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Changes in Sexual Behaviors Following Diagnosis with HIV: Patterns and Correlates Among People Living with HIV (PLHIV) in China

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Abstract

Effective secondary prevention of HIV infections requires knowledge about changes in sexual behaviors after diagnosis among people living with HIV (PLHIV), yet there is a dearth of literature assessing gender-specific patterns and correlates of such changes among heterosexual PLHIV in China. Data used in the current study were derived from a cross-sectional survey conducted from 2012 to 2013 among 1212 heterosexual sexually active PLHIV in Guangxi, China. Most participants reduced sexual frequency (71.2%), reduced or maintained the same number of sexual partners (96.6%), and increased or maintained same frequencies of condom use (80.6%). Gender difference was found in changes in sexual frequency, but not in the number of sexual partners or condom use. For males, decrease in sexual frequency was associated with having no desire to have children (OR = 2.03, 95% CI 1.20, 3.44), being virally suppressed (OR = 0.27, 95% CI 0.079, 0.94), and social support (OR = 1.44, 95% CI 1.06, 1.96). Health promoting behaviors in condom use (i.e., increased or maintained same frequencies of condom use) for males was associated with being 45 years of age or older (OR = 0.35, 95% CI 0.21, 0.61), having an HIV-negative main partner (OR = 1.80, 95% CI 1.11, 2.92), and physical health-related quality of life (OR = 1.02, 95% CI 1.00, 1.04). For females, decrease in sexual frequency was associated with having no desire to have children (OR = 1.58, 95% CI 1.01, 2.47). Health promoting behaviors in condom use for females was associated with having an HIV-negative main partner (OR = 3.24, 95% CI 1.63, 6.45) and social support (OR = 0.75, 95% CI 0.57, 0.99).

Future intervention efforts need to target PLHIV who need extra support in making health-improvement efforts and to facilitate gender-specific behavioral changes in sexual risk reduction after HIV diagnosis.

Keywords

Sexual behaviors; Behavioral change; Gender; People living with HIV; China

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Background

According to the 2015 China AIDS Response Progress Report (AIDS, 2015), the percentage of heterosexual HIV transmissions among the newly diagnosed cases had increased from 30.6% in 2006 to 66.4% in 2014, underscoring the importance of HIV prevention strategies targeting sexual behaviors among heterosexual populations.

Literature showed that heterosexual PLHIV tend to adopt safer sex behaviors after HIV diagnosis (Bernier et al., 2016; Lin et al., 2013; Venkatesh et al., 2011; Zhou et al., 2016). Despite emerging data showing gender differences in sexual behavior changes after HIV diagnosis (Bernier et al., 2016; Lin et al., 2013; Weinhardt, 2005), few have explored gender specific correlates of such changes. The current study aims to identify gender-specific patterns and correlates of changes in sexual behaviors after HIV diagnosis among heterosexual PLHIV in China.

Methods

Participants

Data were derived from a cross-sectional survey conducted between 2012 and 2013 in the Guangxi Autonomous Region (“Guangxi”) of China (Qiao et al., 2015). Twelve cities/counties with the largest cumulative number of reported HIV/AIDS cases were selected. Approximately 10% of the patients at each site were randomly sampled, and a total of 3002 patients (about 90% of those contacted) participated in the survey. The survey was administered by trained research staff in offices of local CDC or HIV clinics. The study received approval from the Institutional Review Boards at the Wayne State University in the U.S and Guangxi CDC in China. Each participant received a small gift equivalent to five U.S dollars after completing the interview.

Among the 2987 participants who completed the survey, 250 were diagnosed within the past 6 months, who were excluded from data analysis to ensure that the patterns of sexual behavior change can be assessed for a minimum of 6 months post-diagnosis. A total of 1428 participants reporting being sexually active during the past 6 months. The current study was based on data from 1212 (88.5%) participants who self-reported as heterosexual (i.e., having sex only with partners of opposite sex).

Measures

Current Sexual behaviors in the past 6 months were inquired in terms of sexual frequency, number of sexual partners, and condom use. Consistent condom use was defined as always using condoms during sex.

Changes in sexual behaviors after HIV diagnosis were assessed (i.e., “more”, “no change”, or “less/fewer”) for each of the three sexual behaviors (sexual frequency, the number of sexual partners, and condom use). Based on the responses to both the “current behaviors” and “changes in these behaviors”, we categorized the changes in number of sexual partners and condom use as either “health promoting” (i.e., those that potentially reduce risk of viral transmission) or “health compromising” (i.e., those that potentially pose risk of viral

transmission). Specifically, health promoting behaviors included reporting fewer partners (or continued having single partner), or more condom use (or maintained consistent condom use) after HIV diagnosis; while health compromising behaviors included reporting more partners (or continued having multiple partners), or less condom use (or continued using condoms inconsistently).

Correlates of sexual behavior change. Demographic, clinical, and psychosocial correlates were measured. A summary of psychosocial scales was presented in Table 1. Physical health-related quality of life was measured using the physical health summary (QOL-PHS) score calculated from the Medical Outcomes Study HIV Health Survey (MOS-HIV) following the instructions provided by Wu et al. (1997). Hazardous drinking was defined using gender-specific cutoffs provided by Bush et al. (1998).

Analysis

We compared gender differences in the distribution of correlates and patterns of changes in each sexual behavior. For changes in sexual frequency, comparison was made between those who reduced sexual frequency versus those who did not. For the other two sexual behaviors, comparison was made between those who reported health promoting behaviors versus those who did not. Bivariate analysis was conducted to identify correlates of decrease in sexual frequency and health promoting behaviors in condom use (not for health promoting behaviors in the number of sexual partners as data were highly skewed). Multiple logistic regressions were further conducted including correlates associated with each sexual behavior change in bivariate analysis at $p < .20$. All data analyses were performed using Stata 13.0 (College Station, Texas).

Results

Sample characteristics

Distribution of demographic, clinical, and psychosocial correlates were shown in Table 2. The mean age was 38.5 years old ($SD = 9.6$ years), and 70.7% were of Han ethnicity (the largest ethnic group in China). Over one third (39.3%) completed elementary education only, 80.0 % were employed, and 91.2% had health insurance. The majority (86.6%) were married or cohabitated, 74.0% had no desire to have children, 55.6% had an HIV-positive main partner, and 15.3% had their HIV status known to no one else in the household. The mean time since HIV diagnosis was 44.2 months ($SD=27.9$), with most participants (77.3%) being on ART and 52.5% having CD4 count below 350 cells/mm³.

Patterns of post-diagnosis changes in sexual behaviors

The patterns of changes in sexual behaviors after HIV diagnosis were shown in Table 3. Most participants (856; 71.2%) reduced sexual frequency, while others increased (10; 0.8%) or maintained (336; 28.0%) the sexual frequency. Gender difference was statistically significant ($p < 0.001$).

For changes in number of sexual partners, most (1164; 96.6%) had health promoting behaviors either by having fewer sexual partners (409; 33.9%) or maintaining single sexual

partner (755; 62.7%). The remaining participants (41; 3.4%) were engaged in health compromising behaviors either by having more partners (9; 0.7%) or maintaining multiple sexual partners (32; 2.7%). No gender difference was found ($p=0.148$).

For changes in condom use, most (963; 80.6%) had health promoting behaviors either by increasing condom use (896; 75.0%) or by maintaining consistent condom use (67; 5.6%). Still, 232(19.4%) participants were engaged in health compromising behaviors either by reducing condom use (55; 4.6%) or keeping inconsistent condom use (177; 14.8%). No gender difference was found ($p=0.170$).

Multiple logistic regression results

Correlates significantly associated with at least one of the changes in sexual behaviors were shown in Table 2. For males, decrease in sexual frequency was associated with having no desire to have children (OR = 2.03, 95% CI 1.20, 3.44), being virally suppressed (OR = 0.27, 95% CI 0.079, 0.94), and social support (OR = 1.44, 95% CI 1.06, 1.96). Health promoting behaviors in condom use for males was associated with being 45 years of age or older (OR = 0.35, 95% CI 0.21, 0.61), having an HIV-negative main partner (OR = 1.80, 95% CI 1.11, 2.92), and QOL-PHS (OR = 1.02, 95% CI 1.00, 1.04). For females, decrease in sexual frequency was associated with having no desire to have children (OR = 1.58, 95% CI 1.01, 2.47). Health promoting behaviors in condom use for females was associated with having an HIV-negative main partner (OR = 3.24, 95% CI 1.63, 6.45) and social support (OR = 0.75, 95% CI 0.57, 0.99).

Discussion

In our study, most participants reported decrease in sexual frequency and health promoting behaviors in the number of sexual partners and condom use after HIV diagnosis. Males were more likely to reduce sexual frequency, while no gender difference was detected for number of sexual partners and condom use. Both genders shared some correlates of sexual behavior change after HIV diagnosis. Having no desire to have children was associated with decrease in sexual frequency for both genders, highlighting the importance of incorporating reproductive needs of heterosexual PLHIV in HIV prevention interventions. For both genders, health promoting behaviors in condom use were more likely to happen when the main partner was HIV negative, but not when the main partner's HIV status was unknown. One possible explanation was that negotiating condom use with sexual partners of unknown HIV status was difficult especially without disclosing one's own HIV status (Ayoola et al., 2014; Nebié et al., 2001).

Noticeably, social support was negatively associated with health promoting behaviors in condom use for females. One possible explanation was that women may depend on sexual partners for tangible and emotional support therefore were more likely to engage in unprotected sex (Dixon, Antoni, Peters, & Saul, 2001; Sobo, 1995).

There are some limitations in our study that need to be considered in interpreting the findings. First, the assessment of behavioral changes might not be accurate based on the self-report data. Second, we were not able to comprehensively assess the relationship between

time since diagnosis and sexual behavior changes as participants diagnosed within the past 6 months were excluded. Thirdly, information on some key aspects of sexual behaviors such as partner type (main vs. casual) was not available.

Our findings suggest several key implications. First, high level engagement in health promoting behaviors after HIV diagnosis highlights the importance of maximizing the uptake of early HIV diagnosis. Second, gender difference in correlates of sexual behavior change calls for gender-sensitive interventions to reduce heterosexual HIV transmission. Still, the small number of PLHIV who engage in health compromising behaviors after diagnosis may be a key population that drives the epidemic. Further studies are needed to understand the characteristics of this key population to develop prevention interventions tailored to their needs.

References

- Ayoola OD, Victoria G-OC, Bamidele O, Olufela KO, Oluwatosin SE, Mbaneifo EP, ... others. (2014). Pattern, challenges and correlates of condom use among Nigerians living with HIV infection. *Asian Pacific Journal of Tropical Biomedicine*, 4, S198—S203. [PubMed: 25183080]
- Berger Barbara E., Carol Estwing Ferrans, and F. R. L. (n.d.). Measuring stigma in people with HIV: Psychometric assessment of the HIV stigma scale{¶}.
- Bernier A, Lefèvre M, Henry E, Verdes L, Acosta M-E, Benmoussa A, ... Préau M (2016). HIV seropositivity and sexuality: cessation of sexual relations among men and women living with HIV in five countries. *AIDS Care*, 28(sup1), 26–31. [PubMed: 26924703]
- Bush K, Kivlahan DR, McDonell MB, Fihn SD, & Bradley KA (1998). The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. *Archives of Internal Medicine*, 158(16), 1789–1795. [PubMed: 9738608]
- Campbell-Sills L, & Stein MB (2007). Psychometric analysis and refinement of the connor--davidson resilience scale (CD-RISC): Validation of a 10-item measure of resilience. *Journal of Traumatic Stress*, 20(6), 1019–1028. [PubMed: 18157881]
- Dixon DA, Antoni M, Peters M, & Saul J (2001). Employment, social support, and HIV sexual-risk behavior in Puerto Rican women. *AIDS and Behavior*, 5(4), 331–342. [PubMed: 20890381]
- Eller LS, Rivero-Mendez M, Voss J, Chen W-T, Chaiphibalsarisdi P, Iipinge S, ... others. (2014). Depressive symptoms, self-esteem, HIV symptom management self-efficacy and self-compassion in people living with HIV. *AIDS Care*, 26(7), 795–803. [PubMed: 24093715]
- Lin H, Ding Y, Liu X, Zhu W, Gao M, & He N (2013). Changes in sexual behaviors among HIV-infected individuals after their HIV diagnosis in a rural prefecture of Eastern China. *PloS One*, 8(3), e59575. [PubMed: 23527221]
- Nebié Y, Meda N, Leroy V, Mandelbrot L, Yaro S, Sombié I, ... others. (2001). Sexual and reproductive life of women informed of their HIV seropositivity: a prospective cohort study in Burkina Faso. *Journal of Acquired Immune Deficiency Syndromes (1999)*, 28(4), 367–372. [PubMed: 11707674]
- Qiao S, Li X, Zhou Y, Shen Z, Tang Z, & Stanton B (2015). Factors influencing the decision-making of parental HIV disclosure: a socio-ecological approach. *AIDS (London, England)*, 29(0 1), S25.
- Radloff LS (1977). The CES-D scale a self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385–401.
- Sobo EJ (1995). Finance Romance, Social Support, and Condom Use among Impoverished Inner-City Women. *Human Organization*, 115–128.
- Sun W, Wu M, Qu P, Lu C, & Wang L (2014). Psychological well-being of people living with HIV/AIDS under the new epidemic characteristics in China and the risk factors: a population-based study. *International Journal of Infectious Diseases*, 28, 147–152. [PubMed: 25281441]
- Venkatesh KK, de Bruyn G, Mayer KH, Cheng H, Blanchard K, Ramjee G, ... van der Straten A (2011). Changes in sexual risk behavior before and after HIV seroconversion in Southern African

women enrolled in a HIV prevention trial. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 57(5), 435–441. [PubMed: 21546849]

Weinhardt LS (2005). HIV diagnosis and risk behavior In *Positive Prevention* (pp. 29–63). Springer.

Wu AW, Revicki DA, Jacobson D, & Malitz FE (1997). Evidence for reliability, validity and usefulness of the Medical Outcomes Study HIV Health Survey (MOS-HIV). *Quality of Life Research*, 6(6), 481–493. [PubMed: 9330549]

Yu DSF, Lee DTF, & Woo J (2004). Psychometric testing of the Chinese version of the medical outcomes study social support survey (MOS-SSS-C). *Research in Nursing & Health*, 27(2), 135–143. [PubMed: 15042639]

Zhou Y, Liu Y, Zhang Y, Bao Y, Xu X, Dou Q, ... Tan, H. (2016). Sexual Risk Behavior and Its Change among HIV-Positive Persons after Notifying their HIV Infection Status: A Retrospective Survey. *Journal of Preventive Medicine*.

Zimet GD, Dahlem NW, Zimet SG, & Farley GK (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52(1), 30–41.

Zung WWK (1971). A rating instrument for anxiety disorders. *Psychosomatics*, 12(6), 371–379. [PubMed: 5172928]

Table 1.

Summary of scales measuring psychological variables (N=1212).

Psychological scales	# Items	α	Sample item	Response options
Anxiety				
Zung Self-Rating Anxiety Scale (SAS) (Sun, Wu, Qu, Lu, & Wang, 2014; Zung, 1971)	20	0.90	I feared of losing control.	4-point Likert scale (1: "not at all" to 4: "a lot")
Depression				
Shorten version of the Center for Epidemiological Studies Depression Scale (CESD-10) (Radloff, 1977)	10	0.87	I was bothered by things that usually don't bother me.	4-point Likert scale (0: "not at all" to 3: "a lot")
HIV symptom management self-efficacy				
HIV Symptom Management Self -Efficacy Scale (Eller et al., 2014)	10	0.94	I'm confident in controlling the side effects of my medications.	5-point Likert scale (1: "not confident at all" to 5: "very confident")
Resilience				
Connor-Davidson Resilience Scale (CD-RISC) (Campbell-Sills & Stein, 2007)	10	0.95	I think of myself as a strong person.	5-point Likert scale (0: "totally disagree" to 4: "totally agree")
Social support				
The Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, Dahlem, Zimet, & Farley, 1988) The Medical Outcomes Study Social Support Survey (MOS-SSS-C)(Yu, Lee, & Woo, 2004)	28	0.97	Someone will provide me with the advice I need.	5-point Likert scale (1: "never" to 5: "always")
Stigma				
The Berger HIV stigma Scale (Berger, Barbara E., Carol Estwing Ferrans, n.d.)	14	0.94	I feel guilty because I have HIV.	4-point Likert scale (1: "totally disagree" to 4: "totally agree")
Physical health-related quality of life				
The Medical Outcomes Study HIV Health Survey(MOS-HIV) (Wu, Revicki, Jacobson, & Malitz, 1997)	35	0.95	In general, would you say your health is: I am somewhat ill.	Varies by items
Alcohol use				
The AUDIT Alcohol Consumption Questions (AUDIT-C) (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998)	3	0.81	How often do you have a drink containing alcohol?	5-point Likert scale (0 to 4)

Table 2. Correlates of decrease in sexual frequency and health promoting behaviors in condom use after HIV diagnosis by gender (N=1212)

Variables	Distribution of correlates by gender: N (%)				Multiple logistic regression: aOR (95% CI)			
	Total	Males	Females	P value	Males		Females	
					Sexual frequency	Condom use	Sexual frequency	Condom use
Total	1212	724 (59.7)	488 (40.3)					
<i>Demographic correlates</i>								
Age (years)								
Mean (SD)	38.5 (9.6)	40.5(9.7)	35.4(8.5)	<0.001				
<35 (ref)	501(41.6)	233(32.3)	268(55.4)					
35–44	461(38.3)	304(42.2)	157(32.4)		1.02(0.59, 1.76)	0.80(0.47, 1.35)	1.12(0.71, 1.77)	0.99(0.58, 1.69)
45+	243(20.2)	184(25.5)	59(12.2)	<0.001	1.34(0.69, 2.60)	0.35(0.21, 0.61)	2.89(1.26, 6.59)	0.65(0.33, 1.29)
Ethnicity								
Han	855(70.7)	527(73.0)	328(67.2)	0.03				
Minority	355(29.3)	195(27.0)	160(29.3)					
Complete education								
Elementary school(ref)	476(39.3)	286(39.6)	190(39.0)	0.910				
Middle school	558(46.1)	330(45.6)	228(46.8)			1.09(0.69, 1.71)		
High school or higher	176(14.6)	107(14.8)	69(14.2)			1.53(0.78, 3.00)		
Employed	964(80.0)	584(81.0)	380(78.5)	0.290				
Health Insurance	1094(91.2)	665(92.8)	429(88.8)	0.019				
Marital status								
Married/cohabitated	1026(86.6)	605(85.9)	421(87.5)	0.431	1.47(0.73, 2.96)			
Others (ref)	159(13.4)	99(14.1)	60(12.5)					
No desire to have children	889(74.0)	554(77.4)	335(68.9)	0.001	2.03(1.20, 3.44)		1.58(1.01, 2.47)	
<i>Clinical correlates</i>								
Main partner's HIV status								
Positive(ref)	670(55.6)	341(47.4)	329(67.8)	<0.001				
Negative	389(32.3)	268(37.2)	121(24.9)			1.80(1.11, 2.92)		3.24(1.63, 6.45)
Unknown	88(7.3)	61(8.5)	27(5.6)			0.83(0.40, 1.72)		0.70(0.28, 1.76)

Variables	Distribution of correlates by gender: N (%)					Multiple logistic regression: aOR (95% CI)			
	Total	Males	Females	P value		Males		Females	
						Sexual frequency	Condom use	Sexual frequency	Condom use
No main partner	58(4.8)	50(6.9)	8(1.7)				0.77(0.35, 1.68)		1.48(0.15, 14.5)
Time since HIV diagnosis									
Mean (SD)	44.2(27.9)	44.3(29.5)	43.9(25.4)	0.814					
6–12 months	149(12.3)	95(13.2)	54(11.1)	0.009					
13–18 months	78(6.5)	55(7.6)	23(4.7)						
19–60 months	686(56.8)	384(53.3)	302(62.0)						
>60 months	295(24.4)	187(25.9)	108(22.2)						
Receiving ART	934(77.3)	556(77.0)	378(77.6)	0.804			0.84(0.51, 1.39)	0.68(0.41, 1.12)	0.62(0.36, 1.07)
Viral suppression	690(91.9)	403(58.4)	287(41.6)	0.367		0.27(0.08, 0.94)			
CD4 group (cells/mm3)									
<350	608(52.5)	389(56.5)	219(46.5)	0.001					
350–499	296(25.5)	170(24.7)	126(26.7)						
500	255(22.0)	129(18.8)	126(26.8)						
Psychosocial correlates									
People in the household aware of your HIV status									
None(ref)	190(15.3)	128(17.7)	62(12.8)	0.005					
Some	810(67.1)	459(63.5)	351(72.4)				1.62(0.93, 2.82)	1.57(0.84, 2.90)	1.53(0.75, 3.14)
All	208(17.2)	136(18.8)	72(14.8)				1.76(0.87, 3.57)	1.12(0.51, 2.42)	0.82(0.35, 1.91)
QOL-PHS Mean (SD)	49.22(9.62)	48.58(9.90)	50.13(9.14)	0.008			1.02(1.00, 1.04)	0.98(0.95, 1.00)	
Depression Mean (SD)	8.63(5.76)	8.76(5.72)	8.45(5.83)	0.385			1.36(0.87, 2.13)	1.25(0.80, 1.95)	1.39(0.91, 2.12)
Social support Mean (SD)	2.42(0.85)	2.42(0.84)	2.41(0.88)	0.827			1.44(1.06, 1.96)		0.75(0.57, 0.99)
HIV symptom management self-efficacy Mean (SD)	3.33(0.72)	3.28(0.76)	3.41(0.65)	0.002				1.11(0.80, 1.53)	0.91(0.61, 1.35)
Resilience Mean (SD)	3.19(0.84)	3.15(0.84)	3.25(0.83)	0.048				1.09(0.81, 1.47)	
Stigma Mean (SD)	2.42(0.52)	2.38(0.53)	2.48(0.52)	<0.001					1.27(0.80, 2.00)
Alcohol use									
Mean (SD)	1.63(2.38)	2.33(2.60)	0.59(1.48)	<0.001					
Hazardous drinking	249(20.7)	208(29.0)	41(8.5)	<0.001					
Drug use	241(20.0)	222(30.8)	19(3.9)	<0.001					

ART, antiretroviral therapy; aOR, adjusted odds ratio. QOL-PHS, quality of life physical health summary.

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Table 3:

Patterns of changes in sexual behaviors after HIV diagnosis (N=1212).

Behavior	Total N	More n (%)	No change n (%)	Fewer/Less n (%)	Health promoting n (%)	Health compromising n (%)	P value
Sexual frequency							
Overall	1202	10(0.8)	336(28.0)	856(71.2)			
Males	717	5(0.7)	175(24.4)	537(74.9)			
Females	485	5(1.0)	161(33.2)	319(65.8)			0.001
Number of sexual partners							
Overall	1205	9(0.7)	787(65.3)	409(33.9)	1164(96.6)	41(3.4)	
Males	721	6(0.8)	376(52.2)	339(47.0)	692(96.0)	29(4.0)	
Females	484	3(0.6)	411(84.9)	70(14.5)	472(97.5)	12(2.5)	0.148
Condom use							
Overall	1195	896(75.0)	244(20.4)	55(4.6)	963(80.6)	232(19.4)	
Males	717	551(76.8)	134(18.7)	32(4.5)	587(81.9)	130(18.1)	
Females	478	345(72.2)	110(23.0)	23(4.8)	376(78.7)	102(21.3)	0.170