

Original Research Article

Determinants of sexual risk practices and HIV transmission among women of childbearing age in sub-urban communities of Rivers State, Nigeria

ABSTRACT

Aim:

The study was aimed at identifying the determinants of sexual risk practices and HIV transmission among community-based women in Rivers State, Nigeria in order to address their intervention needs.

Study design:

The study utilized a quantitative household-based cross sectional design to generate information among women of child bearing age.

Place and Duration of Study:

It was conducted in five sub-urban communities of Obio-Akpor Local Government Area of Rivers State, Nigeria between December 2012 and February 2013. The communities were Rumuosi, Rumuekini, Ozuoba, Rumualogu and Rumuokparali.

Methodology:

The cluster sampling method was used to select 769 eligible participants. Data was analyzed using the SPSS version 20. Bivariate and multivariate analysis, using unconditional logistic regression was done with dependent and independent variables. A $p \leq .05$ considered statistically significant.

Results:

Majority of the women, 658 (85.6%) were sexually exposed, while 245 (37.2%) engaged in sexual risk practices which were defined as sexual debut before 15 years, 110 (16.7%), involvement of multiple sexual relationships, 85(12.9%), the use of alcohol 195 (29.6%) and or illicit drugs 39 (5.9%) before sex, and inadequate condom use with casual sexual partners 55 (22.4%). Logistic regression analysis confirmed that younger women (15-24 years) were 2.2 times likely to engage in sexual risk behaviors than older women (25-49 years), [*O.R* (95% *C.I*) = 1.57 (1.11-2.23)], $p = .01$. Similarly, single women were 2.5 times more likely to engage in sexual risk behavior than ever-married, [*O.R* (95% *C.I*) = 1.71 (1.19-2.47)], $p = .00$. Furthermore, adequate knowledge of HIV transmission was protective against sexual risk behavior, [*A.O.R* (95% *C.I*) = 0.68 (0.47 -0.95)], $p = .02$.

Conclusion:

The study exposes the high prevalence of sexual risk behaviours among community-based women and underscores the need to emphasize HIV interventions on curriculum-based sexuality education in schools and peer education in communities for sexual risk reduction.

Keywords: HIV/AIDS, sexual risk behaviors, Rivers State, Nigeria

1. INTRODUCTION

HIV/AIDS is the leading cause of infectious disease deaths among women of child bearing age [1]. Each year, 55% of deaths occurring among women and girls are caused by AIDS [2]. The epidemic has taken a devastating toll on the lives of women, who account for 50% of the epidemic globally, 60% in sub-Saharan Africa and 58% in Nigeria [3]. In recent years however, significant achievements have been

made in the prevention and management of HIV and AIDS with visible signs of decline in prevalence rates in many developed and developing countries, including Nigeria [1],[4]. In spite of the noteworthy progress in the global HIV response on various fronts, the burden persists commonly in many settings in sub-Saharan Africa [5]. Nigeria remains one of such places with a high burden of the infection with 3.5 million people living with the virus and 300,000 new infections annually [4]. At present Nigeria is the second country with the highest HIV burden in the world after South Africa [6].

Sexual risk behaviors are among the key drivers of the HIV epidemic in Nigeria, where heterosexual transmission accounts for 80-95% of all infections [7]. Women in Nigeria are also disproportionately affected, with infection rates two to three times higher compared with men, and also accounting for 31% of all new infections [4]. This is of cause not without severe implication for mother-to-child transmission of the virus, especially in the face of a weak health system. Maternal transmission of HIV is responsible for 90% of HIV infection in children [8], [9] while only 11% of pregnant women with HIV in Nigeria are reached with HIV prevention interventions [10]. Several studies have linked women in Nigeria with sexual risk behaviors [11-13]. These risky behaviors include early sexual debut, multiple sex partnerships, unprotected sexual intercourse, alcohol or drugs use before sex [11-14] Although, most studies have necessarily focused on the sexual risks of adolescents and unmarried youths because of their high level of risk behaviors and exposures [11],[12]. Nevertheless, it is on record that, women of child bearing age, including those in stable relationships are equally predisposed to sexual risk practices which unduly expose them to the risk of HIV infection and other sexually transmitted infections [15-17]. The study was therefore aimed at exploring the sexual risk practices among women of child bearing age with implications for HIV transmission. This is because identifying prevailing sexual and HIV risk practices among this category of women will provide evidence on which HIV prevention platforms can be anchored [14]. Evidence has shown that preventing HIV infection among women of childbearing age is a key strategy of preventing mother-to-child transmission of the virus [18].

2. METHODS

Study Area:

The study was conducted in five sub-urban communities of Obio-Akpor Local Government Area of Rivers State, Nigeria between December 2012 and February 2013. The communities are Rumuosi, Rumuekini, Ozuoba, Rumualogu and Rumuokparali. Rivers State is in the south-south geopolitical region of Nigeria, also referred to as the Niger Delta region. The area is notable for its huge oil and gas deposits and oil and gas exploration activities. The natives are of the Ikwere ethnic extraction. However, the communities have over the years gradually metamorphosed into multiethnic societies, with several cultural diversities. This is as a result of the influx of people of diverse backgrounds in search of economic opportunities. Health service delivery in the area is anchored on both public and private facilities, with health care financing predominately based on user-fees for service.

Study Design and Population:

The study utilized a quantitative household-based cross sectional design to generate data among women of child bearing age who were normally resident in the communities. The simple random method was used to select one Local Government Area (LGA), the Obio/Akpor LGA from the 23 that make up the State. Thereafter, five communities were selected from the 58 that make up the LGA, also by a simple random method. Five communities were selected in order to broaden the spread of the sample. Visitors and residents less than six months in the communities were excluded.

Sampling size and procedure:

Sample size for the study was computed using the formula for descriptive studies; $n = \frac{Z^2pq}{d^2}$ [19]. It was determined based on 95% confidence level, 5% margin of error, 64.2% proportion of women of reproductive age who had higher-risk sexual intercourse in the past 12 months in south-south region of Nigeria (i.e. sexual intercourse with a non-marital or non-cohabiting partner) [20] and an effect size of 2.

A minimum value of 706 was determined adequate for the study. However, a total of 769 women consented and participated in the study. The cluster sampling method was used to select eligible participants. A central location was identified in each of the communities, from where the first house and first household with eligible participant was identified and interviewed. The next participant was selected from the consecutive households. This process was continued until the required sample size was reached and exceeded.

Data Collection:

A validated, interviewer-administered questionnaire was used to collect information on socio-demographic variables, HIV knowledge and perception and sexual risk behaviors of respondents. Socio-demographic variables considered were age, marital status, educational level, religion, parity and employment status. Assessment of HIV knowledge centered on knowledge of HIV transmission, unprotected sexual intercourse with HIV/AIDS infected persons, blood transfusion, mother-to-child transmission of HIV and risks in sharing of sharp objects and instruments. Information collected on HIV perception focused on myths and misconceptions about HIV infection. Finally, information on sexual risk practices were assessed based admission of multiple sexual relationships, non-use of condom among multiple sex partners, sexual debut before age 15 or the use of alcohol or recreational drugs before sex. These sexual risk variables formed the composite indicator for determining sexual risk practices among the respondents. Indulgence in any of the aforementioned practices was considered a sexual risk practice.

Data Analysis:

Data was analyzed using the Statistical Package for Social Sciences (SPSS) Version 20. Bivariate analysis was performed using Chi-square and Fisher's Exact statistical tests. Multivariate analysis using unconditional logistic regression was done with sexual risk behaviors of participants as dependent variable, and their socio-demographic characteristics, HIV knowledge and perception constituting the independent variables. A p-value of less than .05 was considered statistically significant.

3. RESULTS

Socio-demographic Characteristics of respondents:

A total of 769 women of child bearing age participated in the study. Most of them 354 (46%), were within the age bracket, 15-24 years, were single, 399 (51.9%) and had completed secondary level education 531 (69.1%). Details of demographic profile are documented in Table 1.

Table 1: Socio-demographic profile of study population

Variable	Frequency (N=769)	Percentage (%)
<i>Age group</i>		
15-24	354	46.0
25-34	309	40.2
35-44	86	11.2
45-49	20	2.6
<i>Marital Status</i>		
Single	399	51.9

Married	347	45.1
Divorced/Separated	7	0.9
Widowed	16	2.1

Level of education

None	24	3.1
Primary	58	7.5
Secondary	531	69.1
Tertiary	156	20.3

Religion

Christianity	757	98.4
Islam	12	1.6

Employment Status

Employed	340	44.2
Unemployed	429	55.8

Parity

Para 0	418	54.4
Para1-4	296	38.5
Para ≥ 5	55	7.2

98

99 **Factors Associated with sexual risk practices**

100 Majority of the women, 658 (85.6%) were sexually exposed. Of these, 245 (37.2%) had ever engaged in
 101 sexual risk behaviors. Overall, 110 (16.7%) had early sexual debut, 85(12.9%) were involved in multiple
 102 sexual relationships, 195(29.6%) used alcohol before sex, 39(5.9%) used recreational drugs before sex,
 103 while only 55 (22.4%) used condoms with casual sexual partners (Table 2).

104 **Table 2: Sexual risk behaviors among women of child bearing age (*multiple responses*)**

Variable	Frequency (n=658)	Percentage (%)
Early sexual debut (<15 years)	110	16.7
Multiple sex partnership	85	12.9
Use of alcohol before having sex	195	29.6

Use of recreational drugs before having sex	39	5.9
--	----	-----

105

106 Poor knowledge of HIV was found among those who exhibited risky sexual behaviors: 97 (42.9%) of them
 107 did not know that HIV was transmitted by unprotected sexual intercourse with HIV/AIDS positive persons
 108 ($p=0.029$), 77 (46.1%) did not know that HIV could be transmitted through blood transfusion, ($p=.01$), 116
 109 (43.0%) did not know that HIV could be transmitted from a mother to a child ($p=.01$) and 52 (45.6%) did
 110 not know that HIV could be transmitted by sharing sharp objects ($p=.04$). (Table 3) Bivariate analysis
 111 showed that age ($p=.01$), marital status ($p=.04$), educational level ($p=.05$) as well as being parity ($p=.003$)
 112 were significantly associated with sexual risk practices, while religion ($p=.23$) and employment status
 113 ($p=.30$) were not (Table 4).

114 **Table 3: Association between sexual risk behavior and HIV knowledge**

HIV Knowledge	HIV sexual risk behaviors		Total	P
Indicators			(N=653)	value
	Yes (n=245)	No (n=413)		
	n (%)	n (%)		
HIV transmission by unprotected sexual intercourse with HIV/AIDS persons				
Yes	148 (34.3)	284 (65.7)	432	.03*
No	97 (42.9)	129 (57.1)	226	
HIV transmission by blood transfusion				
Yes	168 (34.2)	323 (65.8)	491	.01*
No	77 (46.1)	90 (53.9)	167	
Mother-to-child transmission of HIV from				
Yes	129 (33.2)	259 (66.8)	398	.01*
No	116 (43.0)	154 (57.0)	270	
HIV transmission by sharing sharp objects				
Yes	193 (35.5)	351 (64.5)	544	.04*
No	52 (45.6)	62 (54.4)	114	

115 *Statistically significant

116

117

118 **Table 4: Association between sexual risk behaviors and socio-demographic variables**

Variables	HIV sexual risk behaviors		Total	p value
	Yes (n=245)	No (n=413)		
	n(%)	n(%)		
Age category				
15-24	106 (40.5)	156 (59.5)	262	.01*
25-34	89 (30.6)	202 (69.4)	291	
35-44	39 (45.9)	46 (54.1)	85	
45-49	11 (55.0)	9 (45.0)	20	
Marital Status				
Single	113 (38.8)	178 (61.2)	291	.04*
Married	119 (34.6)	225 (65.4)	344	
Separated/Divorced	2 (28.6)	5 (71.4)	7	
Widowed	11 (68.8)	5 (31.2)	16	
Educational level				
None	11 (55.0)	9 (45.0)	20	.05*
Primary	27 (49.1)	28 (50.9)	55	
Secondary	167 (36.7)	288 (63.3)	455	
Tertiary	40 (37.2)	88 (68.8)	128	
Religion				
Christianity	243 (37.6)	403 (62.4)	646	.23**
Islam	2 (16.7)	10 (83.3)	12	
Employment status				
Employed	193 (36.3)	339 (63.7)	532	.30
Unemployed	52 (41.3)	74 (58.7)	126	

Parity				
0	119 (38.8)	188 (61.2)	307	.03*
1-4	98 (33.1)	198 (66.9)	296	
≥ 5	28 (50.9)	27 (49.1)	55	

*Statistically significant **Fisher Exact

Determinants of Sexual risk behaviors:

Multivariate analysis, using logistic regression however, confirmed that women who were younger (15-24 years) were 2.2 times more likely to engage in sexual risk behaviors than older women (25-49 years), [O.R (95% C.I) = 1.57 (1.11-2.23)], $p=.01$. Similarly, women who were single were 2.5 times more likely to engage in HIV sexual risk behavior than those ever-married, [O.R (95% C.I) = 1.71 (1.19-2.47)], $p=.00$. On the other hand, knowledge of HIV transmission through unprotected sex was protective against sexual risk behavior (adjusted odds ratio, [A.O.R (95% C.I) = 0.68 (0.47 -0.95)], $p=.02$. In a similar vein, the perception that HIV/AIDS was a threat to human life was also protective against sexual risk behaviors, (adjusted odds ratio, [A.O.R (95% C.I) = 0.36 (0.21-0.62)], $p=.00$ (Table 5).

Table 5: Determinants of sexual risk behaviors

Independent variables	Adjusted	95% Confidence		P
	Odds	Interval		value
	ratio	Lower	Upper Limit	
		limit		
Age group	1.571	1.106	2.231	.01*
Marital status	1.714	1.190	2.469	.00*
Education	2.241	0.931	5.390	.07
Employment status	1.231	0.882	1.718	.22
Knowledge of transmission of HIV via unprotected sexual intercourse with HIV/AIDS infected person	0.679	0.486	0.948	.02*
Knowledge of transmission of HIV via blood transfusion	0.737	0.452	1.202	.22
Knowledge of transmission of HIV via sharing needles and sharps	0.803	0.462	1.396	.44

Knowledge of transmission of HIV from infected mother-to-child	0.840	0.57	1.238	.34
Perception HIV being a threat to human life	0.362	0.211	0.6211	.00*
HIV transmitted by witchcraft	0.983	0.701	1.377	.92
Cure of HIV with traditional medicine	1.250	0.853	1.833	.25
HIV perception HIV can be cured by sex with virgin	1.156	0.757	1.765	.50
Constant	0.099			.02

*Statistically significant

4. DISCUSSION

This study showed that nearly all of the respondents were sexually exposed even though less than half were ever married. It is a pointer that substantial level of sexual activities takes place outside marriage in the sampled communities. It was however quite worrisome that a third of the sexually exposed engaged in sexual risk practices, with less than a quarter of them using condoms consistently with casual sex partners. Other sexual risk practices included multiple sexual relationships and the use of alcohol and illicit drugs before sex, all which have known implications for increased HIV transmission [15-17]. Although multiple sexual partnerships and low or sporadic condom use are prominent reproductive health challenges in parts of Nigeria, [21], [13] the problem appeared heightened in the oil-rich communities of the Niger Delta region [22]. The attendant implications for sexual and reproductive health are quite obvious.

The high level of alcohol consumption found in the study corroborates the findings of a study carried out among Latino immigrants in Florida, USA [23] and also confirms the high prevalence of alcohol consumption reported among women attending prenatal clinics in the Niger Delta communities.[24] High alcohol or drug intake is known to alter an individual's sense of judgment that may predispose to inconsistent condom use and multiple sexual exposures, all of which have severe consequences for HIV transmission [24], [25].

Although reports of sexual risk taking in sub-Saharan Africa have been linked with poverty, a comparable scenario plays out in the study area, even though the area is rich in oil and gas resources [22]. Nevertheless, other variables continue to play significant roles in sexual risk practices. Our study showed that inappropriate knowledge about HIV transmission still persisted among several respondents three decades since the epidemic. Such gaps in HIV knowledge have also been reported in some setting in Nigeria and elsewhere in Sub-Saharan Africa [26], [27]. Although it has been sufficiently established that accurate knowledge about HIV does not necessarily guarantee the adoption of healthy sexual lifestyle, [28], [29] it has also been said that pointing out areas of knowledge deficiency in HIV programming is critical for the uptake of its prevention and treatment [30]. The persistence of knowledge gaps might therefore partly explain why new cases of the HIV infection have continued to emerge in many locales and regions in sub-Saharan Africa despite the significant global and local responses to the epidemic [1], [4].

Also, a multiple regression analysis showed that youths (15-24 years) and those who had never married were significantly more likely to engage in HIV sexual risk behaviors. This finding corroborates with similar results from other studies in Nigeria and elsewhere, [31], [32] and probably confirms why youths

are at the centre of sexually transmitted infections and the HIV epidemic [33], [4]. It might also be the reason why HIV/AIDS is the leading cause of death among women of child bearing age, especially in sub-Saharan Africa [1].

Therefore, to curtail the HIV/AIDS transmission among women of child bearing age and eliminate mother-to-child transmission of HIV/AIDS in Nigeria, it is important to prioritize the attention given to young people in HIV/AIDS preventive program design and implementation. This cannot be over emphasized. Furthermore, the perception that HIV/AIDS was no longer a threat to human life due to availability of better clinical management, may be deceptive for those in resource limited settings with weak health systems, if not put in the right perspective. This is because such as notion has the propensity to intensify the epidemic [34]. The important issue is to dispel fear and provide accurate information on HIV/AIDS to women of child bearing age which would in turn modify their sexual behaviors to healthier and safer ones.

Study Limitations

The study was carried out among women of childbearing age residing in sub-urban communities and thus limits generalizing the findings. Also, the risk of each of the determinants was not measured.

5. CONCLUSION

The study underscores the important role of HIV knowledge in sexual risk reduction. Although evidence continues to suggest an increase in HIV/AIDS awareness among the general population in Nigeria [20], [13], this has unfortunately not significantly translated to reduction in sexual risk practices, even though it has made commendable contributions in behavior modifications [26], [30]. Hence the need to reappraise the strategy, depth and scope of the interventions aimed at increasing HIV knowledge, especially for the youths and the 'never married' community-based women. While we advocate for emphasis on peer education and curriculum-based sexuality education in schools in order to promote the right perception about HIV and sexual risk reduction, we also call for further research to investigate the effect of the use of information and telecommunication technology with tailored short message services (SMS) and the social media platforms in sexual risk reduction among community-based women.

ETHICAL APPROVAL (WHERE EVER APPLICABLE)

Ethical approval for the study was obtained from the Research Ethics Board of the University of Calabar and the Federal Ministry of Health, Abuja. Verbal informed consent was gotten from all participants after a full explanation of the aim of the study as well as reassurances that all responses and opinions were strictly confidential. Furthermore, participants were informed that they were free to decline participation or discontinue with the interview at any point in the course of the interview without any reprimands.

REFERENCES

1. United Nations Programme on AIDS (UNAIDS). HIV/AIDS Fact sheets 2014. Accessed 16 April 2015. Available: http://www.unaids.org/sites/default/.../documents/WAD2014_FactSheet_en.pdf
2. World Health Organization. HIV/AIDS. Global health Observatory (GHO), 2014. Accessed 16 April 2015. Available: <http://www.who.int/gho/hiv/en/on>.
3. National Agency for the Control of AIDS (NACA). Women, Girls and HIV in Nigeria. Accessed 16 April 2015. Available: <http://resourcedat.com/wp-content/uploads/2013/09/FACT-SHEET-2011-Women-Girls-and-HIV.pdf>
4. National Agency for the Control of HIV/AIDS (NACA). Global AIDS Response: Nigeria Country Report. Abuja, Nigeria: NACA; 2012. p. 1- 41.

- 216 5. United States President's Emergency Plan for AIDS Relief (PEPFAR). Why Reaching Women and
217 Girls is a Priority for PEPFAR. Accessed 18 April 2015. Available:
218 <http://www.pepfar.gov/press/229070.htm>.
- 219 6. Joint United Nations Programme on HIV/AIDS (UNAIDS). Report on the Global HIV/AIDS Epidemic.
220 Geneva: UNAIDS; 2010. p. 15-36.
- 221 7. Nasidi A, Harry TO. The epidemiology of HIV in Nigeria. In: Adeyi O, Kanki PJ, Odutolu O, Idoko JA,
222 editors. AIDS in Nigeria: a nation on the threshold. Cambridge MA: Harvard Center for Population and
223 Development Studies; 2006. p. 37- 130.
- 224 8. De Cock KM, Fowler MG, Mercier E, de Vincenzi I, Saba J, Hoff E et al. Prevention of mother-to-child
225 HIV transmission in resource-poor countries: Translating research into policy and practice. JAMA 2000;
226 283 (9):1175–82.
- 227 9. Joint United Nations Programme on HIV/AIDS (UNAIDS). Report on the Global HIV/AIDS Epidemic.
228 Geneva: UNAIDS; 2002. p. 6-16.
- 229 10. Federal Ministry of Health. National Guidelines on Prevention of Mother to Child Transmission of HIV
230 in Nigeria. Abuja, Nigeria: Federal Ministry of Health; 2011.
- 231 11. Fawole AO, Ogunkan DV, Adegoke GS. Sexual Behaviour and Perception of HIV/AIDS in Nigerian
232 Tertiary Institutions: a case study of university of Ilorin. Glob J Hum Soc Sci. 2011; 11:1. Accessed 16
233 April 2015. Available: <http://socialscienceresearch.org/index.php/GJHSS/article/view/77>
- 234 12. Imaledo JA, Peter-Kio OB, Asuquo EO. Pattern of risky sexual behavior and associated factors
235 among undergraduate students of the University of Port Harcourt, Rivers State, Nigeria. Pan Afr Med J.
236 2012; 12: 97.
- 237 13. National Population Commission/[Nigeria] and ICF Micro International. Nigeria Demographic and
238 Health Survey 2013. Maryland, USA: National Population Commission/[Nigeria] and ICF Micro
239 International; 2014.
- 240 14. Centre for Disease Prevention and Control (CDC). Risk Behavior. Accessed 20 April 2015. Available:
241 <http://www.cdc.gov/hiv/risk/behavior/>.
- 242 15. Keetile M. High-risk behaviors among adult men and women in Botswana: Implications for HIV/AIDS
243 prevention efforts. SAHARA J. 2014; 11:158-66.
- 244 16. Smith TK, Larson EL. Sexual risk behavior in older black women: a systemic review. Women's Health
245 Issue. 2015; 25(1): 63-72.
- 246 17. Cox CM, Babalola S, Kennedy CE, Mbwapbo J, Likindikoki S, Kerrigan D. Determinants of
247 concurrent sexual partnerships within stable relationships: a qualitative study in Tanzania. BMJ Open.
248 2014; 4. doi:10.1136/bmjopen-2013-003680.
- 249 18. United Nations Childrens Fund (UNICEF). Preventing mother-to-child transmission of HIV. Accessed
250 6 May 2015. Available: http://www.unicef.org/esaro/5482_pmtct.html.
- 251 19. Campbell MJ, Machin D. Medical Statistics: A common sense approach. 2nd ed. London: John Willey
252 and Sons Ltd; 1996.
- 253 20. National Population Commission/[Nigeria] and ICF International. Nigeria Demographic and Health
254 Survey 2008. Maryland, USA: National Population Commission/[Nigeria] and ICF Micro International;
255 2009.

- 256 21. Arowojolu AO, Ilesanmi AO, Roberts OA, Okunola MA. Sexuality, contraceptive choice and AIDS
257 awareness among Nigerian undergraduates. *Afr J Reprod Health*. 2002; 6 (2):60–70.
- 258 22. Udonwa NE, Ekpo M, Ekanem IA, Inem AV, Etokidem A. Oil doom and AIDS boom in Niger Delta
259 region of Nigeria. *Rural and Remote Health*. 2004. Accessed 6 May 2015. Available:
260 <http://rrh.deakin.edu.au>.
- 261 23. Rojas P, Dillon FR, Cyrus E, Ravelo GJ, Malow RM, De La Rosa M. Alcohol use as a determinant of
262 HIV risk behaviors among recent Latino immigrants in south Florida. *J Assoc Nurses AIDS Care*. 2014;
263 25(2):135-44.
- 264 24. Ordinioha B, Brisibe S. Alcohol consumption among pregnant women attending the ante-natal clinic
265 of a tertiary hospital in South-South Nigeria. *Nig J Clin Pract*. 2015; 18(1):13-17.
- 266 25. Chanakira E, O'Cathain A, Goyder EC, Freeman JV. Factors perceived to influence risky sexual
267 behaviors among university students in the United Kingdom: a qualitative telephone interview. *BMC*
268 *Public Health*. 2014; 14: 1055. Accessed 16 April 2015. Available: [http://www.biomedcentral.com/1471-](http://www.biomedcentral.com/1471-2458/14/1055)
269 [2458/14/1055](http://www.biomedcentral.com/1471-2458/14/1055)
- 270 26. Okafor CI, Dinwoke VO, Udigwe GO. Awareness of human immunodeficiency virus (HIV) infection
271 among antenatal clients in Nnewi, Nigeria. *Niger J Med*. 2014; 23(1): 20-25.
- 272 27. Ciampa PJ, Skinner SL, Patricio SR, Rothman RL, Vermund SH, Audet CM. Comprehensive
273 knowledge of HIV among women in rural Mozambique: development and validation of the HIV knowledge
274 scale. *PLoS One*. 2012; 7:10. e48676. doi: 10.1371/journal.pone.0048676. Epub 2012 Oct 31.
- 275 28. Bandura A. Social foundations of thought and action: A social cognitive theory. New Jersey:
276 Englewood Cliffs; 2008.
- 277 29. Perkins EL, Steniss KB, Spriggs VT, Kwegyir-Afful EA, Prather A. Is knowledge enough? Considering
278 HIV/AIDS risk behaviours and HIV/AIDS knowledge of African American women. *Int J High Risk Behav*
279 *Addict*. 2014; 3:3. doi:10.5812/ijhrba.15038.
- 280 30. Buehler CP, Blevins M, Ossemame EB, Gonzalez-Calvo L, Ndatimana E, Vermund HH et al.
281 Assessing spatial patterns of HIV knowledge in rural Mozambique using geographic information systems.
282 *Trop Med Int Health*, 2015; 20:3:353-64.
- 283 31. Onayade AA, Abiona TC, Ugbala C, Alozie G, Adetuyi O. Determinants of consistent condom use
284 among adolescents and young adults attending a tertiary educational institution in Ile-Ife, Nigeria.
285 *Postgrad Med J*. 2008.15:3:185-191.
- 286 32. Hong Yan, Weiqi Chen, Haocheng Wu, Yongyi Bi, Miaoxuan Zhang, Shiyue Li et al, Multiple sex
287 partner behavior in female undergraduate students in China: A multi-campus survey. *BMC Public Health*,
288 2009; 9: 305. doi: 10.1186/1471-2458-9-305.
- 289 33. Federal Ministry of Health, National HIV&AIDS and Reproductive Health Survey (NARHS). Abuja,
290 Nigeria: Federal Ministry of Health; 2012.141-48.
- 291 34. Cichocki M. Is HIV a Risk to National Security? About Health. Accessed 6 May 2015. Available:
292 <http://www.aids.about.com/od/legalissues/a/national.htm>.