Sexuality & Culture (2016) 20:535–554
DOI 10.1007/s12119-016-9341-6

ORIGINAL PAPER

Risky Sexual Behavior of Multiple Partner Relations and Women's Autonomy in Four Countries

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Published online: 7 March 2016

Abstract Existent research reveals that inequitable gender-based power in relationships and intimate partner violence contribute to HIV rates among women in the developing world. This study uses a multi-country analysis to examine women's autonomy in negotiating safe sex practices such as having sex with a partner with no other concurrent partner to reduce the risk of HIV/AIDS in Nigeria, Kenya, Malawi, and Nepal. The Demographic Health Survey data for Nigeria (2013), Kenya (2008–2009), Malawi (2010), and Nepal (2011) provide geographical variability as well as HIV risk variables. The sample included 16,540 women aged 15–49 years who self-identified as ever married. Factor analysis for women's autonomy was conducted based on socio-cultural theory. Logistic regression was conducted and results identified decision-making, labor force participation, and individual autonomy as women autonomy factors significantly reduced the risk for HIV infection by having one sex partner who has only one sex partner. Other women autonomy factors related to lower risk for HIV include education, place of residence, and religion. Our study indicates that effective management of HIV transmission requires addressing women autonomy factors within the context of culture.

Keywords Culture · Developing countries · Sexual relationships · Women autonomy

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Introduction

The HIV/AIDS epidemic is one of the greatest humanitarian public health problems in human history (Uchudi et al. 2012), with 35 million people infected and 25 million more dead (The Joint United Nations Program on HIV/AIDS [UNAIDS] 2013). Seventy percent of newly diagnosed infections in the world occurred in sub-Sahara Africa most of which were passed by heterosexual contact (UNAIDS 2013). Some hypotheses have been proposed to explain HIV disparity; however, understanding the HIV differences and unequal disease prevalence between and within countries still vexes researchers of HIV/AIDS epidemics. Statistics show demographic and cultural differences across ethnic lines. In South Africa, for example, blacks and coloreds have higher HIV infection rates than their white counterparts (Kenyon and Zondo 2011). Western Kenya, where the Luo, Luhya, and Kisii communities predominate, has higher HIV prevalence rates than Northern region where the Somali, Rendille, Borana and Oromo tribes live (The National Empowerment Network of People Living with HIV and AIDS [NEPHAK] and GNAP 2009). The current study examines the concept of autonomy and autonomy related constructs impacting HIV risk outcomes. We hypothesized that women autonomy differed across countries and regions, and thus affected HIV prevalence differently in these countries. The study examined the following autonomy factors: economic and child-related decision-making processes, social mobility, access to economic/social resources, and control over economic resources. Most studies on women autonomy and HIV examine a one-dimensional aspect of autonomy, a complex concept that is often difficult to measure (Anderson and Eswaran 2009; Bloom and Griffiths 2007). Methodically, we include factor analysis to uncover the interdependence of autonomy variables and how they relate to one another to help in better analytical decision-making.

Malawi, Kenya, Nigeria, and Nepal were selected for this study for their high HIV burden. They all have rates of infection that are very high in their respective regions: Malawi [10.23 %]; Kenya [6.04 %]; Nigeria [3.17 %] and Nepal [.23 %] (United States Central Intelligence Agency [CIA] 2013); and had equally high mortality rates related to AIDS in 2013: Nigeria, [209,600]; Kenya, [58,400], Malawi, [47,800] and Nepal, [3300] (CIA 2013). This high number of deaths in any given year is a source of concern. The extent of gender inequities is rooted in cultural practices especially in sub-Saharan Africa and South Asia. The role of women in these cultures has been defined by gender norms of inequality, lack of autonomy, and poor reproductive health (Namasivayam et al. 2012). For example, in 2011, the World Health Organization estimated that 358,000 women die every year due to preventable complications during pregnancy and childbirth. More than half of these deaths occur in sub-Saharan Africa, and one-third in South Asia; together accounting for 87 % of all maternal deaths (WHO 2015).

Literature Review

Factors Driving Infection Rates

High-risk individual behaviors such as multiple and concurrent partnerships, reckless sexual relationships, premarital sex, and extramarital sex have been

implicated in HIV infection rates in developing countries (Mah and Halperin 2010; Rohleder et al. 2009). Macro factors of social-economic resources, literacy, education level, and social cultural factors have also been a concern (Stern et al. 2014). Hegemonic gender norms of masculinity are also associated with a high HIV risk involving a reluctance to test for HIV and having regular unprotected sex (Stern et al. 2014). Moreover, structural causes, which are endemic and difficult to erase, have been problematic in HIV prevention. Thus, HIV prevention researchers are recommending prevention efforts to target transmission reduction using interventions that address cultural aspects of the disease (Mah and Halperin 2010). While these discourses are necessary and are aimed at exploring solutions to prevent HIV/AIDS, they may ignore the role of relational autonomy and sexual autonomy. Relational autonomy is associated with a woman's ability to access and control resources and to make decisions in her family, community, and country (Jejeebhoy 2000). While sexual autonomy refers to the ability of a woman to use contraceptives including condoms at her volition, to access gynecological health services, and to decide the size of her family or when to have children (UNAIDS 2013).

Literature that discusses relational autonomy and HIV pathways has identified women's low control over sexual decision-making, decreased ability to negotiate condom, sexual choice and autonomy, and an emasculated submission to accept multiple sexual relationships by their sexual partners as normative factors to the high HIV prevalence among women in poor countries (Wechsberg et al. 2013). Interventions addressing these pathways have been studied in HIV risk context (Adamczyk and Greif 2011). This paper focuses on the social construction of women autonomy and its impact on women's sexual and reproductive health. The objective of the study is to yield a more nuanced and contextualized understanding of cultural norms factors as they relate to autonomy in a variety of geographically and culturally different regions of Kenya, Malawi, Nigeria, and Nepal.

Research suggests that individual sexual networks and social norms of polygamy may explain demographic differences in HIV infection rates (Kenyon and Zondo 2011). In South Africa for example, black Christian converts are more likely to conceal having additional sexual partners (Haidt and Hersh 2001), which leads to higher HIV infection risks than seen in cultural groups who openly embrace polygamy (Mah and Halperin 2010; Adamczyk and Greif 2011). Counterintuitively, being married and monogamous in sub-Sahara Africa may be a risk factor for HIV because of sexual infidelity (Hageman et al. 2010). The normative cultural acceptance of multiple partners or multiple marriages exposes women to HIV risk (Weiser et al. 2007). Moreover, asymmetrical gender roles impact decision making (Adamczyk and Greif 2011) and contributes to unequal distribution of resources (Kalichman et al. 2005; World Bank 2002). The present study highlights the role of relational autonomy across a diverse region using a social-cultural theoretical perspective.

Socio-cultural Factors and HIV

Brummelhuis and Herdt (2003) conceptualize gender relational culture as beliefs and values on courtship, sexual networking, contraceptive use, perspectives on sexual orientation, norms for gender roles and marital relations that form a cultural

context through which HIV risk is defined. In the context of HIV transmission, living with HIV without testing due to the social stigma is a cultural issue (Mashinini and Pelton-Cooper 2012) that leads to delayed diagnosis and access to care (Underwood et al. 2011). Additionally, social-cultural factors such as early marriages that are predominant in sub-Saharan Africa and South Asia regions exacerbate the spread of HIV (Underwood et al. 2011).

The social cultural barriers to HIV prevention (Lindgren et al. 2005) including relational power and the feeling of disempowerment, the thinking that "we are just vessels for our husbands" (Lindgren et al. 2005, p. 81) make it difficult to achieve gender equality. Thus, health education alone may be insufficient to stop the tide of the disease particularly because of cultural norms that are engrained in history and traditions are challenging to eliminate (Lindgren et al. 2005).

Conceptual Framework

The current study uses social-cultural theory to address unequal interpersonal power relationship and suggests that these factors drive HIV health disparities among women in poor countries (Adamczyk and Greif 2011). The application of this theory proposes that intervention policy and programs might benefit from integrating cultural factors that promote gender equality, interventions that increase gender integration; empower women to take charge of their own personal decisions, and promote shared control and responsibilities. Further, focusing on health education alone is insufficient because it cannot address these cultural factors. The theory recognizes that by forging comprehensive partnerships that are culturally relevant through policy change, gender equality can be improved. Thus, social-cultural theory emphasizes the "social" to understanding the significance of HIV (Mykhalovskiy and Rosengarten 2009). It addresses the social complexity of the disease and the need to move away from purely behavioral causes (Fontdevila 2009).

Research Questions

Keeping these frameworks in perspective, we posed the following research questions: (1) What are the various socio-demographic variables associated with HIV/AIDS risk? (2) What measures are related to women's lack of autonomy, such as condom negotiation power, labor force participation, final say on healthcare decisions, money, and household purchases? (3) Are these socio-demographic variables, as well as autonomy factors, good predictors of reducing the risk of getting HIV/AIDS?

Methods

Dataset

The recent Demographic and Health Surveys (DHS) for Nigeria (2013) (National Population Commission [NPC] and ICF International 2014), Malawi (2010)

(National Statistical Office [NSO] and ICF Macro 2011), Kenya (2008–2009) (Kenya National Bureau of Statistics [KNBS] and ICF Macro 2010), and Nepal (2011) (Ministry of Health and Population [MOHP], New ERA, and ICF International Inc. 2012), comprised the data for this cross-sectional exploratory study. The final sample for this study was drawn from the couples' data set. The DHS is a nationally representative, population-based household survey that is conducted every 5 years in more than 85 countries by national institutions with funding from the United States Agency for International Development (USAID). All data are collected face-to-face in household interviews and a standard questionnaire is included in each survey, enabling cross country analyses. Because of the uniformity across countries in data collection procedures, DHS is ideal for multi-country comparison. This study takes advantage of women autonomy related questions in the dataset.

Sample

Our study population was women who declared to be married or living together from the couple's data set between the ages of 15–49 years in each country. Our final dataset includes ever married women from Malawi (3764), Nigeria (9017), Kenya (1463), and Nepal (2296). DHS sample weights were applied to all frequency calculations and regression models to correct for differences in probability of selection between cases in the sample (Rutstein and Rojas 2006). Our sample is representative and generalizable to women aged 15–49 in Malawi, Nigeria, Kenya and, Nepal. The final DHS survey report of each country provides details regarding sampling design, data collection procedures, and ethical considerations. (NSO 2011; NPC 2014; KNBS 2010; MOHP 2012).

Variables and Measures

Demographic characteristics such as education, wealth index, age of respondent, place of residence, ethnicity, and religion were also assessed to understand the socio-cultural context of women's autonomy and risk related to HIV/AIDS. Education level was defined in terms of highest level of education attained. The wealth index in the DHS is based on household income, consumption, and expenditures. The DHS from the five countries computed national-level wealth-quintiles (from lowest to highest) and divided the rankings into five equal categories: poorest, poorer, middle, richer, and richest. We recoded wealth index into three categories: poor, middle, and rich. The DHS data provided information about women aged 15–54, grouped in 5-year intervals. Places of residence were grouped into rural and urban based on the definition of each country's geographical regions. Religion was categorized as Christians, Muslims, Hindus, Buddhists, and others.

Our outcome variable of interest was reducing women's risk of getting HIV/AIDS infection measured by having only one sexual partner who had no other partner. This variable was dichotomized into No = 0/Yes = 1. This HIV outcome

variable has been associated with high HIV risk among couples (Kalichman et al. 2007).

The predictor variables were conceptually selected from the dataset based on theory and related women's autonomy variables such as women's participation in the labor force (formal or informal) (Caldwell 2000), decision making participation (Anderson and Eswaran 2009), and individual indicator variables of autonomy (Jejeebhoy 2000). Respondents' occupation, in last 12 months, final say on their own health care, on making household purchases for daily needs, final say on visits to family or relatives, final say on deciding what to do with money self or husband earned, number of children five and under, age of respondent at birth of first child, age of respondent at first marriage, and highest education level were chosen as they are described in literature to measure women's individual autonomy and decision making (Atteraya et al. 2014; Jejeebhoy 2000).

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. The study used factor analysis to compose indicators related to women's autonomy based on theoretical understanding. Bivariate analyses, independent sample *t* tests and Chi square were conducted to assess whether there were statistically significant differences in women autonomy and risk for HIV/AIDs in having sex with one partner between the four countries. Chi square tests were conducted to determine group differences in women autonomy and socio-demographic variables between countries. Principal component analysis that generates linear combinations of weighted observed variables were used to identify underlying constructs that loaded together. Logistic regression was used to assess the odds of women's autonomy variables and their risk of HIV/AIDS infection controlling for the social-demographic variables.

Results

Socio Demographic Characteristics

Characteristics of the four countries included in this analysis are presented in Table 1. The majority lived in rural areas—Nigeria (66.0 %), Kenya (72.0 %), Malawi (84.0 %), and Nepal (85.6 %) compared to urban areas. Women in Malawi had a lower level of secondary education completion (0.9 %), than women in Nigeria, Nepal, and Kenya. Nigeria and Nepal had a majority of women with no education (48.6 percent and 47.5 % respectively). Kenya had the highest percentage of women classified as rich (48.4 %) while Nigeria had the highest percentage of women classified as poor (46.0 %). The remainder of the results address a single outcome variable: reducing the chances of getting HIV/AIDS by having only one sex partner who has only one sex partner.

Table 1 Socio-demographic characteristics of women in the four countries

Variable	Nigeria (9017)		Kenya (1463)		Malawi (3764)		Nepal (2296)	
	n	%	n	%	n	%	n	%
Age group								
15–19	994	11.0	55	3.7	288	7.7	193	8.4
20–24	1798	19.9	312	21.3	883	23.5	405	17.6
25–29	2390	26.5	398	27.2	971	25.8	457	19.9
30–34	1750	19.4	279	19.0	597	15.9	461	20.1
35–39	1332	14.8	180	12.3	519	13.8	369	16.1
40–44	587	6.5	148	10.1	300	8.0	286	12.5
45–49	166	1.8	91	6.2	206	5.5	124	5.4
Education level								
No education	4380	48.6	118	8.1	682	18.1	1090	47.5
Primary	1714	19.0	886	60.5	2516	66.8	420	18.3
Secondary	2291	25.4	368	25.1	531	14.1	644	28.0
Higher	632	7.0	92	6.3	35	0.9	142	6.2
Wealth index								
Poor	4145	46.0	514	35.2	1414	37.6	816	35.6
Middle	1547	17.2	240	16.4	823	21.9	510	22.2
Rich	3324	40.0	709	48.4	1527	40.6	969	42.2
Place of residence								
Urban	3069	34.0	410	28.0	601	16.0	330	14.4
Rural	5948	66.0	1054	72.0	3163	84.0	1966	85.6
Religion								
Christian	3188	35.4	1324	90.5	3261	86.6	53	2.3
Muslim	5678	63.0	103	7.1	439	11.7	71	3.1
Hindu	–	–	–	–	–	–	1966	85.7
Buddhist	–	–	–	–	–	–	171	7.4
Other	82	1.6	36	2.5	60	1.6	35	1.5

Comparison Between the Four Countries Regarding Socio-demographic Indicators and Women Autonomy Factors in Reducing the Chances of Getting HIV/AIDS by Having Only One Sex Partner

As indicated in Table 2, analysis showed various socio-demographic variables related to the outcome variable, having one sex partner with no other partner, in each country: (1) Nigeria [age $\chi^2(6) = 13.1$, $p < .05$; wealth index $\chi^2(2) = 150.6$, $p < .001$; place of residence $\chi^2(1) = 109.6$, $p < .001$; religion $\chi^2(2) = 34.2$, $p < .001$]; (2) Kenya [wealth index $\chi^2(2) = 19.0$, $p < .001$; place of residence $\chi^2(1) = 15.4$, $p < .05$; religion $\chi^2(2) = 26.0$, $p < .001$]; (3) Malawi [age $\chi^2(6) = 20.4$, $p < .01$; wealth index $\chi^2(2) = 7.8$, $p < .05$; religion $\chi^2(2) = 37.9$, $p < .001$], and in (4) Nepal [age $\chi^2(6) = 41.0$, $p < .00$; wealth index $\chi^2(2) = 34.7$,

Table 2 Chi square results (percent) for socio-demographic variables and reducing risk for HIV by having one sex partner only, who has no other partner within countries (weight adjusted)

Variable	Nigeria (N = 8197)				Kenya (N = 1456)				Malawi (N = 3748)				Nepal (N = 1963)			
	n (%)	Yes	No	χ^2	n (%)	Yes	No	χ^2	n (%)	Yes	No	χ^2	n (%)	Yes	No	χ^2
Age group				13.1*				5.1				20.4**				41.0***
15–19	828 (10.1)	83.3	16.7		54 (3.7)	90.7	9.3		284 (7.6)	85.2	14.8		168 (8.6)	93.5	6.5	
20–24	1620 (19.8)	84.1	15.9		309 (21.2)	91.9	8.1		881 (23.5)	84.8	15.2		354 (18.1)	92.9	7.1	
25–29	2172 (26.5)	85.3	14.7		396 (27.2)	91.7	8.3		965 (25.7)	89.4	10.6		393 (20.0)	92.9	7.1	
30–34	1646 (20.1)	86.2	13.8		278 (19.1)	93.5	6.5		595 (15.9)	85.0	15.0		390 (19.9)	91.5	8.5	
35–39	1236 (15.1)	87.1	12.9		180 (12.4)	91.7	8.3		519 (13.8)	84.0	16.0		322 (16.4)	94.1	5.9	
40–44	542 (6.6)	81.9	18.1		148 (10.2)	91.9	8.1		298 (8.0)	81.5	18.5		244 (12.4)	84.4	15.6	
45–49	154 (1.9)	85.1	14.9		91 (6.2)	97.8	2.2		206 (5.5)	81.1	18.9		90 (4.6)	77.8	22.2	
Wealth index				150.6***				19.0***				7.8*				34.7***
Poor	3573 (43.6)	79.7	20.3		510 (35.0)	89.6	10.4		1400 (37.4)	83.4	16.6		629 (32.0)	82.8	12.2	
Middle	1384 (16.9)	86.9	13.1		240 (16.5)	89.6	10.4		824 (22.0)	86.0	14.0		425 (21.7	87.3	12.7	
Rich	3242 (39.5)	90.2	9.8		706 (48.5)	95.6	4.4		1524 (40.7)	87.0	13.0		909 (46.3)	95.2	4.8	
Place of residence				109.6***				15.4***				0.4				0.7
Urban	2981 (36.3)	90.5	9.5		408 (28.0)	96.8	3.2		602 (16.1)	86.7	13.3		312 (15.9)	92.3	7.7	
Rural	5222 (63.7)	81.9	18.1		1050 (72.0)	90.8	9.2		3145 (843.9)	85.2	14.8		1651 (84.1)	90.9	9.1	
Religion				34.2***				26.0***				37.9***				17.3**
Christians	3060 (36.3)	88.0	12.0		1323 (90.8)	93.2	6.8		3245 (86.7)	85.9	14.1		51 (2.6)	84.3	15.7	
Muslim	5220 (63.7)	83.2	16.8		101 (6.9)	91.1	8.9		437 (11.7)	86.5	13.5		49 (2.5)	93.9	6.1	
Hindu	–	–											1670 (85.1)	91.8	8.2	
Buddhist	–	–											157 (8.0)	83.4	16.6	
Other	54 (0.7)	81.5	18.5		33 (2.3)	69.7	30.3		59 (1.6)	57.6	42.4		35 (1.8)	97.1	2.9	

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

$p < .001$; religion $\chi^2(4) = 17.3$, $p < .01$ and wealth index $\chi^2(2) = 34.8$, $p < .001$]. In general, the socio-demographic factors of age, education, wealth index, and place of residence were significantly associated with the outcome variable. Kenya was an exception with respect to age and neither Malawi nor Nepal showed an association with place of residence.

As Table 3 shows, women's autonomy factors in the four countries differed significantly in having one sex partner with no other partner. In Nigeria there were differences with regard to respondents' occupation $\chi^2(6) = 27.9$, $p < .001$; worked in the last 12 months $\chi^2(3) = 10.0$, $p < .05$; final say on own health care $\chi^2(2) = 49.2$, $p < .001$; final say on making large household purchases $\chi^2(2) = 61.9$, $p < .001$; final say on visits to family or relatives $\chi^2(2) = 15.3$, $p < .001$; final say on what to do with money husband earns $\chi^2(3) = 30.2$, $p < .001$ and education $\chi^2(3) = 131.3$, $p < .001$. Similarly, women's autonomy related variables differed on number of children 5 and under t (6975) $= -2.417$, $p < .05$; age of respondent at 1st birth t (6293) $= 5.337$, $p < .001$ and age at first marriage t (6975) $= 6.698$, $p < .001$. In other words, women's autonomy factors were significantly associated with having only one sexual partner who has no other partner in Nigeria.

In Kenya, respondents' occupation $\chi^2(6) = 16.7$, $p < .05$; whether they worked in last 12 months $\chi^2(2) = 8.0$, $p < .05$; their final say on visits to family or relatives $\chi^2(2) = 7.3$, $p < .05$, and education $\chi^2(3) = 59.3$, $p < .001$ were significantly associated with variables related to women's autonomy.

In Malawi, there were also significant associations between the outcome variable and women's autonomy factors: respondent's occupation $\chi^2(6) = 65.0$, $p < .001$; if the respondent worked in the last 12 months $\chi^2(3) = 49.4$, $p < .001$; final say on own health care $\chi^2(2) = 26.2$, $p < .001$; final say on making household purchases for daily needs $\chi^2(2) = 29.1$, $p < .001$; final say on visits to family or relatives $\chi^2(2) = 23.4$, $p < .001$, and education $\chi^2(3) = 15.4$, $p < .01$.

Finally, in Nepal, final say on visits to family or relatives $\chi^2(2) = 6.2$, $p < .05$; education $\chi^2(3) = 67.0$, $p < .001$, and age at first marriage t (1787) $= -0.2$, $p < .01$ were significantly associated with reducing the chances of getting HIV/AIDS by having only one sexual partner who has no other partner.

Exploratory Factor Analysis of Women Related Variables

Exploratory factor analysis for the indicators of autonomy from the DHS data set was applied to all four countries. We explored the factorability of all women's autonomy factors listed in Table 4 [respondents occupation, worked in the last 12 months, final say on making large household purchases, final say on making household purchases for daily needs, final say on own health care, final say on visits to family or relatives, final say on deciding what to do with money husband earns, highest education level, age of respondent at 1st birth, and age at first cohabitation/marriage wherever data were available]. Factor correlations were further confirmed using the correlation matrix, suggesting reasonable factorability for the four countries. Kaiser–Meyer–Olkin measure of sampling adequacy was .5 and above for Nigeria (0.75), Kenya (0.62), Malawi (0.61), and Nepal (0.58)

Table 3 Chi square (percent)and Independent samples t-test results for women autonomy related variables and reducing risk for HIV by having one sex partner only, who has no other partner within countries (weight adjusted)

Autonomy related variables	Nigeria (N = 8197)				Kenya (N = 1456)				Malawi (N = 3764)				Nepal (N = 1963)			
	n (%)	Yes	No	χ^2	n (%)	Yes	No	χ^2	n (%)	Yes	No	χ^2	n (%)	Yes	No	χ^2
Respondents occupation				27.9***				16.7*				65.0***				9.3*
Not currently working	2546 (31.1)	83.7	16.3		519 (35.7)	91.3	8.7		919 (24.5)	78.6	21.4		434 (22.1)	90.1	9.9	
Formal employment	339 (4.1)	90.9	9.1		338 (23.2)	96.4	3.6		641 (17.1)	87.5	12.5		396 (20.2)	94.7	5.3	
Physical labor	3998 (48.9)	84.9	15.1		73 (5.0)	93.2	6.8		220 (5.9)	90.5	9.5		59 (3.0)	93.2	6.8	
Administrative	139 (1.7)	85.6	14.4		93 (6.4)	84.9	15.1		21 (0.6)	71.4	28.6		_	_	_	
Government	336 (4.1)	92.3	7.7		3 (0.2)	100.0	0.0		24 (0.6)	79.2	20.8		_	_	_	
Agriculture	812 (9.9)	84.2	15.8		412 (28.3)	92.2	7.8		1737 (46.4)	88.0	12.0		1071 (54.6)	89.9	10.1	
Unclassified	6 (0.1)	100.0	0.0		18 (1.2)	94.1	5.9		185 (4.9)	88.7	11.3		3 (0.2)	100.0	0.0	
Worked in last 12 months				10.0*				8.0*				49.4***				4.8
No	2540 (31.0)	83.7	16.3		519 (35.6)	91.3	8.7		918 (24.5)	78.5	21.5		434 (22.1)	90.1	9.9	
In the past year	156 (1.9)	84.0	16.0		32 (2.2)	90.6	9.4		674 (18.0)	89.3	10.7		245 (12.5)	94.7	5.3	
Currently working	5166 (63.1)	86.0	14.0		872 (59.8)	93.7	6.3		2049 (54.7)	87.1	12.9		1257 (64.0)	90.7	9.3	
Have a job but on leave last 7 days	331 (4.0)	81.9	18.1		34 (2.3)	82.4	17.6		105 (2.8)	89.5	10.5		27 (1.4)	92.6	7.4	
Final say on own health care				49.2***				3.8				26.2***				0.3
Respondent alone	373 (4.6)	86.1	13.9		353 (24.2)	92.1	7.9		488 (13.0)	84.2	15.8		270 (13.7)	91.9	8.1	
Joint decision making	2701 (33.0)	88.9	11.1		708 (48.6)	91.5	8.5		1438 (38.4)	89.2	10.8		983 (50.1)	91.0	9.0	
Respondent has no say	5113 (62.5)	83.0	17.0		396 (27.2)	94.7	5.3		1816 (48.5)	82.9	17.1		711 (36.2)	90.7	9.3	
Final say on making household purchases for daily needs								0.4				29.5***				5.1
Respondent alone	–	–	–		655 (45.0)	93.0	7.0		1128 (30.1)	89.5	10.5		342 (17.4)	83.3	16.7	

Table 3 continued

Autonomy related variables	Nigeria (N = 8197)				Kenya (N = 1456)				Malawi (N = 3764)				Nepal (N = 1963)			
	n (%)	Yes	No	χ^2	n (%)	Yes	No	χ^2	n (%)	Yes	No	χ^2	n (%)	Yes	No	χ^2
Joint decision making	–	–	–		524 (36.0)	92.2	7.8		664 (17.7)	87.0	13.0		843 (43.0)	86.4	13.6	
Respondent has no say	–	–	–		277 (19.0)	92.1	7.9		1951 (52.1)	82.6	17.4		777 (39.6)	88.3	11.7	
Final say on making large household purchases				61.9***				2.7				4.8				0.4
Respondent alone	359 (4.4)	90.5	9.5		157 (10.8)	94.3	5.7		272 (7.3)	87.5	12.5		430 (24.1)	90.5	9.5	
Joint decision making	2617 (32.0)	89.0	11.0		815 (55.9)	91.5	8.5		811 (21.7)	87.4	12.6		544 (30.4)	91.0	9.0	
Respondent has no say	5214 (63.7)	82.7	17.3		485 (33.3)	93.6	6.4		2657 (71.0)	84.6	15.4		813 (45.5)	91.5	8.5	
Final say on visits to family or relatives				15.3***				7.3*				29.1***				6.3*
Respondent alone	492 (6.0)	88.0	12.0		253 (17.4)	93.7	6.3		724 (19.3)	86.0	14.0		342 (17.4)	91.8	8.2	
Joint decision making	3294 (40.2)	86.5	13.5		819 (56.2)	90.8	9.2		1598 (42.7)	88.5	11.5		843 (42.9)	89.2	10.8	
Respondent has no say	4404 (53.8)	83.7	16.3		385 (26.4)	95.1	4.9		1422 (38.0)	81.6	18.4		778 (39.6)	92.7	7.3	
Final say on what to do with money husband earns				30.2***				0.6				23.4***				1.3
Respondent alone	216 (2.7)	81.0	19.0		98 (6.8)	92.9	7.1		320 (8.9)	85.0	15.0		257 (13.1)	89.7	14.1	
Joint decision making	1934 (23.7)	88.6	11.4		802 (55.5)	92.9	7.1		832 (22.4)	90.6	9.4		1055 (54.2)	91.8	13.2	
Respondent has no say	6000 (73.6)	85.0	16.0		546 (37.8)	91.8	8.2		2556 (68.7)	83.9	16.1		636 (32.6)	89.9	14.2	
Education level				131.3***				59.3***				15.4**				67.0***
No education	3721 (45.4)	80.4	19.6		115 (7.9)	76.5	23.5		677 (18.1)	82.1	17.9		796 (40.6)	79.1	20.9	
Primary	1601 (19.5)	86.6	13.4		882 (60.6)	92.2	7.8		2505 (66.9)	85.6	14.4		390 (19.9)	87.9	12.1	
Secondary	2247 (27.4)	89.5	10.5		368 (25.3)	98.1	1.9		530 (14.1)	88.3	11.7		635 (32.3)	92.9	7.1	
Higher	631 (7.7)	92.9	7.1		91 (6.2)	93.4	6.6		34 (0.9)	100.0	0.0		142 (7.2)	96.5	3.5	

Table 3 continued

	n	M (SD)	t	n	M (SD)	t	n	M (SD)	t	n	M (SD)	t
Independent samples *t* test results for women autonomy and reducing risk for HIV by having one sex partner only, who has no other partner within countries												
Number of children 5 and under			2.4*			1.2			1.3			0.5
Yes	6975	1.72 (1.31)		1347	1.23 (0.96)		3203	1.32 (0.87)		1787	0.77 (0.91)	
No	1225	1.82 (1.27)		109	1.35 (1.01)		544	1.38 (0.83)		175	0.89 (0.93)	
Age of respondent at 1st birth			5.3***			0.1			0.7			1.0
Yes	6293	19.33 (4.26)		1266	19.32 (3.49)		3037	18.38 (2.88)		1587	19.79 (3.26)	
No	1104	18.59 (3.90)		104	19.36 (3.36)		523	18.47 (2.69)		166	19.89 (3.35)	
Age at first marriage			6.7***			1.8			1.5			0.2**
Yes	6975	17.79 (4.59)		1347	19.22 (3.81)		3203	17.43 (2.99)		1787	17.71 (3.25)	
No	1225	16.85 (4.13)		109	18.55 (3.57)		544	17.22 (2.86)		175	17.04 (3.19)	

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

indicating appropriateness of applying factor analysis. The Bartlett's test of sphericity for all countries were significant [Nigeria $\chi^2(36) = 32{,}196.35$, $p < .001$, Kenya $\chi^2(36) = 3035.83$, $p < .001$, Malawi $\chi^2(36) = 5585.71$, $p < .001$ and Nepal $\chi^2(36) = 4837.51$, $p < .001$]. Finally, all of the communalities were above .3 (see Table 4), further confirming that each item shared a common variance with other items. Table 4 reflects on all the loadings that were .4 or more and hence included in the final factor loading matrix. Number of children 5 and under did not load or loaded negatively for all countries, so we removed it from the analysis.

Three rotated components, namely, labor force participation, decision making, and individual autonomy, were extracted for each country using the varimax rotation. These latent constructs represent measures related to women's decision making participation, education, employment, asset ownership and access to productive resources and control of their earnings (Allendorf 2007; Anderson and Eswaran 2009; Araujo and Miller 2014; Atteraya et al. 2014; Bloom and Griffiths 2007; Durevall and Lindskog 2012). Reliability for the constructs in all four countries had acceptable Cronbach alpha (see Table 4).

Determinants of Reducing the Chances of Getting HIV/AIDS by Having One Sex Partner with No Other Partner

Table 5 shows the results of logistic regression on predicting the odds of having one sex partner with no other partner, based on women's autonomy related factors and other socio-demographic variables. Only significant socio-demographic variables were entered in the model. Excluding insignificant variables in each country would help in determining the strongest predictors of women autonomy in reducing risk for HIV/AIDs and provide a parsimonious final model. These significant socio-demographic variables were also considered based on the fact that they are structural factors that exacerbate HIV risk in these regions (Adamczyk and Greif 2011).

The logistic regression showed that individual autonomy in Nigeria significantly increased the odds of having one sex partner with no other partner 1.10 times. Being in the middle and rich wealth index, in Nigeria, increased the odds of having one sex partner with no other partner by 1.28 times. Also, living in urban areas significantly increased the odds of having one sex partner with no other partner in Nigeria, by .72 times.

Interestingly, women's autonomy factors of labor participation, decision making, and individual autonomy in Kenya were not significant predictive factors of having one sex partner with no other partner. However, being in rural residents and those affiliated with "other" religions had a lower rate of the outcome variable than urban residents (0.36) and Christians/Muslims (0.45), respectively.

In Malawi, interestingly, decision making power significantly decreased the odds of having one sex partner with no other partner, by 0.23 times, while respondents from age group 25 to 29 and being rich significantly increased the odds of showing the outcome variable, by 0.93 and 1.11 times respectively. Members of "other" religions had a lower incidence of having one sex partner with no other partner than Christians/Muslims, 0.78 times.

Table 4 Final rotated component loadings and communalities based on a principal component analysis

Factor	Variables	(α)	Nigeria		(α)	Kenya		(α)	Malawi		(α)	Nepal	
			Factor loading	Communality		Factor loading	Communality		Factor loading	Communality		Factor loading	Communality
Labor force participation	Respondents occupation	**.80**	.91	.86	**.68**	.84	.87	**.20**	.82	.68	**.58**	.90	.82
	Worked in the last 12 months		.92	.87		.93	85		.80	.65		.87	.77
Decision making	Final say on making large household purchases	**.80**	.83	.75	**.59**	.69	.52	**.64**	.68	.46	**.73**	.81	.66
	Final say on making household purchases for daily needs		-	-		.69	.49		.68	.47		_	_
	Final say on own health care		.85	.76		.47	.39		.63	.41		.76	.58
	Final say on visits to family or relatives		.79	.67		.65	.42		.67	.45		.82	.69
	Final say on deciding what to do with money husband earns		.60	.37		-†	-†		.55	.31		-	-
Individual autonomy	Highest education level	**.75**	.64	.54	**.70**	.71	.52	**.87**	-†	-†	**.72**	.50	.41
	Age of respondent at 1st birth		.92	.84		.88	.78		.94	.88		.91	.83
	Age at first cohabitation/marriage		.93	.87		.88	.78		.94	.88		.93	.87

Factor loadings included in the final matrix >.40; Cronbach alpha are in boldface; -† item excluded for parsimony; - variables not available for the dataset

Table 5 Determinants of reducing HIV risk by having one sex partner only, who has no other partner

Variables	Nigeria			Kenya			Malawi			Nepal		
	B	Exp (B)	P	B	Exp (B)	P	B	Exp (B)	P	B	Exp (B)	P
Labor force participation	0.00	1.00	0.98	0.13	1.14	0.18	-†	-†	-†	0.19	1.21	0.05*
Individual autonomy	0.10	1.10	0.03*	0.04	1.04	0.75	0.02	1.02	0.67	0.19	1.21	0.04*
Decision making	−0.08	0.93	0.06	0.15	1.16	0.15	−0.23	0.79	0.00***	0.01	0.96	0.67
Age group	−0.03	0.97	0.24	-†	-†	-†	−0.08	0.93	0.01**	−0.18	0.79	0.00***
Wealth index	0 .25	1.28	0.00***	0.16	1.17	0.26	0.11	1.11	0.05*	0.33	1.67	0.00***
Place of residence	−0.33	0.72	0.00***	−1.03	0.36	0.01**	-†	-†	-†	-†	-†	-†
Religion	−0.02	1.02	0.81	−0.79	0.45	0.00***	−0.28	0.78	0.01**	0.04	1.04	0.80

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

-† Item excluded for parsimony

In Nepal, labor force participation and individual autonomy increased the odds of having one sex partner with no other partner, each by 0.19 times. Also, rich and poor Nepalese showed a higher prevalence of having one sex partner with no other partner than the middle class, by 1.67 times. Interestingly, respondents aged 45–49 had a higher rate of having one sex partner with no other partner than 15–19 olds, by 0.79 times. Overall, Ominibus model and Hosmer and Lemeshow tests predicted adequate data fit for the final model in each country.

Discussion

This study examined how women's autonomy related factors influenced women's chances of getting HIV/AIDS by having sex with one partner and no other partner. Primarily, targeted efforts have been suggested to include beliefs and values of group culture; courtship practices, the practices surrounding sexual networks, contraceptives use, sexual orientation, gender roles, and cultural norms (UNAIDS 2013). The study results show that different factors in different countries predict respondents' likelihood of reducing the chances of getting HIV/AIDS by having one sex partner who has no other partner. We believe this reflects country and culture specific factors that may be strongly associated to the nature of sexual partnerships.

In Nigeria, women's autonomy, particularly individual autonomy related to education and age at first birth or cohabiting, predicts decision making on having one sex partner only. This finding expands on other studies that found that higher education to have a positive impact on health related outcomes, including HIV knowledge (Bloom and Griffiths 2007; Snelling et al. 2007). Furthermore, literature clearly relate that keeping girls in school can delay marriage or cohabitation and early child birth (Lindgren et al. 2005). These can increase women's overall power and autonomy and, therefore, their ability to determine the nature of their sexual relationships. Also, our logistic regression analysis shows that living in rural areas is a significant predictor of having multiple partners. Traditional practices such as early marriages or multiple marriages in rural areas may be some of the facilitators of multiple sex-partners. Similarly, our study showed that being poor in Nigeria significantly decreased the odds of having one sex partner only who has no other partner. Poverty may deprive many from good access to healthcare services, and/or information about HIV/AIDS transmission to make an informed decision about sexual partnerships. Being from the rural area and identifying as from "other" in the religion category, (that is, individuals who are neither Christians, Muslims, Buddhists nor Hindus) decreased the odds of reducing the chances of getting HIV/AIDS by having one sex partner who has no other partner in Kenya. As stipulated before, this may suggest that factors associated with rural living such as lack of education, traditional cultural practices of multiple marriages, health services and knowledge in having multiple partners and associated risk of HIV/AIDS may be lacking. Additionally, not belonging to an organized religion and its social support system needs to be further explored in exploring cultural factors associated with multiple partners and the risks associate with HIV/AIDS. Women's autonomy factors were not significant predictors of reducing HIV/AIDS in Kenya. More

explorations on the interaction effects of autonomy related factors and other socio-demographic variables need to be conducted to understand the culture of HIV/AIDS risks for women in Kenya. Wealth, education, respondent's occupation, length of employment and final say on visits to family or relatives, were significantly associated in bivariate analysis with having only one sexual partner who had no other partner in all four countries. However, they were not significant predictors in the logistic regression. This may be due to some interactions among variables loaded in the logistic regression analysis that need to be explored further.

In Malawi, interestingly, decision-making power significantly decreased the odds of reducing risk for HIV/AIDS by having one sex partner who has no other partner. This finding contradicts those of a prior study on decision-making power and HIV risk reduction in Malawi (Durevall and Lindskog 2012). This could be due to differing study design or differences in outcome variables. However, further research is needed to tease out the differences. Also, our study found that a lower likelihood of strict monogamy in relationships for women in the age group of 25–29 compared to younger and older women; for poor women than rich women, for women affiliated with an "other" religion than Christian/Muslim women. Poverty is a consistent predictor of risky sexual decision making across all countries. As mentioned before, influence of religion in reducing the risk of getting HIV/AIDS needs further exploration.

Finally, in Nepal, women's autonomy factors for individual autonomy and labor force participation were predictors of reducing risk for HIV/AIDs by having only one sex partner with no other partner. Our findings with respect to Nepal concur with studies that suggest that increased gender equality and equal socio-economic status empowers women to decide their sexual and reproductive preferences, and that this may greatly reduce their risk of HIV infection (Connell 1987). Age and wealth status were also significantly associated with reducing risk for HIV/AIDs by having only one sex partner with no other partner in Nepal. This finding is consistent with other studies that have examined socio-demographic factors and their association with sexual behavior and risk for HIV in Nepal (Atteraya et al. 2014).

Limitations

Due to the cross-sectional nature of DHS data, no causal inferences can be made. Because the data for women's autonomy were collected at the time of the survey, the temporal relationship between autonomy and our outcome variable cannot be determined. The same observed or unobserved factors may influence both autonomy and sexual risk by one partner. We did not control for endogeneity, which was beyond the scope of this paper. Questions of risk for HIV/AIDs were self-reported and this may have created social desirability bias particularly because sex as a subject is seldom discussed in public. Since this is a secondary data analysis, the research design and variables are already selected and this reduced the flexibility to explore other aspects of the data. The data sets are also somewhat old, particularly in Kenya, collected in 2008–2009. However, our variables of interest in autonomy,

socio-demographic factors and risk for HIV are consistently relevant to understanding HIV/AIDs sexual risk behaviors.

The study was also restricted to married or cohabiting women and our analyses showed that these women were less educated and less wealthy than the broader sample. We can speculate that unmarried women may be more autonomous than married or cohabitating women, and thus our findings are only generalizable to women who are married or living with a partner in these particular countries. Finally, there are variations in sample size and the period in which specific surveys were done in all four countries. These factors may have affected the cross-national comparisons as well as cultural and social norms in each country.

Conclusion

Our study indicates that effective management of HIV transmission requires addressing women autonomy factors especially when talking about systematic cultural factors. It also affirms similar findings by other researchers who have discouraged the focus on individual behavioral factors. Future studies should examine the impact of traditional gender roles on women's autonomy and their ability to negotiate safer sex, accounting for evidence-based social-culture diversity factors that influence sexual decision-making.

We found important associations between several dimensions of women's autonomy and reducing risk for HIV/AIDS. Data used, effectively represent couples across the rural and urban populations. Making HIV prevention more effective in developing countries will require a focus on socio-cultural context of people concerned at each stage of the intervention process, from conceptualization and design of policies and programs to evaluation of outcomes and impacts. Future data collection efforts may involve careful consideration of context based variables that capture women's empowerment. It is also important to explore more cultural factors that may help generate important theories that may explain HIV and autonomy factors. Of great significance is the assessment of cultural strengths that can help to reduce vulnerability to HIV/AIDs among women. Policies that promote autonomy for women in decision making and labor force participation outside their households, by promoting resistance to social pressure may start to address the HIV cultural risks. Even though this study examined autonomy for women only, policies and interventions may need to promote gender equality among couples. Health workers may need to educate women on the importance of HIV testing and multiple partner relationships.

Finally, it is important to note that higher education in the four countries was associated with less risk for HIV. Education might be one form of intervention that can help in the fight against the scourge of HIV in poor countries. Education would bring women to participate in the market economy by improving their skills to engage in the labor force. Empowering young women to have skills may also bolster their resilience and improve their self-esteem to negotiate safe sex.

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