

Sexual Risk Behaviors and Risk Perception of HIV/AIDS among a Rural Adult Population in Southwestern Nigeria

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Abstract: To identify the sexual risk behaviors and risk perception of HIV/AIDS in a rural adult population in Southwestern, Nigeria. A community-based descriptive cross-sectional study. In a multi-stage random sampling, 325 adult respondents were selected into the study. There was a high level of awareness of HIV/AIDS, knowledge about routes of transmission and modes of prevention; however, there exist some misconceptions. High levels of stigmatizing behavior translating into high levels of negative attitude to People Living with HIV/AIDS (PLWHA) exist. Age, gender and marital status were statistically significantly related to knowledge score of routes of transmission while, gender and marital status were statistically significantly associated with knowledge score of modes of prevention. Prevalence of sexual high-risk behaviors was moderate while, the perception of personal risk of HIV infection was low. Gender was predictive of good knowledge score of route of transmission and preventive measures having controlled for the effect of other variables. This study has shown a rural adult population whose high level of awareness, knowledge of HIV infection transmission and preventive measures is at dissonance with their poor risk perception of HIV infection and risky sexual behaviors thus, putting them potentially at great risk of HIV/AIDS. Risk reduction strategies in this environment, should include promotion of comprehensive knowledge of HIV infection transmission and preventive measures, elimination of stigmatizing behaviours and harmful traditional practices, increase in practice of safe-sex techniques, reduction in number of sexual partners, continued efforts to reach CSW and making condoms much more available and affordable for rural dwellers.

Key words: Sexual risk behavior, risk perception, HIV/AIDS, rural population, Nigeria

INTRODUCTION

In the two decades, that have passed since its initial identification, HIV/AIDS has grown into a pandemic that has devastated families and communities worldwide. HIV/AIDS prevalence rates across countries of the world vary >500-fold, from 0.06% in Hungary to 33.4% in Swaziland (Talbot, 2007). Its effect has been greatest in sub-Saharan African region; of the 38.6 million people living with HIV/AIDS globally, almost 25 million (65%) live in sub-Saharan Africa (De Clercq, 2007). In Malawi for instance, adult prevalence of HIV/AIDS was estimated to be 15%, which is higher than the 7.1% average rate for sub-Saharan Africa (Ghosh and Kalipeni, 2005). Africa contains 70% of adults and 80% of children living with AIDS in the world and has buried 75% of the 21.8 million worldwide who have died of AIDS since the epidemic began (Sanni *et al.*, 2006). Most sub-Saharan African

countries are experiencing generalized epidemics; HIV is spreading throughout the general population, rather than being confined to populations at higher risk, such as commercial sex workers and their clients, men who have sex with men and injecting drug users.

Nigeria, the most populous country in Africa, has 5.8% of her adult population having HIV infection at the end of 2003 (Sanni *et al.*, 2006). This figure probably under-estimates the real magnitude of the HIV/AIDS problem in Nigeria because of under-reporting, inadequate resources for HIV testing and missed diagnosis.

No doubt the HIV/AIDS epidemic has assumed a major public health challenge in Nigeria. For a country with most of its population in the rural areas, who are often marginalized, without basic social amenities especially health services, this study was thought to be necessary and needful at this crucial time in the nation's history and development. The majority of the rural

dwellers are illiterates; mostly farmers, traders and artisans. They are also more likely entrenched in old traditional customs e.g., polygamy, traditional ways of circumcision, female genital mutilation, utilization of untrained birth attendants, traditional tribal marks and tattoos and still they are not completely isolated from the cities- rural dwellers transit back and forth for purposes of trading and other personal matters between rural and urban areas. This study was therefore, designed to identify the sexual risk behaviors and risk perception to HIV/AIDS transmission and the level of knowledge of HIV prevention among the rural adult population (ages 15 years and above) of Ilie Community, Southwestern, Nigeria. It was conducted with a view to recommending appropriate intervention strategies at the community level for preventing and controlling the ongoing HIV/AIDS epidemic in the rural areas of the country where, majority of the nation's population reside.

MATERIALS AND METHODS

Study location: Ilie Community, which consists of seven villages, is the rural practicing area of the Department of Community Medicine, Ladoke Akintola University of Technology (LAUTECH), College of Health Sciences, Osogbo. It is situated in Olorunda local government area of Osun State and has an estimated total population of 11, 280 people. It is situated on the edge of a huge man-made lake; the access road is very bad and almost un-motorable during the rainy seasons.

Study design: This is a community-based cross-sectional survey. Since, this is a new territory for research purposes and training of medical students in community-based rural experience for the Department of Community Medicine, LAUTECH, a de facto population census was carried out in the villages selected into the study. Thereafter, an exercise to give Primary Health Care (PHC) numbers to the households in the villages was carried out. This formed the basis of the comprehensive list from which, a proper sample size of the population was chosen.

Trained research assistants administered a standardized pre-tested semi-structured questionnaire to the respondents.

Sample size calculation: The sample size calculation assumed that 71.0% of the target population has the particular characteristic of interest (Iliyasu *et al.*, 2006; Odujirin and Adebajo, 2001; Nwokoji and Ajuwon, 2004). Confidence interval was set at 95%. A sample size of 316 was arrived at using Kirkwood's formula $n = Z^2 pq d^{-2}$ expression. An anticipated 5.0% non-completion rate was added to arrive at a sample size of 336.

Sampling technique: A multi-stage random sampling method was utilized. First, a cluster sampling method was used to select the villages to be included in the study. Ilie Communities consists of several villages. These villages are natural clusters from which, 50% (4 villages out of 7 villages comprising Ilie Communities) was selected by simple random sampling technique utilizing the ballot method. Then a systematic random sampling technique was used to select 25% of all households from a list of all households compiled during the initial de facto census. Finally, all adults aged 15 years and above in each household selected were recruited into the study. Verbal informed consent was obtained from each respondent.

Data entry and analysis: Data was entered on a computer and analysis was carried out utilizing the Statistical Package for Social Sciences (SPSS) software. Frequency distributions of variables were derived and bi-variate analysis used for cross tabulations. Chi-square (χ^2) test was used to test for association between categorical variables on the contingency tables. Statistical levels of significance were set at $p < 0.05$ with a 95% confidence interval. Correlates of knowledge of HIV infection transmission and modes of prevention were evaluated using multiple logistic regression analysis, confidence intervals and odd ratios.

OUTCOME MEASURES

Knowledge scores: Knowledge scores were computed by awarding one mark for each correct answer and no mark for incorrect answers. For each item, 3 responses were possible, Yes, No and don't know. These were recoded into correct answer = 1 mark, incorrect answer = 0.6 questions were used to assess the respondents level of knowledge of routes of transmission and modes of prevention.

The maximum score obtainable was 6, while the minimum was 0. A composite knowledge score was compiled by adding together the individual knowledge scores. The mean and the standard deviation were obtained as the summary measures.

The scores were classified into 2 categories by taking the mean of the highest and lowest scores. A value of 3.0 was obtained. This was used to classify the respondents into poor knowledge and good knowledge. Scores < 3.0 were deemed poor (incorrect) knowledge, while scores > 3.0 were considered good (correct) knowledge

Attitude scores: Attitude scores were computed by awarding 1 mark for each correct answer to 3 statements,

which assessed the respondents attitude/perception to HIV/AIDS prevention and PLWHAs. For each item, 2 responses were possible- Yes or No (these were recoded into Yes as 1 and No as 0). The maximum score obtainable was 3. The scores obtained ranged from 0-3. A composite attitude score was compiled by adding together the individual attitude scores and the mean was calculated. Scores <1.5 were deemed poor attitude, while scores >1.5 were considered good attitude.

Ethical consideration: The ethics and research committee of the LAUTECH Teaching Hospital approved the research protocol and study instrument. Verbal informed consent was obtained from the village head and each respondent prior to data collection.

RESULTS

Socio-demographic characteristics: Questionnaires were administered to a total of 340 respondents but only 325 were with complete responses, giving a 4.4% non-response rate. Forty three (13.2%) respondents were aged <20 years, 141 (43.4%) were between 20-29 years old while, 43 (13.2%) were 50 years and above. The mean age of respondents was 29.96±11.55 years. Male to female ratio was 1.6:1. Majority (86.2%) had primary education or more and 68.3% were Moslems. One hundred and thirteen (34.8%) respondents were single, 201 (61.8%) married, 10 (3.1%) widowed and 1 (0.3%) was divorced.

Of the ever married (married, widowed and divorced) respondents, 131 (61.8%) were in monogamous type of marriage, while 81 (38.2%) were in polygamous type of marriage. Only 62 (19.1%) of respondents had never lived outside the study area before.

Knowledge of HIV transmission and prevention: There was a high level of awareness with 93.8% of respondents aware of HIV/AIDS. The respondents knowledge of the route of transmission was also rather high as 90.2, 80.9, 80.3, 78.2, 76.3 and 70.2% of respondents know that sexual intercourse, blood transfusion, traditional and cultural practices (such as scarification and tattoo, injection with unsterilized needles), surgical procedures and mother to child transmission during delivery were routes of transmission of the HIV, respectively. However, as many as 108 (33.2%) of respondents erroneously thought that HIV could be transmitted through hugging, holding hands and talking to people with HIV/AIDS, while 120 (36.9%) thought transmission could occur through mosquito bite.

Knowledge of preventive measures was also high as 83.7, 82.2, 79.1, 75.1 and 72.6% of respondents knew that

abstinence, fidelity to one's sexual partner, proper screening of blood/blood products before transfusion, proper sterilization of surgical equipment before use and use of condom are methods of prevention of HIV transmission, respectively. However, only 44.3% of respondents knew that treatment of infected people including pregnant women is a means of preventing HIV transmission.

Table 1 shows the distribution of respondent according to knowledge scores of route of transmission and modes of prevention of HIV infection and attitudinal scores. About two thirds, 209 (64.3%) and 201 (61.8%) of respondents had good knowledge scores of routes of transmission and modes of prevention of HIV/AIDS, respectively. However, only about 1/3, 119 (36.4%) of the respondents had good attitudinal scores towards HIV/AIDS and PLWHAs.

Sexual risk behaviors and HIV Risk perception:

There was a low prevalence of psychoactive substance use in this study, population as only 29.5, 8.6, 3.4 and 1.2% of the respondents indulge in alcohol intake, cigarette smoking, narcotics drugs and marijuana, respectively.

Total 274 (84.3%) respondents were sexually active, of which 65 (23.7%) had multiple sexual partners (ranging from 2-6 partners). The prevalence of extramarital sexual affairs was 32.1% (68 respondents) amongst the 212 ever married respondents. Sixty two (54.9%) of the 113 single respondents were sexually active. Of this number, 42 (67.7%) used condoms at sexual intercourse; only 9 (21.4%) used condoms consistently at every sexual intercourse, while 33 (78.6%) used it only occasionally and 20 (32.3%) never used it. Furthermore, only 18 (26.5%) of the 68 married respondents that were having extramarital sexual affairs use condoms; 3 (16.0%) at every intercourse and 15 (84.0%) occasionally. Altogether, only 96 (35.0%) of the 274 sexually active respondents used condoms at sexual intercourse; 40 (14.6%) respondents at every intercourse, while 56 (20.4%) respondents used condoms occasionally.

Eighteen (6.6%) of the 274 sexually active respondents had ever had sex with Commercial Sex Worker (CSW). Frequency of sexual intercourse with CSW was daily by 1 (5.6%), weekly by another 1 (5.6%), monthly by 3 (16.6%) and occasionally by 13 (72.2%) respondents, respectively. Of the respondents that had sexual contact with CSW, only 1 (5.6%) respondent used condoms at every intercourse, 14 (77.7%) used it occasionally, while 3 (16.7%) of them never used condoms.

Table 1: Distribution of respondents according to Knowledge of routes of transmission, modes of prevention and attitudes scores

Score categories	Min. score	Max. score	Mean score	SD
Knowledge of route of transmission of HIV score	0.0	6.0	4.39	1.594
Knowledge of modes of prevention of HIV infection score	0.0	6.0	4.42	1.754
Attitude score	0.0	3.0	0.91	1.319
Variables	Frequency			(%)
Knowledge of route of transmission of HIV				
Good knowledge	209			64.3
Poor knowledge	116			35.7
Knowledge of modes of prevention of HIV infection				
Good knowledge	201			61.8
Poor knowledge	124			38.2
Attitude				
Good attitude	119			36.4
Poor attitude	206			63.4

Table 2: Socio-demographic characteristics of respondents as related to knowledge score of HIV transmission and prevention

Socio-demographic variables	Knowledge score of routes of transmission of HIV				Knowledge score of modes of prevention of HIV			
	Good	Poor	χ^2	p-value	Good	Poor	χ^2	p-value
Age								
<20 years	32 (74.4)	11 (25.6)	4.66	0.0300	33 (76.7)	10 (23.3)	2.08	0.15000
>20 years	178 (63.2)	104 (36.8)			168 (59.6)	114 (40.4)		
Gender								
Male	136 (68.2)	63 (31.8)	13.84	0.0002	132 (66.2)	67 (33.8)	19.73	0.00001
Female	60 (48.0)	66 (52.0)			52 (41.5)	74 (58.5)		
Religion								
Christianity	64 (69.8)	28 (30.2)	1.55	0.2100	58 (63.3)	34 (36.7)	0.12	0.73000
*Others	145 (62.2)	88 (37.8)			142 (61.0)	91 (39.0)		
Marital status								
Single	81 (71.8)	32 (28.2)	5.51	0.0200	79 (69.7)	34 (30.3)	5.88	0.02000
**Ever-married	124 (58.4)	88 (41.6)			119 (56.1)	93 (43.9)		

*Others: Islam and Traditional and others; **Ever married, married, widowed and divorced

Analysis of data in respect of respondents own risk perception of HIV/AIDS showed that 46 (14.2%) respondents think that HIV/AIDS does not occur among blacks, while majority of respondents, 234 (72.0%) felt that they can never contract HIV/AIDS. Reasons given for this include faithfulness to spouses/sexual partners (70.1%), practice of abstinence (18.4%) and avoidance of unprotected sex (4.3%). On the other hand, reasons were also proffered for having self risk-perception of HIV infection in 91 (28.0%) respondents. Of these, 33 (36.3%) think that their risk of contracting the disease will be from an unfaithful spouse/sexual partner, 28 (30.8%) think it will be from having multiple sexual partners, 12 (13.2%) think it will be from having unprotected sex, while 18 (19.8%) think it will be from sharing use of sharp objects.

Results showed high levels of stigmatizing behavior related to HIV/AIDS translating into a very high level of negative attitude to People Living with HIV/AIDS (PLWHA) among the respondents, as 70.2, 70.5 and 65.5% of them cannot sleep on the same bed, eat from same plate or embrace (hug) someone with HIV/AIDS, respectively.

Bivariate analysis showed that age ($\chi^2 = 4.66$; $p = 0.03$), gender ($\chi^2 = 13.84$; $p = 0.002$) and marital status ($\chi^2 = 5.51$; $p = 0.02$) were statistically significantly related to knowledge score of routes of transmission of

Table 3: Predictors of knowledge of routes of transmission and preventive measures of HIV/AIDS

Predictors	B	SE	Odds ratio	p-value
Knowledge of routes of transmission of HIV/AIDS				
Age	0.220	0.120	1.020	0.081
Gender	1.040	0.321	2.830	0.001
Marital status	0.161	0.275	1.180	0.557
Knowledge of preventive measures against HIV/AIDS				
Age	0.020	0.013	1.002	0.879
Gender	0.789	0.323	2.201	0.015
Marital status	0.421	0.283	1.523	0.137

HIV/AIDS, while gender ($\chi^2 = 19.73$; $p = 0.00001$) and marital status ($\chi^2 = 5.88$; $p = 0.02$) were statistically significantly associated with knowledge score of modes of prevention of HIV/AIDS (Table 2). However, no socio-demographic characteristic of respondents was statistically significantly associated with attitudinal scores ($p > 0.05$).

Table 3 shows a multiple logistic regression analysis of the knowledge of route of transmission and that of preventive measures of HIV/AIDS. Gender was found to be statistically significantly associated with knowledge of route of transmission of HIV/AIDS (OR = 2.83) and preventive measures (OR = 2.201) having controlled for the effect of the other variables such as age and marital status.

DISCUSSION

The results of this study revealed a rural adult population with a high level of awareness (>90%) of the existence of HIV/AIDS accompanied by a moderately high level of knowledge about HIV/AIDS routes of transmission and preventive measures, as about 2/3rd of the respondents had good knowledge score of routes of transmission and modes of prevention of HIV/AIDS, respectively. Compared with other target groups, the finding in this rural population was of similar magnitude with regards to level of knowledge of transmission routes and preventives measures (Ismail *et al.*, 1995; Odujirin and Adebajo, 2001; Hartung *et al.*, 2002; Nwokoji and Ajuwon, 2004; Iliyasu *et al.*, 2006; Vaz *et al.*, 2006). This is an encouraging finding and it is probably due to the intensified campaign on HIV/AIDS by government and non-governmental organisations through the mass media.

However, in spite of the high levels of awareness of the existence of HIV/AIDS and the relatively good knowledge scores of routes of transmission and of the preventive measures, the presence of widespread misconceptions should be of concern to all stakeholders involved in the fight against HIV/AIDS. In this study, at least a third of the respondents had misconceptions about route of transmission of HIV. Some misconceptions relate to route of transmission and stigma whilst others raised serious questions about the extent of the people's comprehensive knowledge of HIV/AIDS, in particular the depth of the understanding they require to protect themselves. This is similar to findings of other researches in other parts of Nigeria and elsewhere (Shama *et al.*, 2002; Hentgen *et al.*, 2002; Derlega *et al.*, 2006; Sadob *et al.*, 2006; Esiet *et al.*, 2006).

Furthermore, results showed high levels of negative attitudes to People Living with HIV/AIDS (PLWHA) as revealed by the fact that majority (>2/3) of respondents had at least two stigmatizing behaviours towards PLWHA culminating in poor attitudinal scores. The presence of stigmatization had been found to affect protective behavior and Voluntary Confidential Counseling and Testing (VCCT) and thereby weaken efforts to curtail the spread of the HIV infection (Derlega *et al.*, 2006; Okonkwo *et al.*, 2007; Rogers *et al.*, 2006). This is an important finding that should be focused on by HIV/AIDS prevention program planners; decreasing the level of misconceptions and increasing the people's comprehensive knowledge about HIV/AIDS transmission mechanisms and preventive measures.

Substance use has been linked with sexual risk-taking behaviors. Even though, there was a low prevalence of

substance use in this study population, other factors like tradition, culture and misconceptions were seen to affect more the respondent's sexual risk-taking behaviors. For example, a little bit >1/3 of the ever-married respondents were in polygamous type of marriage; about a 3rd of the ever-married engaged in extra-marital sexual affairs; about 1/4 of the sexually active respondents had multiple sexual partners and only 1 out of 7 sexually active respondents used condoms consistently at every sexual intercourse. Moreover, there was very minimal use of condoms among the few respondents that patronize Commercial Sex Workers (CSW).

Furthermore, the study showed that the respondents had very low levels and poor perception of their own risk of HIV/AIDS infection as >2/3 perceived the risk of their ever contracting HIV infection to be nil. Similar findings have been reported elsewhere by other researchers where the majority of the adult population perceived their risk of HIV infection to be nil or low (Shabbir and Larson, 1995; Olayinka and Osho, 1997; Kengeya-Kayondo *et al.*, 1999; Shama *et al.*, 2002; Sadob *et al.*, 2006; Derlega *et al.*, 2006; Rogers *et al.*, 2006; Brown and Van Hook, 2006; Ijadunola *et al.*, 2007; Esiet *et al.*, 2006; Okonkwo *et al.*, 2007). Amongst the few respondents (28.0%) that had self risk-perception of HIV infection, more than a third of these felt that their risk would be from other people's actions; either infidelity on their spouse's/sexual partner's part or from having multiple sexual partners. Overall, sexual partner's behavior was the commonest reason for risk perception, while individual's own sexual risk behavior came second. This is similar to the findings of a study in rural southwest Uganda and Nigerian College students (Shabbir and Larson, 1995; Kengeya-Kayondo *et al.*, 1999; Ijadunola *et al.*, 2007). This shows that we have a rural adult population that is potentially at risk of HIV/AIDS because of their poor risk perception in addition to their risky sexual habits. Perceived threat is an important concept needed to be understood in order to change sexual risk behaviors that lead to Sexually Transmitted Infections (STIs), including HIV/AIDS (Fisher and Fisher, 2000). For example, the information-motivation-behavioral skills model, as applied to HIV infection, argues that the perceived threat of HIV infection can motivate an individual to adopt a protective behaviour (Fisher and Fisher, 1992).

These factors are important elements to focus on in planning appropriate preventive intervention strategies and programs for the rural populace in this environment. Stigma and discrimination stand out as another significant challenge to the prevention and control of HIV/AIDS in

rural Nigeria. The presence of a high level of stigma facilitates the spread of HIV/AIDS, not least by its effects on some of the prevention packages such as Voluntary Confidential Counseling and Testing (VCCT).

A high level of comprehensive and in-depth knowledge of HIV/AIDS must be considered as necessary inputs into the preventive programs planned for rural dwellers in Nigeria which, hopefully, will lead to positive attitudinal and behavioral changes.

CONCLUSION

This study has shown, a rural adult population whose high level of awareness and knowledge of HIV infection transmission and preventive measures is at dissonance with their poor risk perception of HIV infection and risky sexual behaviors. This confirms the fact that knowledge does not necessarily translate to behavioral change. Risk reduction strategies in this environment should in addition to the promotion of partner reduction, place strong emphasis on comprehensive knowledge of HIV infection transmission and preventive measures. This is for the aim of eliminating misconceptions about HIV/AIDS, stigmatizing behaviours and harmful traditional practices (e.g., polygamy, female genital mutilation, facial tribal marks and widow inheritance), strengthening risk perception and increasing safe-sex techniques. The gap that exists between knowledge of condoms and its use should be addressed in HIV/AIDS prevention programs. There should be continued efforts to reach CSWs and make condoms much more widely available, acceptable and affordable especially in the rural areas through innovative and culturally sensitive behaviour modification programs.

REFERENCES

- Brown, E.J. and M. Van Hook, 2006. Risk behaviour, perceptions of HIV risk and risk-reduction behaviour among a small group of rural African American women who use drugs. *J. Assoc. Nurses AIDS Care*, 17 (5): 42-50. PMID: 16979514.
- De Clercq, E., 2007. AIDS in the third World: How to stop the HIV infection? *Verh. K Acad. Geneesk. Belg.*, 69 (2): 65-80. PMID: 17550059.
- Derlega, V.J., X. Yang and H. Luo, 2006. Misconception about HIV transmission, stigma and willingness to take sexual risks in Southwestern China. *Int. J. STD. AIDS*, 17 (6): 406-409. DOI: 10.1258/0956420677323490.
- Esiet, U.I., C.O. Adebajo, M.V. Bello, R. Booth, I.I. Esiet, N. Esiet, F. Oyebola, B. Yusuf and B. Opiyo-Omolo, 2006. CCIES at the Kinsey Institute: Nigeria. www.kinseyinstitute.org/ccies/ng.php.
- Fisher, J.D. and W.A. Fisher, 1992. A general social psychological model for changing HIV-risk behaviour. *Psych. Bull.*, 111: 455-474.
- Fisher, J.D. and W.A. Fisher, 2000. Theoretical Approaches to Individual-level Change in HIV-risk. In: Peterson, J.L. and R.J. DiClemente (Eds.). *Handbook of HIV Prevention*. New York: Kluwer Academic/Plenum Press, pp: 3-56.
- Ghosh, J. and E. Kalipeni, 2005. Women in Chinsapo, Malawi: Vulnerability and risk to HIV/AIDS. *SAHARA J.*, 2 (3): 320-332. PMID: 17600974.
- Hartung, T.K., J. Nash, N. Ngubane and V.G. Fredlund, 2002. AIDS awareness and sexual behaviour in a high HIV prevalence area in rural northern Kwazulu-Natal, South Africa. *Int. J. STD AIDS*, 13 (12): 829-832. DOI: 10.1258/095646202321020107. PMID: 12537736.
- Hentgen, V., S. Jaureguiberry, A. Ramibiarisoa V. Andrianantoandro and M. Belec, 2002. Knowledge, attitude and practices of health personnel with regard to HIV/AIDS in Tamatave (Madagascar). *Bull. Soc. Pathol. Exot.*, 95 (2): 103-108. PMID: 12145952.
- Ijadunola, K.T., T.C. Abiona, O.O. Odu and M.Y. Ijadunola, 2007. College students in Nigeria underestimate their risk of contracting HIV/AIDS infection. *Eur. J. Contracept. Reprod. Health Care*, 12 (2): 131-137. DOI: 10.1080/13625180601068461 PMID: 17559011.
- Iliyasu, Z., I.S. Abubakar, M. Kabir and M.H. Aliyu, 2006. Knowledge of HIV/AIDS and attitude towards voluntary counseling and testing among adults. *J. Natl. Med. Assoc.*, 98 (12): 1917-1922. PMID: 17225834.
- Ismail, S., F. Hgiorgis, D. Leggese, E. Alemu, K. Regassa, M. Abdella and M. Shibeshi, 1995. Knowledge, attitude and practice on high risk factors pertaining to HIV/AIDS in a rural community. *Ethiop. Med. J.*, 33 (1): 1-6.
- Kengeya-Kayondo, J.F., L.M. Carpenter, P.M. Kintu, J. Nabaitu, R. Pool and J.A.G. Whitworth, 1999. Risk Perception and HIV-1 Prevalence in 15,000 adults in rural Southwest Uganda. *AIDS*, 13 (16): 2295-2302.
- Nwokoji, U.A. and A.J. Ajuwon, 2004. Knowledge of AIDS and HIV risk-related sexual behavior among Nigerian naval personnel. *BMC Public Health*, 4: 24. DOI: 10.1186/1471-2458-4-24. PMID: 15210055 PMCID: PMC449717.
- Odujirin, M.T. and S.B. Adebajo, 2001. Social characteristics, HIV/AIDS knowledge, preventive practices and risk factors elicitation among prisoners in Lagos, Nigeria. *West Afr. J. Med.*, 20 (3): 191-198. PMID: 11922150.

- Okonkwo, K.C., K. Reich, A.I. Alabi, N. Umeike, S.A. Nachman, 2007. An evaluation of awareness: Attitudes and beliefs of pregnant Nigerian women toward voluntary counseling and testing for HIV. *AIDS Patient Care STDs*, 21 (4): 257-260. DOI: 10.1089/apc.2006.0065. PMID: 17461720.
- Olayinka, B.A. and A.A. Osho, 1997. Changes in attitude, sexual behaviour and the risk of HIV/AIDS transmission in southwest Nigeria. *East Afr. Med. J.*, 74 (9): 554-560. DOI: PMID: 9487429.
- Rogers, A., A. Meundi, A. Amma, A. Rao, P. Shetty, J. Antony, D. Sebastian, P. Shetty and A.K. Shetty, 2006. HIV-related knowledge, attitudes, perceived benefits and risks of HIV testing among pregnant women in rural Southwestern India. *AIDS Patient Care STDs*, 20 (11): 803-811.
- Sadob, A.E., A.O. Fawole, W.E. Sadoh, A.O. Oladimeji, O.S. Sotiloye, 2006. Attitudes of health-care workers to HIV/AIDS. *Afr. J. Reprod. Health*, 10 (1): 39-46. PMID: 16999193.
- Sanni, M.U., A.Z. Mohammed, B. Adamu, S.M. Ysusf, A.A. Samalia and M.M. Borodo, 2006. AIDS mortality in a tertiary health institution: A four-year Review. *J. Natl. Med. Assoc.*, 98 (6): 862-826. PMID: 16775907.
- Shabbir, I. and C.P. Larson, 1995. Urban to rural routes of HIV infection spread in Ethiopia. *J. Trop. Med. Hyg.*, 98 (5): 338-342. PMID: 7563263.
- Shama, M., L.E. Fiala and M.A. Abbas, 2002. HIV/AIDS perceptions and risky behaviours in squatter areas in Cairo, Egypt. *J. Egypt Public Health Assoc.*, 77 (1-2): 173-200. PMID: 17219897.
- Talbott, J.R., 2007. Size Matters: The Number of Prostitutes and the Global HIV/AIDS Pandemic. *PLoS ONE*, 20;2:e543. DOI: 10.1371/journal.pone.0000543 PMID: 17579715 PMCID: PMC1891093.
- Vaz, F.S., A.M. Ferreira, M.S. Kulkarni and D.D. Motghare, 2006. Sexual risk behaviours and HIV/AIDS awareness among males in a rural community in Goa. *J. Commun. Dis.*, 38 (1): 74-78. PMID: 17370692.