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Full Length Research Paper

Traditional crop farmers in Kogi East, Nigeria elucidate elevated HIV and AIDS prevalence level during a five - year study period

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The United Nations reported that HIV and AIDS have negative impact upon agriculture and increasing hunger in sub-Saharan Africa. Such a situation is postulated to synonymously occur in Nigeria. This study therefore, aimed to investigate the prevalence level of HIV antibodies and AIDS among traditional crop farmers and non-farmers comprising traders, drivers, teachers and students in Kogi East. This is one of the primary agricultural areas of Kogi State, Nigeria and is therefore of great importance to perform an assessment depicting the prevalence of local HIV infection. Documented records of HIV antibody screening from the year 2002 to 2006 at the Voluntary Counselling and HIV Testing Unit of General Hospital, Ankpa, Kogi East were reviewed. Selected data was statistically analyzed with Chi^2 - test using SPSS 13.0. A total of 11,077 patients from the ages of two months to 72 years were screened during the five years. Of this, 2,510 HIV positive cases (overall prevalence of 22.70%; mean = 21.86%; n = 5; standard deviation [SD] = 5.64%) and 322 mean = 12.47%; n = 5; SD = 2.23%) AIDS-related deaths were documented. The letter group included 250 (77.6%, mean = 71.91%; SD = 15.72%) farmers. A significant higher number of farmers were seropositive (χ^2 = 72.710; p = 0.001, df = 1, α = 0.05) and died (χ^2 = 93.255; p = 0.001, df = 1, α = 0.05) of AIDS-related illness compared to the non-farmers. The ages of people that died range from 12 to 49 years (n = 322) with a mean age of 44.1 years. Throughout the specified five years sampling duration, more non-farmers than farmers partook in HIV antibody screening. Farmers that were seropositive for HIV antibodies and died of AIDS-related illness were significantly higher in proportion than the non-farmers.

Key words: HIV, AIDS, farmers, Kogi, Nigeria.

INTRODUCTION

The pandemic of Human Immunodeficiency Virus (HIV) infection, the cause of Acquired Immune Deficiency Syndrome (AIDS) ranks among the greatest infectious disease scourges in history (WHO, 2005). AIDS has become the cause of death in Africa being responsible for one in five deaths in sub-Saharan Africa (UNAIDS, 2002). Moreover, sub-Saharan Africa is the home to about two-thirds, that is, 25.8 million (23.8 – 28.9 million) of all people living with HIV. An estimated 2.4 million (2.1 – 2.7 million) people died of AIDS-related illnesses while about 3.2 million (2.8 – 3.9 million) became infected with HIV in this region in 2005 (WHO, 2005).

The first case of HIV infection was reported for Nigeria in 1986 (UNAIDS, 2004). Currently Nigeria has the third highest number of people living with HIV in the world (that is, 3.6 million at the end of 2003), after South Africa and India (WHO, 2005). Furthermore, the second highest number of people living with HIV in sub-Saharan Africa, and the highest number in West Africa (WHO, 2004) occur in Nigeria. Although, prevalence of HIV in Nigeria was lower (that is, Prev. = 5.40%), compared to sub-Sa-

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Saharan Africa (Prev. = 7.50%) and 1.1% globally (WHO, 2004). However, a review of the HIV sentinel surveys in Nigeria shows that HIV prevalence varied across geopolitical locations in the country (FMOH, 2003; Olaleye et al., 2006; Utulu and Lawoyin, 2007). The result of the 2003 sentinel survey indicated that HIV prevalence levels in Kogi state was higher in dense agricultural areas (that is, Prev. = 5.80%) (FMoH, 2003).

In review of the socio-economic aspects of the AIDS pandemic in the inter-tropical zone of Africa, with 500,000 AIDS cases and five million HIV infected individuals as of October, 1990; The World Health Organization (WHO) estimated that three times as many persons will be infected by HIV in 1991-2000 as in 1981 - 1990. The World Bank estimated that excess mortality related to AIDS in Africa amounts to 0.1%, which may result in a 30% decline in the progress of the Gross National Products (GNP) (Gentilini and Chieze, 1990). Additionally, it was reported that each case of AIDS results in a loss of productivity of 8.8 years and the age group most affected by AIDS was 25 - 45 years (Gentilini and Chieze, 1990). Moreover, it increased health expenditures, reduced savings, and decreased investment in education and human resources (Ilinigumugabo, 1996).

In 2001, the United Nations in a report titled 'The state of food and agriculture, 2001' noted that HIV and AIDS was devastating farming and worsening hunger in sub-Saharan Africa (FAO, 2001a). Furthermore, the Food and Agriculture Organisation (FAO) reported that HIV and AIDS had killed approximately seven million agricultural workers since 1985 in the 25 impacted countries in Africa (FAO, 2001a). This is evidently reflected by a 40.00% drop in food consumption in homes affected by HIV and AIDS (FAO, 2001b).

Studies have shown that HIV and AIDS had a profound effect on agriculture mainly subsistence farming, in terms of crop production, labour and delivery (Drimie, 2002). Food shortage has been reported in regions with high prevalence of HIV including six countries in Southern Africa with high HIV prevalence levels (FAO, 2001a and b). Kerkhoven (1997), in a review of effects of HIV and AIDS on the farming system in Eastern Africa, observed that effects of the epidemic on rural households were complex and not easily estimated.

Hunter et al. (1993), in a report on AIDS and agricultural production in Uganda, noted that, factors including HIV infections and AIDS-related deaths were the most frequently reported reasons for crop reductions. Furthermore, high prevalence of HIV and increase in AIDS-related mortality were implicated in agricultural productivity decreases in the most fertile districts of Uganda (Hunter et al., 1993).

United Nations studies revealed that communal agricultural output in Zimbabwe decreased by 50.00% in a five year period, largely due to HIV and AIDS (FAO, 2002; Villarreal, 2006). It was also noted that labour shortages were particularly serious for agriculture since production was seasonal hence, a shortfall in household labour meant more land lay fallow resulting in a decline in household's output (FAO, 2001 a and b).

Within Nigeria, agriculture especially crop farming, remains one of the major factors for economic sustainability (Jabbar et al., 1994). This retrospective study therefore investigated the prevalence (number of people in a population estimated to have an infection at a specific point in time) of HIV and AIDS among traditional crop farmers and non-farmers in Kogi East, one of the largest crop-producing areas of Kogi State, Nigeria. Due to the prevalence of HIV in Nigeria and macroeconomic impact of HIV and AIDS pandemic on local agriculture, the need to investigate the prevalence of HIV among farmers and possible effects on the country is evident.

MATERIALS AND METHODS

Records of 11,077 HIV antibody screening were reviewed between January, 2002 and December, 2006 at the Voluntary Counselling and HIV Testing Unit of General Hospital, Ankpa, Kogi East, Kogi state, The state has a population of over 3.5 million people is located in the North-central zone of Nigeria. It shares common boundaries with other states including Niger, Kwara, Nassarawa and The Federal Capital Territory in the North; as well as Enugu and Anambra in the South. HIV screening results, AIDS-related deaths and other pertinent demographic data were obtained and analyzed with SPSS v.13.0 using a non-parametric χ^2 – test (that is, Pearson goodness-of-fit-test) according to the Chi-square distribution.

Study population

The study population included 5,036 (45.50%) males and 6,041 (54.50%) females, aged two months to 72 years. Patients were mainly from the 9 Local Government Areas (LGAs) in Kogi East and the population include 2,939 (26.50%) crop farmers, and 8,138 (73.50%) non-farmers specifically traders, drivers, teachers and students.

Testing

Each patient had been screened using a pair of rapid HIV test kits and documented by VCT, General Hospital, Ankpa. A parallel testing algorithm was employed with Determine® (Abbott Laboratories, Abbott Park, IL) and Uni-Gold™ or Capillus® (Trinity Biotech PLC, Bray, County Wicklow, Ireland) Rapid HIV test kits. The Determine® test kit was used in combination with Uni-Gold™ or Capillus® at various times during the five year period depending on availability. Assays were performed by trained personnel who worked strictly by the manufacturers' procedures. Specimens were promptly and properly discarded after assay. All patients with detectable antibody to HIV by either pair of the test kits were considered positive to HIV infection.

Statistical analysis

Descriptive statistics was used to present the results obtained in this study. In order to establish statistical difference or lack thereof between two categorical data, X^2 test was used. T-test was also used to compare the means of two groups of data. SPSS 13.0 for windows was used for the analysis.

Table 1. Seroprevalence of HIV and AIDS related-deaths in the study population.

Year	Number screened	Number positive (n)	Percentage (%)	AIDS related deaths (n)	Percentage (%)
2002	1,616	250	15.5	31	12.40
2003	1,840	312	17.0	37	11.90
2004	2,204	510	23.1	52	10.20
2005	2,357	690	29.3	81	11.70
2006	3,060	748	24.4	121	16.20
total	11,077	2510	22.7	322	12.80

Table 2. Prevalence of HIV infection by Local Government Area (LGA).

LGA	Number Screened	Number Positive	Percentage (%)
Ankpa	2,917	920	31.50
Bassa	1,400	221	15.80
Dekina	987	207	21.0
Idah	900	210	23.30
Ibaji	443	120	27.10
Olamaboro	2,048	497	24.30
Odolu	452	131	29.0
Ofu	794	19	2.40
Omala	1,136	185	16.30

RESULTS

Overall, a total of 11,077 patients were screened for HIV between January, 2002 and December, 2006. A total of 2,510 (22.70%) of the patients had detectable antibody to HIV, while, 322 (2.9%) of the study population died of AIDS-related diseases (ARD) (Table 1). The highest (31.50%) and lowest (2.40%) prevalence rates of HIV infection were recorded in Ankpa and Ofu LGAs respectively (Table 2). Total number of patients screened for HIV increased from 1,616 in 2002 to 3,060 mean = 2,215.40; n = 5; SD = 555.37 in 2006. At the same time, the percentage of patients who tested positive to HIV antibodies increased from 15.50% to 29.30% (mean = 21.86%; n = 5; SD = 5.64%) during the study period (Table 1).

Analysis showed that the number of farmers screened for HIV antibodies increased from 390 to 953 (mean = 587.8; n = 5; SD = 219.55) between 2002 and 2006. Also, a significantly higher HIV prevalence was observed within the occupational group (Figure 1) (n = 1,319; χ^2 = 1126.99; p = 0.001, df = 1, α = 0.05). Overall, a total of 1,319 (44.9%) out of 2,939 farmers, and 1,191 (14.6%) out of 8,138 non-farmers had antibodies to HIV. In addition, 250 (19.0%) farmers and 72 (6.0%) non-farmers who initially tested positive to HIV antibodies died of ARD. The ages of people that died range from 12 to 49 years with a mean age of 44.1 years. It is pertinent to note that significantly (n = 1,319; df = 1; X^2 = 1126.99; p = 0.001; α = 0.05) higher number of farmers were seropositive and died (n = 250; df = 1; X^2 = 93.26; p = 0.001; α = 0.05) of AIDS compared to the non-farmers (Figure 1).

Analysis of data also showed that 24.62 and 21.02% of the male and female populations respectively had antibody to HIV (male: n = 1240, mean = 23.82%, SD = 5.84%; female: n = 1270, mean = 20.29%, SD = 6.46%). Furthermore, analysis by age showed a prevalence of 27.3 > 12.1 > 10.5% in age groups 15 - 49, ≤ 14 and ≥ 50 years respectively. HIV prevalence occurred in the decreasing order of 35.80%; 10.70% and 9.70% for patients without formal education; with tertiary education, and secondary education respectively (n = 11,077; X^2 = 1061.22; df = 2; p = 0.001; α = 0.05).

DISCUSSION

Review of the HIV sentinel surveys in Nigeria shows that HIV prevalence increased gradually from 1.8% in 1991 to 5.8% in 2001 (FMoH, 2003). Similarly, review of this study showed that the percentage of patients who tested positive to HIV antibodies increased from 15.5 to 29.3% (mean = 21.86%; n = 5; SD = 5.64%) between 2002 and 2006, even as the number of patients screened for HIV antibody increased in the study locations all through the five-year period (Table 1).

Considerably higher proportion of farmers was seropositive for HIV antibodies or died of ARD than non-farmers even though a higher number of non-farmers were screened during the study period [farmers, n = 5; mean = 587.8; SD = 219.55; non-farmers, n = 5; mean = 1,627.6;

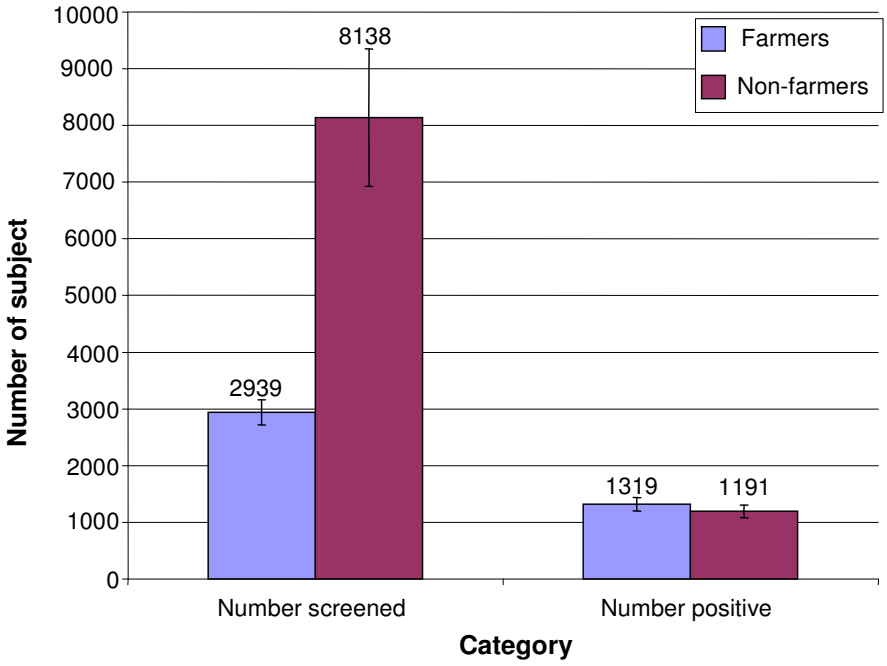

Figure 1. Comparison of HIV seropositivity by occupational group (error bars represent 1 SD).

SD = 1,213.5; t = 3.58; df = 8; P = 0.096; α = 0.05]. Similarly, Kerkhoven and Sendah (1999) in review of 1997 Zimbabwe's sentinel survey of women attending antenatal clinics reported wide variation in HIV seroprevalence rates ranging from 7.0 percent in the rural area of Karirangwe, to a maximum of 50.80 percent prevalence in rural areas of Buhera. Equally, review of the HIV national sentinel survey showed that HIV prevalence varied significantly across geopolitical locations as well as between different risk groups in Nigeria (FMoH, 2003; Olaleye et al., 2006; Utulu and Lawoyin, 2007). A similar phenomenon was recorded in the study population where the rate of infection varied between 2.4 and 31.5% in Ofu and Ankpa LGAs respectively.

Comparatively, high HIV rate of 22.7% over the five years (21.86%; n = 5; standard deviation [SD] = 5.64%; max. = 37.25% and min. = 12.11%) reported in this study may be a true reflection of the HIV rates in the population rather than the lower 5.8% reported in the 2003 national sentinel survey. On the other hand, it may be characteristic of the study population which consist mostly of patients who visited the hospital on request by the physician due to specific clinical presentations rather than apparently healthy individual accessing voluntary counselling and testing. Although, HIV prevalence of 5.80% was reported for Kogi state during the 2003 sentinel survey, it is pertinent to note that Kogi state shares border with Benue, Federal Capital Territory and Niger where higher HIV prevalence of 9.30, 8.50 and 6.90% respectively were reported during the same period (FMoH, 2003).

It is also worth mentioning that variation was noted in HIV infection rate reported in the survey in comparison with population based study conducted by AIDS Prevention Initiative in Nigeria (APIN) and Department of Virology, University College Hospital, Nigeria, between 2001 and 2005 involving about 10,000 apparently healthy volunteers from Oyo state. HIV infection rates of 7.0 and 8.0% respectively were recorded in the urban capital city and a semi-urban area within the same state (Olaleye et al., 2006). However, a lower HIV rate of 3.9% was reported for the state in the 2003 national sentinel survey (FMoH, 2003).

Limitations have been identified in the national HIV data because the rates were based on HIV seroprevalence among pregnant women attending government health facilities, therefore, little is known about HIV infections among paediatric population or among men (FMoH, 2001). Also, information on incidence and prevalence rates among various at-risk populations were not available from the survey (FMoH, 2001).

Variation between occupational groups was noted in this study with HIV seroprevalence rates of 44.9 and 14.6% among farmers and non-farmers respectively (X^2 = 1126.99; df = 1; P = 0.001; α = 0.05). Also, higher proportion of farmers (18.95%, mean = 17.76%; SD = 6.87%) than non-farmers (6.04%, mean = 7.17%; SD = 3.69%) population who initially tested positive to HIV antibodies died of ARD during the period of study.

Similarly, (Olaleye et al., 2006) in the collaborative study with APIN also reported that HIV infection rates varied between occupational groups. Furthermore, it was reported from the collaborative study that HIV infection rates varied from 5.4 to 13.6% in the urban and 3.2 to 16.9% in the semi-urban study locations.

HIV infection rate of 44.9% (mean = 44.5%; n = 5; SD = 13.0%) reported among farmers population over the five years in this study might be due to high risk behaviours. Also, socio-cultural behaviours of the people such as polygamy especially among farmers in the region might influence HIV infection rate. Additionally, interaction between crop farmers and high-risk groups like long distance truck drivers (non-farmers with higher HIV prevalence) during transportation of farm produce may further enhance spread of HIV infection between groups.

Studies conducted among people with high-risk behaviours such as sex workers and long-distance truck drivers showed a gradual increase in HIV infections among sex workers from about 2% in 1988 - 1989 to 15% in 1993, 24% in 1994 and greater than 50% in 1995 (WHO, 2004). Also, HIV infection rates among the long-distance truck drivers increased from about 4% in 1990s to over 20% in 2000 (WHO, 2004). It is noteworthy that, by 2004, the rate of HIV infection among sex workers had further increased and ranged between 35 and 80% in most part of the country (WHO, 2004).

Review of the 2003 and previous HIV national sentinel surveillance as well as the study by Olaleye et al. (2006) showed a significantly higher HIV infection rate among males than females in different regions and even in communities within the same geographic location in the country (FMoH, 2001; FMoH, 2003; Olaleye et al., 2006). Comparatively, higher proprotion (24.6%) of male than (21.0%) of female population had antibody to HIV in the aforementioned study.

A significantly higher HIV infection rate observed among patients within age group of 15 - 49 years in this study (n = 1,107; X^2 = 340.25; df = 2; p = 0.001; α = 0.005) is comparable to results of previous studies and HIV national sentinel survey (Gentilini and Chieze, 1990; FMoH, 2001; FMoH, 2003). Although, highest HIV infection rate (35.8%) was observed in patients without formal education in this study (X^2 = 1,061.22; df = 2; p = 0.001; α = 0.05). Chang (1996), in a study in Taiwan noted that education, one of the most potent acquired socioeconomic characteristics is by itself not always the predictor of risk exposure. Adeokun (2006) noted that geographic variations in HIV prevalence may be due to previous hubs of sexually transmitted infections (STIs) or urban development in Nigeria. Accordingly, high HIV infection rate in this study may be due to its proximity to the tin mining area of Plateau region; hub for STIs and rapid urban development as well as migratory movement from surrounding cities.

Findings from this retrospective study have revealed the need to further investigate the prevalence of HIV and AIDS among different occupational groups previously considered low risk and factors affecting HIV prevention and control in different geographical regions in Nigeria. Also, there is need to consider population based HIV surveillance to further enhance HIV research and planning in the country.

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