

Sero-epidemiology of human immunodeficiency virus (HIV) in Plateau State, Nigeria

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Abstract

Introduction: Previous sentinel surveys of HIV in Nigeria studied pregnant women attending antenatal care, thereby omitting other important high-risk groups. We therefore investigated the prevalence of HIV/AIDS in low- and high-risk populations in the state of Plateau, Nigeria.

Methodology: Blood samples were collected by venepuncture from 5,021 adults aged ≥ 15 years between August and October 2008. At least one major town and one rural community were selected in each Local Government Area (LGA). Samples were initially screened with a rapid HIV testing kit; reactive samples were further tested using Stat Pak. Discordant samples were confirmed using Genie-II.

Results: Of 5,021 subjects screened, 245 (4.88%) were seropositive. Local Government prevalence ranged from 0.68% in Bassa to 16.07% in Jos North. On average, LGAs in the Southern Senatorial Zone had higher rates. Most (over 80%) positive cases were younger than 40 years. Females had a significantly higher (6.85%) prevalence than males (2.72%). Age-specific prevalence was higher among females aged 25 to 29 years (2.09%). Risk factors identified for acquisition of HIV infection were previous history of STDs (6, 16.28%); men having sex with men (2, 11.76%); having multiple sexual partners (97; 10.49%); intravenous drug use (10, 7.58%); sharing of sharp objects (20, 4.82%); and history of blood transfusion (21, 3.65%).

Conclusion: The seemingly higher prevalence recorded in this survey could be attributed to the inclusion of high- and low-risk groups in the general population, unlike previous reports which studied only antenatal care attendees. This survey provides useful baseline information for further studies.

Key words: sero-epidemiology, human immunodeficiency virus, Plateau State, Nigeria

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Introduction

The high incidence of HIV and AIDS has a disproportionately greater impact on sub-Saharan Africa, which constitutes about 10 percent of the world's population but has the highest number of HIV infections: 25 million of the global estimates of about 40 million infected people live in this region of the World [1]. Since one out of every five Africans is a Nigerian, the impact is greater in Nigeria. Out of the current estimated population of about 140 million people in Nigeria, between 3.2 and 3.8 million are reported to be infected and this figure is projected to increase to between 3.7 and 4.3 million. Nigeria is second only to South Africa in the absolute number of people living with HIV [2].

Plateau State is one of the 36 states of Nigeria located within the North Central geopolitical Zone. The 2006 National Population Census put the population of Plateau State at 3,178,712 (1,593,033 males and 1,585,679 females). The state has been classified among states in the "hot zone" of HIV infections. Statistics from the national HIV seroprevalence survey show that in 1991/92 Plateau State had a prevalence of 6.2%. This increased to 8.2% in 1993/94. Further increase was witnessed in 1995/1996 to 11%. However, in 1999, the prevalence declined to 6.1% but rose to 8.5% in 2001. In the year 2003, the figure was 6.3% and the current national HIV and syphilis sentinel sero survey conducted in 2005 reported the prevalence in Plateau State to be

4.9%, which is still above the national average of 4.4% [3-8].

Also, in 2005, Sagay *et al.* [9] found an HIV prevalence of 8.2% among pregnant antenatal attendees at the Jos University Teaching Hospital. Studies on the prevalence of HIV among female sex workers in some parts of Nigeria revealed increasing rates of 17.5% in 1991 to 35.6% in 1995. Recently, Imade and coworkers [10] in Jos found an alarmingly higher prevalence of 48% among 398 female sex workers.

Justification for the study

All previous sentinel surveys of HIV in Nigeria studied pregnant women attending antenatal care. These represent only a small proportion of the population and many high-risk groups were therefore omitted, leading to significant under reporting of HIV cases. The first case of HIV was reported in Nigeria in 1986 and subsequently among commercial sex workers in Lagos and Enugu. Data from several parts of Nigeria suggest there is increasing sexual activity among single adolescents of both genders, lower age of onset of sexual activity, and poor contraceptive use [11].

Additionally, the at-risk members of our society, such as men having sex with men (MSM), long-distance truck drivers, and *okada* motorcycle riders are often overlooked in our preventive programmes and thus require adequate evaluation and documentation. The present survey, therefore, aims to provide a comprehensive baseline data on the HIV situation in low- and high-risk populations in Plateau State. Such a study will aid in resource allocation and technical advice to implementing partners on control strategies for the HIV epidemic in Plateau State.

Methodology

Ethical considerations

The study proposal was reviewed and approved by the Ethics Committee of the Plateau State Specialist Hospital prior to the survey. Subjects confirmed to be reactive to HIV were given further counselling and appropriately referred to an antiretroviral treatment programme for further management.

Survey population

The study population consisted of adults above the age of 15 years who accepted voluntary counselling before testing. Thus low-risk as well as high-risk groups were included.

Study sites and site selection

Sites were selected to provide continuous monitoring of the trends of the epidemic. Public health facilities possessing a basic laboratory unit where simple rapid HIV testing could be performed were preferred. These included general hospitals, maternity facilities, comprehensive health centres, and specialist or primary health care centres.

At least one major town and one rural community were selected in each Local Government Area (LGA). Where it was difficult to recruit the required number of subjects in a rural setting, specimens were collected from a third site. A minimum of 34 sites were selected namely: Bassa(Rukuba and Binchin); Jos North (Jos and Tudun Wada); Jos South (Kugiya and Gangare); Jos East (Angware, Dangora and Maijuju); Riyom (Riyom and Ganawuri); BarkinLadi(BarkinLadi and Sho); Bokkos (Bokkos and Horrop); Mangu (Mangu and Pushit); Pankshin (Pankshin and Ballang-Shippang), Kanke (Kabwir and Amper); Kanam (Dengi and Jarmai); Langtang-North (Langtang,Pilgani and Dadur); Langtang-South (Mabudi, SabonGida and Turaki); Wase (Wase and GwiwanKogi); Mikang (Tunkus, Garkawa and Piapun); Shendam (Shendam and Kuka); and Qua'an Pan (Doemak and Kwalla).

Site selection criteria

The following were considered as site inclusion criteria: participation in a previous survey; availability of staff and facilities for drawing blood; availability of qualified personnel; and willingness of site staff to cooperate.

In addition, each Local Government AIDS Control Agency (LACA) Officer was involved in the selection process.

Each site was evaluated before commencement of the survey to determine the availability of appropriate personnel, supplies and training to function as a surveillance site. This process was fair and involved the following:

- (i) Ability to demonstrate methods for assuring patient anonymity.
- (ii) Appropriate data collection methods
- (iii) Adequate laboratory and short-term sample storage capacity.

For each selected site, a nurse or community health officer and one laboratory scientist/technician were identified and trained as the site surveillance staff responsible for data and blood collection.

Survey design

The sample size was determined using the following formula:

$$n_0 = Z_{\alpha/2}^2 p(p-1)/e^2 \text{ and } n = n_0 / (1 + (n_0 - 1) / N)$$

Where:

n = the population

$Z_{\alpha/2}$ = the critical value for the area in the right tail of the standard normal distribution

p = percentage picking a choice, expressed as decimal (0.5) used for sample size needed

e = confidence interval, expressed as decimal

When calculated for the different Local Government Areas, where the confidence level was 95% (confidence interval \pm 5%), n ranges from 382 to 384 with a total of 6,531 for the entire state.

Considering that the population used for this calculation included people below 15 years of age, as well as for want of resources, we evaluated a minimum of about 300 subjects from each LGA (150 from the LGA town and 150 from a rural [district] site). Thus the total expected size for the state was to be a minimum of 5,100. However, we collected and screened specimens from 5021 subjects.

The study group consisted of consecutive consenting individuals aged 15 years and older during the sampling period. Persons below the age of 18 required surrogate consent by a guardian for ethical reasons. The sampling period was 12 weeks. Those sites that reached their sample size earlier either continued the survey or stopped depending on resource availability.

Blood and data collection

All subjects underwent voluntary counselling and then subsequent testing. Three to five milliliters of blood was drawn from the antecubital fossa and tested for HIV antibodies.

For each eligible individual recruited for this study, demographic information was recorded in a structured questionnaire. This included age, education, occupation (and spouse where applicable), history of blood transfusion, surgery, intravenous drug use or homosexual relationship (where applicable).

Sterile Vacutainer tubes (BD, Franklin Lakes, NJ, USA) were used to collect the blood. Each plasma sample obtained was transferred into a cryo-vial. These were then transferred to the laboratory where the HIV screening was performed.

Laboratory screening

Samples were retrieved daily from sites with no adequate storage facilities and transferred to the Plateau State Specialist Hospital Laboratory. Each sample was initially screened with a Rapid HIV testing kit (Determine, Inverness Medicom, Japan). All samples with a non-reactive result were reported as negative, whereas reactive samples in the initial testing were further tested using Stat pak (ChemBio Diagnostic Systems, Inc, Medford, NY, USA). Any discordant sample was confirmed using the Genie II assay (Bio-Rad, Marnes-La-Coquette, France) at the quality control laboratory. Any sample that was reactive in the first test but negative in the second test was recorded as negative.

Quality assurance

Quality assurance was maintained using the following criteria:

- (i) Engagement of qualified and experienced laboratory scientists
- (ii) Two days of training for all personnel involved in the survey including field workers/assistants
- (iii) Use of same test kits at all sites
- (iv) Evaluation of test kits for potency and shelf life before use
- (v) Strict adherence to the Standard Operating Procedure at all levels
- (vi) Regular supervisory visits to sites to ensure compliance with the survey protocol
- (vii) Maintenance of cold chains

Data management

Data forms were checked for completeness, errors and inconsistencies. These were entered using Microsoft Excel 2003 (Microsoft, Redmond, WA, USA), and were later exported to SPSS version 13 for analysis (IBM, Chicago, USA). Pearson Chi-square analysis of age and sex distribution of HIV seroprevalence in the study population was performed at 95% confidence interval. P value was 0.034 with a maximum likelihood ratio of 0.048, thus considered statistically significant.

Results

Overall, 5,021 specimens were collected from all 17 Local Government Areas of Plateau State and screened for HIV. Of these, 2,393 (47.66%) were from

Table 1. HIV seroprevalence in relation to age and sex in Plateau State

Age Group (Years)	Male			Female		Total Number (%) Positive
	Total Number Examined	Number Examined	Number (%) Positive	Number Examined	Number (%) Positive	
15 – 19	800	348	3(0.13)	452	15(0.57)	18(0.36)
20 – 24	883	183	8(0.33)	500	36(1.37)	44(0.88)
25 – 29	841	381	14(0.59)	459	55(2.09)	69(1.37)
30 – 34	680	332	14(0.59)	349	38(1.45)	52(1.04)
35 – 39	484	254	11(0.46)	230	12(0.46)	23(0.46)
40 – 44	387	208	4(0.17)	179	12(0.46)	16(0.32)
45 – 49	330	170	6(0.25)	160	11(0.42)	17(0.34)
50 – 54	222	106	1(0.04)	116	2(0.08)	3(0.06)
55 - 59	115	66	2(0.08)	49	1(0.04)	3(0.06)
>60	278	145	2(0.08)	123	0(0.00)	2(0.04)
TOTAL	5021	2393(47.66%)	65(2.72%)	2629(52.36%)	180(6.85%)	245(4.88%)

male subjects while 2,629 (52.36%) were from female subjects. A total of 245 (4.88%) were HIV seropositive. The female subjects had a higher prevalence 180 (6.85%) compared to 65 (2.72%) among the male subjects ($P < 0.05$). Over 80% of the positive cases were recorded among subjects younger than 40 years. Age-specific prevalence ($P < 0.05$) was higher in the age groups 25-29 and 30-34 years which were recorded as 69 (1.37%) and 52 (1.04%) respectively (Table 1).

Table 2 shows the number of screened individuals and the number of positive individuals in each Local Government Area. In the Northern Senatorial zone of Plateau State, a total of 1,745 specimens were collected and screened for HIV. Of these, 826 (47.91%) were from male subjects while 909 (52.09%) were from female subjects. A total of 81 (4.64%) were seropositive and females accounted for a higher 68 (7.48%) prevalence than males (13, 1.56%) in. Over 80% of the positive cases were recorded among subjects younger than 40 years (Table 3).

A total of 1,515 samples were screened in the Central Senatorial zone. Of this number, 701 (46.27%) were from males while 814 (53.73%) were from females. A total of 46 (3.04%) were HIV seropositive and females had a higher prevalence of 33 (4.05%) compared to males (13, 1.85%). The age group 25-29 years had the highest prevalence rate (12, 0.79%). Prevalence for other age groups was observed as follows: 20-24 years, 10 (0.66%); 30-34 years 9 (0.59%); 40-44 years, 5 (0.33%); 15-19 years 4 (0.26%); and 45-49 years (0.13%) (Table 4).

In the Southern Senatorial zone of Plateau State, a total of 1,761 specimens were collected and screened for HIV. Of this number, 856 (48.61%) were from male subjects while 905 (51.39%) were from female subjects. A total 103 (5.85%) were seropositive for HIV and again females accounted for a higher 75 (8.29%) prevalence than males (28, 3.27%) in males. About 80% of all infections were recorded among subjects younger than 40 years (Table 5).

A comparison of HIV seroprevalence in relation to the Senatorial zone shows that the Southern zone had the highest prevalence of 103 (5.85%) while the Central zone had the lowest prevalence of 61 (4.03%). The Northern zone had a prevalence of 81 (4.64%).

Table 6 shows the HIV seroprevalence in relation to risks factors in Plateau State. Of the 2,282 subjects who indicated exposure to the risk factors, 158 (6.92%) were HIV seropositive. The most important risk factors in the acquisition of HIV infection as revealed in this study appear to be previous history of STDs (6, 16.28%); men having sex with men (2, 11.76%); those with multiple sexual partners (97, 10.49%); intravenous drug users (10, 7.58%); sharing of sharp objects (20, 4.82%) and history of blood transfusion (21, 3.65%). Long-distance truck drivers and lesbians, although few in number, were all HIV seronegative.

Table 7 shows the HIV seroprevalence in relation to occupation in Plateau State. High prevalence was recorded among the following occupational groups: commercial sex workers, 48.24%; traders, 8.56%; health workers, 7.14%; businesspeople, 6.98%; drivers, 6.47%; and housewives, 5.31%. All the

Table 2. HIV seroprevalence in relation to Local Government Area in Plateau State

Local Government Area (LGA)	Number Screened	Number (%) Positive
BarkinLadi	289	14(4.84)
Bassa	297	2(0.68)
Bokkos	300	6(2.00)
Jos East	282	3(1.06)
Jos North	280	45(16.07)
Jos South	305	8(2.62)
Kanam	316	10(3.16)
Kanke	300	10(3.33)
Langtang North	299	15(5.02)
Langtang South	279	27(9.68)
Mangu	300	4(1.33)
Mikang	299	10(3.34)
Pankshin	299	16(5.35)
Qua'an Pan	299	10(3.34)
Riyom	292	9(3.08)
Shendam	287	35(12.20)
Wase	298	6(2.01)
Total	5,021	245(4.88)

commercial sex workers were sampled from Jos North where there are a significant number of brothels. The clergy recorded no positive case.

Discussion

Findings from this study showed an overall prevalence of 4.88% for human immunodeficiency virus (HIV) infection in Plateau State. This result is similar to the reported findings of the 2005 national survey which found a rate of 4.9% prevalence in Plateau State. The prevalence rate documented in this survey is still higher than the 4.4% national prevalence documented by the Federal Ministry of Health [8], but is significantly lower (27%) than the findings reported by the Plateau State AIDS Control Agency (PLACA) in 2005 among patients attending hospitals and clinics in Plateau State. The agency reported a prevalence of 27% among 122,321 people screened, with some LGAs having a rate as high as 48.8%.

It is, however, significant to note that whereas seroprevalence surveys conducted by the Federal Ministry of Health and the Plateau State AIDS Control Agency (PLACA) involved pregnant women attending antenatal clinics from one or two locations per state across the country or patients attending hospitals and clinics, the present study reports findings from all the LGAs in the state involving both low- and high-risk groups.

Also, the 4.9% prevalence determined in the 2005 sero-survey by the Federal Ministry of Health was based on data generated from two sites in Plateau State: Jos and Shendam. Incidentally, these LGAs produced the highest rates (Jos, 16.07% and Shendam, 12.20%) presented in this report. This observation suggests an underreporting of the true situation by the previous report.

These findings also indicate that the prevalence of HIV in Plateau State has been decreasing steadily since 1995 after an initial increase. The prevalence rate of 6.2% in 1991 increased to 8.2% in 1993 and increased further to 11% in 1995. It then fell to 6.1% in 1999, rose again to 8.5% in 2001, and then decreased to 6.3% in 2003 and 4.9% in 2005 [3-8].

With the exception of Jos North (the state capital), which is in the Northern Senatorial Zone and had the highest HIV seroprevalence of 45 (16.07%), Pankshin (16, 5.35%), BarkinLadi (14, 4.84%), and the Local Government Areas in the Southern Senatorial Zone (Shendam [15, 12.20%], Langtang-South [27, 9.68%] and Langtang North [15, 5.02%]) had some of the highest rates. The high prevalence recorded in Jos North could be attributed to the cosmopolitan nature of the city and the fact that high numbers of high-risk groups such as commercial sex workers (CSWs) were recruited as part of the survey population. In addition, the peaceful disposition and near temperate weather of Jos attracts not only expatriates but other Nigerians from other parts of the country.

Table 3. HIV Seroprevalence in relation to Age and Sex in Northern Senatorial Zone of Plateau State

Age Grp (Years)	Total No. Examined	Male		Female		Total No.(%) Positive
		No. Examined	No.(%) Positive	No. Examined	No.(%) Positive	
15 - 19	181	51	0(0.00)	80	4(0.44)	4(0.23)
20 - 24	264	110	1(0.12)	154	15(1.65)	16(0.92)
25 - 29	264	128	2(0.24)	136	23(2.53)	25(1.43)
30 - 34	239	125	6(0.72)	115	9(0.99)	15(0.86)
35 - 39	176	94	3(0.36)	82	8(0.88)	11(0.63)
40 - 44	161	82	1(0.12)	79	2(0.22)	3(0.17)
45 - 49	149	76	0(0.00)	73	6(0.66)	6(0.34)
50 - 54	121	59	0(0.00)	62	0(0.00)	0(0.00)
55 - 59	66	33	0(0.00)	33	1(0.11)	1(0.06)
>60	173	78	0(0.00)	85	0(0.00)	0(0.00)
TOTAL	1745	836(47.91%)	13(1.56%)	909(52.09%)	68(7.48%)	81(4.64%)

Table 4. HIV seroprevalence in relation to age and sex in Central Senatorial Zone of Plateau State

Age Group (Years)	Total Number Examined	Male		Female		Total Number (%) Positive
		Number Examined	Number (%) Positive	Number Examined	Number (%) Positive	
15 - 19	311	138	1(0.14)	173	3(0.37)	4(0.26)
20 - 24	316	116	0(0.00)	200	1(1.23)	10(0.66)
25 - 29	266	114	4(0.57)	151	08(0.98)	12(0.79)
30 - 34	175	85	2(0.29)	90	7(0.86)	09(0.59)
35 - 39	149	69	3(0.43)	80	1(0.12)	4(0.26)
40 - 44	96	59	3(0.43)	37	2(0.25)	5(0.33)
45 - 49	91	49	0(0.00)	42	2(0.25)	2(0.13)
50 - 54	39	19	0(0.00)	20	0(0.00)	0(0.00)
55 - 59	23	19	0(0.00)	4	0(0.00)	0(0.00)
>60	49	33	0(0.00)	16	0(0.00)	0(0.00)
TOTAL	1515	701(46.27%)	13(1.85%)	814(53.73%)	33(4.05%)	46(3.04%)

Table 5. HIV seroprevalence in relation to age and sex in Southern Senatorial Zone of Plateau State

Age Group (Years)	Total Number Examined	Male		Female		Total Number (%) Positive
		Number Examined	Number (%) Positive	Number Examined	Number (%) Positive	
15 - 19	358	159	1(0.12)	199	6(0.66)	7(0.40)
20 - 24	303	157	2(0.23)	146	13(1.44)	15(0.85)
25 - 29	311	139	3(0.35)	172	22(2.43)	25(1.42)
30 - 34	266	122	7(0.82)	144	20(2.21)	27(1.53)
35 - 39	159	91	5(0.58)	68	3(0.33)	8(0.45)
40 - 44	130	67	2(0.23)	63	6(0.66)	8(0.45)
45 - 49	90	45	4(0.47)	45	3(0.33)	7(0.40)
50 - 54	62	28	1(0.12)	34	2(0.22)	3(0.17)
55 - 59	26	14	1(0.12)	12	0(0.00)	1(0.06)
>60	56	34	2(0.23)	22	0(0.00)	2(0.11)
TOTAL	1761	856(48.61%)	28(3.27%)	905(51.39%)	75(8.29%)	103(5.85)

Table 6. HIV seroprevalence in relation to risk factors in Plateau State

Risk factor	Total Screened	Number Positive (%)
Blood transfusion	575	21(3.65)
Multiple sexual partners	925	97(10.49)
Long distance truck drivers	39	0(0.00)
Men having sex with men (MSM)	17	2(11.76)
Lesbians	13	0(0.00)
Intravenous drug users (IDU)	132	10(7.58)
Presence of STD'S	43	7(16.28)
Sharing infection needles	47	0(0.00)
Surgery	55	1(1.82)
Sharing sharp objects	436	20(4.82)
Total	2,282	158(6.92)

Table 7. HIV seroprevalence in relation to occupation in Plateau State.

Occupation of clients	Total Number Examined	Number. Positive	% Positive
Applicant	190	8	4.21
Artisan	149	7	4.11
Baby Sitter	1	0	0.00
Business	358	25	6.98
Carpenter	22	0	0.00
Chief	5	0	0.00
Civil Servant	729	27	3.70
Clergy	48	0	0.00
Commercial sex Worker	85	41	48.24
Community Development worker	1	0	0.00
Computer operator	1	0	0.00
Consultant	1	0	0.00
Client to commercial sex workers	1	0	0.00
Driver	77	5	6.49
Farmer	892	27	3.03
Health worker	14	1	7.14
House wife	584	31	5.31
Motor cyclist	56	1	1.79
Musician	2	0	0.00
Native doctor	2	0	0.00
National Youth Service Corps	2	0	0.00
Pensioners	25	0	0.00
Politician	5	0	0.00
Security	54	2	3.70
Shepherd	19	0	0.00
Student	1222	40	3.27
Trader	222	19	8.56
Not indicated	315	11	3.49
Total	5021	245	4.88

Pankshin and BarkinLadi LGAs are first-generation Local Government Areas that could qualify as truly urban centres. HIV prevalence has been found to be generally high in both urban and rural areas in Nigeria; however, the prevalence is reported to be higher in urban areas (5.7%) than in rural areas (3.7%) [8].

The higher prevalence recorded in Local Government Areas in the Southern Senatorial Zone of the state could be attributed to the crises that engulfed the area between 2004 and 2006, leading to the declaration of a state of emergency (SOE) on the whole state by the Federal Government, which led to the massive deployment of troops to the area to maintain peace. HIV prevalence is reported to be higher among Uniformed Personnel Services compared to the general population [12]. Work conditions, relatively young age, mobility and values peculiar to the uniformed service personnel have been proposed as contributing to this high prevalence of HIV in the uniformed services personnel [13]. Furthermore, the uniformed services personnel integrate freely with the society and therefore may pose a risk in fueling the pandemic [14]. This was the exact situation when troops were mobilized to maintain peace in the troubled areas.

Most (over 80%) positive cases occurred among subjects younger than 40 years. Females had a significantly higher (180, 6.85%) prevalence than males (65, 2.72%). Findings from previous sentinel surveys indicate that the age group 20 to 24 years had the highest national prevalence of 5.6% and the HIV prevalence for women aged 15 to 24 years was 5.5%, suggesting early onset of sexual activity. In this study, the age-specific prevalence was higher among females aged 25 to 29 years (55, 2.09%) compared to older women of 30 to 34 years (38, 1.45%) and younger women of 20- to years (36, 1.37%). The higher prevalence documented among females may be attributed to the practice of polygamy and wife inheritance.

HIV seroprevalence in relation to risk factors confirmed the role of traditional risk factors in acquisition of HIV infection. High prevalence rates were recorded among the following occupational groups: commercial sex workers (48.24%); traders (8.56%); health workers (7.14%); Businesspeople (6.98%); drivers (6.47%); and housewives (5.31%). The clergy recorded no positive case. The prevalence recorded in housewives is higher than that of the state prevalence rate. This statistic is worrisome and calls for urgent steps to curb this trend.

The seemingly higher prevalence rate recorded in this survey when compared with that of the last sentinel survey conducted in 2005 could be attributed to the fact that the general population, including high- and low-risk groups, were involved in this survey, unlike previous reports which used antenatal care attendees. This survey provides useful baseline information on the true HIV situation in Plateau State.

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