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Effect of Health Education Intervention on Knowledge of HIV/AIDS and Risky Sexual Behaviours amongst Prison Inmates in Kaduna State, Nigeria

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ABSTRACT

The prison population worldwide accommodates a higher proportion of individuals at high risk of HIV infection compared to the general population, and there is recognition of risky sexual activities among the inmates. But for complex political, legal, social, cultural and religious reasons, preventive measures like use of condom in prison are often not permitted and access to community based intervention in prison is limited. In order to make meaningful decisions about their reproductive health, inmates need reliable information. This study assessed the effect of health education on HIV/AIDS related knowledge and risky sexual behaviours amongst prison inmates in Kaduna State, Nigerian. The study employed a quasi- experimental study design among 366 inmates in two prisons between 1st November 2010 and April 2011 using multistage sampling technique. Educational intervention with an integrated peer education was instituted in the study prison after baseline data was collected from both intervention and control prisons and the outcome of the intervention in the intervention prison was carried out immediately, and three months post intervention.

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The data were analysed using SPSS (version 17) with statistical significant set at p-value of 0.05. Majority of the inmates in the study (84.7%) and control (87.4%) prisons were aware of HIV/AIDS but there were misconceptions on sharing of toilets (23.5% and 20.7%), mosquito bites (20.6% and 18.2%), witchcraft (17.3% and 16.0%) and sharing eating utensils (16.5% and 11.8%) in both intervention and control prisons respectively. Thirty (16.4%) of inmates in intervention prison and 26.2% in control prison engaged in high risk sexual practices. The immediate and three months post intervention knowledge score of HIV/AIDS among the inmates in the intervention prison statistically improved by 34.5% and 44.7% respectively and misconceptions concerning the modes of transmission reduced by 27.8%, while homosexuality reduced by 53.3 %. Health education intervention was found to have very strong positive influence on the knowledge of HIV/AIDS and risky sexual behaviour among the prison inmates in Kaduna; hence it should be developed for prison inmates nationwide.

Keywords: Health Education; HIV/IDS; knowledge; Sexual behaviours; Prison Inmates.

1. Introduction:

The seroprevalence and severity of human immunodeficiency virus/Acquired immune deficiency syndrome (HIV/AIDS) in Nigeria prisons just like any other part of the world remained considerably higher than the national average [1-5], since the first case was reported. In 2009, an estimated average prevalence of 7.0% out of about 45,000 inmates nationwide was reported (far higher than the national average of 3.6%) [6]. Several factors are responsible for inmate's vulnerability to HIV infection. Generally, there is recognition of the fact that sexual activities are common among inmates [7-8] and some physical and social conditions associated with imprisonment which may as well facilitates the driving factors of HIV infection are widespread.

A high proportion of the estimated 10 million prison inmates worldwide are between the ages of 25 to 29 years and are largely from the most marginalized groups in the society where problems of unemployment, overcrowding, poor nutrition, ignorance, inaccurate message about HIV, presence of untreated sexually transmitted diseases, poor access to health facilities and absence of screening are common [2, 6, 9-12]. Prior to incarceration, most prison inmates engaged in risky sexual practices such as unprotected sex with multiple partners, homosexuality, commercial sex work, transactional sex, sexual violence as well as behavioral practices like drug abuse, sex in exchange for drugs and impaired judgment from drug intoxication [13-15]. Incarceration put inmates at extra risk of the infection; some of them engaged in use of contaminated instruments, tattooing, stabbing/assaults, scarring or self mutilation, non conceptual anal intercourse, rape and sexual assaults [16-18]. Some of the reported transactional sex that takes place among prison inmates is done in exchange for money, toiletries and food [1, 7, 19]. Due to overcrowding and congestion in most prison cells and inadequate prison staff these illicit sexual behaviours among inmates often take place without the knowledge of the prison authority and inmates cannot report fellow inmates for fear of punishment [1, 9].

There is also wide gap between knowledge of HIV transmission and personal risk assessment among inmates with about 72% considering themselves to be at no risk of being infected by HIV [8]. Furthermore, inmate's inability to negotiate the use of condoms and also its use prohibition by most authorities due to complex unexplained reasons exposed the inmates at more risk of contracting the virus [20, 21]. In Nigeria, some studies have reported improvement in knowledge and attitude of HIV/AIDS and risk behavioural reduction following health education among school children and male out of schools [22]. On the other hand, no study reports on response to HIV intervention in Nigerian prisons have been documented. However, majority of the prison inmates after serving their sentence returned back to the same society from which they were sentenced; hence the prison inmates and the staff of prisons are important targets for HIV/AIDS prevention interventions. These people are central to the course of HIV epidemics, but surprisingly they are peripheral to the responses and comprised one of the least represented populations in national HIV strategies of prevention, care and support and mitigation. This study was carried out to

determine the effectiveness of health education intervention on HIV/AIDS related knowledge and risky sexual behaviours amongst prison inmates in Kaduna State, Nigeria.

2. Methodology

2.1 Study Area and Population:

The study was carried out among prison inmates in two prisons of Kaduna State Command, namely Kaduna and Zaria prisons. Nigeria prison system is a Federal government owned organization with staff strength of 27,000 taking lawful custody of about 45,000 inmates nationwide out of which about 36,000 (80.0%) are awaiting trials [7]. Kaduna State command has 15 main prisons, 10 satellite prisons and one farm centre. The largest of the prison is Kaduna convict prison; established in 1915 to accommodate 550 inmates and Zaria prison established in 1948 to accommodate 400 inmates. The total inmates lock up in all the prisons at the time of the study was over 2000, and all the prisons accommodate male inmates with exception of Kaduna and Zaria prison which accommodates female inmates as well as male. Each of the prisons has a medical unit which provides preventive and minor curative services to inmates and staff and refers serious medical or surgical cases to the nearest secondary or tertiary health facilities. There are periodic health talks and HIV screening but no pre-admission counseling and screening of inmates for HIV in any of the prisons.

2.2 Study Design /Sampling Technique:

A Quasi- experimental non- randomized study with pre and posttest design was conducted between 1st November 2010 and April 2011, using a multistage sampling technique. Kaduna convict prison was selected as the intervention prison and Zaria prison approximately 75km away from Kaduna as the control prison. All inmates with clinically diagnosed HIV/AIDS and the inmates who had less than six months serving sentence and those with state sensitive issues were excluded from the study because of their unpredictability of stay or likelihood of relocation. The inmates who did not consent to participate in the study were also excluded. The inmates in both intervention and control prisons were stratified into four groups based on their sentence and their cell accommodation for ease of access and participation. Group 1 was made up of the female inmates of all categories, while group 2 comprises of long and short term inmates. Group 3 was made up of condemned prisoners and lifers and group 4 was awaiting trial inmates. Actual selection of the respondents was done via simple random sampling.

2.3 Sample Size:

A total sample size of 366 inmates were selected (183 from intervention prison and 183 inmates from control prison) using hypothetical testing method [23] with regards to the proportion knowledgeable about HIV transmission and practicing voluntary counseling and testing [13], and an observed difference of 0.10 or more, significant at 0.05 level. The calculated sample size was adjusted by 10% to account for anticipated subject non response. A pre-test of the instruments was carried out with 37 inmates (10% of the calculated sample size) in Kakuri open prison camp also in Kaduna state Command.

2.4 Data Collection:

Baseline data was collected from each arm of the study using a pretested structured interviewer administered questionnaire with sections on socio-demographic characteristics, knowledge about HIV/AIDS, practice of risky behaviours, attitude towards HIV/AIDS, abstinence and use of condoms. Educational intervention with an integrated peer education was instituted in the intervention prison after baseline data was collected and the outcome of the intervention in the intervention prison was assessed immediately and an endline three months later.

2.5 Key Measures:

The main outcome indicators used for comparing the effect of health education between the intervention group and control group were awareness of HIV/AIDS, knowledge of transmission of HIV, knowledge of methods of prevention of HIV and the practice of risky sexual behaviour of HIV transmission. The independent variables were the age, ethnicity, religion, pre-imprisonment marital status, educational status and reasons for incarceration.

2. 6 Data Analysis:

The data were analysed using Statistical Package for Social Sciences (SPSS-version 17.0) software and presented as contingency tables. Chi-square(X^2) was used as the statistical test of significance between pre and post intervention data and p-value was set at $p< 0.05$. All related questions on knowledge were awarded 1 mark for any correct answer and zero mark for all wrong answers. The total was summed up and the percentage score were graded as reported in a previous study [13].

2.7 Ethical Considerations:

Ethical approval for the study was obtained from the ethical committee of the Nigerian Prisons Service Authority Review Board, Abuja and permission was obtained from the Controller of Prisons (CP) in –charge of Kaduna State prisons Command before the study was conducted. An informed verbal consent was obtained from each of the participants before carrying out the study, agreeing that inmate's confidentiality must be maintained

3. Results:

3.1 Baseline Socio-demographic Characteristics:

At baseline all the selected 366 respondents from both the intervention and control prisons participated in the study giving a response rate of 100.0%. At the health education intervention stage, ten (5.5%) of the 183 respondents in the study prison were transferred to other prisons and they were replaced with other 10 eligible inmates from the same prison. Prior to the 3 months post- intervention data collection, four (2.2%) of the inmates in the intervention prison died due to causes other than HIV/AIDS, while 6 (3.3%) of the respondents in the control prison were released on amnesty before completion of their jail term, but were not replaced. The mean age of the respondents before intervention was 28(±8) and 31(±9) years for the intervention and control prisons respectively. The male to female ratio of the respondents was in favour of males in both prisons (13.4: 1 and 17:1 respectively), and they were predominantly of Hausa ethnicity (43.7% and 57.4% respectively). Muslim in study and control prisons constitutes 69.9% and 53.6% respectively. A hundred and nine (59.6%) of the respondents in the intervention prison and 52.5% in the control prison were not married before imprisonment and those who had attained either primary or secondary education or combined were higher in the intervention prison (80.8%) as compared to the respondents in control prisons (68.3%). Fifty one (27.9%) of respondents in the study prison and 42(23.0%) in the control prison were traders prior to their imprisonment. Amongst the offences committed by the respondents leading to imprisonment; illegal possession of fire arms/armed robbery predominates (33.9% and 21.3% respectively). Rape and domestic violence constitutes 5.5% and 4.9% in study prison; 6.6% and 2.7% in control prison. There were no statistical differences in the sociodemographic variable of the respondents in the intervention prison when compared with the control at pre-intervention (Table 1).

3.1.2 Knowledge of HIV/AIDS:

Prior to intervention, 155(84.7%) of respondents in the intervention and 160(87.4%) in control prisons were aware of HIV/AIDS, out of which 76.5% in the intervention and 66.7% in the control prison had accurate knowledge about

the causative agent of AIDS. Ninety six (52.5%) of the respondents in the intervention prison and 29.1% in the control prison did not know all the four routes of transmission of HIV/AIDS (Table 2). Concerning misconception on the route of transmission of HIV, respondents in the intervention and control prisons who believe that HIV could be transmitted through sharing of toilets were higher (23.5% and 20.7% respectively), followed by mosquito bite (20.6% and 18.2%), witchcraft (17.3% and 16.0%) and sharing eating utensils (16.5% and 11.8%). Only thirty seven (20.2%) of the respondents in the intervention prison and 33(18.6%) in the control prison had correct knowledge of methods of prevention (Table 3). Generally, the respondents in the intervention prison who had poor knowledge of HIV/AIDS (49.2%) constitutes the highest proportion, followed by those with very good knowledge (46.4%) and those with fair knowledge (4.4%). Among the respondents in the control prison, majority had good knowledge (63.4%) of HIV at baseline. Those with very good knowledge score is comparatively lower than the respondents in the intervention prison. (Table 4).

3.1.3 Practice of Risky Sexual Behaviour:

At pre- intervention stage, 16.4% the male inmate respondents in intervention prison and 26.2% in control prison had sexual intercourse with fellow male inmates. The average numbers of male sex partners among the male respondents was 1.3 ($\pm$ 0.6) in the intervention prison and 1.4 ($\pm$ 0.7) in the control prison. Among male respondents who reported having sex with fellow male inmates, over two third in both the intervention and control prisons (73.3% and 70.8% respectively) do not uses condoms (Table 5). Other sexual practices found among the male inmates in intervention and control prison were masturbation (6.4% and 5.8% respectively), 0.1% oral sex (0.1% and 0.2% respectively). Two (15.4%) of females in the intervention prison practice lesbianism.

3.2.1 Effect of Health Education Intervention on Knowledge of HIV:

At post intervention, the awareness among respondents in the intervention prison immediately, and three months post intervention statistically increased by 15.3% (p=0.000) (Table 2).The misconceptions about the routes of transmission of HIV reduced by 15.9% immediately after the educational intervention and 27.8% three months post educational intervention (Table 3). Using the graded score outlined in the methodology; the respondents in the intervention prison that had poor knowledge of HIV/AIDS reduced from 4.4% to 0.5% immediately after intervention and 0.0% three months post-intervention (reduction of reduction of 87.5% and 100% respectively). Those with very good knowledge statistically increased from 46.4% to 80.9% (34.5% increase) immediately after intervention to 91.1% (44.7% increase) three months post intervention. The changes in knowledge of HIV/AIDS among the respondents in the control prison were not statistically significant [P= > 0.005] (Table 2, 3 and 4).

3.2.2 Effect of Health Education Intervention on Risky Sexual Behaviours:

In the intervention prison the respondents who engaged in male to male sexual practices statistically reduced by 4.4% immediately after health education intervention and 7.5% three months post intervention, p = 0.032 as shown in table 5. The mean number of male sexual also reduced from 1.3 to 1.1 (84.6%) . In terms of condom use among those involved in risky sexual practice, the change among respondent in intervention prison was found to be statistically significant, P= 0.027. In the control prisons the changes were not statistically significant. The proportion of those involved in male to male sex in the control prison increased by 2.2%, P=0.667. There was also increase in the proportion among respondents with risky sexual behaviour in the control prison, p=0.954 (Table 5).

4. Discussion:

In our study, there was high level of awareness of HIV/AIDS amongst inmates in both intervention and control prisons at baseline and that can be compared with those from other studies [4,5, 24, 25, 26, 27]. This high level of

awareness could be due to general increase in awareness about HIV/AIDS in the country and sensitization through various intervention programmes; since HIV/AIDS is a subset of the general concern [24]. Despite the high level of awareness in both arms of the study, there was still some significant level of misconceptions in some areas on the preventive measures of HIV among the inmates. These therefore, explained the relevance of health education as an important HIV preventive measure as aimed in this study.

At post intervention, majority of the inmates in the intervention prison reported a comparably better knowledge of both how HIV can and cannot be transmitted. There was narrowing of the gaps in areas of misconceptions that HIV could be transmitted by mosquitoes bite, kissing, shaking hand with infected person, sharing eating utensils and witchcraft($p < 0.005$). There was also a significant change in knowledge of methods of prevention and control of HIV/AIDS in the intervention group. Generally there was significant reduction of poor knowledge of HIV/AIDS and significant improvement of very good knowledge of HIV/AIDS amongst inmates in the intervention prison when compared with the control group. Several studies have also reported a similar improvement in knowledge of HIV prevention as a result of educational intervention (28-31). In the control prison there was 2.5% increase in level of awareness among inmates which was not statistically significant. That could be due to different ongoing prevention and awareness campaign programmes order than the health educational intervention in the control prison; as found in the general population [24.].

This study also addressed issues regarding risky sexual behaviour which is also an important area of interest on HIV prevention strategies in the prison. It has been demonstrated in this study that homosexuality in prison is real. Therefore, since the prison population is dynamic, the inmates represented a group at high risk for HIV infection. Less than a quarter of prisoners in the intervention prison (16.4%) and about quarter in control prison (26.2%) reported having sexual intercourse while in custody three months preceding the baseline survey and all of them had the sex with fellow male inmates (homosexuality). Other sexual practices found among the inmates were heterosexuality, oral sex, lesbianism and masturbation. The mean number of male sex partners was 1.3 to 1.4 for both prisons. These finding is comparable to the prevalence of 8.0%-15.0% of homosexuality reported for inmates in selected Nigerian prisons [2,8]. However, the result of this study is far lower compared to that reported for a prison in South Africa (65.0 %) [9], and the findings in Kaduna prison where Sabitu et al reported 56.2%% [5] and in Kirikiri prison Lagos, where Odujinrin et al reported 42.8% [25]. At post intervention there was significant difference in the practice of risky sexual behavioure amongst inmates in the intervention prison.

Despite the benefits of consistent condom use in HIV prevention, it was found out in this study that, among male inmates who reported having sex, only a few in the intervention prison uses condom. The non-compliance to condom use could be due to poor access to condoms in prison or misconceptions about condom use as some inmates were of the opinion that if condom is distributed to inmates it could promote sexual promiscuity. The result of this study, reveal a knowledge/attitude access gap in terms of condom use. This is comparable with the reported opposition of free access to condom among inmates in Zambia prison where majority (68.0%) opinioned that condom distribution among prison male was socially unacceptable as it could lead to high cases of homosexuality [28]. The non-acceptance of condom could also be attributed to religious backgrounds and lack of legal or constitutional back up on gay practice in our society. Similar studies in other prisons provoked controversies and implementation of divergent policies [6, 13,32,33,34]. This finding implies that HIV spread in prison can be put to halt if awareness and knowledge which translate to reduction in practice of risky sexual behaviour can be supported with good and sustainable access to condom supply.

In this study, the socio-demographic characteristics of the respondents in the intervention and control prisons groups provide important preliminary insights into many factors that may shape the society contribution to crime and HIV transmission. The identified mean age of 28(±8) and 31(±9) years among inmates in the study and control prisons and age bracket of 25 to 29 years is similar to that reported for Kaduna convict prison [4,5] and those of inmates in Kirikiri prison[3, 25]. It is also comparable to other reports where 18 to 35 years were independently reported as the

predominant age of prison inmates worldwide.[9,34,35.,]. This could be a reflection of high youth unemployment, increase hardship on the citizenry, poor standard of living, increase school dropout rate and high level of corruptions in our society [7,10]. Apart from high prevalence of crime associated with the age bracket identified in this study [10], other studies reported that they are also the most sexually active age group[36], as well as the ones most likely involved in nonsexual practices such as ear piercing, tattooing, intravenous drug usage, scarification marks, barbing, and manicure/pedicure with shared unsterilised instruments[4, 26]. In this study it was also found out that male inmates predominates and most of them were either single or divorced before incarceration and had attained primary or secondary education. This is as well consistent with studies carried out in other prisons where male inmates were reported to be the main gender [13, 33, 34, 37].

The tool of data collection could be a source of limitations to this study. The use of interviewer administered questionnaire could be a limitation to this study since respondents may have the feeling that some information's could be leaked to the prison management since homosexuality is prohibited, thereby leading to under reporting.

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5.0 Conclusion:

Health education intervention results in increased knowledge of HIV/AIDS, and reduction in risky sexual practices among the prison inmates in Kaduna, but use of condom is low; probably due to its prohibition in the prison environment. There remains the need for measures for more development of health intervention programme for prison inmates nationwide and more studies to acceptance of condom in prison.

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References

[1] Oloyde, G., Agomoh, U., *"A baseline assessment of the substance abuse and HIV & AIDS situation in selected prison institutions in Nigeria"*. United Nations office on Drug and Crime, 1999.

[2] The Federal Ministry of Internal Affairs. "*HIV/AIDS Knowledge, Attitudes, Practices and Seroprevalence among Staff of the Paramilitary Services (Nigerian Prisons and Immigration) and Prison inmates*". A Rapid Assessment Report (draft). 2002.

[3] Ehinmowo, O.C., Akpan, R.C., Ofobrukweta, D.E., *"Preventing HIV/AIDS among female prisoners in Kirikiri prison Lagos.*" presented at.15th International Conference on AIDS Bangkok, Thailand, 2004.

[4] Joshua, .IA., Ogboi, S.J., "*Seroprevalence of HIV amongst inmates of Kaduna prison Nigeria"*. Science world journal, 2008, 3(1), pp. 17-19. , [on line]. Available: www.scinceworldjournal.com [June10, 2009].

[5] Sabitu, K., Iliyasu, Z., Joshua, I.A., *"An assessment of knowledge of HIV/AIDS and associated risky behavior among inmates of Kaduna convict prison, the implications for prevention programs in Nigerian prisons"*. Nigerian Journal of medicine, 2009, Vol. 18(1), pp.52-58.

[6] Chima, C., Labo, H.S., Adebayo, S., Anyanti, J., Nwosu, A.N., Okekearu, I., Mohammed, H., *"High HIV sero-prevalence rates in prisons in Nigeria: a case of double sentencing for prison inmates"*. The society for family health rapid assessment report, 2009.

[7] Labo, H.S., *"The Nigerian Prison System: Present Situation and prospect for reform"*, National institute press publisher, Bukuru, Jos, Nigeria; 2004.

[8] National Action Committee on AIDS (NACA*). "HIV/AIDS policy for the Federal Ministry of Internal Affairs/Paramilitary sector (2005)"*. Edition Produced with support from USAID and ENHANSE project.

[9] Goyer, K.C., *"HIV/AIDS in Prisons: Problems, Policies, and Potentials*", ISS Monograph Series. No.79, February, Pretoria: Institute of Security Studies, 18th Feb.2003.

[10] Dambazau, A.B., "*Criminology and Criminal Justice"*, second edition, Spectrum books limited publishers, Ibadan Nigeria, 2007, Pp. 84-161.

[11] Asamoah-Odei, E., Garacia-Celleja, J.M., Boerma, T., *"HIV prevalence and trends in Sub-Saharan Africa: No decline and large regional difference"*, Lancet 2004, Vol. 364, pp.35-40.

[12] Nwadnobi, C., Uju, A., Solaojo, O., Okoi, E,. *"Towards Good Standards"*, A manual for Prisoner Rehabilitation and Welfare Action (PRAWA), May 1999.

[13] Centers for Disease Control and prevention (CDC). *"HIV transmission Among Male Inmates in a State Prison System-Georgia 1992-2005". MMWR, 2006.* Vol.55, No.15, pp. 421-6.

[14] Horsburgh, L.R., Javis, J.Q., McCather, T., *"Seroconversion to human immunodeficiency virus infection in prison inmates"*, AMJ public Health, 1990, Vol.80, pp.209-210. [pubMed].

[15] Brewer, T.F., Vlahov, D., Taylor, E., *"Transmission of HIV-1 within a statewide prison system*", *AIDS*, 1998, Vol.2, pp.263-367.

[16] Human Rights watch." *No escape: Male rape in United States of America prison, 2001*". (Accessed on 8th July 2010 at www.hrw.org/reports/2001/prison).

[17] Centers for Disease Control and Prevention (CDC). *"Prison Rape spreading deadly disease*", 2002.

[18] Society for Family Health. *"National behavioural survey 1: Brothel Based Sex work in Nigeria. Abuja*", Society for Family Health, 2001.

[19] Ronald, L.B., Theodore, H., Kimberly, R., Jacob, A., *"HIV/AIDS in Correctional Settings"*, AIDS Education and Prevention, 2002, Vol.14 (Suppl. B), pp. 1–6.

[20] World Health Organization. *"World Health Organization (WHO) Guidelines on HIV infection and AIDS in Prisons*. Geneva Switzerland: 2001.

[21] Curtis, M., *"Fighting for Prison Health"*, Newsletter of the International Harm Reduction Development Program of the Open Society Institute. 2004.

[22] Oluwole, O., Babatunde, A., Micheal, G., Oluwatosin, M., *"The National response to HIV/AIDS. AIDS in Nigeria in A nation on the threshold,'* Harvard Center for Population and Development Studies publisher, USA, 2006, Pp. 241-277.

[23] Araoye MO. *Research Methodology with Statistics for Health and Social Sciences*, first edition. Nathadex publishers Ilorin, 2004, Pp. 115- 120.

[24] Nations office on Drugs and crime . *"HIV/AIDS in places of detention. A toolkit for policy makers, managers and staff,"* The *United Nations office on Drugs and crime* 2007 advanced copy.

[25] Odujinrin, M.T, Adebajo, S.B., *"Social characteristics, HIV/AIDS knowledge, preventive practices and risk factors elicitation among prisoners in Lagos, Nigeria", West Afr J Med.* , 2001, Vol**.** 20, pp.191-8.

[26] Olusegun, L.I., Melvin, O.A., "*Prison reform and HIV/AIDS in selected Nigeria Prisons*". Journal of International Social Research. 2008, Vol. I/4 summer.

[27] Akeke, V.A., Mokgate, M., Oguntibeju, O.O., "Assessment of knowledge and attitude about AIDS among inmates of Quthing prison, Lesotho", *West Indian Med J*. 2007, Vol. 56, pp. 48-54.

[28] Simooya, O., Sanjobo, N., *"In But Free - an HIV/AIDS intervention in an African prison*", Culture, Health & Sexuality**,** *2001, Vol.3 (2), pp. 241-251.*

[29] Dolan, K., Bijil, M., White, B., *"HIV education in a Siberian prison colony for drug dependent males*", International Journal of Equity in Health, 2004, pp. 3:7.

[30] Ehrmann, T., *"Community-based organizations and HIV prevention for incarcerated populations: Three HIV prevention programs", AIDS Education and Prevention,* 2002, Vol.14(5 Supp l Suppl: HIV/AIDS in correctional settings), pp. 75-84.

[31] Comfort, M., *"Reducing HIV risk among women visiting their incarcerated male partners",* Criminal Justice and Behaviour, 2000, Vol. 21, pp. 57-71.

[32] Horsburgh, L.R., Javis, J.Q., McCather, T., *"Seroconversion to human immunodeficiency virus infection in prison inmates*. AMJ public Health, 1990, Vol.80, pp. 209-210.. [pubMed].

[33] Brewer, T.F, Vlahov, D., Taylor, E.. *"Transmission of HIV-1 within a statewide prison system", AIDS* 1998, Vol.2, pp. 263-367.

[34] Macher, A., Goosby, A., *"The Incarcerated",* A Report from the 12th World AIDS Conference. 2004.

[35] Stubblefield, E., Wohl, D., "*Prisons and Jails Worldwide*", Update from the 13th International Conference on AIDS; 2000.

[36] National Agency for the Control of AIDS (NACA). *"National HIV/AIDS Strategic Framework (NSF) 2010-2015"* 2009, pp. 1-3.

[37] Genius, S.J., Genius, S.K., *"HIV/AIDS prevention in Uganda: why has it worked?"* Postgrad Med J, 2005. Vol. 81, pp. 615-617.

ANNEX - Table

Table 1: Socio-demographic Characteristics of Respondents by Study Status (n=183)

Socio-demographic characteristics	Intervention prison Frequency (%)	Control prison Frequency (%)	X^2	df	P value
Age group (years)					
Mean age	28 (±8 years)	31 (±9 years)			
15-19	13 (7.1)	11 (6.0)			
20-24	45 (24.6)	40 (21.9)			
25-29	71 (38.8)	59 (32.2)			
30-34	23 (12.6)	24 (13.1)			
35-39	19 (10.4)	21(11.5)			
40-44	6 (3.3)	13 (7.1)			
45-49	2 (1.1)	5 (2.7)			
50+	4 (2.2)	10 (5.5)			
			8.126	7	0.322
Sex					
Male	170 (92.9)	173 (94.5)			
Female	13 (7.1)	10 (5.5)			
			0.418	1	0.518
Ethnicity					
Hausa	80 (43.7)	105 (57.4)			
Ibo	21 (11.5)	14 (7.7)			
Yoruba	13 (7.1)	12 (6.6)			
Others	69 (37.7)	52 (28.4)			
			7.207	3	0.066
Religion					
Muslim	98 (53.6)	112 (61.2)			
Christianity	82 (44.8)	64 (35.0)			
Others	3 (1.6)	7 (3.8)			
			4.753	2	0.093
Marital status before incarceration					
Single	109 (59.6)	96 (52.5)			
Married	60 (32.8)	67 (36.6)			
Divorced	10 (5.5)	13 (7.1)			
Widowed	4 (2.2)	7 (3.8)			
			2.420	3	0.490
Highest level of education					
Never attended	23 (12.6)	35 (19.1)			
Primary	57 (31.1)	53 (29.0)			
Secondary	90 (49.2)	72 (39.3)			
Post secondary	13 (7.1)	23 (12.6)			
			7.406	3	0.060
Occupation before incarceration					
Farming	25 (13.7)	30 (16.4)			
Trading	51 (27.9)	42 (23.0)			
Schooling	31 (16.9)	40 (21.9)			
Civil servant	14 (7.7)	16 (8.7)			
Driving	14 (7.7)	9 (4.9)			
Building/carpentry	5 (2.7)	3 (1.6)			
Motorcycle rider (Okada)	7 (3.8)	3 (1.6)			
Motor Mechanic	6 (3.3)	2 (1.1)			
Others	30 (16.4)	38 (20.8)			
		8.728	8	0.366	

The demographic characteristics were comparable between the study statuses of the prisons (P>0.005)

Table 2: Distribution of Respondent's Knowledge of HIV by Study Status

	Intervention prison			Control prison		
	Pre- intervention	Post –intervention		Pre- intervention	Post –intervention	
		Immediate	3 months		Immediate	3 months
	Freq.(%)	Freq.(%)	Freq.(%)	Freq.(%)	Freq.(%)	Freq.(%)
Awareness						
Yes	155(84.7)	183 (100.0)	179 (100.0)	160 (87.4)	162 (88.5)	159 (89.8
No	28(15.3)	0(0.0)	0 (0.0)	23 (12.6)	21 (11.5)	18 (10.8)
Total	183 (100)	183 (100)	179 (100)	183 (100)	183 (100)	177 (100)
		Fishers Exact Test =41.138; df=1; p value = 0.000	Fishers Exact Test =40.498; df=1; p value = 0..000		X^2=3.823; df=1; p value = 0.748	X^2= 0.474; df=1; p value = 0.513
Routes of transmission						
Blood transfusion	128 (69.9)	180(98.4)	172 (96.1)	145 (79.2)	160 (87.4)	157 (87.7)
MTCT	87 (47.5)	181 (98.9)	173 (97.2)	133 (72.7)	141 (77.0)	147 (82.1)
Unsterile instruments	131 (71.6)	181 (98.9)	174 (97.4)	134 (73.2)	145 (79.2)	157 (87.7)
Unprotected sex with infected person	157 (85.8)	178 (97.3)	174 (97.4)	130 (71.7)	144(78.7)	157 (8.7)
Know all the four						
Yes	87 (47.5)	183 (100.0)	173 (97.7)	127 (70.9)	132 (74.2)	135(76.3)
No	96 (52.5)	0 (0.0)	4 (2.3)	52 (29.1)	46 (25.8)	42 (23.7)
Total	183 (100.0)	182 (100.0)	179 (100)	179 (100)	178 (100)	177(100)
		X^2= 27.988 df =1 P = 0.000	X^2=113.018 df= 1 p= 0.000		X^2=0.461 df= 1 p=0.497	X^2=0.987 df= 1 p=0.085

Table 3: Respondent's Knowledge Of Methods Of HIV Prevention By Study Status

	Intervention prison			Control prison		
	Pre- intervention	Post –intervention		Pre- intervention	Post –intervention	
Routes of transmission		Immediate	3 months		Immediate	3 months
	Freq.(%)	Freq.(%)	Freq.(%)	Freq.(%)	Freq.(%)	Freq.(%)
Staying with one faithful uninfected partner	122 (66.7)	183(100.0)	143 (79.9)	93 (50.8)	93 (50.8)	91 (51.4)
Using condom all the time	115 (63.2)	183(100.0)	148 (82.7)	87 (47.5)	87 (47.5)	90 (50.8)
Healthy looking person can be HIV positive	150 (83.3)	183(100.0)	178 (99.4)	128 (69.)	140 (76.5)	130 (73.4)
Mosquito cannot transmit HIV	107(69.0)	182 (99.5)	158 (88.3)	125 (79.1)	118 (75.6)	116 (75.8)
Sharing meal /utensils cannot spread HIV	125 (78.1)	183 (100.0)	156 (87.2)	138 (87.9)	135 (86.0)	127 (84.1)
Get all five correct						
Yes	37 (20.2)	66 (36.1)	86 (48.0)	33(18.6)	29 (16.0)	33(18.6)
No	146 (79.8)	117 (63.9)	93 (52.0)	144 (81.4)	150 (83.8)	144 (81.4)
Total	183 (100.0)	183 (100.0)	179 (100.0)	183(100)	179 (100)	177 (100)
		X^2=12.702 df= 1 p=0.000	X^2=33.239 df= 1 p=0.000		X^2=0.369 df= 1 p=0.543	X^2=0.400 df= 1 p=0.527

Table 4: Respondent's HIV/AIDS knowledge score by Study status

	Intervention Prison			Control Prison		
Knowledge score	**Pre – intervention**	**Post intervention Immediate**	**Freq. (%) 3 months**	**Pre - intervention**	**Post intervention Immediate**	**3 months**
	Freq. (%)	**Freq. (%)**	**Freq. (%)**		**Freq. (%)**	**Freq. (%)**
Fair	8 (4.4)	1 (0.5)	0 (0.0)	26 (14.2)	17 (9.3)	17 (9.6)
Good	90 (49.2)	34 (18.6)	16(8.9)	116 (63.4)	114 (62.3)	103 (58.2)
Very good	85 (46.4)	148 (80.9)	163 (91.1)	41 (22.4)	52 (28.4)	57 (32.2)
Total	183 (100.0)	183 (100.0)	179(100.0)	183 (100.0)	183 (100)	177 (100)
	X^2=102.319 df= 4 p value =0.000			X^2=6.128 df= 4 p value=0.190		

Table 5: Respondents History of Male to Male Sexual Intercourse and Condom Use by Study Status

History of male to male sexual intercourses	**Intervention prison**			**Control prison**		
	Pre –intervention Freq. (%)	**Post intervention**		**Pre-t intervention Freq. (%)**	**Post intervention**	
		Immediate Freq. (%)	**3 months Freq. (%)**		**Immediate Freq. (%)**	**3 months Freq. (%**
Yes	30 (16.4)	22 (12.0)	16 (8.9)	48 (26.2)	53 (29.00)	50 (28.2)
No	153 (83.6)	161 (88.0)	163 (91.1)	135 (73.8)	130 (71.1)	127 (71.8)
N	183 (100)	183 (100)	179 (100)	183 (100)	183 (100)	177 (100)
	X^2 = 1.487; df=1; p value=0.223		X^2 = 4.620 df=1; p =0.032	X^2 = 0.342; df=1 p =0.559		X^2 = 0.185 df=1; P =0.667
Number of male sex partners						
None	153(83.1)	161(88.0)	163(91.1)	136(74.3)	131(71.6)	127(71.6)
One	17 (9.3)	13(7.1)	13(7.3)	27(14.8)	32(17.5)	33(18.6)
Two	8(4.4)	6(3.3)	3 (1.7)	17(9.3)	17(9.3)	15(8.5)
Three	5 (2.7)	3(1.6	0(0.0)	2(1.1)	2(1.1)	2(1.1)
≥ Four				1(0.4)	1(0.4)	-
Mean	1.3 (± 0.6)	1.2 (± 0.5)	1.1(± 0.3	1.4 (± 0.7)	1.4 (± 0.7)	1.4 (± 0.6)
Total	183	183	179	183	183	177
	X^2= 1.523; df=3; p value=0.677			X^2=2.651; df = 8; p value = 0.954		
Condom use						
Yes	8 (26.7)	6 (27.3)	3 (18.8)	14 (29.2)	14 (26.4)	12 (24.0)
No	22 (73.3)	16 (72.7)	13 (81.2)	34 (70.8)	39 (73.6)	38 (76.0)
N	30 (100)	22 (100)	16 (100)	48 (100)	53 (29.0)	50 (100)
	X^2 = 1.215 df=1 p value=0.270		X^2 = 4.806 df=1 p value =0.027	X^2 = 0.179 df=1 p value=0.673		X^2 = 0.032 df=1 p value =0.858