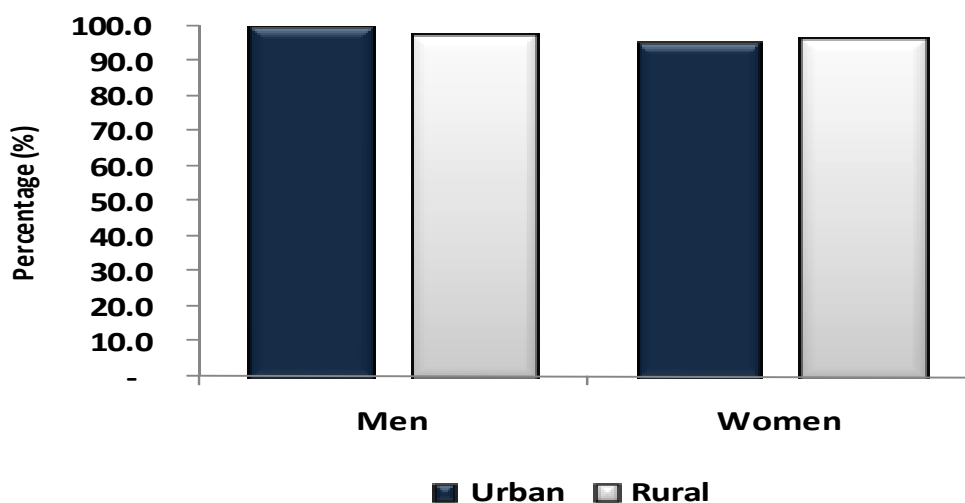
- iii. **Educational attainment:** Majority of the respondents has attended secondary schools (41.7%), about a quarter has attended primary school and only negligible proportion (2.5%) has no educational background. Strikingly, there is no much urban-rural variation between the proportions of respondents that attended Quranic and formal education. The proportion of respondents that has no form of education is higher among rural (6.0%) and urban (1.7%) women. See annex 5.
- iv. **Religious affiliation:** Muslims are over-represented in the sample carrying 72.5% of the respondents, 27.3% are Christians and 0.2% affiliated traditional religion. See annex 5, table 1

3.2.2 Knowledge and attitude about HIV:

- i. **Awareness about HIV** (See annex 6): Awareness “ever heard of HIV” about HIV is generally high; with the exception of interviewees with no form of education over 95% of respondents across the background characteristics have heard of HIV. There is no significance difference on the level of awareness between urban-rural (CI; -1.43 to 2.23) and male-female (CI; -0.3 to 5.7) respondents.

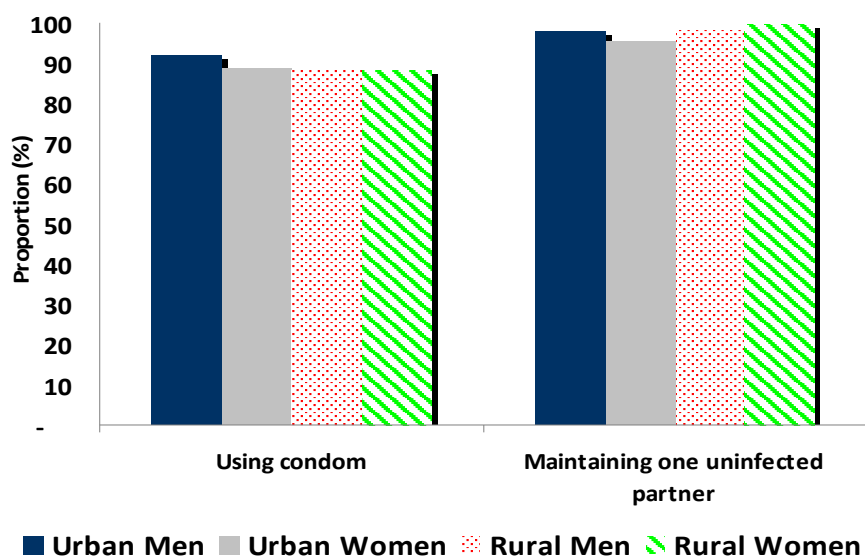
(See figure 4) However respondents with secondary school education have the highest level of awareness (98.8%).

Figure 4: Proportions of male and female respondents who ever heard of HIV



ii. **Knowledge on HIV Prevention** (annex 7): Equally, knowledge on protective measures; use of condom and maintaining one uninfected sexual partner is high among men and women in the State. However, maintaining one uninfected sexual partner is mentioned by more men (98%) and women (97%) than use of condom (90%) in both sexes. Strikingly, urban men with higher level of education and those in the age bracket 45-49years have the lowest level of knowledge (less than 80%) on the two indicators. There is no significant difference of level of knowledge on HIV prevention between religious beliefs and locations.

Figure 5: Knowledge on prevention of sexual transmission of HIV by sex and location



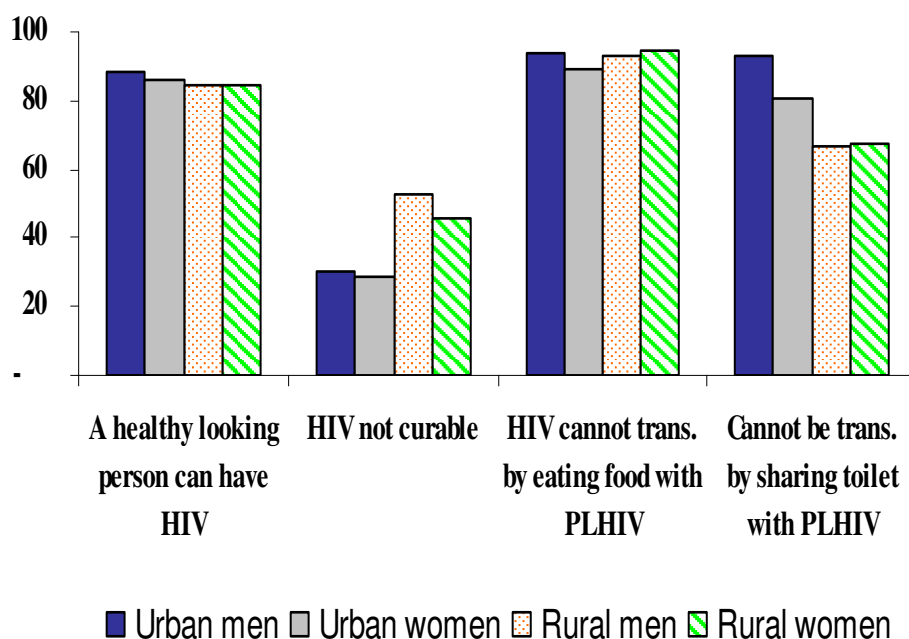
iii. Beliefs about HIV and AIDS (see annex 8&9): Three questions; a healthy looking person cannot have the germ that causes AIDS, is HIV curable? And can HIV be transmitted through sharing of toilets were used to assess the respondent’s beliefs on HIV.

The misconception that healthy looking person cannot have HIV is dispelled by majority of respondents across all background characteristics with the exception of 44.5% of 45-49years old men, who has a contrary opinion. The opinion on this variable does not vary much with religious affiliations.

The knowledge on incurability is low, especially among urban men (30.6%, CI; 25 to 37) and women (28.3%, CI; 20 to 36). The highest proportion of respondents that opined HIV is not curable is found among men (57.3%, CI; 46 to 68) and women (62.5%, C; 52 to 74) with higher education. The low level of knowledge on incurability of HIV can be attributed to misconception about curing effect ARV. Knowledge on ARV may be lower in rural settings, hence the urban-rural difference.

HIV cannot be transmitted by sharing toilet is recognized by over 80% of urban men and women. Similarly, 66.6% and 67.8% of rural men and women respectively opined that HIV cannot be transmitted by sharing toilets.

Figure 6: Beliefs about HIV by sex of respondents in urban location



iv. Accepting attitudes towards PLHIV (annex 10&11): Four questions were asked to investigate the attitude of respondents towards PLHIV; willingness to eat from the same bowl with a PLHIV,

if a family member is living with HIV should be kept a secret or not, willingness to care for a family member living HIV and whether a teacher living with HIV should be allowed to teach children.

Majority of the respondents (over 80%) across all the background characteristics expressed their willingness to eat with a PLHIV from the same bowl. This view is corroborated by the recognition that HIV cannot be transmitted by eating food with a PLHIV from the same bowl by majority of respondents.

About a half (52%) and over two-third (78.1%) of men and women respectively with higher education opined that the HIV status of a family member should remain a secret, this position was up-held by 41.7% of men and 60% of women with no education. However, bulk of respondents across other background characteristics has contrary opinion.

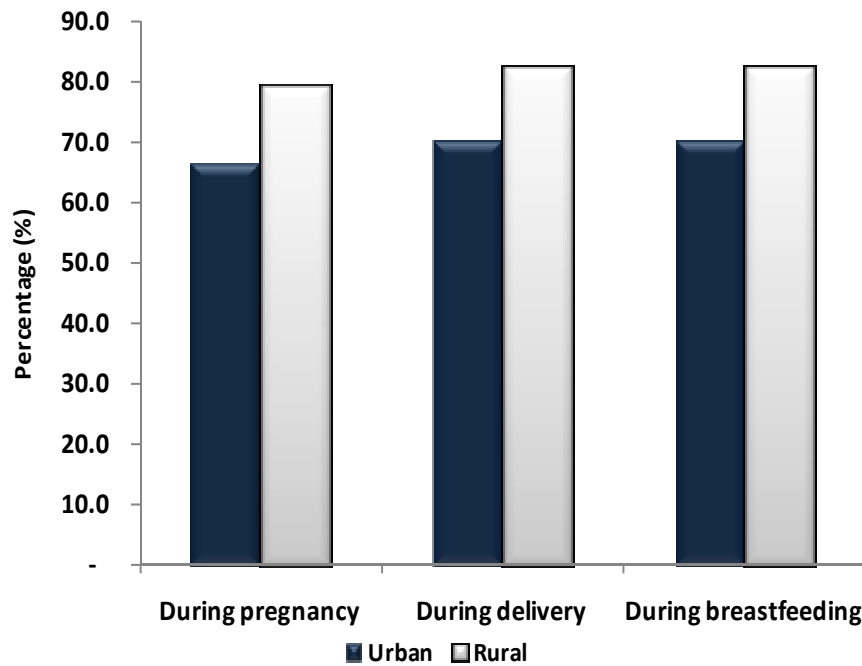
Overwhelming proportion of respondents with the exception of about half of men and women with no form of education are willing to care for a family member living with HIV and believed that a teacher living with HIV should be allowed to teach children. A higher proportion of respondents affiliated to Islamic belief have accepting attitude to PLHIV than their Christian counterparts.

It is apparent from the foregoing that people with higher education are likely to have less accepting attitudes towards PLHIV than those with Quranic, primary and secondary education. However, even those that expressed accepting attitude their actual behaviour may be different.

- v. Knowledge on Mother-To-Child-Transmission (MTCT) of HIV** (annex 12&13): Three questions were asked to elicit knowledge on MTCT of HIV; whether HIV can be transmitted during pregnancy, delivery, or breastfeeding. These questions can only measure knowledge on means of transmission but not on prevention which is more important.

Nonetheless, 66.4%, 69.9% and 69.9% of urban women opined that HIV can be transmitted from mother to a child during pregnancy, delivery and breastfeeding respectively. (See figure VII) This is in contrast to their rural counterparts where 87.3%, 88.6% and 89.5% of them believed that HIV can be transmitted from mother to child during pregnancy, delivery and breastfeeding respectively. This disparity may be explained partly by the fact that urban women patronize private facilities where PMTCT services are scarce.

Figure 7: Percentage of urban and rural women having correct knowledge on MTCT



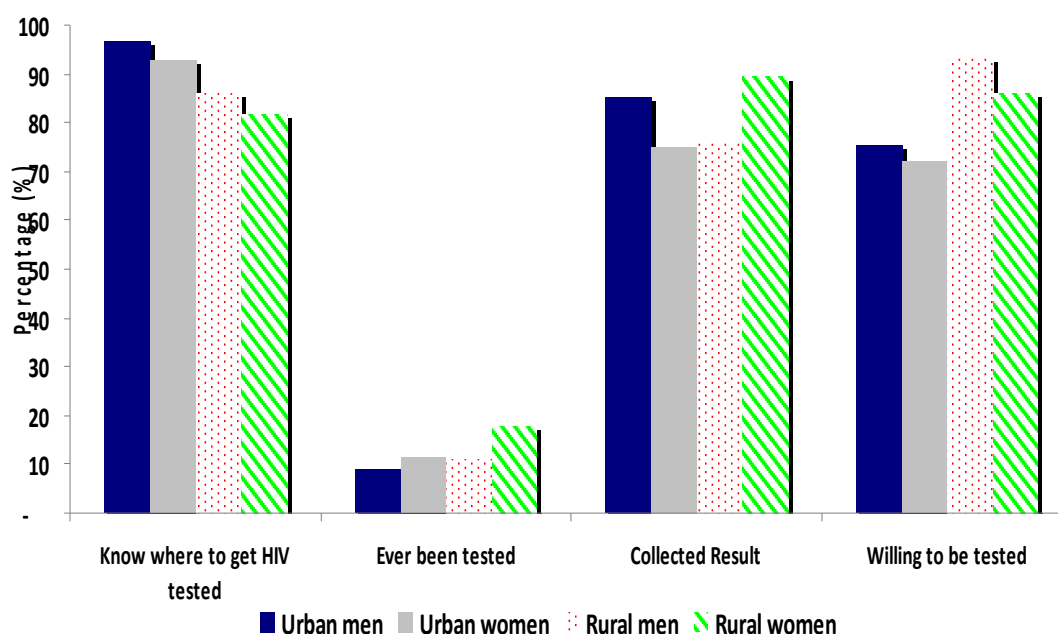
vi. Knowledge about HIV Counselling & Testing (HCT) (annex 14&15) To assess the knowledge on HCT, three questions were posed to the respondents; whether they know where to get tested for HIV, ever been tested, and willingness to be tested.

Ninety seven percent and 93% of the urban men and women respectively acknowledged that they know where to get HIV testing, this level of knowledge cross cut gender, educational level and religious affiliation.

Unfortunately, the high level of knowledge about location of HCT centre has not translated into HIV testing; only 9.0% and 11.4% of urban men and women respectively attested to have been tested. Interestingly, higher proportion of rural respondents (11.1% men and 17.8% women) had ever tested. Equally, 34.4% of men and 51.5% of women with higher education have tested. Most respondents who ever tested are within the age group 40-44years. About 10-15% of respondents that ever tested failed to collect their results.

Seventy percent and above, of male and female respondents that have never been tested for HIV expressed willingness to get tested. A higher proportion of interviewees in rural locations and of Christian faith indicates willingness to get tested for HIV than their urban and Muslim counterpart.

Figure 8: Knowledge on HCT among men and women respondents by location



vii. Risk perception (annex 16&17): Respondents that ever heard of HIV were asked on their perceived chance of contracting HIV. Most of the interviewees in all categories believed that they are not at risk of HIV, the assertion is more pronounced amongst men and women within the age band 15-19years. Thirteen percent of men and 8.3% of women with higher education believed their risk of contracting HIV is high. Low risk perception is associated with high-risk practices and poor health seeking behaviour.

3.3 Critique of the study on knowledge & attitude on HIV:

This section critically analyzes the strength and weaknesses of the primary study, and proposes on how the weaknesses could have been avoided.

3.3.1 Strength:

If not of the weaknesses discussed below the precision of the study could have been excellent because of its large sample size (1,650), wide coverage (including all the LGAs), large number of clusters (66) and high response rate (89.8%). Also, stratification of the data into locations and sex provides an opportunity to compare findings between different sub-populations and adjusted for some of the sampling biases.

Within its caveat, the study is an ice-breaker for research on HIV specific to Gombe State and the information generated will add to better understanding of Gombe State HIV epidemic.

3.3.2 Weaknesses and limitations:

Most of the weaknesses identified are related to inadequate technical know-how on research, these include:

- i. **Lack of literature review:** A modest literature review could have widened the scope and get the study focused by paving way for problem analysis, development of research questions and objectives, which will lead to formulation of variables/indicators and subsequently the choice of suitable study mix.
- ii. **Questionnaire:** It was developed not with an aim of addressing study questions or objectives, hence excluding relevant issues on behaviour. The tool was not translated to a widely spoken language "Hausa", which could have ensured uniform understanding of the questions. Moreover, the questionnaire was not adequately pre-tested, limiting the opportunity for detecting flaws and making early corrections. Some questions are leading, hence introducing respondent and interviewer bias.
- iii. **Poor selection of interviewers:** Majority of the interviewers are male health workers working for the Local Action Committee on AIDS having little experience in research. They may have introduced interviewer bias such that the outcome of the study will favour their claimed performance. Equally, knowing that the interviewers are HIV workers, respondents may give desired responses.
- iv. **Inadequate training:** The interviewers were not familiarized with the study purpose, methodology and interview techniques. Hence they may not realize the rationale of the research as well as the need for correct sampling and interviewing.
- v. **Implementation of sampling:** Although, rural communities were randomly selected per LGA, the selection did not take into cognizance the variation in LGA populations, consequently equating heavily populated with sparsely populated LGAs.

In the sample, Muslims and men were over represented when compared with Christian and women counterparts. This selection bias might have resulted from interviewers defying the sampling instructions due to lack of supervision and difficulty of accessing married women by male interviewers.

There was no contingent sampling plan for dealing with compound households, which are common in the northern part of the State. This might lead to sampling many respondents with similar characteristic.

- vi. Inadequate supervision:** The interviewers were supervised only on the first day of the field work. Thus subsequent sampling and field work might not have been conducted according to plan.
- vii. Non-participatory design and implementation of the study** limits inputs from stakeholders and will not promote ownership of the outcome. However, the outcome of the study will be disseminated.
- viii. Lack of consideration for ethical issues:** There was no written clearance to undertake the research from State and LGAs. The consent form was not comprehensive and there was no consideration for privacy.

Chapter 4: Behavioural factors and drivers of the epidemic: Methodology and findings of literature review

This chapter presents the methodology and findings of literature review aimed at exploring behavioural factors and drivers generalized HIV epidemic with contribution of key population at higher-risk. And identifying those that likely influence on Gombe State HIV epidemic in line with objectives 2 & 3.

4.1 Methodology:

The focus of the review is the disease of interest "HIV and/or AIDS", exposure/factors as described by the heuristic framework (See figure 9) and outcome is HIV infection/transmission.

Summary of search terms: HIV, AIDS, HIV-1, HIV-2, Drivers, Behaviour, Attitude, Knowledge, Culture, Gender, Stigma, Discrimination, Laws, Policies, Migration, Mobility, Urbanization, Conflicts, War, Marriage, Extramarital, Polygamy, Wife inheritance, Sex, MSM, IDU, Circumcision, Occupation, Wealth, Poverty, Sexually Transmitted Infections, Multiple partnerships, Condom, Concurrent sexual partnership, Gombe, Nigeria, West Africa. MeSH terms and Wild cards were used where appropriate.

Search strategy: Separate, sensitive searches using multiple, alternative search terms connected by Boolean operators "OR" was conducted for each component of the PICO⁷ set. Subsequently, the Boolean operators "AND/OR" was used to combine the separate searches.

Pubmed, Embase, AIDSLINE, and Cochrane databases were searched. Google scholar was also used. KIT, WHOLIS & VU catalogues and literature from UNAIDS, World Bank, UNDP and NACA websites were searched. Information on programmes was obtained from NACA and GomSACA. All citations retrieved were exported to reference manager.

Inclusion criteria: Articles in English published by reputable sources, validity of the study e.g. sampling techniques, adjusting for confounders and well referenced articles were included in the study.

Framework for analysis: A heuristic framework for social epidemiology of HIV was adapted to analyze and discuss the findings of the literature review. It is developed by K.E Pounstone and published in 2004. (45)

The framework distinguishes the determinants of HIV epidemic at individual, social and structural levels. The levels are separated by a porous dotted lines indicative of the cross relationship of factors in different layers.

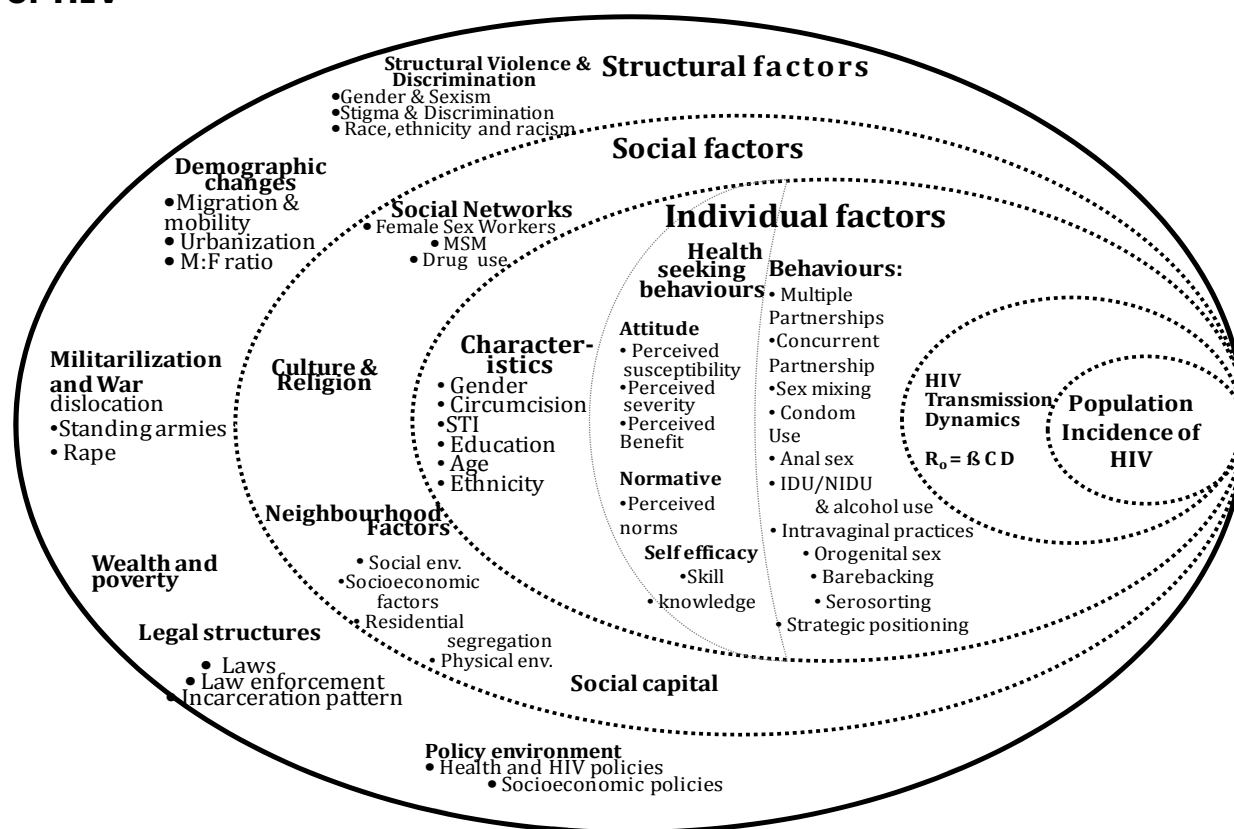
At the distal level the framework identifies militarization, demographic changes, gender, stigma and discrimination, laws and policies as structural factors that drive HIV epidemic. The distal drivers inter-relate

⁷ PICO: P-Patient or disease, I-Intervention, C-Comparison and O-Outcome

and influence directly or indirectly the layer of social factors, which consist of the cultural, neighbourhood factors, social capital and social networks. The factors in these layers influence individual behaviour by affecting the social constructs brought forth by social cognitive models- health belief model and alike. The behaviours determine the population incidence of HIV by modulating the transmission dynamics. The adaptations made on the original framework by the author are:

- Breaking down sexual practices into MP, CP, anal sex etc, which Pounstone’s article left undefined.
- Introduction of social constructs of health behaviour to Interface between individual characteristics and behaviours.
- Adding wealth/poverty and religion as structural and social determinant respectively
- Using neutral terms for some of the factors originally posit in normative and stigmatizing way.

Figure 9: Modified heuristic framework of the social epidemiology of HIV

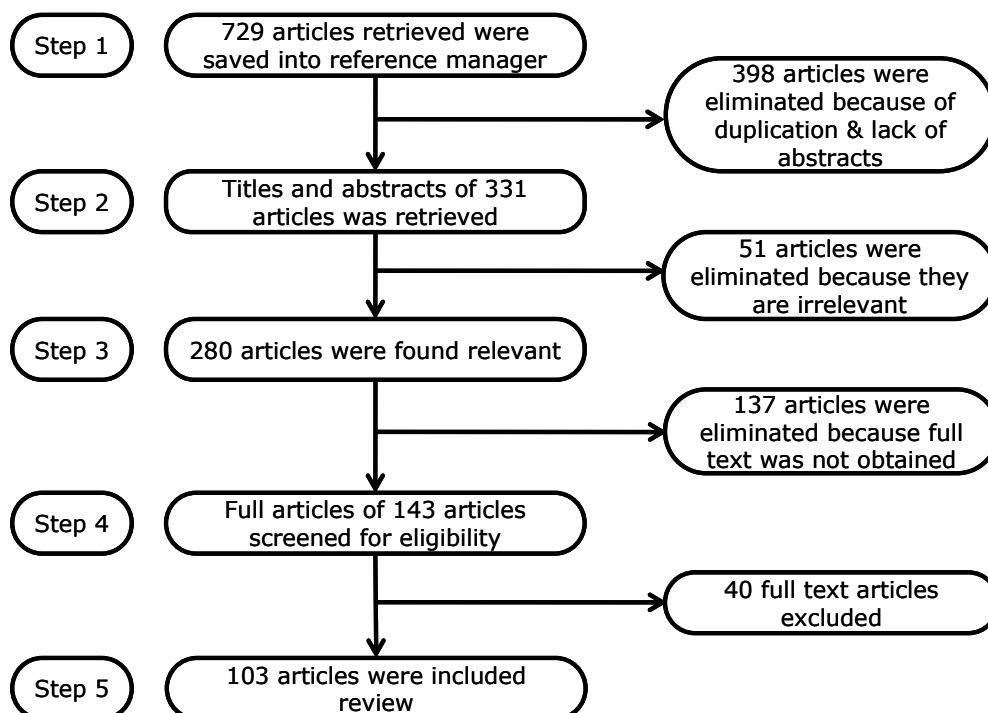


4.2 Results of literature search

A total of 729 articles were retrieved and saved into reference manager. Five hundred and eighty six articles were screened out because they were irrelevant or their abstracts or full articles were not accessible. The full text of remaining 143 articles was retrieved and screened using the

inclusion criteria and 103 were found eligible for inclusion in the study. See figure 10

Figure 10: Flow chart describing result of literature search



4.3 Limitations:

Broadness of the topic, inability to access full text of articles studies about Nigeria’s epidemic, lack of articles about Gombe State’s epidemic.

4.4 Findings of literature review:

The findings of literature review are described using the adapted heuristic framework of the social epidemiology of HIV. See figure 9

4.4.1 HIV Transmission dynamics:

HIV transmission can occur when there is exchange of HIV infected body fluid between an index case and susceptible individual. (19) Seventy-five percent to 85% of HIV transmission occurs through sexual intercourse, which is also true for Nigeria. (2)

Similarly, epidemic will ensure if there is critical number of susceptible host and the basic reproductive number R_0^8 is greater than one ($R_0 > 1$). R_0 is a product of transmissibility of HIV (β), contact rate (C) and duration of infectiousness (D). (45;46) See figure 9.

The transmissibility of HIV, contact rate and duration of infectiousness are determined by the characteristic of the agent (HIV), host (human) and

⁸ R_0 defined as the expected number of secondary cases produced by a single index case in a completely susceptible population(Pounstone)

structural factors. At a proximal level individual characteristics and behaviour determines the risk of infection, while social and structural factors operates as fundamental causes. (45)

4.4.2 Individual factors:

These factors operate as proximal determinants of HIV infection and consist of A) Behaviours and B) individual characteristics; intermediating between the individual characteristics, distal drivers and behaviour are social constructs of health seeking behaviour.

A. Behaviours:

i. Multiple sexual partnerships (MP)

Define as keeping more than one sexual partner over a period of 12 months (47) irrespective of period overlap, partner type, partner change rate⁹ or sexual mixing. MP is a risk factor for heterosexual acquisition of HIV; women and men with 3 or more sexual partners had Odd Ratio of 3.64 (CI, 2.87 to 4.62) and 3.15 (CI, 2.08 to 4.78) respectively than those with 0 to 2 partners. (69)

The 2007 NARHS indicated that in the northeast zone of Nigeria, where Gombe State is located 1% of women and 26.7% of men engaged in multiple sexual partnerships (marital and non-marital). This is pronounced among rural men, men with Quranic education only and women with higher education. Equally, young men and women in northeast Nigeria have the highest rate (15.8%) of multiple sexual partnerships in the country. (48) Early sexual debut and premarital sex are positive predictors of MP; 31% and 3.6% of young women and men respectively experienced first sex at 15years in Nigeria and 15% and 29.6% of same age group engage in premarital sex in north-eastern zone. (7) Gombe State being a core north-eastern State may exhibit similar pattern of MP, hence its role in fuelling the HIV epidemic.

ii. Concurrent sexual partnership (CP)

It is a form of MP characterized by "overlapping sexual partnerships where sexual intercourse with one partner occurs between two acts of intercourse with another partner" (49).

CP increases the speed, size and persistence of HIV transmission by connecting sexual networks because it eliminates the protective effect of "sequence" seen serial monogamy. In CP the earlier partner is at higher risk of infection when the subject become infected from the latter concurrent partner, since transmission probability is higher during the acute (primary) phase of HIV infection (first three weeks to two months).

⁹ Rate of partner change is defined as number of partners acquired per unit time (Hatog, S, America STD Ass. 2007)

(21) Brandy et al are of the opinion that infectivity rates of semen are higher during symptomatic phase (0.299) than acute phase (0.024) and asymptomatic (0.002), (98) even if this argument holds a symptomatic person is unlikely to engage in high sexual activity for obvious reasons.

Halperin & Epstein opined that concurrent partnership coinciding with acute HIV infection and low levels of circumcision are the cause of explosive nature of South African epidemic. (20) However, Largard et al found no association between concurrency and HIV prevalence in five cities of SSA (three of the cities are in West Africa) (22) Largard argument is undermined by measuring only *current* concurrency instead of concurrency over a *period*.

The effectiveness of concurrency in HIV transmission is influenced by duration of overlap, coital frequency, factors affecting level of viremia, (STI, opportunistic infections, and Anti-retroviral drugs) pattern of coitus, condom use and type of partnership (regular, casual or commercial). (50)

Available literature on sexual behaviour in Nigeria measures multiple partnerships regardless of its concurrency. In 2007 6.7% (n, 3,163) and 1.9% (n, 3,893) of married men and women respectively engaged in MP in Nigeria. (48) Logically, it can be concluded that a good proportion of these married men and women had concurrent sexual relationship, although the duration of overlap and type of partnership is not known. The reported level of MP and CP is likely to be underestimated because of social desirability and recall biases. Concurrency is an essential in the State's HIV epidemic.

iii. Sexual mixing patterns

Sexual mixing patterns determine the probability of a susceptible individuals having contact with an infected partner and the speed and quantity of HIV transmissions within a population. (51) It is a spectrum ranging from a situation where individuals select partners from their own group "assortative" through a mix of the two extremes "proportionate" to partners in a group with divergent characteristics "dissortative". In a population with high rate of partner change the latter two scenarios lead to higher and diffuse endemic levels "generalized" while the former leads to group-epidemics "concentrated epidemic".

When the rate of partner change (C) is low in a dissortative mixing the reproductive rate (R_0) will be <1 , therefore the epidemic will fail to sustain itself. In 2003 northeast Nigeria has the highest rate (6.3%) of dissortative sexual mixing between low risk men and higher risk FSWs (reported as % of men reporting sex with FSW in the past 12months) in the country (7). In the same zone, 11.6% of women age 15-19 who had non-marital sex in the past 12 months had it with a man 10 years older than themselves (intergenerational sex).

It is culturally and religiously acceptable and commonly practiced for an older man to marry a younger woman in Gombe State. The younger woman is placed at risk of HIV infection because of weak sexual negotiation power. Therefore, sexual mixing may be responsible for the generalized HIV epidemic in Gombe State. However, data on sexual mixing and partner change are not available.

iv. Low/Inconsistent condom Use

Consistent use of male condom¹⁰ reduce HIV incidence by 60 to 96% (24) (Relative Risk, 0.37; 95% CI, 0.15 to 0.88). Low condom use especially during high-risk sex¹¹ could fuel HIV epidemic. Likewise inconsistent condom use does not protect against HIV (RR, 0.97; 95% CI, 0.53 to 1.81) (23), this is important in places like Gombe State where barriers to access and use of condom are common.

High risk sex is practiced by 2.9% (n, 718) and 9.3% (n, 818) of women and men respectively in northeast Nigeria and only a negligible proportion of women and less than half of men used condom during the sexual encounter. Also, condom use at first and premarital sex is low. NARHS 2007 demonstrated that low condom use is associated with higher prevalence of HIV; HIV prevalence among condom users in high risk sex is 3.1% compared to 4.2% in non-users. (48)

Low condoms use among key-population at higher risk fuels HIV epidemic by facilitating transmission within the group and to general population through "bridging". Regular condom use during high risk sex by LDD and city bus drivers is 9% and 11.6% respectively in Nigeria (52;53), however higher figures were cited by IBBS 2007 (31.1% to 100%). (4) Similarly, condom use by FSWs in the last 30days varies with the type of relationships; it is highest with clients (above 85%) and lowest with regular partners (<12%), this pattern of condom use partly explain the high HIV prevalence among FSW in Nigeria. Similarly, MSM have low condom use in anal sex, but high (83.7%) during vaginal sex with FSW. No data was accessed on the use of lubricant in Nigeria.

Even though there is no data on condom use specific to Gombe State, barriers to access and effective utilization are obvious and presumably the use is low, thereby facilitating the spread of the virus.

v. Anal sex

Anal sex between discordant poses higher risk transmission probability per act. The role of anal sex is increasingly appreciated in Nigeria epidemic as it occurs not only in homosexuals but also heterosexuals. The estimated population size of MSM in Nigeria is 281,600 with a HIV prevalence of 13.5% (4) accounting for 8% of the 250,000 new infections

¹⁰ Consistent condom use is defined as using condom for all acts of penetrative vaginal intercourse (UNAIDS)

¹¹ High Risk Sex is defined as sex with non-marital, non-cohabiting partner in the last 12 months (UNAIDS)

in 2008. (18) Majority of MSM are young (mean age 25 years) and over 50% of them engage in non-paying sex. The role of MSM in Gombe State HIV epidemic is not known, however there is a growing concern about anal sex among elites and young women.

Use of saliva as lubricant in penetrative anal sex, fingering and fisting practiced by MSM increases the risk of HIV transmission. (54) No literature is available on these practices in Nigeria and Gombe State.

Other sexual practices like intravaginal practices (dry sex, wiping, scarification, douching and insertion of substances) and orogenital sex (fellatio and/or cunnilingus) may play less important role in Gombe State HIV epidemic.

vi. Drug use: Injecting (IDU & non-injecting (NIDU), other mood altering drugs and alcohol use:

Illicit drug use is associated with heightened risk of HIV. Globally, there are 16million IDUs and about 20% are living with HIV. (55) Nigeria has a well-established illicit drug use, IDUs exists in all the geo-political zones including northeast, where Gombe State is located. (56) The estimated HIV prevalence among IDU is 5.6% (4) by small sample size with a population size of 316,800 in the country (18) and the main substances injected are heroin, cocaine, speedball and pentazoscine. (56) The prevalence of needle sharing is between 11% and 15% and sharing of paraphernalia- pre-filled syringe, cooker, and solution is 35%, 44% 28% respectively in Nigeria.

Use of alcohol, mood altering drugs is associated with MP (57) and low condom use (POR¹²; 0.5, CI, 0.42 to 0.83), marijuana (POR; 0.48, CI, 0.34 to 0.69) (58). Amount of alcohol ingested, male gender and drinking environment are positive predictors of high-risk sex. (59;60)

While of IDU in Gombe State epidemic is not clear, the use of mood altering drugs and alcohol are ubiquitous especially among youth, thus it is more likely to be a fuelling factor of the epidemic.

B. Individual characteristics:

Individual characteristics influences risk taking and health seeking behaviour by moderating perceived susceptibility, perceived severity, perceived benefit and perceived barrier, which in turn affect intention to act.

¹² POR: Pooled Odd Ration or Adjusted Odd Ratio: Is a weighted average of the stratum-specific odd ratios done after obtaining different odd ratios in stratified analysis for the control of confounders. (Essential of Epid. Penny Webb pg. 341)

i. Gender:

Females have higher risk of HIV infection, this is not unexpected given that the chance of male to female HIV transmission per penile-vaginal sexual act is 0.03% compared to 0.001% for female to male transmission. (61) The integrity of vaginal/cervical lining and vaginal antiviral factors determine the rate of HIV transmission from males to females. STI, and conceivably bacterial vaginosis (BV) and intravaginal sexual practices enhance HIV transmission by affecting the functionality of the vaginal protective mechanism. (62-64) similarly, vaginal atrophy due to oestrogen withdrawal (menopause or oophorectomy) increases HIV acquisition by 8 folds. (65) The population of Gombe State is shared almost equally between men and women. This implies that half of the State's population has heightened susceptibility to HIV infection.

ii. Male circumcision (MC):

Low MC (<2%) partly explains the HIV hyperendemic situation in Southern Africa. There is a geographical correlation between high HIV prevalence and low MC. (66;67) In Nigeria; States with relatively low level of circumcision correspond to the epicentre of the epidemic. (See annex 3) Nigeria like some West African countries has over 80% of male population circumcised and may partly explains the lower HIV prevalence.

A properly done MC protect against heterosexual transmission of HIV with risk reduction ratio¹³ of 38% to 66% over 24 months. Three Randomize Control Trials were terminated because of high efficacy of MC against HIV. (68) However, the effectiveness of MC against HIV transmission in MSM is equivocal. (69)

MC is commonly practiced in northern Gombe as a traditional/religious ritual during childhood and may partly explain the lower HIV prevalence relative to its Southern counterpart, where some ethnic groups do not circumcise.

ii. Sexually Transmitted Infections (STI):

The presence of GUD e.g. Syphilis and non-genital ulcer disease (NGUD) like Chlamydia increases HIV transmission 5 fold and 3 fold respectively. The role of STI in HIV epidemic is more pronounced in East and Southern Africa than West Africa. (70) Almost a third of new HIV cases in four urban West African cities were attributed to HSV-2 (PAF¹⁴ >30%). (25) And 60% of HIV among FSW in Kenya was attributed to GUD. (70) The PAF of HIV due to STI varies between populations, stage of the epidemic, type of sexual network and concurrency of STIs. (71)

¹³ *Relative Risk Reduction the extent to which an intervention reduces a risk, in comparison with subjects not receiving the intervention of interest (1-Relative Risk). (Essential of Epid. Penny Webb pg. 96)*

¹⁴ *Population Attributable Fraction (PAF) is the proportional reduction in population disease or mortality that would occur if exposure to a risk factor were reduced to an alternative ideal exposure scenario. (HIS-WHO)*

The Prevalence of syphilis in Nigeria and Gombe State is 1.5% (CI, 1.1 to 1.8) and 1.2% (CI, 0.6 to 2.2) respectively, (3) while that of HSV-2 in southwest is 61.3% (72). Knowledge and health seeking behaviour on STI is poor in northeast Nigeria, majority of people having symptoms of STI do nothing or at best consult herbalist. (48) Although, the prevalence of other STIs in Gombe is not known, it plays a crucial role in the State's epidemic.

iii. Educational attainment

Educational attainment reduces the risk of HIV exposure because of its association with high level of knowledge about HIV and condom use. (48) However, women with Quranic education only have lower HIV prevalence (3.1%, CI, 2.7 to 2.6) than those with formal education in Nigeria. (3) Also a study conducted in Benue State, Nigeria corroborated that mothers with no formal education have lower risk of contracting HIV. (73) Even though the relationship may be confounded by high level of male circumcision and low economic status among partners of women with Quranic education only.

It is observed that studies conducted before 1996 found no association or high risk of HIV infection among educated, while those conducted 1996 onwards found low risk among educated. (74) In Nigeria, HIV prevalence among those with higher education (3.8%, CI, 3.3 to 4.3%) is significantly lower than those primary (4.8%, CI, 4.4 to 5.3) or secondary education. (5%, CI, 4.7 to 5.4). (3) Therefore, the relationship between HIV and education is dwarfed by contextual factors and its role in the State epidemic is not obvious.

Other individual characteristics that affect susceptibility to HIV infection are age, ethnicity income level and occupation, which are associated with the ability to buy sex, risk taking, mobility and culture.

4.4.3 Social Drivers:

Social network, culture and religion, neighbourhood effects and social capital modulate some of the individual characteristics and behaviour, consequently, affecting susceptibility to HIV.

A. Social networks:

Social networks influence the susceptibility and vulnerability of individual and communities to HIV through; social influence, social engagement and participation, network member mixing, access to HIV services and social support.

i. Female Sex Industry (FSW):

Female sex work contributes substantially to HIV epidemic in West Africa. SW may be formal or informal (transactional sex). Many women engage

in SW freely, some are trafficked or coerced into selling sex, while others were forced by poverty, gender inequality and breakdown of family structure. (75) The circumstances and settings in which SW occurs influence the risk of acquiring HIV. Unaccommodating laws, policies and stigmatizing social attitudes drive SW underground exacerbating their susceptibility and vulnerability to HIV infection.

In Nigeria, Brothel-based (BB) FSW has the highest HIV prevalence (37.4%) followed by non-brothel-based (NBBFSW) with 30.2%. The size of the sub-population and their clients is 1.7million. (4;18) Most BBFSW in Gombe State are located in urban areas and occasionally operates in villages on market days. NBBFSW may have larger population and operate hidden networks making them difficult to reach.

Weak enabling environment, social and geographical diversity of sex work and lack of understanding of dynamics of the industry hampers effective interventions, thus, facilitating the spread of the virus to general population through clients. SW is most likely driver of Gombe State epidemic.

ii. Network of MSM & Illicit drug:

Stable pattern of interactions between key populations at higher-risk of HIV produces networks with distinct subcultures. Pattern of drug use or anal sex and risk of HIV infection is determined by structural relationship between members, centrality of HIV positive members the “core group”, density and size of network. (76) Strategic positioning, barebacking (77) and serosorting are perceived prevention strategies commonly practiced within MSM networks, which increase the risk of HIV transmission. While sharing of needle and injection paraphernalia within IDU network increases the risk of transmission. No data was accessed on network characteristics of MSM and IDU in Nigeria and Gombe State.

B. Cultural and religious context:

Culture moulds the knowledge, attitudes, beliefs and habits of an individual as a member of a society. Gombe State being multi-cultural faces myriads of harmful cultural practices that increase individual and community susceptibility to HIV infection.

i. Early¹⁵ and late marriage

Early marriage a common practice among Hausa/Fulani in Nigeria, is associated with increased susceptibility to HIV, (31) the average age of marriage in northeast Nigeria is 15 and 25 years for females and males respectively, (48) it may be as low as 12 years in rural areas of the Gombe State. On the contrary young men and women marry late in

¹⁵ *The definition of early sex is context specific, but in Nigeria is defined as marriage before the age of consent (18years)*

southern part of the State, which is associated with premarital sex and MP. (32)

ii. Polygyny:

Forty-five percent and 28% of females and males respectively are in polygynous union in northeast Nigeria. (48) Northern part of Gombe State practice polygyny more than the southern part because of the predominant Hausa/Fulani culture and Islamic belief. The practice of faithful polygyny is not a risk factor for HIV infection in as much as partners joining network are not HIV infected. Nevertheless, men in polygynous relationship engage more in extramarital sex than monogamous ones (27) which tantamount to concurrency and increase risk of HIV acquisition.

iii. Pre and post-partum abstinence:

Pre and postpartum abstinence practiced for the child spacing and religious reasons in Nigeria. It is associated with increased likelihood of extra-marital sex and increase risk of contracting HIV. Postpartum abstinence is practiced compulsorily by all Muslims, who constitute over half of Gombe State population after childbirth until the lochia ceases (up to 60days). Postpartum abstinence extends averagely to 16.5months in northwest Nigeria, in contrast to 2.3months in the north-eastern zone (7). Northern part of Gombe State is likely to exhibit similar pattern with northwest zone due to cultural similarities. In Gombe State, there is sizeable population of Yoruba who traditionally accept their husbands to seek for sexual alternative during pre-partum or post-partum periods. (27) Despite the decline of pre and post-partum abstinence as observed by NDHS 2003, it may play a role in propagating HIV within marital setting in the State.

iv. Husband and wife inheritance (Sororate and Levirate)

These are cultural dictates practiced by most ethnic groups in Africa not only for sexual purposes but also to provide a safety net for the widow, widower and orphans. (78) Many cultures in Nigeria allow the practice of wife inheritance and widow cleansing. These practices are acceptable in Gombe State; however their role in driving the epidemic is not ascertained. (31)

v. Blood letting, uvulectomy and scarification:

It is biologically plausible to acquire HIV from infected sharp objects. Blood letting, scarification and uvulectomy are commonly practiced in northern Nigeria including Gombe State by traditional barbers (31) using the same unsterilized equipment for many people, sometimes in a sequence. Sharing of sharp instruments may propagate Gombe State HIV epidemic.

C. Neighbourhood-level factors

Physical environment, socioeconomic factors and residential segregation shapes population HIV pattern by increasing the probability an individual coming in contact with someone living with HIV. Ecological studies suggested an association between HIV prevalence and poor neighbourhood. Equally, high-risk practices, lack of social amenities and breakdown of social capital accentuate HIV epidemic in marginalized poor neighbourhoods. (45) There is a significant correlation between poor neighbourhood and multiple sexual partnerships in Nigeria. (42)

While there is no empirical evidence of the effect of neighbourhood on Gombe State HIV epidemic, slums in urban areas, increase concentration of affluent and poor and segregation of ethnic groups are visible and may play role in the State's epidemic

D. Social capital:

It is a constituent of social structure that facilitates social action measured by participation in social groups. (45) Breakdown of social capital is correlated with heightened susceptibility to STI. (99) Likewise participation in social groups with high-risk behaviours increases the risk of HIV acquisition. (100) Conversely, HIV epidemic leads to social disruption and loss of support to weaker individuals exacerbating their susceptibility and vulnerability to HIV.

Studies have acknowledged the complexity of the interface between social capital and HIV epidemic, likewise its role in Gombe State epidemic is not ascertained.

4.4.4 Structural drivers:

These are distal determinants that shape HIV epidemic; structural violence and discrimination, demographic change, militarization and conflicts, legal structures and policy environment.

A. Structural violence and discrimination:

i. Stigma and discrimination:

"Stigmatization is an act of labelling, stereotyping, separation, status loss". (44) And discrimination "enacted stigma" refers to negative act that result from stigma and serve to devalue and reduce the life chances of the stigmatized. Stigma in its entire ramification perpetuates power relation, where someone with a socially undesirable attribute is seen as inferior. PLHIV are being looked at as transgressors and immoral leading to avoidance and ill treatment. Key population at higher-risk and women suffer greater stigma.

Stigma leads to silence, secrecy and denial resulting into high-risk practices and poor uptake of HIV services that culminate into increase HIV transmission. (79) Prolong period of denial in early phase of the pandemic characterized Nigeria's HIV response giving way for the epidemic to expand.

Self-perceived stigma and social stigma influence the desire for HCT in northern Nigeria (80) and adherence to ART. Certainly, stigma is important in Gombe State epidemic.

ii. Gender inequality and Sexism:

HIV epidemic has brought into limelight the deep seated gender-related cultural, economic and social inequities that exist in communities. Women accounts for over 58% of adult PLHIV in SSA. This differential susceptibility of women to HIV is explained by biological, political economy, feminism and human right factors. (45)

Strikingly, African countries with higher gender equality exhibit higher HIV prevalence. (81) In Nigeria, there is no disparity between HIV prevalence's in women and men at national level. Contrastingly, there is significant gender difference in the northeast zone (women, 4.8%; men, 2.2%; CI, 0.6 to 4.6). (3)

The association between gender inequality and HIV may be modulated by contextual factors. Nonetheless, economic dependency of women makes them vulnerable to physical and sexual violence, hence higher risk of HIV infection. In Nigeria women from poorest and middle household was 83% and 51% more likely to engage in MP. (42) The soaring level of poverty in Gombe State especially among women and girls and other gender inequities drive the epidemic.

Masculinity and feminity influences sexual behaviour, it is culturally accepted for men to exhibit MP and infidelity, while enshrined for women and girls to be chaste. Likewise, virginity is highly valued by most cultures in Gombe State, this expectation compel young women to indulge in anal sex, which poses greater danger of HIV transmission.

B. Demographic change

Demographic change affects the distribution of HIV within a population though age pattern, sex ratio, migration, mobility and urbanization. The population of Gombe State is predominantly young, sexually active and inclined to take risk. The effect of urbanization on Gombe State HIV epidemic has been described elsewhere in the review.

i. Migration and Mobility

Migration and mobility increases individual susceptibility to HIV, migrant population has a higher chance of contracting HIV than non-migrant population independent of HIV prevalence at place of origin or destination. Seasonal labour migration is a men institution associated with heightened risk of HIV infection due to spousal separation, freedom from social control and peer pressure. (82) In Gombe State it is commonly observed at the end of the rainy season, where young men referred to "Yan-cirani" migrate to major cities for economic purpose. During community dialogue, seasonal labour migration has been cited by many communities as a major route HIV is imported into their localities.

Migration is a way of life for Fulani nomadic ubiquitously found in Gombe State. Although, the dynamics of HIV within this subpopulation is not documented, but their migratory way of life and other cultural practices increases their risk of HIV. (83) At the end of every rainy season they migrate to north-central and south-east "AIDS belt" zones of the country. The susceptibility of Fulani nomadic to HIV is accentuated by illiteracy, having money to buy sex, and difficult to reach with HIV interventions. Similarly, fisher folks have heightened risk of HIV acquisition.

Long Distance Drivers are "core group" of HIV transmission in Nigeria because of their inherent high-risk behaviours. (84) However, IBBS 2007 indicated that their HIV prevalence 3.6% (4) lower than the national median (4.4%), but the low figure might be attributed to inclusion of motorcyclist and inter and intra-city bus drivers who might have lower prevalence. Gombe State by the virtue of its central location, commercial activities and presence of cement factory attract LDD, who in-turn attract FSWs. Trucking and car dealership are one of the major economic activities in Gombe State, car dealers stay away from home for a long period to import and market cars within West Africa, this is associated with prolonged spousal separation and likelihood of high-risk sex.

From the foregoing review migration and mobility are most likely drivers of HIV in Gombe State.

C. Wealth and Poverty:

The role of poverty & wealth as drivers of HIV epidemic is under discourse owing its complexity. (36-43) However, within the caveats of documented studies wealthier individuals, households and countries have higher HIV prevalence than their poor counterparts, but Nicoli suggested that poverty may play a role in HIV epidemic in some countries, and as well influence the vulnerability of all countries to HIV. (39)

Poverty causes AIDS by causing malnutrition and reduction of defence mechanism was disputed by the finding of equal CD₄ count between nourished and malnourished, but there is an inverse correlation between HIV prevalence and calorie intake per capita. (39) Other, studies has found that wealthier people are equally if not more susceptible to HIV than the poor. Contextual factors dwarf the relationship between poverty

and HIV, however when infected the poor suffer disproportionately. (36-43)

Placing wealth and poverty into the perspective of Gombe State epidemic, both factors play a role; as seen poverty drives rural adolescents to migrate to urban settings and predisposes them to transactional intergenerational sex, and at the other flip wealthier people are mobile, and have the time and resources to maintain concurrent partnership. Therefore, poverty and wealth may fuel Gombe State HIV epidemic in different contexts.

D. Conflict & militarization:

The duo of HIV and conflict shows a bidirectional correlation, although not empirically substantiated. Disruption of social and physical infrastructure, mass migration and sexual mixing are on the causal pathway. A contradiction; countries in conflict have lower HIV prevalence than those in post conflict period. (101) Major conflicts are not experienced in Gombe State hence its irrelevance. Militarization and paramilitarization may play a role.

Militarization is linked to high HIV prevalence in urban settings in a study conducted by World Bank; reduction of size of military population by half as a proportion of urban population could reduce the HIV prevalence by 1%. (45) The HIV prevalence of Nigerian Army (3.1%) and Police (3.5%) in 2007 is lower than national median (4.4%). (4) They are at high-risk of acquiring and transmitting HIV especially during peace keeping operations. (85) Conflicts and militarization may not be essential in Gombe State epidemic.

E. Legal structures and Human rights:

Lack of anti-discriminatory law at the national and State level will encourage discrimination against PLHIV and key population at higher-risk, consequently affecting their access to health and other social services. Criminalization of illicit drug use in Nigeria hampers the access to IDUs and NIDUs for harm reduction, treatment and rehabilitation services. (86)

Homosexuality is a criminal offence in Nigeria, attracting a minimum of 14 years under the panel code and maximum of death sentence for an adult in Shari' a law practiced in 12 northern States including Gombe State. Female sex working is illegal but tolerable. Criminalization and intolerance of these practices force the sub-populations to go underground, heightening their high-risk behaviours and making it difficult to reach with interventions.

F. Policy environment:

The macroeconomic environment created by poor governance and Structural Adjustment Programme (SAP) provides a fertile ground for the spread of HIV in SSA. This is mediated by decline in rural subsistence economy, improved transport infrastructure, increased rural-urban migration and deterioration in health and social infrastructure. (102)

The Nigeria health system has been in crisis before the advent of HIV. Policies are on ground but scarcely implemented; the national HIV policy and other health/HIV policies are yet adapted in Gombe State making the enabling environment shaky for meaningful HIV response. Access HIV services have improved but far from desired.

Chapter 5: Discussion

This chapter discusses findings of the thesis in two parts; 5.1) findings on knowledge and attitude about HIV from the primary study, 5.2) findings of the literature review at individual, social and structural levels.

5.1 Knowledge and attitude about HIV:

Knowledge enhancement can result to behavioural modification, but the link is mediated by individual inherent/learned characteristics (e.g. self efficacy) and structural factors. (87) Within the limitations of the primary study, general knowledge about HIV is high; more than 95% of respondents have ever heard of HIV, this is corroborated by the north-eastern zonal result of NARHS 2007. (48) However, contrary to the author's findings NARHS 2007 shows significant difference between urban-rural location and gender. This level of knowledge and equality between urban-rural and male-female populace is not unexpected, because bulk of the prevention initiatives are women focused and rural-based.

Majority of the respondents dispel major misconceptions about HIV, which concur with the findings of NARHS 2007 in NE zone (48) except that about half of the participants in Gombe State opined that HIV is not curable contrary to 77.8% of NARHS findings. The belief that HIV is curable may be driven by the observed effect of ARV on PLHIV and the Islamic belief that "there is no disease that God has created, but He also has created its treatment". This belief might lead to false perception of complete protection and curability from HIV, inducing high-risk behaviours "behavioural disinhibition"

However, the level of knowledge observed is not commensurate with health seeking behaviours. About 11% to 17% of the respondents who knows where to get HIV test, ever tested, equally the knowledge on MTCT is high but only 23% of estimated pregnant mothers tested for HIV in 2007. (88) Poor accessibility and responsiveness of health care services, low risk perception and stigma are barriers to uptake of HCT and PMTCT services, consequently propagating the epidemic.

Majority (over 80%) of the respondents are willing to accept PLHIV and treat them with compassion, NARHS 2007 also uphold these findings. However, in reality fear, blame and rejection of PLHIV is common, even in health care facilities.

Individual perception of risk is a predictor of behaviour change, measured by level of risk perception. Theory suggests that those perceiving themselves at risk are more likely to change behaviour. (103) Risk perception to HIV in Gombe State is very low, where 74% and 77% of male and female respondents opined that they were not at risk of contracting HIV. This implies that two-third of the State's population is unlikely to adapt safer behaviours.

Low knowledge and attitude about HIV is not a fuelling factor of Gombe State epidemic. But low risk perception, low uptake of HCT and PMTCT services and behavioural disinhibition are contributing factors.

Figure 11: Box 1- Summary knowledge and Attitude

Box 1: Knowledge and attitude factors related to Gombe State HIV epidemic

- Factors influencing the epidemic
 - Low risk perception
 - Poor up-take of HCT and PMTCT services
 - Low knowledge on incurability of HIV, which will affect perceived severity causing behavioral disinhibition and high-risk behavior
 - Unwillingness to disclose HIV status

5.2 Individual factors:

i. Multiple sexual partnerships, concurrent sexual partnerships and sexual mixing:

Obviously, there would not be HIV pandemic if not of MP especially in the presence of concurrency and sexual mixing. The risk of HIV infection is not uniform for all types of concurrency for instance there is a minimal risk of acquiring HIV in faithful polygyny.

The State's HIV epidemic may be driven by MP and accentuated by CP and dissociative sexual mixing. It manifest as culturally accepted polygyny, frequent marriages intergenerational sex and frequent divorces or culturally frowned behaviours like patronization of FSWs, extramarital and premarital sex. There is anecdotal evidence that urban elites in the state secretly accommodate women in apartments outside their matrimonial houses for long-term sexual relationship. In this situation sex occurs concurrently with their legal-wives, which may contribute to the spread of infection within marital settings.

ii. Low/inconsistent condom use:

Knowledge about the use of condom as HIV prevention method is common among adult men and women in Gombe State. (See 3.2.2) However, condom use in high-risk sex may be low and worse in regular sexual partnerships. (48) Marital setting; where most new infections occur in Nigeria, condom use is likely to be poor, because sex is driven by the desire to have children. Similarly, women are less empowered to negotiate for safer sex even if they suspect their partner is engaging in high-risk behaviours.

Most users obtain condoms from patent medicine stores and petty traders because it is not available in the state HIV programme. Thus, the device may be of bad quality or damaged from poor storage and users might not be educated on how to use it. This may lead to user failure and/or device failure increasing the chances of HIV transmission. Possible barriers to utilization of condom in the State include; lack of condoms where sex

occurs, poverty, low-risk perception and low social acceptance. (89) Knowledge and availability of female condom is very low, it is not readily available, expensive, difficult and inconvenient to use.

iii. Alcohol and mood altering drugs:

The association between alcohol unsafe sex, poor adherence to ARV and gender-based-violence was highlighted by the 58th World Health Assembly. (60) Alcohol, marijuana and glue are widely abused in Nigeria (56) and Gombe State in particular; alcohol ingestion is part of the culture of some indigenous tribes of southern Gombe, while smoking of marijuana and glue sniffing are the order of the day among young men. Use of these substances is associated with MP and heightened susceptibility to HIV infection.

iv. Sexually Transmitted Infections:

The number of new HIV infections attributable to STI in the State is not known, but the role of STI in HIV epidemic is compelling. The State's 2005 prevalence of symptomatic syphilis is the highest in north-eastern Nigeria and majority women attending gynaecology clinics in the State present with pelvic infections and sub-fertility, which are principally due to STIs. (90) The level of knowledge and health seeking behaviour about STI is considerably poor especially among women and FSW in northeast Nigeria. (48) These factors and high PAF makes STI crucial in the State's HIV epidemic.

v. Low circumcision rate in the southern part of the State:

Globally, MC is predominantly practiced by Muslims and Jews in fulfilment of their religious doctrines, while some ethnic groups practice MC for social desirability and health benefits. High socioeconomic status, level of education and circumcision status of the father are predictors of circumcision in the Northern globe, but not important in SSA. (91)

The penile foreskin increases HIV vulnerability because uncircumcised males have higher risk of GUD, which increases the risk of HIV acquisition by 5 folds. Also HIV target cells; macrophages, langerhans cells and T-lymphocytes are closer to inner lining of the foreskin due to lack of keratin allowing easy access to HIV, in contrast to the glans penis of the circumcised that is protected from HIV by a thick layer of keratin. (91)

Anecdotal evidence has shown that there is low male circumcision among some tribes in Shongom, Kaltungo and Balanga LGAs of Southern Gombe State, their population size and the cultural underpinnings of the practice is not documented. Hence, low MC may play a role in the spread of HIV in Southern part of the State.

vi. Educational attainment

Analysis of the relationship between educational attainment and risk of HIV infection is complicated by structural factors. However, girl child

education is associated with improved health and economic chances consequently, reducing the risk of sexual violence and HIV infection. Therefore, low level of education especially among women in Gombe state may contribute to the State's HIV epidemic.

vii. Anal sex

The closet nature of anal sex is brought about by death sentence under Shari' a law and stigmatization. These have accentuated their susceptibility and their partner's susceptibility to HIV infection. Increasing awareness of MSM in the State has brought it into public discourse, it is claimed that wealthy men and politicians engage in anal sex with younger men for ritual purposes in addition to sexual preference. Under secret circumstance the use of condom and lubricant may be a challenge. MSM may contribute to Gombe State HIV epidemic than earlier thought but the size of the population and its dynamics is not known.

viii. IDU:

The role of IDU in Nigeria HIV epidemic is increasingly being acknowledged due to increase availability of drugs as the country serve as a hub for illicit drug trade between Asia, Latin America and Europe. (56) Gombe State being a rural State and far from major airports, the availability of illicit dugs may be limited but pentazoscine and other opiod analgesics are abused, and needle sharing is not unexpected. The size of the population and their HIV and the dynamics of the network are unknown.

Figure 12: Box 2- Summary individual characteristics and behaviour

<p>Box 2: Individual behaviours and characteristics that fuel Gombe State HIV epidemic</p> <p>Most likely factors:</p> <ul style="list-style-type: none"> • Multiple sexual partnership, Concurrent partnership and sexual mixing • Low condom use • Use of alcohol and mood altering drugs • Sexually transmitted infections • Female gender: Half the state's population is female who have heightened risk of HIV infection • Age composition: Almost two-third of the State's population is under 30 years and the age group have the highest HIV prevalence <p>Factors that are inconclusive:</p> <ul style="list-style-type: none"> • Low male circumcision in southern part of the State. • Anal sex • Injecting drug use • Level of educational attainment <p>Unlikely factors:</p> <ul style="list-style-type: none"> • Orogenital sex, intravaginal practices (Scarification, douching, with drying agents)
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5.3 Social drivers:

i. Female Sex Work:

The significance of female sex trade in Gombe State HIV epidemic can be attributed to lack of regulation, social acceptance and poor enabling environment. The population size and dynamics of the industry is unknown but the informal sex sector may have greater influence on the epidemic than the formal sector because of its diversity. Three types of NBBFSW exist in Gombe State 1) those that operate in residence of older ladies who are often retired SWs, 2) those that stay in their parent's houses and get connected to clients through an intermediate by using mobile phone and 3) part time FSWs who search for their clients, mostly students, government workers or business attendants.

The central location of the State, economic activities and junction towns attract FSWs from neighbouring States, especially Benue State the epicentre of Nigeria's epidemic. FSW is a recognized means of livelihood among TIV tribe in Benue State and they play a key role in Gombe State's sex industry.

In 2007 brothels and bars were closed in one of the most affected LGAs as a strategy of curbing the spread of HIV by reducing sex work and alcoholism. Most of the FSWs start operating from their family houses, pushing them underground, difficult to reach and more vulnerable.

ii. Cultural and religious practices:

Extramarital sex, polygyny associated with high-risk behaviours, wife inheritance, early marriage and intergenerational sex are practices accepted by majority of communities in Gombe State. These practices are not for sexual reasons alone but perceived to be safety nets for weaker members of the community. However, with the State's HIV prevalence of 4.9% among general population there is a high risk of HIV transmission from inherited wife/husband, older man to younger woman and infection between spouses in polygamous unions. The extent of wife inheritance, widow cleansing is not known, likewise there is no evidence on spouse sharing in the State.

iii. Neighbourhood factors:

Rapid urbanization of Gombe metropolis and other LG headquarters has lead to overcrowding and formation of slums. Some men and women use public places like markets as shelter; this increases the occurrence of high-risk sex including rape. In addition, SWs and visible drugs and alcohol users ostracized from their communities as such they resort to live in the vicinity of beer parlours and brothels where their likelihood of getting infected is increased. Typical of such slums are "Bambur" in Kumo Akko LGA and BCGA in Gombe metropolis.

iv. Eroded social capital:

The existing safety nets are over-stretched by increasing number of CABA and widows. Although, religious and civil society organizations are thriving to cushion the impact, less is being done by the government to provide social protection for key population at higher-risk of HIV. The role of social capital in the State's epidemic is uncertain.

Figure 13: Box 3-Summary social drivers

Box 3: Social drivers of Gombe State HIV epidemic
Most likely factors: <ul style="list-style-type: none">• Female Sex Work (Formal and informal-transactional)• Cultural and religious factors: Polygyny, pre/postpartum abstinence associated with extramarital sex, early in northern part of the State and late marriage in southern part of the State, intergenerational sex.• Neighbourhood factors: slums and residential segregation
Factors that are inconclusive: <ul style="list-style-type: none">• Eroded social capital• Networks of IDU and MSM• Sororate/levirate• Blood letting, uvulectomy and scarifications
Unlikely factors: <ul style="list-style-type: none">• Widow cleansing, spouse sharing

5.4 Structural drivers:

i. Mobility and migration:

A large institution; mobility and migration as part of life for Fulani nomadic or as means of livelihood for LDD, traders, fishermen and seasonal migrants, are most likely drivers of the State's HIV epidemic. Mostly, involved are sexually active young adult men, who are likely to participate in high-risk sexual networks especially during prolonged spousal separation. Most of the seasonal migrants that don't participate in local sexual network back home because of social desirability. If infected transmission become restricted to their spouses "truncation". (92) This may be the pattern of rural epidemic in State.

ii. Stigma and discrimination:

Stigma and discrimination is a catalyst in propagation of HIV in Gombe State despite the appealing level of accepting attitudes demonstrated in the study presented in this thesis and other surveys. Shame, fear and denial are barriers to disclosure and utilization of HIV services. Shame is more pronounced in northern part of the State especially within Fulani tribe who consider shame "Semtinde or hersa" a pinnacle of their cultural life. (93) This may partly explain the contrasting level of up-take of HIV

services and the formation of HIV self-help groups between southern and northern part of the State.

Health care related stigma plays a role in Gombe State epidemic partly as result of vertical nature of most HIV services, weak internal mainstreaming and poor enabling environment.

iii. Gender inequality and sexuality:

Related to aforementioned sociocultural practices is gender inequality, which manifest as gender based violence. While, comparison of HIV prevalence and gender inequality across some countries in Africa shows a negative association, (81) I opined that it gender inequality occupy a central role Gombe State epidemic. Gender based violence in all forms can directly or indirectly increases the susceptibility of women and girls to HIV. (94)

Girl-child trafficking is a booming business in Nigeria despite its criminalization. Rural adolescent girls are moved to urban areas in a promise of getting a good employment, unfortunately ending as sex workers. (95) In addition, adolescents are vulnerable to older male predators "sugar daddies" that fulfil their economic needs in exchange for sex putting them at risk of contracting HIV. Some communities in Southern part of Gombe have a long history of local girl-child trafficking. In one of the community dialogue sessions a community leader testified that many of such adolescent victims returned home with AIDS.

Also, force marriage and frequent divorce increase women's susceptibility to HIV infection. Majority of women are unemployed in Gombe State and depends on their male partners for livelihood predisposing them to sexual abuse, while some are forced to engage in transactional sex to cater for themselves and their children; poverty and food insecurity is associated with FSW in Nigeria. (96) Masculinity and the provider role ascribed to men by most cultures in the State make them susceptible to HIV infection.

iv. Wealth and Poverty:

While it is clear how wealth drive HIV by sustaining CPs the role of poverty in driving HIV epidemic is mask by contextual factors. About 80% of Gombe State population is poor with limited access to social and health services. Apparently, transactional and intergenerational sex, touting and substance abuse are to a large extends by-products of the soaring level of poverty in the State. Conversely, civil servants, LDD and wealthy traders are mobile, men with money to buy sex and keep multiple partners.

v. Health and HIV policies:

Lack or poor implementation of health/HIV policies influences the spread of HIV. In Nigeria medical injections contributes 0.84% of the new infections that occurred in 2008, this is a result of failure to implement

injection safety policies. Access to quality HIV services still remained a nightmare; only 26% of eligible PLHIV are on ARV at the end of 2008 implying that majority are living with a relatively high viral load for effective transmission. (5) The national HIV policy although comprehensive is silent about key populations at higher risk. Generic national policies are yet to be domesticated in Gombe State. Equally, the coverage of HCT, PMTCT, STI and ART is grossly inadequate.

vi. Socioeconomic policies:

HIV is mainstreamed in the Nigeria poverty reduction strategy (NEEDS), which is replicated in Gombe State. However, the implementation of NEEDS/SEEDS and mainstreaming of HIV in social sectors is far from desired. No social protection programme for orphans and vulnerable children and women in the State. Lack of implementation of pro-poor policies and mainstreaming of HIV may play a role in the State’s epidemic.

vii. Conflict and militarization:

Conflict and militarization are empirically associated with increase population’s susceptibility to HIV. There are limited conflicts and military activity in Gombe State but their location within the general population may have HIV driving effect. An army barracks with beer parlours “Mami market” located in the heart of Gombe metropolis provides a sanctuary for high-risk behaviours. Likewise, a sudden increase of HIV prevalence to 4% in a rural sentinel site (Kwami PHC) was observed one year after the relocation of mobile police barrack to the village.

Figure 14: Box 4- Summary structural Drivers

Box 4: Structural drivers of Gombe State HIV epidemic
<p>Most likely factors:</p> <ul style="list-style-type: none"> • Demographic factors: Migration and mobility (LDD, Traders, nomadic Fulani, Fishermen, seasonal migrants) • Structural violence: Stigma and discrimination, gender inequality (Gender Based Violence, girl-child trafficking) • Wealth and poverty in different context • Lack of anti-discriminatory law, weak macroeconomic and health policies • Locating militarization and paramilitarization barracks within general population <p>Factors that are inconclusive:</p> <ul style="list-style-type: none"> • Criminalization of MSM, IDU • Conflict • Racism, ethnicity

Chapter 6: Conclusion & Recommendations

6.1 Conclusion:

Despite concerted effort to curb the spread and mitigate the impact of HIV in Gombe State, it is still a major health and development concern. The State's HIV prevention effort is bedeviled by inadequate understanding of the epidemic resulting into failure to contain the spread of the virus. This and subsequent analysis is imperative for evidence-informed planning and targeted interventions, which will hopefully bring the epidemic to control.

Low of knowledge as a fuelling factor of the State epidemic is dismissed by the findings:

- Over 95% of respondents has heard of HIV
- Faithful monogamy and condom use as HIV prevention strategies is opined by most respondents.
- Major misconceptions about HIV were dispelled except it is perceived as curable by majority of the respondents especially in rural areas.
- Bulk of interviewees expressed accepting attitude towards PLHIV, however most and especially respondents with higher education want the HIV status of a family member to remain a secret.
- Majority of respondent especially rural residents demonstrated good knowledge on MTCT, where to get HIV test and willingness to get tested.

About two-third of respondents opined not at risk of contracting HIV, this imply the unlikelihood of adapting safer health behaviour. This is corroborated by low-uptake of HCT services (10%-17%) among the respondents.

Analysis of existing literature suggested that multiple sexual partnerships, concurrent sexual partnerships, sexual mixing, low condom use in high-risk sex and within marital/cohabiting relationship, prevailing STI, abuse of alcohol, marijuana and other mood enhancing drugs are the individual factors that facilitates the spread of HIV in the State. While the role of low circumcision in southern part of the State, educational attainment, MSM and IDU is uncertain.

Suffice to say that understanding behaviour factors and applying biomedical intervention is quicker and within the ambit of public health, neglecting structural approaches will impede their success. Therefore, "drivers" should be analyzed and addressed alongside behavioural factors. (97) Poorly regulated FSW, cultural factors like extramarital sex associated with polygyny, pre/post partum abstinence, early/late marriage, mobility/migration, neighbourhood factors, urbanization, stigma, gender inequality, wealth and poverty, militarization, weak legal and policy instruments are likely structural drivers of the State's epidemic. The role of criminalization of MSM, IDU, wife inheritance, widow

cleansing, social capital conflict and ethnicity in the State's HIV epidemic is uncertain.

6.2 Remarks on adapted framework:

The heuristic framework of the social epidemiology of HIV was found useful in the analysis and presentation of the study. The adaptations made have clarified some of the vague concepts in the framework and have reduced repetitions. However, the social constructs of health behaviour incorporated have not reflected well in the analysis.

6.3 Recommendations:

As a limitation, evidence-informed interventions on how to address the identified drivers were not explored. But while pursuing the agenda of ***knowing the epidemic***, identified factors should be tackled. PLHIV and target groups should meaningfully participate in the design and implementation of these recommendations:

6.3.1 Policy & governance:

These recommendations are directed to policy makers in order of priority:

1. Adaptation of national HIV policy.
2. Enactment and enforcement of anti-discriminatory law protecting the right of PLHIV and key population at higher-risk.
3. Policy protecting the right of FSW and ensuring access to comprehensive HIV/STI services.
4. Policy regulating alcohol and substance use and creating enabling environment for users to access information, treatment and rehabilitation services.

6.3.2 Research/assessments:

To ensure credibility the study should be participatory and triangulated by using appropriate data collection techniques, e.g. Focus Group Discussion, interviewing, projective techniques like mapping and mix of methodologies.

1. Immediate (Before Mar. 2010):

- Mapping of FSW and base-line assessment
- Mapping and base-line assessment for LDD, seasonal migrants and Fulani nomadic.
- Barriers to up-take of condom, HCT, STI and PMTCT services
- Exploring MSM and IDU networks

2. Long-term (On-going): See annex 18 the themes of research.

6.3.3 Interventions:

Evidence-informed and cost effective interventions should be employed in to:

1. Improve the level of risk perception through self risk assessment participatory techniques like “wild fire”
2. Improve access and utilization of condom, PMTCT, STI and HCT services
3. Reducing MP, CP and sexual mixing by reducing extramarital sex, early sexual debut, partner overlap, rate of partner change and cultural practices like prolong pre/partum abstinence, early marriage.
4. Improving access of FSW to STI/HIV services including condoms
5. Reducing self, community and health care related stigma
6. Reducing gender inequity (GBV and girl-child trafficking)
7. Improving access of STI/HCT services to mobile population

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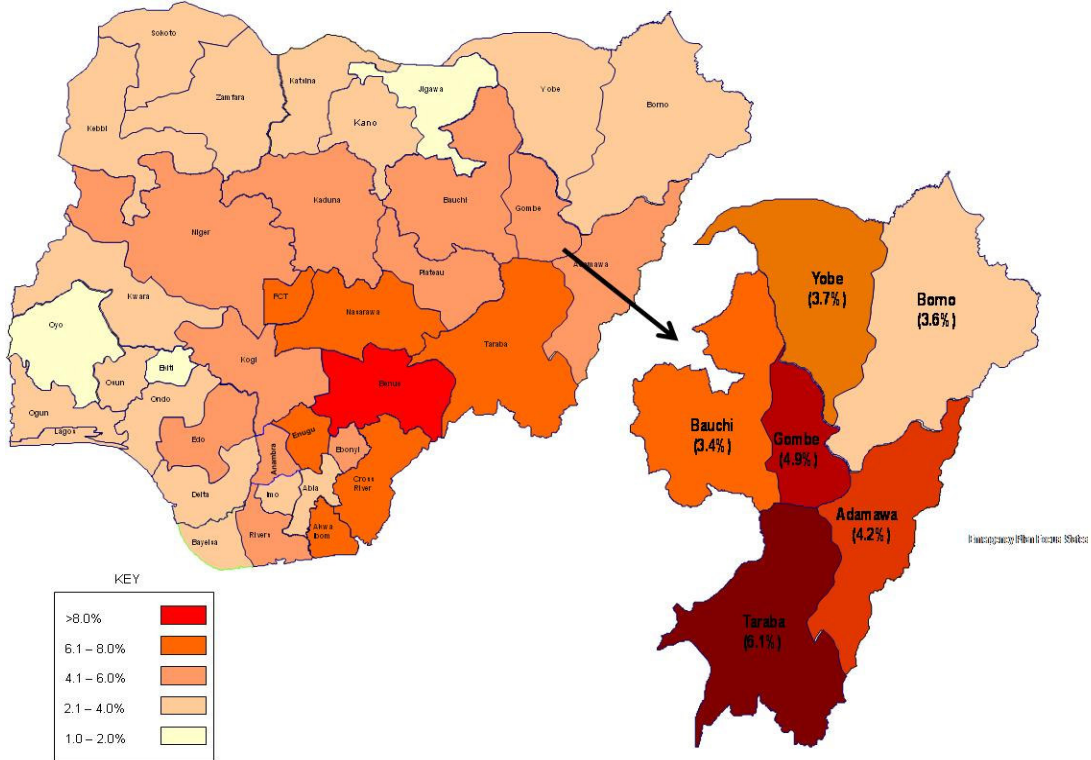
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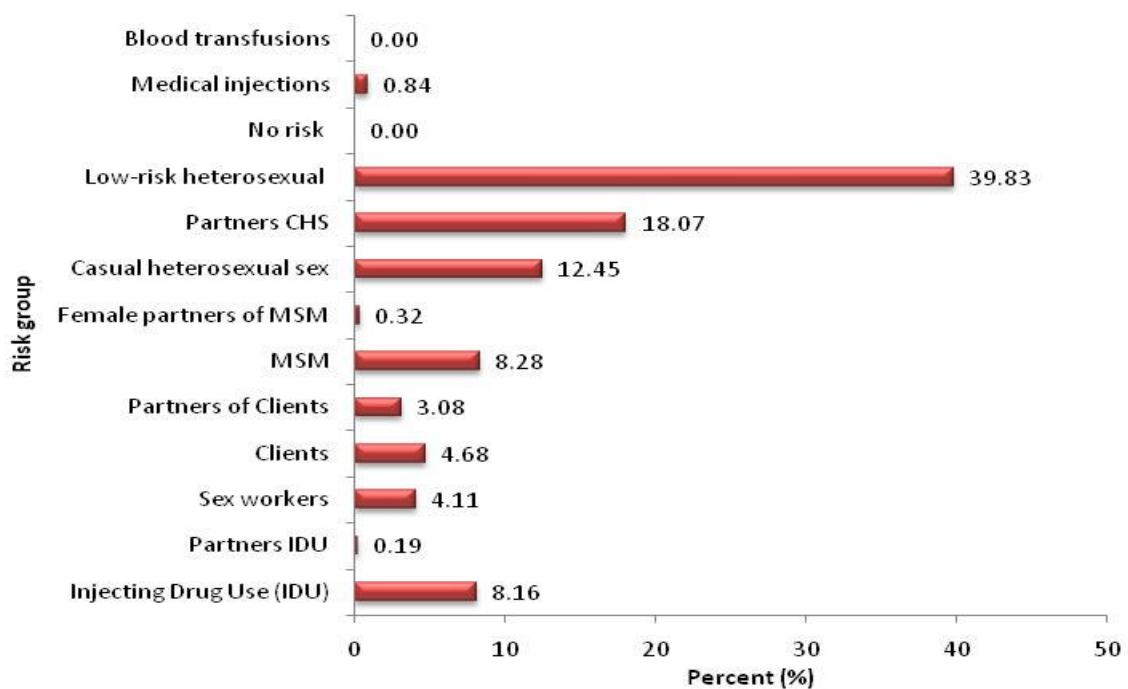
Annexes

Annex 1: Graduated map of Nigeria showing HIV prevalence by State (Insert Northeast zone)



Annex 2: Modelling of mode of transmission of HIV. Nigeria

Number of new infections: 240,836



Annex 3: Regions where most men are uncircumcised



Source: Scientific American, 1996

Annex 4: Questionnaire

KABP Study, Gombe State.

Individual Interview for Men and Women of Reproductive Age (15-49years)

Instructions: Check the right answer using *x* for e.g. [x] with AB pencil

Questionnaire Identification Number: ___/___/___/___/

Community: Urban [] Rural []

Introduction: My name is _____. I am a researcher. We are interviewing people here in order to find out level of knowledge, attitude and some practices on HIV.

Confidentiality: I wish to ask you some questions some which may be very personal. Your answers are completely confidential. Your name will not be written on this form, and will never be used in connection with any of the information you tell me.

Interviewer: Name _____ Signature _____ Date _____

A) Background Data

No.	Questions and Filter	Coding Categories	Skip to
1	Sex of the respondent	Male (1) [] Female (2) []	
2	Age of the respondent	1. 15-19years [] 2. 20-24years [] 3. 24-29years [] 4. 30-34years [] 5. 35-39years [] 6. 40-44years [] 7. 45-49years []	
3	Have you ever attended school?	1. Yes [] 2. No []	Ⓢkip to 5

4	What is the highest level of school you attended?	1. Quranic only [] 2. Primary [] 3. Secondary [] 4. Higher []	
5	What language can you read?	1. English [] 2. Hausa [] 3. Arabic [] 4. Others []	
6	What is your religion?	1. Christianity [] 2. Islam [] 3. Traditional [] 4. None []	

B) Knowledge on HIV/AIDS

No.	Questions and Filter	Coding Categories	Skip to
7	Have you ever heard of HIV and/or AIDS?	1. Yes [] 2. No []	
8	Do AIDS have a cure?	1. Yes [] 2. No [] 3. I don't know []	
9	Do you know someone died of AIDS?	1. Yes [] 2. No [] 3. I don't know []	
10	How can a person get the germ that causes AIDS? <i>(first record all those mentioned including those not listed under others then prompt)</i>	1. Sexual intercourse • Yes [] • No [] 2. Mother To Child • Yes [] • No [] 3. Use of infected sharp objects • Yes [] • No [] 4. Blood transfusion • Yes [] • No [] 5. I don't know [] Others not mentioned: _____ _____ _____	
11	What are the ways that a person cannot get the germ that causes AIDS? <i>(first record all those mentioned including those not listed under others then prompt)</i>	1. Shaking hands • Yes [] • No [] 2. Eating from the same bowl • Yes [] • No [] 3. Sharing toilets • Yes [] • No [] 4. Sharing clothes • Yes [] • No [] 5. I don't know [] Others not mentioned: _____ _____ _____	
12	Is it possible that a person having the germ that causes AIDS looks healthy?	1. Yes [] 2. No [] 3. I don't know []	

13	<p>What are the ways that the germ that causes AIDS cannot be transmitted? <i>(first record all those mentioned including those not listed under others then prompt)</i></p>	<ol style="list-style-type: none"> 1. Maintaining one uninfected sexual partner <ul style="list-style-type: none"> • Yes [] • No [] 2. Not sharing sharp objects <ul style="list-style-type: none"> • Yes [] • No [] 3. Abstinence from sex <ul style="list-style-type: none"> • Yes [] • No [] 4. Use of condom <ul style="list-style-type: none"> • Yes [] • No [] 5. Using salt water to wash sex organs after sex <ul style="list-style-type: none"> • Yes [] • No [] 6. Praying to God <ul style="list-style-type: none"> • Yes [] • No [] 7. I don't know [] <p><i>Others not mentioned:</i> _____ _____</p>	
14	<p>Can some of our cultural and religious factors promote the spread of HIV/AIDS?</p>	<ol style="list-style-type: none"> 1. Yes [] 2. No [] 3. I don't know [] 	<p>⊗ skip to 17 ⊗ skip to 17</p>
16	<p>Can you mention some of these religious and cultural factors? <i>(first record all those mentioned including those not listed under others then prompt)</i></p>	<ol style="list-style-type: none"> 1. Child hawking <ul style="list-style-type: none"> • Yes [] • No [] • I don't know [] 2. Gender discrimination <ul style="list-style-type: none"> • Yes [] • No [] • I don't know [] 3. Wife inheritance <ul style="list-style-type: none"> • Yes [] • No [] • I don't know [] 4. Polygamy <ul style="list-style-type: none"> • Yes [] • No [] • I don't know [] 5. Alcohol and drug abuse <ul style="list-style-type: none"> • Yes [] • No [] • I don't know [] 6. Early marriage <ul style="list-style-type: none"> • Yes [] 	

C) Attitude and Practice on HIV/AIDS

No.	Questions and Filter	Coding Categories	Skip to
19	Have you ever been tested to find out if you have the virus that causes AIDS	1. Yes [] 2. No []	Skip to 22
20	Will you like to have a test to find out if you have the virus that causes AIDS?	1. Yes [] 2. No []	Skip to 22
21	Why not?	1. Do not want to know my HIV status [] 2. Fear and Anxiety [] 3. I feel it is not necessary [] 4. I cant afford [] 5. I don't know where it is being done [] 6. <i>Others not mentioned:</i> _____ _____ _____	
22	I don't want to know the result of your test, but did you get the results of the test?	1. Yes [] 2. No []	
23	How would you rate your chances of getting the virus that causes AIDS?	1. High [] 2. Low [] 3. Not at risk [] 4. Already have AIDS [] 5. I don't know []	1, 2, and ask Q24 and skip to 28 Skip to 25 Skip to 28
24	Why do you think you have a chance at all of getting AIDS (or the virus that causes AIDS)?	1. I abstain from sex • Yes [] • No [] 2. I use condoms • Yes [] • No [] 3. I trust my partner • Yes [] • No [] 4. I have a limited number of sex partners • Yes [] • No [] 5. I have only sex partner • Yes [] • No [] 6. Sex with sex workers • Yes [] • No [] 7. Spouse/partners has no other sex partners • Yes [] • No [] 8. God will protect me • Yes [] • No [] <i>Others not mentioned:</i> _____ _____ _____	

29	If a member of your family becomes ill with the virus that causes AIDS, would you want it to remain secret or not?	1. Yes, I would want it to remain secret [] 2. No, I would not want it to remain secret [] 3. I don't know []	
30	If a relative of yours becomes ill with the virus that causes AIDS, would you care for him/her?	1. Yes, I would care [] 2. No, I would not care [] 3. I don't know []	
31	If a child has the virus that causes AIDS, should he be allowed to attend school with other children?	1. Yes [] 2. No [] 3. I don't know []	
32	If a teacher has the virus that causes AIDS, should s/he be allowed to teach children?	1. Yes [] 2. No [] 3. I don't know []	

D) Existing HIV/AIDS Services in the Community

No.	Questions and Filter	Coding Categories	Skip to
33	Does your community have a health facility where pregnant mothers can be helped to protect their children from HIV	1. Yes [] 2. No [] 3. I don't know []	
34	Does your community have HIV Testing services	1. Yes [] 2. No [] 3. I don't know []	
35	Does your community have a TB screening and treatment services	1. Yes [] 2. No [] 3. I don't know []	
36	Is there exist a support group of PLWHAs	1. Yes [] 2. No [] 3. I don't know []	
37	Is there exist a Non Governmental Organization offering HIV/AIDS services	1. Yes [] 2. No [] 3. I don't know []	
38	Is there exist a community based policy that will prevent the spread of HIV/AIDS, reduce stigma, or support PLWHAs, OVC and PABAs	1. Yes [] 2. No [] 3. I don't know []	
39	Is there exist a participatory community decision making process that brings the voice of men, women, girls and boys voices to the forefront that addresses their concerns	1. Yes [] 2. No [] 3. I don't know []	

Supervisor: Name _____ Signature _____ Date _____

Annex 5: Background characteristics of respondents

Characteristics	Men					Women					All	
	Urban		Rural		N	Urban		Rural		N	Total (T)	% (T%)
	%	n	%	n		%	n	%	n			
Age (years)												
15-19	14.7	34	6.8	54	88	3.9	9	3.9	31	40	128	8.6
20-24	12.6	29	15.3	121	150	12.1	28	9.0	71	99	249	16.8
25-29	20.8	48	22.4	177	225	10.0	23	10.8	85	108	333	22.5
30-34	23.8	55	28.1	222	277	11.3	26	9.9	78	104	381	25.7
35-39	15.6	36	16.5	130	166	10.4	24	6.5	51	75	241	16.3
40-44	8.7	20	6.1	48	68	3.0	7	2.5	20	27	95	6.4
45-49	3.9	9	4.8	38	47	0.9	2	0.6	5	7	54	3.6
Total	100.0	231	100.0	790	1,021	51.5	119	43.2	341	460	1,481	100
Highest level of education												
None	0.4	1	1.6	13	14	1.7	2	6.2	21	23	37	2.5
Quranic	10.4	24	12.2	96	120	8.4	10	10.0	34	44	164	11.1
Non formal	0.9	2	1.1	9	11	-	-	0.6	2	2	13	0.9
Primary	26.8	62	25.9	205	267	31.9	38	27.6	94	132	399	26.9
Secondary	41.1	95	42.4	335	430	40.3	48	41.1	140	188	618	41.7
Higher	20.3	47	16.7	132	179	17.6	21	14.7	50	71	250	16.9
Total	100.0	231	100.0	790	1,021	100.0	119	100.0	341	460	1,481	100
Religion												
Christianity	16.0	37	28.5	225	262	21.0	25	34.3	117	142	404	27.3
Islam	84.0	194	71.1	562	756	79.0	94	65.7	224	318	1,074	72.5
*Traditional	-	-	0.4	3	3	-	-	-	-	-	3	0.2
Total	100.0	231	100.0	790	1,021	100.0	119	100.0	341	460	1,481	100

NB: Mean age (X) is 29.9years (SD; 7.7), Median age is 24.5 , Modal age 27 years

***Percentages derived from absolute numbers less than 15 were not in interpretation of data analysis**

Annex 6: Knowledge of AIDS: Percentage of men and women who have heard of AIDS, by background characteristics, Gombe State, Nigeria 2008

Characteristics	Men		Women		All	
	% Ever heard of HIV	No. of respondents	% Ever heard of HIV	No. of respondents	% Ever had HIV	No. of respondents
Urban	99.1	231	95.0	119	97.7	350
Rural	97.7	790	96.5	341	97.3	1,131
Total		1,021		460		1,481
Age (years)						
15-19	98.9	88	95.0	40	97.7	128
20-24	99.3	150	93.9	99	97.2	249
25-29	96.9	225	97.2	108	97.0	333
30-34	97.8	277	99.0	104	98.2	381
35-39	98.2	166	93.3	75	96.7	241
40-44	98.5	68	100.0	27	98.9	95
45-49	97.9	47	85.7	7	96.3	54
Total		1,021		460		1,481
Highest level of education						
None	85.7	14	87.0	23	86.5	37
Quranic	94.1	119	77.3	44	89.6	163
Non formal	75.0	12	100.0	1	76.9	13
Primary	97.4	267	96.3	134	97.0	401
Secondary	99.8	431	98.9	186	99.8	617
Higher	100.0	178	100.0	72	100.0	250
Total		1,021		460		1,481
Religion						
Christianity	98.9	262.0	98.6	142	98.8	404
Islam	98.0	756.0	95.0	318	97.1	1,074
Traditional	33.3	3.0	-	-	33.3	3
Total		1,021		460		1,481

**Percentages derived from absolute numbers less than 15 are excluded from interpretation*

Annex 7: Knowledge of AIDS: Percentage of men and women who mentioned use of condom and/or maintaining one uninfected sexual partner as a method of HIV prevention among respondents who have heard of AIDS background characteristics, Gombe State, Nigeria 2008

Characteristics	Men				Women				All	
	Using condom	Maintaining one uninfected partner	Using condom	Maintaining one uninfected partner	Using condom	Maintaining one uninfected partner	Using condom	Maintaining one uninfected partner	Using condom	Maintaining one uninfected partner
Urban	91.7	97.8	88.5	95.6	90.6	97.1				
Rural	88.3	98.3	88.1	99.4	88.3	98.6				
Total										
Age (years)										
15-19	92.0	98.9	94.7	100.0	92.8	99.2				
20-24	95.3	98.0	93.5	97.8	94.6	97.9				
25-29	89.0	97.2	88.6	98.1	88.9	97.5				
30-34	88.6	98.2	83.5	99.0	87.2	98.4				
35-39	91.4	99.4	81.4	97.1	88.4	98.7				
40-44	80.6	100.0	92.6	100.0	84.0	100.0				
45-49	71.7	95.7	100.0	100.0	75.0	96.2				
Total										
Highest level of education										
*None	41.7	91.7	50	100.0	46.9	96.9				
Quranic	68.8	98.2	68	100.0	68.5	98.6				
*Non formal	66.7	100.0	100	100.0	60.0	100.0				
Primary	95.8	99.2	95	98.4	95.4	99.0				
Secondary	96.0	98.4	96	98.4	95.9	98.4				
Higher	79.8	96.6	79	97.2	79.6	96.8				
Total										
Religion										
Christianity	89.2	94.4	90.7	97.9	89.7	95.6				
Islam	89.1	99.6	87.1	98.7	88.5	99.3				
*Traditional	100.0	100.0	-	-	100.0	-				
Total										

Annex 8: Beliefs on HIV: Percentage of men who dispel major beliefs about HIV, by background characteristics, Gombe State, Nigeria 2008

Men					
Characteristics	A healthy looking person can have the germ that cause AIDS	HIV is not curable	HIV cannot be transmitted by eating food with PLHIV from same bowl	HIV cannot be transmitted by sharing toilets	No. of respon-dents
Urban	88.2	30.6	93.9	81.2	229
Rural	84.8	52.3	92.9	66.6	772
Total					1,001.0
Age (years)					
15-19	92.0	41.4	98.9	79.3	87
20-24	84.6	44.3	94.6	69.8	149
25-29	84.4	48.6	91.7	63.3	218
30-34	85.6	39.5	93.0	70.1	271
35-39	90.8	52.1	95.7	77.9	163
40-44	77.6	59.7	83.6	64.2	67
45-49	55.5	47.8	89.1	63.0	46
Total					1,001.0
Highest level of education					
*None	41.7	58.3	91.7	16.7	12
Quranic	84.8	45.5	93.8	74.1	112
*Non formal	100.0	22.2	100.0	100.0	9
Primary	93.5	42.3	97.7	88.5	260
Secondary	87.2	44.2	94.4	73.5	430
Higher	73.0	57.3	82.6	33.7	178
Total					1,001
Religion					
Christianity	87.0	41.6	89.6	71.0	269
Islam	85.1	47.7	94.4	69.6	731
*Traditional	100.0	100.0	100.0	-	1
Total					1,001

**Percentages derived from absolute numbers less than 15 are excluded from interpretation*

Annex 9: Beliefs on HIV: Percentage of women who dispel major beliefs about HIV, by background characteristics, Gombe State, Nigeria 2008

Women					
Characteristics	A healthy looking person can have the germ that cause AIDS	HIV is not curable	HIV cannot be transmitted by eating food with PLHIV from same bowl	HIV cannot be transmitted by sharing toilets	No. of respondents
Urban	85.8	28.3	89.4	80.5	113
Rural	84.8	45.6	94.8	67.8	329
Total					442
Age (years)					
15-19	78.9	52.6	97.4	81.6	38
20-24	88.2	43.0	95.7	75.3	93
25-29	87.6	44.8	91.4	69.5	105
30-34	82.5	43.7	90.3	68.9	103
35-39	82.9	52.9	92.9	68.6	70
40-44	88.9	63.0	100.0	63.0	27
45-49	83.3	33.3	100.0	66.7	6
Total					442
Highest level of education					
*None	45.0	35.0	80.0	5.0	20
Quranic	70.6	38.2	94.1	70.6	34
*Non formal	100.0	-	100.0	100.0	1
Primary	92.2	45.0	95.3	89.9	129
Secondary	91.4	41.9	96.2	81.2	186
Higher	73.6	62.5	86.1	29.2	72
Total					442
Religion					
Christianity	83.6	49.3	92.9	59.3	140
Islam	85.8	46.0	93.7	76.5	302
*Traditional	-	-	-	-	-
Total					442

Annex 10: Accepting attitudes towards those living with HIV: Percentage of men expressing accepting attitudes toward people with HIV, by background characteristics, Gombe State.

Men					
Characteristics	Willing to eat from same bowl with a PLHIV	If a family member is living with HIV should not be kept a secret	Willing to care for a family member living with HIV	HIV-positive teacher should be allowed to teach	No. of respondents
Urban	93.9	88.2	99	98.7	229
Rural	92.9	78.9	98	96.6	772
Total					1,001.0
Age (years)					
15-19	98.9	83.9	100.0	100.0	87
20-24	94.6	80.5	100.0	99.3	149
25-29	91.7	75.7	97.7	95.9	218
30-34	93.0	81.2	96.3	95.2	271
35-39	95.7	87.7	98.2	97.5	163
40-44	83.6	71.6	97.0	98.5	67
45-49	89.1	91.3	97.8	97.8	46
Total					1,001.0
Highest level of education					
*None	91.7	58.3	50.0	50.0	12
Quranic	93.8	91.1	97.3	94.6	112
*Non formal	100.0	100.0	100.0	100.0	9
Primary	97.7	96.5	99.6	98.5	260
Secondary	94.4	81.2	98.6	97.9	430
Higher	82.6	52.2	97.2	97.8	178
Total					1,001
Religion					
Christianity	89.6	77.0	94.8	95.2	269
Islam	94.4	82.5	99.0	97.9	731
*Traditional	100.0	100.0	100.0	-	1
Total					1,001

**Percentages derived from absolute numbers less than 15 are excluded from interpretation*

Annex 11: Accepting attitudes towards those living with HIV: Percentage of women expressing accepting attitudes toward people with HIV, by background characteristics, Gombe State.

Women					
Characteristics	Willing to eat from same bowl with a PLHIV	HIV-positive status of a family member should not remain a secret	Willing to care for a family member living with HIV	HIV-positive teacher should be allowed to teach	No. of respondents
Urban	89.4	80.5	96	98.2	
Rural	94.8	75.1	96	95.1	
Total					
Age (years)					
15-19	97.4	86.8	97.4	97.4	
20-24	95.7	79.6	96.8	96.8	
25-29	91.4	74.3	98.1	98.1	
30-34	90.3	76.7	92.2	95.1	
35-39	92.9	74.3	95.7	91.4	
40-44	100.0	63.0	96.3	96.3	
45-49	100.0	83.3	83.3	100.0	
Total					
Highest level of education					
*None	80.0	40.0	65.0	55.0	
Quranic	94.1	82.4	100.0	97.1	
*Non formal	100.0	100.0	100.0	100.0	
Primary	95.3	92.2	97.7	100.0	
Secondary	96.2	85.5	96.8	96.2	
Higher	86.1	31.9	95.8	98.6	
Total					
Religion					
Christianity	92.9	73.6	92.9	90.7	
Islam	93.7	77.8	97.0	98.3	
*Traditional	-	-	-	-	
Total					

**Annex 12: Knowledge on Mother To Child Transmission of HIV:
Percentage of men mentioning ways of Mother To Child Transmission of
HIV, by background characteristics, Gombe State, Nigeria 2008**

Men				
	During pregnancy	During delivery	During breastfeeding	No. of respondents
Characteristics				
Urban	87.3	88.6	89.5	229
Rural	89.8	92.6	93.5	772
Total				1,001.0
Age (years)				
15-19	95.4	96.6	97.7	87
20-24	91.3	91.9	92.6	149
25-29	90.8	93.6	95.0	218
30-34	86.0	89.3	90.8	271
35-39	89.6	93.3	92.6	163
40-44	86.6	89.6	89.6	67
45-49	84.8	84.8	87.0	46
Total				1,001.0
Highest level of education				
*None	100.0	100.0	91.7	12
Quranic	90.2	93.8	93.8	112
*Non formal	66.7	66.7	66.7	9
Primary	90.0	90.4	91.5	260
Secondary	91.9	92.8	93.7	430
Higher	81.5	90.4	92.1	178
Total				1,001
Religion				
Christianity	91.4	91.8	92.6	269
Islam	88.4	91.7	92.6	731
*Traditional	100.0	100.0	100.0	1
Total				1,001

**Percentages derived from absolute numbers less than 15 are excluded from interpretation*

**Annex 13: Knowledge on Mother To Child Transmission of HIV:
Percentage of women mentioning ways of Mother To Child
Transmission of HIV, by background characteristics, Gombe State,
Nigeria 2008**

Women				
	During pregnancy	During delivery	During breastfeeding	No. of respondents
Characteristics				
Urban	66.4	69.9	69.9	113
Rural	79.3	82.4	82.4	329
Total				442
Age (years)				
15-19	84.2	86.8	81.6	38
20-24	65.6	72.0	69.9	93
25-29	76.2	77.1	79.0	105
30-34	76.7	79.6	79.6	103
35-39	80.0	82.9	85.7	70
40-44	81.5	85.2	85.2	27
45-49	100.0	100.0	100.0	6
Total				442
Highest level of education				
*None	80.0	80.0	90.0	20
Quranic	85.3	91.2	91.2	34
*Non formal	-	-	-	1
Primary	68.2	69.0	69.0	129
Secondary	77.4	80.1	78.5	186
Higher	81.9	90.3	91.7	72
Total				442
Religion				
Christianity	84.3	85.7	85.7	140
Islam	72.2	76.2	76.2	302
*Traditional	-	-	-	-
Total				442

Annex 14: Knowledge on HIV Counseling and Testing: Percentage of men who can locate HCT site, has tested or willing to get test, by background characteristics, Gombe State, Nigeria 2008

Characteristics	Men							
	Know where to get HIV tested		Ever been tested		Collected Result		Willing to be tested	
	%	No. heard HIV	Yes	No. know HCT Site	Yes	No. tested	Yes	No. not tested
Urban	96.5	229	9.0	221	85.0	20	75.6	201
Rural	86.0	772	11.1	664	75.7	74	93.1	590
Total		1,001.0		885		94		791
Age (years)								
15-19	94.3	87	3.7	82	66.7	3	68.4	79
20-24	85.9	149	8.6	128	81.8	11	75.2	117
25-29	89.9	218	12.2	196	75.0	24	72.7	172
30-34	84.5	271	12.2	229	85.7	28	80.6	201
35-39	92.0	163	7.3	150	72.7	11	77.0	139
40-44	88.1	67	20.3	59	66.7	12	66.0	47
45-49	89.1	46	12.2	41	80.0	5	94.4	36
Total		1,001.0		885		94		791
Highest level of education								
*None	16.7	12	-	2	-	-	100.0	2
Quranic	84.8	112	1.1	95	-	1	87.2	94
*Non formal	66.7	9	-	6	-	-	100.0	6
Primary	88.1	260	3.1	229	71.4	7	72.1	222
Secondary	90.7	430	7.7	390	73.3	30	72.8	360
Higher	91.6	178	34.4	163	82.1	56	83.2	107
Total		1,001		885		94		791
Religion								
Christianity	89.6	269	12.0	241	82.8	29	93.4	212
Islam	88.1	731	10.1	644	75.4	65	69.6	579
*Traditional	-	1	-	-	-	-	-	-
Total		1,001		885		94		791

**Percentages derived from absolute numbers less than 15 are excluded from interpretation*

Annex 15: Knowledge on HIV Counseling and Testing: Percentage of women who can locate HCT site, has tested or willing to get test, by background characteristics, Gombe State, Nigeria 2008

Characteristics	Women							
	Know where to get HIV tested		Ever been tested		Collected Result		Willing to be tested	
	%	No. heard HIV	Yes	No. know HCT Site	Yes	No. tested	Yes	No. not tested
Urban	92.9	113	11.4	105	75.0	12	72.0	93
Rural	81.8	329	17.8	269	89.6	48	86.0	221
Total		442		374		60		314
Age (years)								
15-19	89.5	38	5.9	34	50.0	2	65.6	32
20-24	84.9	93	13.9	79	81.8	11	66.2	68
25-29	89.5	105	19.1	94	94.4	18	57.9	76
30-34	76.7	103	15.2	79	83.3	12	82.1	67
35-39	82.9	70	12.1	58	71.4	7	72.5	51
40-44	88.9	27	37.5	24	100.0	9	73.3	15
45-49	100.0	6	16.7	6	100.0	1	80.0	5
Total		442		374		60		314
Highest level of education								
*None	25.0	20	20.0	5	-	1	100.0	4
Quranic	85.3	34	13.8	29	50.0	4	84.0	25
*Non formal	-	1	-	-	-	-	-	-
Primary	83.7	129	3.7	108	50.0	4	69.2	104
Secondary	89.2	186	10.2	166	76.5	17	63.1	149
Higher	91.7	72	51.5	66	-	34	81.3	32
Total		442		374		60		314
Religion								
Christianity	84.3	140.0	19.5	118	91.3	23	83.2	95
Islam	84.8	302.0	14.5	256	83.8	37	63.0	219
*Traditional	-	-	-	-	-	-	-	-
Total		442		374		60		314

Annex 16: Risk Perception: Percentage of men who perceived their risk of contracting HIV, by background characteristics. Gombe State,

Men					
	High	Low	Not at risk	Already have HIV	No. of respondents
Characteristics					
Urban	3.9	19.2	76.9	0	229
Rural	8.2	21.1	70.6	-	772
Total					1,001.0
Age (years)					
15-19	4.6	9.2	86.2	-	87
20-24	9.4	21.5	69.1	-	149
25-29	6.0	27.1	67.0	-	218
30-34	6.6	18.8	74.5	-	271
35-39	8.0	16.6	75.5	-	163
40-44	7.5	29.9	62.7	-	67
45-49	8.7	21.7	67.4	2.2	46
Total					1,001.0
Highest level of education					
*None	-	75.0	25.0	-	12
Quranic	2.7	10.7	86.6	-	112
*Non formal	-	-	100.0	-	9
Primary	4.2	8.8	86.9	-	260
Secondary	8.1	18.4	73.5	-	430
Higher	12.9	47.2	39.3	0.6	178
Total					1,001
Religion					
Christianity	4.5	21.6	73.6	0.4	269
Islam	7.5	20.0	72.5	-	731
*Traditional	-	100.0	-	-	1
Total				100.0	1,001

**Percentages derived from absolute numbers less than 15 are excluded from interpretation*

Annex 17: Risk Perception: Percentage of men who perceived their risk of contracting HIV, by background characteristics,

Men					
	High	Low	Not at risk	Already have HIV	No. of respondents
Characteristics					
Urban	2.7	18.6	78.8	-	113
Rural	3.6	20.7	75.7	-	329
Total					442
Age (years)					
15-19	-	10.5	89.5	-	38
20-24	6.5	18.3	75.3	-	93
25-29	1.9	25.7	72.4	-	105
30-34	2.9	18.4	78.6	-	103
35-39	4.3	21.4	74.3	-	70
40-44	3.7	18.5	77.8	-	27
45-49	-	33.3	66.7	-	6
Total					442
Highest level of education					
*None	-	65.0	35.0	-	20
Quranic	-	20.6	79.4	-	34
*Non formal	-	-	100.0	-	1
Primary	1.6	9.3	89.1	-	129
Secondary	3.8	15.1	81.2	-	186
Higher	8.3	40.3	51.4	-	72
Total					442
Religion					
Christianity	5.0	34	61.4	-	140.0
Islam	2.6	14	83.4	-	302.0
*Traditional	-	-	-	-	-
Total					442

Annex 18: Research themes:

While exploration of literature has exposed the knowledge gap in understanding the dynamics of Gombe State epidemic, the proposed research themes are not meant to delay action “we can continue building the ship as we sail”.

Individual factors:

- **Multiple Partnerships and Concurrent Partnerships:**
 - Magnitude
 - Dynamics (Predominant type of sexual mixing, duration/overlap and rate of partner change)
 - Structural determinants
- **Alcohol and mood altering drugs:**
 - Mapping of locations
 - HIV/STI prevalence among users
 - MP and CP among users
- **STIs:**
 - Prevalence of GUD and NGUD
 - Knowledge and health seeking behaviours about STIs
 - Prevalence of HIV/STI co-existence
- **Male Circumcision in southern Gombe:**
 - Explore the practice of MC in the area
 - Prevalence of MC in the communities
 - Sociocultural dimensions of MC in the communities
- **Education and HIV:**
 - Association between HIV and different forms of education
 - Factors responsible for protective effect of Quranic education

Social level factors

- **Female Sex Workers and network:**
 - Forms, mobility pattern and population size
 - Knowledge on HIV/STI
 - Sexual behaviours (condom use, client type and rate)
 - Fundamental causes contributing to entry into sex work
 - Drug use and overlap with other key population at higher risk
 - Barriers to accessing HIV/STI
 - HIV prevalence
- **MSM and network**
 - Size estimation
 - Knowledge on HIV/STI
 - Sexual behaviours (condom use, partner type and rate of change, overlap with FSW and IDUs, sexual practices)
 - Barriers to access of HIV/STI services

- HIV prevalence
- **IDU and network**
 - Size estimation
 - Knowledge on HIV/STI
 - Type of drug injected and injection practices
 - Sexual behaviours (condom use, partner type and rate of change, overlap with FSW and IDUs)
 - Barriers to access of harm reduction services
 - HIV prevalence
- **Culture and Religion:** (Sororate & levirate, unfaithful polygyny, early/late marriage, abstinence practices and harmful surgical practices)
 - Prevalence
 - Risk factors associated with the practices
 - Drivers of the practices
 - Culturally acceptable alternative practices
- **Neighbourhood factors:**
 - Explore risk factors associated with types of neighbourhoods
 - Map neighbourhoods with high-risk behaviours

Structural factors

- **Mobile population:** (Long Distant Drivers, Motorcyclist, Fishermen, Fulani nomadic, Traders)
 - Pattern of migration
 - Knowledge on HIV/STI transmission and prevention
 - Sexual behaviours (condom use, partner type and rate of change)
 - Fundamental factors increasing susceptibility
 - Barriers to access of HIV/STI services at origin, destination and transit sites
 - HIV prevalence
- **Stigma and discrimination:**
 - The level of self stigma, community and health care stigma
 - Determinants of stigma in mentioned settings
 - The effect of stigma on up-take of HIV services and adopting safer behaviours
- **Gender and HIV**
 - Analysis of gender-related policies and laws in the State
 - Effect of disclosure of sero-status
 - Prevalence and determinants of domestic and sexual violence
 - Prevalence of rape and barriers to PEP access
 - Prevalence and structural underpinnings of girl-child trafficking
 - Extend and barriers to male engagement in HIV services.

Modelling: Mode of Transmission