

# Locational Analysis of HIV/AIDS Prevalence in Gombe State, Nigeria

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**Abstract:** Ever since 1981 when AIDS was first discovered the world has seen an extraordinary degree of devastation and incapacitation of humankind caused by the disease. About 77.3 million people were infected with HIV/AIDS from its inception to date and out of this number; 35.4 million people have passed away as a result of the AIDS epidemic (USAIDS, 2019). Furthermore, it was estimated that more than three million Nigerians are now living with HIV (Nigerian Bureau of Statistics, 2018). HIV/AIDS incidence in Gombe State as per 2003 was 6.8% but decreased to 4.9% in the 2005 and still greater than 5% and 4.4% of the country rates respectively (Mela, 2009). The Sustainable Development Goals (SDG) has targeted year 2030 to end AIDS pandemic in the world. It is on this basis that this paper aimed to studied the locational analysis of HIV/AIDS in Gombe State and the specific objectives are to compare death occurrences among local government areas within the last decade, to discover the leading diseases causing death in the state, to create a HIV/AIDS density map (hot spots) and to finally to compare incidence of the HIV/AIDS among different age groups. Data were basically collected from the Specialist and all the General Hospitals within the state and analysed using Microsoft excell and presented in simple tabulations, graphs and a map using rate and percentages. The paper found that the highest number of deaths was recorded in 2010, 2014, 2015 and 2011 and the local governments with highest number of death are Kaltungo, Kwani and Funakaye. It was also discovered that the leading cause of deaths in the State is the Human Immunodeficiency Virus /Acquired Immunodeficiency Syndrome (HIV/AIDS) and malaria with infection rate as 27 persons per 100 persons and 19 persons per 100 persons respectively. The paper also established that the highest number of persons infected with HIV/AIDS was recorded in 2009 and Gombe Local Government Area was found to be the most density HIV/AIDS hotspot followed by Dukku, Kaltungo, Akko, Funakaye and Nafada Local Government Areas. It is recommended for governments at various levels, health related organizations and other policy makers to create a HIV/AIDS reduction model targeting on large scale awareness campaign, provision of HIV related drugs in the HIV/AIDS hotspots areas of the state.

**Keywords:** HIV/AIDS, HIV/AIDS Prevalence, Gombe Metropolis and Locational Analysis

## 1. Introduction

Ever since 1981 when AIDS was first discovered among homosexuals in the United State the world has seen an extraordinary degree of devastation and incapacitation of humankind by the disease on almost every aspect of the world (Mela, 2009). AIDS is an acronym for Acquired Immunodeficiency Syndrome and is defined as a fatal illness cause by a retrovirus well-known as the Human Immunodeficiency Virus (HIV) which breaks down the body's immune system, leaving the victim susceptible to a multitude of life threatening infections and neurological turmoil (Alan, 2015). Hence, AIDS essentially means the last stage of HIV infection. About 77.3 million people were infected with HIV/AIDS from its inception to date and out of this number; 35.4 million people have pass away due to the AIDS epidemic(USAIDS, 2019).. In 2017 36.9 million people are existing with HIV worldwide with sum total new infections of approximately 1.8 million people (UNAIDS, 2018). Therefore, AIDS poses the significant threat to the human health especially sub-Saharan African. It was estimated that 1.6 million deaths in 2007 was recorded in Sub-Saharan Africa as a result of AIDS and a total of 22.5 million people are now living with HIV/AIDS (Samson, 2017). Population of Nigeria was etimated at 190, 886, 31 million people in 2017 and the prevalence of HIV has attained 1.8 percent among adult population (Nigerian Bureau of Statistics, 2018). Furthermore, it was estimated that more than three million Nigerians are now living with HIV (Nigerian Bureau of Statistics, 2018). Gombe State has a total population of 2,865,649 million in 2012 and

significantly increased to 3,270,798 in 2016 (Nigerian Bureau of Statistics, 2018). HIV/AIDS incidence in the state as per 2003 was 6.8% but decreased to 4.9% in the 2005 HSS which was greater than 5% and 4.4% greater than the country rates respectively (Mela, 2009).

The Sustainable Development Goals (SDG) has targeted year 2030 to end AIDS pandemic in the world. Hence, the Global AIDS and Monitoring adhered that the number of persons newly infected with HIV must be trim down to fewer than 500,000 worldwide by 2020 and to also shrink the number of people dying from AIDS-related cause to fewer than 500,000 globally in 2020 (USAIDS, 2018). It is on the basis of the above that this paper aimed to studied the locational analysis of HIV/AIDS in Gombe State and the specific objectives are to compare death occurrences among local government areas within the last decade, to discover the leading diseases causing death in the state, to create HIV/AIDS density map (hot Spots) and to finally to compare incidence of the HIV/AIDS among different age groups. Data were basically collected from the Specialist and all the Local Government General Hospitals in the state. The data were further analysed using Microsoft excell and presented in simple tabulations, graphs and a map.

## 2. Study Area

Gombe State one of the six states in the North East geopolitical zone and it share political boundaries with Yobe and Maiduguri to the North and North East, to west by Bauch and to South and South East by Taraba and Adamawa

respectively. Figure 1 shows Map of Nigeria and the study area, Gombe State

Figure 1 comprises all the Local Government Areas of Gombe State as the study area.

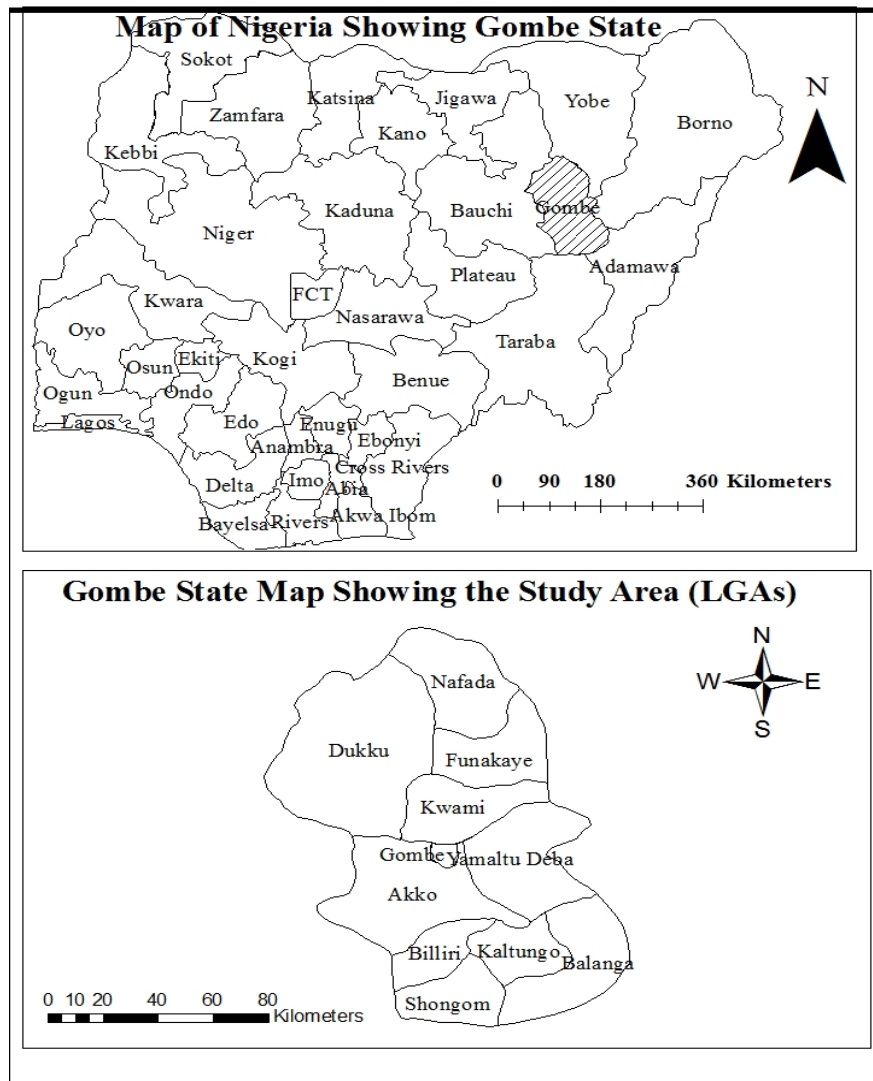


Figure 1: Map of Nigeria and Gombe State (The Study Area)

### 3. Methodology

The research aimed at studying locational analysis of HIV/AIDS in Gombe State and the specific objectives are to compare death occurrences among local government areas within the last decade, to discover the leading diseases causing death in the state, to create HIV/AIDS density map (hot Spots) and to finally to compare incidence of the HIV/AIDS among different age groups. Hence, data were collected were basically from secondary data sources records from Specialist and General Hospitals found in the state. Information related to death recorded from 2009-2019, diseases causing deaths, cases of HIV/AIDS recorded, age categories of HIV/AIDS infected persons were all collected analysed in Microsoft excel and presented in simple tables and graphs. The data were further used to create HIV/AIDS density map to show the HIV/AIDS hot spots in the state. To create the map, ArcGIS software was employed where topo map of Gombe State was digitized to create the boundaries for all the Local Government Areas. Further more, field was

added to the attribute table of the digitized feature class of Gombe State Local Government map so as to input data related to HIV/AIDS cases recorded from 2010-2019 in the state. Finally, dot density of quantities in symbology was applied to create HIV/AIDS density map.

### 4. Results and Discussion

The data collected with respect to the objectives raised previously are presented and discussed in this section. Basically, death, diseases causing death, prevalence of HIV/AIDS, rate of spread of HIV/AIDS and age specific related are all analysed and presented as follows.

#### 4.1 Gombe State Mortality Trend in 2009 to 2019

This research work fundamentally collected data from the General and Specialist Hospitals from all the eleven Local Government Areas of the state with the exclusion few in certain cases where data were not available.

Table 1: Recorded Cases of Death in the State from 2009-2019

Year	Death											Total
	Akko	Balanga	Billiri	Dukku	Funakaye	Gombe Municipal	Kaltungo	Kwami	Nafada	Shongom	Yamaltu Deba	
2009	NA	14	NA	NA	31	25	53	32	5	NA	45	205
2010	28	16	NA	NA	64	28	41	37	10	NA	45	269
2011	37	19	NA	NA	53	31	23	48	12	NA	32	255
2012	32	18	NA	NA	28	26	37	53	11	NA	15	220
2013	20	30	NA	NA	42	20	14	48	12	NA	17	203
2014	15	38	NA	NA	37	21	98	37	15	NA	7	268
2015	17	50	NA	NA	69	2	72	36	14	NA	8	268
2016	12	34	NA	NA	31	17	40	31	25	NA	11	201
2017	18	35	NA	NA	28	16	51	46	14	NA	8	216
2018	15	22	NA	NA	23	11	22	43	16	NA	14	166
2019	8	38	NA	NA	39	14	12	37	24	NA	3	175
Total	202	314	0	NA	445	211	463	448	158	0	205	2446

Note: NA (Data Not Available)

Table 1 shows data collected from various general hospitals in all the State Local Governmnetsit from 2009 to 2019 and the highest number of death was recorded in 2010, 2014, 2015 and 2011. However, from 2016 to 2019 the number of death keeps decreasing probably due to an improvement in health care facilities. The Local Government with highest number of death recorded within the period was Kaltungo, Kwani and Funakaye respectively and although few number of deaths were recorded in Akko, Gombe and Nafada LGAs, as seen in Figure 1.

multiply by a constant (i, e, 100). Table 2 presents the analysis of diseases causing death, death measurement and the rate of death from 2009 to 2019 in all the Local Government Areas of the State and the sum total number of death recorded within that period was 2,446 persons. The analysis shows that the most significant and the leading disease causing deaths in the State is the Human Immunodeficiency Virus /Arquired Immunedeficiency Syndrum (HIV/AIDS) as seen in table 2 (27Pers/100 Persons)

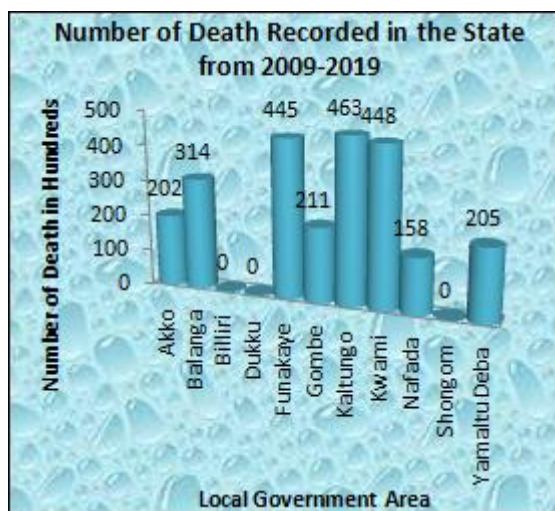


Figure 2: Recorded Number of Death in the State from 2009-2019

Source: Author’s Work, 2020

#### 4.2 Factors of Mortality in Gombe State

Most of the factors responsible for death are associated with some diseases especially where we have disfunctional health care system, indifferent to utilization of health care facilities by the people where it is available among others. In medical geography causes of death rate can be determine by dividing the number of death due to specific cause during a time period by deaths due to all the causes at the same period and

Table 2: Causes of Death by Various Diseases from 2009-2019 in Gombe State

Disease	Death Recorded	Death Rate Measurement	Death Rate
HIV/AIDS	657	$\frac{657}{2446} \times 100$	27 died Per 100 Persons
Malaria	477	$\frac{477}{2446} \times 100$	19 died Per 100 Persons
Typhoid	295	$\frac{295}{2446} \times 100$	12.1 died Per 100 Persons
Cancer	292	$\frac{292}{2446} \times 100$	12 died Per 100 Persons
Hypertension	406	$\frac{406}{2446} \times 100$	16.6 died Per 100 Persons
Others	317	$\frac{317}{2446} \times 100$	12.9 died Per 100 Persons

Source: Author’s Work 2020

However, Malaria and hypertension are also the second and third most important factors responsible for death, while others are cancer, hepthyties and accidents. Since HIV/AIDS being the most significant factor causing death; the paper further looked into the distributin of the disease in the last eleven years local government areaswise.

#### 4.3 HIV/AIDS Hotspots

To establish the hotspots, data collected on HIV/AIDS infected persons in state was utilized and table 3 shows the prevalence of the disease.

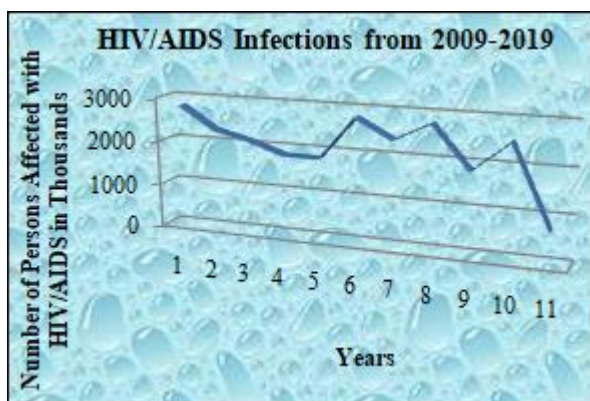
**Table 3:** Incidence of HIV/AIDS in Gombe State from 2009-2019

Year	Akko	Balanga	Billiri	Dukku	Funakaye	Gombe Municipal	Kaltungo	Kwami	Nafada	Shongom	Yamaltu Deba	Total
2009	225	23	N.A.	732	210	1099	317	6	43	N.A.	148	2803
2010	222	27	N.A.	385	203	1013	257	8	69	N.A.	109	2293
2011	196	35	N.A.	304	125	913	322	13	86	N.A.	110	2104
2012	256	25	N.A.	147	152	810	246	28	92	N.A.	83	1839
2013	165	60	N.A.	416	83	651	215	66	87	N.A.	91	1834
2014	158	73	N.A.	313	226	1553	290	39	90	N.A.	58	2800
2015	96	37	N.A.	294	111	1430	197	36	89	N.A.	77	2367
2016	168	24	N.A.	331	86	1744	146	35	151	N.A.	95	2780
2017	156	50	N.A.	414	131	713	120	37	131	N.A.	86	1838
2018	83	30	N.A.	225	414	1501	87	17	136	N.A.	22	2515
2019	66	31	N.A.	119	48	204	74	10	124	N.A.	38	714
Total	1791	415	0	3680	1789	11631	2271	295	1098	0	917	23887

Note: NA (Data Not Available)

Source: Author’s Work, 2020

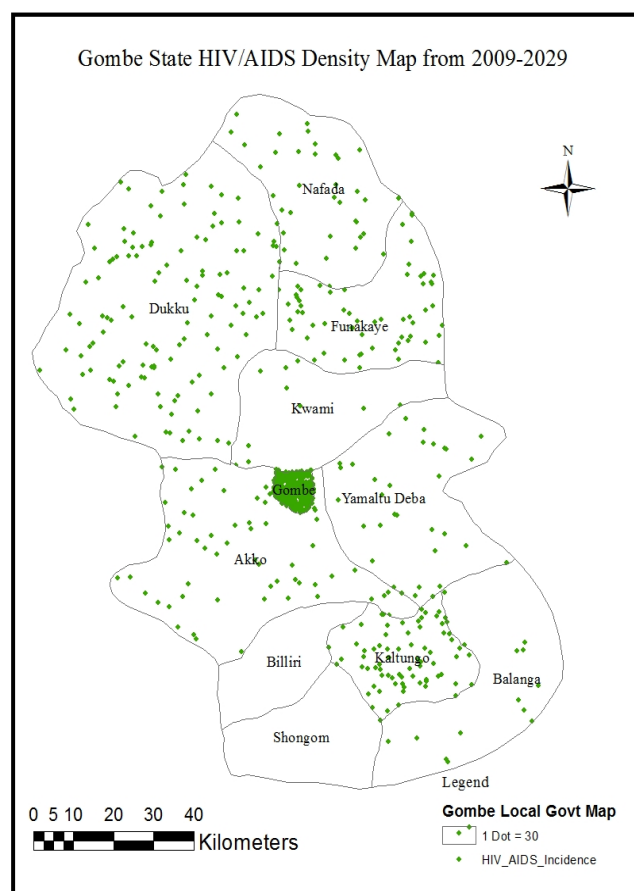
The total number of persons infected with HIV/AIDS was high in 2009; however it has gradually decreased in 2013. Between 2014 and 2018 the state experienced fluctuations and finally show a significant decrease seen in 2019 as seen in Figure 1 below.



**Figure 3:** The Trend of HIV/AIDS Infections from 2009-2019

Source: Author’s Work 2020

HIV/AIDS epidemics vary geographically and in terms of their distribution among social or economic groups, hence, the research further study the pattern of spread of the diseases within the study period so as to discover the HIV/AIDS hotspots in the state. Figure 4 is an HIV/AIDS density map created to show the distribution of the virus according to the local government areas. In terms of person infected by local government, Gombe Local Government Area has the highest density HIV/AIDS hotspot (infected persons) and this is probably Gombe being the state capital and therefore a hub for HIV/AIDS.



**Figure 4:** HIV/AIDS Hotspots

Source: Author’s Work, 2020

The second most density HIV/AIDS hotspots are Dukku, Kaltungo, Akko, Funakaye and Nafada Local Government Areas (a significant number of people were infected with the virus). The least HIV/AIDS density infected areas are Kwami, Balanga and Yamaltu Deba. Figure 5 shows that the significant portion of people infected with HIV/AIDS are basically adult and youth while children are the infected with the virus.



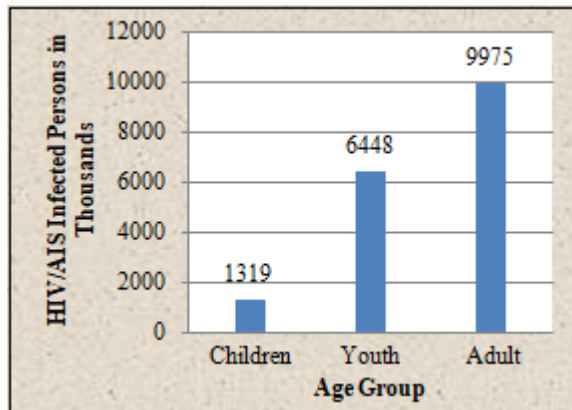


Figure 5: HIV/AIDS Infections by Age

Source: Author's Work, 2020

## 5. Conclusion and Policy Implication

The paper was able to discover that the highest number of deaths was recorded in 2010, 2014, 2015 and 2011 and the local governments with highest number death are Kaltungo, Kwani and Funakaye. Further more the analysis revealed that the leading cause of deaths in the State is the Human Immunodeficiency Virus /Acquired Immunodeficiency Syndrome (HIV/AIDS) and malaria with infection rate as 27 persons per 100 persons and 19 persons per 100 persons respectively. The paper also found out that the highest number of persons infected with HIV/AIDS was recorded in 2009 however it is gradually decreasing to date. Gombe Local Government Area was found to be the highest density HIV/AIDS hotspot followed by Dukku, Kaltungo, Akko, Funakaye and Nafada Local Government Areas. It is recommended for governments at various levels, health related organizations and other policy makers to create a HIV/AIDS reduction model targeting a massive awareness campaign, provision of HIV related drugs in the HIV/AIDS hotspots as indicated by paper.

## References

- [1] Alan W. (2015). Poverty and HIV/AIDS in Africa, Third Quarterly, 23(2)
- [2] Daniel S. U. (2009) Socio-Economic Impact of HIV/AIDS on Farm Women in Nigeria: Evidence from Enugu State. World Applied Science Journal, 6(2)
- [3] Mela D. (2009). HIV/AIDS Risk Behavioural Tendency among Secondary School Students in Gombe, Nigeria, Internet Journal of Health, 8(5).
- [4] National Population Commission(2016)
- [5] Simon D., Scott M., & Jennifer R. (2002). The Impact of HIV and Aids on African Economic Development. Retrieved on 17<sup>th</sup> February, 2020 from [www.bmj.com](http://www.bmj.com)
- [6] USAID (2019). Global AIDS Monitoring 2019: Indicators for Monitoring 2016 Political Declaration on Ending AIDS, Retrieved on Retrieved on 17<sup>th</sup> February, 2020 from [www.aidreporting.unaids.org](http://www.aidreporting.unaids.org)
- [7] UNAIDS (2018). Fact Sheet: World AIDS Day Retrieved on 17<sup>th</sup> February, 2020 from [www.aidsfor.unaids.org](http://www.aidsfor.unaids.org)