Prevalence and Attitudes Regarding Withdrawal Use for Pregnancy and HIV Prevention Among HIV-Positive Youth

Anna Maya Powell, MD, MSCR,¹ Blake Vessa, BA,² Sarah Law, BS,² Beth Sundstrom, PhD, MPH,³ and Gweneth B. Lazenby, MD, MSCR¹

To the Editor:

WITHDRAWAL (COITUS INTERRUPTUS) has been fairly well studied for pregnancy prevention, but its use for HIV transmission prevention has not been fully explored, particularly among sexually active youth. Potential concerns arise from the fact that semen and other genital fluids may represent an independent HIV reservoir: pre-ejaculate has been shown to contain CD4 lymphocytes, macrophages, as well as cell-free HIV virions.¹ The presence of HIV virions in genital secretions may explain incidence of HIV transmission even in the setting of an undetectable plasma viral load.² Withdrawal before ejaculation has been shown to reduce the risk of HIV-1 transmission in the context of penile–vaginal intercourse.³ Prevalence of withdrawal use among sexually active youth is widely variable, with higher rates reported in the literature if study participants report ever use or use concurrent with another method.^{4–6} Sexual risk taking among youth is high, and this additionally holds true for those living with HIV.⁷ Our objective was to determine the prevalence of withdrawal use as both a method for HIV transmission prevention and contraceptive option in a population of 18- to 25-year-old youth living with HIV.

The study design was a prospective observational study approved by the Medical University of South Carolina's IRB (No. 44763). Youth living with HIV of ages 18–25 years were eligible for the study if they presented to a clinic visit and had not previously participated. Individuals were not eligible if they were not primarily literate in English. Eligible individuals were approached for study enrollment during a routine HIV care appointment for participation in an online survey after verbal consent. Survey responses were collected and stored in REDCap, a secure electronic data capture tool.⁸ Study participants were enrolled between 2014 and 2017.

A sample size of 88 participants was needed to have 80% power to demonstrate a 3.5-fold difference in self-reported withdrawal use among HIV-infected male youth compared with female youth ($\alpha=0.05$). Survey questions were developed on the basis of a survey administered by Higgins and Wang,⁹ with assistance of a qualitative researcher with expertise in survey design and instrument development for primary data

collection (B.S.). Survey questions aimed to assess sexual activity, contraceptive use, and self-knowledge of HIV.

Data analysis was performed using SAS software version 9.4 (Cary, NC) and HyperRESEARCH 3.7.3. Open-ended text responses were analyzed using thematic analysis methodology.¹⁰ Participant characteristics and HIV-related variables were compared between male and female participants, as well as between withdrawal users (WU) and nonusers. Shapiro–Wilk analysis was used to evaluate continuous variables for normal distribution. Normally distributed continuous variables were described as means with standard deviation, and non-normally distributed continuous variables were described as medians with a corresponding interquartile range. Continuous variables were analyzed using Wilcoxon rank sum tests, whereas categorical variables were analyzed by Fisher's exact or chi-square test.

A total of 88 youth of 18–25 years of age living with HIV were surveyed for the study; 89 youth were approached, 1 female declined participation. Thirty-eight males and 36 females completed the survey (response rate = 84%; Table 1).

Among the 41 (55%) respondents reporting any withdrawal use, WU were 54% male [59% men having sex with men (MSM), 41% men having sex with women (MSW)] and 46% female [89.5% women having sex with men (WSM), 10.5% women having sex with women (WSW)]. WU were more likely to report monogamous sex (44.7% vs. 25%, $p=0.02$), sex partner with unknown HIV status (30% vs. 9.1%, $p=0.005$), oral contraceptives use (22% vs. 6%, $p=0.04$), and report that condoms decreased sexual pleasure (24.4% vs. 3%, $p=0.009$).

Respondents were asked about withdrawal use for HIV and pregnancy prevention: 17 (40%) reported using withdrawal for both HIV and pregnancy prevention, 4 (9.5%) reported exclusively using withdrawal for HIV prevention, and 20 (48%) reported only using withdrawal for pregnancy prevention. Among the four respondents exclusively reporting withdrawal for HIV prevention, there were three males and one female; compared with non-WU, WU for HIV prevention ($n=4$) were more likely to report sexual education from family (100% vs. 27%, $p=0.01$).

Respondents exclusively using withdrawal for HIV prevention ($n=4$) were grouped with those reporting withdrawal

¹Department of Obstetrics and Gynecology, Medical University of South Carolina, Charleston, South Carolina.

²College of Medicine, Medical University of South Carolina, Charleston, South Carolina.

³Department of Communication and Director, Women's Health Research Team, College of Charleston, Charleston, South Carolina.

TABLE 1. DEMOGRAPHICS, SEXUAL ATTITUDES AND PRACTICES AMONG MALES AND FEMALES LIVING WITH HIV

Variable	Males (n=38)	Females (n=36)	p ^a
Age, years (median, IQR) ^b	22 (21–24)	22.5 (20–24)	ns
Race/ethnicity, n (%)			
Black	25/38 (65.8)	22/36 (61.1)	ns
White	4/38 (10.5)	6/36 (16.7)	ns
Other race (Asian, Pacific Islander, Native American)	10/38 (26.3)	8/36 (22.2)	ns
Hispanic ethnicity	1/38 (2.63)	1/36 (2.63)	ns
Education, n (%)			
Less than high school	5/38 (13.2)	4/36 (11.1)	ns
Greater than high school	31/38 (81.6)	31/36 (86.1)	ns
Source of sexual education, n (%)			
Healthcare provider	8/38 (21.1)	4/36 (11.1)	ns
Church	4/38 (10.5)	0/36	ns
Family	19/38 (50)	13/36 (36.1)	ns
School	21/38 (55.3)	14/36 (38.9)	ns
Friend	24/38 (63.2)	23/36 (63.9)	ns
Sexual history, n (%)			
Coitarche ^c	16 (±2.62)	16 (±1.77)	ns
Number of lifetime partners ^b	9 (5–15)	3.5 (2–5)	*
Had sex in the past 3 months	25/37 (67.6)	20/36 (55.6)	ns
Male sex partner primary	24/31 (77.4)	21/24 (87.5)	ns
Female sex partner primary	7/31 (22.6)	3/24 (12.5)	
Monogamy with sex partner, n (%)			
Yes	15/37 (40.5)	10/34 (29.4)	*
No	21/37 (56.8)	22/34 (64.7)	
Unknown	1/37 (2.7)	2/34 (5.9)	
Duration of monogamous relationship (months) ^b	3.5 (1–7)	9 (1–36)	ns
HIV characteristics, n (%)			
Disclosed HIV status to sexual partner	32/36 (88.9)	25/28 (89.3)	ns
Inquire about partner(s) HIV serostatus	29/37 (78.4)	19/36 (52.8)	*
History of any serious HIV-related illness ^c	7/36 (19.4)	2/29 (6.9)	ns
Reported taking HIV meds	23/36 (63.9)	26/29 (89.7)	*
HIV medication adherence ^{b,d}	7 days (1–7)	7 days (5–7)	ns
Partner HIV status, n (%)			
Yes	8/37 (21.6)	3/36 (8.3)	*
No	19/37 (51.4)	28/36 (77.8)	
Unknown	10/37 (27)	5/36 (13.9)	
Sexually transmitted infections, n (%)			
Any history of sexually transmitted infection	22/38 (57.8)	21/36 (58.3)	ns
<i>Neisseria gonorrhoeae</i>	7/38 (18.4)	8/36 (22.2)	ns
<i>Chlamydia trachomatis</i>	11/38 (29)	10/36 (27.8)	ns
<i>Trichomonas vaginalis</i>	0/38	6/36 (16.7)	*
Herpes simplex virus	2/38 (5.3)	6/36 (16.7)	ns
Pelvic inflammatory disease	0/38	1/36 (2.6)	ns
Gender of respondent, n (%)			
Male	37/38 (97.4)	1/36 (2.8)	*
Female	0/38	36/36 (100)	*
Transwoman	1/38 (2.6)	0	ns
Gender other	1/38 (2.6)	0	ns

^aSignificance at $p < 0.05$ level indicated by asterisks.

^bNon-normally distributed continuous variables (age, HIV medication adherence, duration of monogamy, and number of lifetime partners) are reported as medians with interquartile range. Coitarche was normally distributed and thus is reported as mean with standard deviation.

^cSerious HIV-related illness refers to opportunistic infection or other HIV-related illness requiring hospitalization.

^dHIV medication adherence refers to how many days of the week subjects report taking their HIV medications.

IQR, interquartile range; ns, not significant.

use for HIV and pregnancy prevention ($n=17$) due to small sample size.

Among WU for HIV prevention ($n=21$), there were 15 males and 6 females; there were 11 MSM among males (52.4% of total WU for HIV prevention), 1 MSW (4.8%), and

3 with sex partners of both sexes (14.3%). Among the six females, there were four WSM (19% of total), one WSW (4.8%), and one reporting sex partners of both sexes (4.8%). Compared with non-WU, WU for HIV prevention ($n=21$) were more likely to be female ($p=0.04$), monogamous with a

TABLE 2. CHARACTERISTICS OF WITHDRAWAL USERS FOR HIV AND PREGNANCY PREVENTION

<i>Variable</i>	<i>Withdrawal user—HIV prevention (n = 21^a)</i>	<i>Versus nonuser p-value^b</i>	<i>Withdrawal user—pregnancy prevention (n = 20^c)</i>	<i>Versus nonuser p-value^b</i>
Male, <i>n</i> (%)	14/21 (66.7)	ns	8/19 (42.1)	ns
Female, <i>n</i> (%)	7/21 (33.3)	*	12/19 (63.2)	ns
Age, years (median, IQR) ^b	22 (21–24)	ns	22 (20–24)	ns
Race/ethnicity, <i>n</i> (%)				
Black	14/21 (66.7)	ns	9/19 (47.4)	ns
White	0/21 (0)	ns	5/19 (26.3)	ns
Other race (Asian, Pacific Islander, Native American)	6/21 (28.6)	ns	2/19 (10.5)	ns
Hispanic ethnicity	1/21 (4.76)		1/19 (5.3)	
Education, <i>n</i> (%)				
Less than high school	3/21 (14.3)	ns	3/19 (15.8)	ns
High school or greater	17/21 (80.9)		16/19 (84.2)	
Source of sexual education, <i>n</i> (%)				
Healthcare provider	3/21 (14.3)	ns	5/19 (26.3)	ns
Church	2/21 (9.5)	ns	1/19 (5.3)	ns
Family	13/21 (61.9)	*	8/19 (42.1)	ns
School	12/21 (57.1)	ns	12/19 (63.2)	*
Friend	12/21 (57.1)	ns	12/19 (63.2)	ns
Sexual history, <i>n</i> (%)				
Coitarche ^d	15 (±1.73)	ns	15.6 (±3.05)	ns
Number of lifetime partners ^d	5.5 (4–9.5)	ns	6.5 (2–10)	ns
Had sex within the past 3 months	14/20 (70)	ns	12/19 (63.4)	ns
Duration of monogamous relationship (months) ^d	3 (1–12)	ns	12.7 (1–6)	ns
Male sex partner primary	16/18 (88.9)	ns	11/15 (73.3)	ns
Female sex partner primary	2/18 (11.1)		4/15 (26.7)	
Male and female sex partners	5/21 (23.8)	ns	3/19 (15.8)	ns
Monogamy with sex partner, <i>n</i> (%)				
Yes	10/20 (50)	*	7/17 (41.2)	ns
No	9/20 (45)		10/17 (58.8)	
Unknown	1/20 (5)		0/17	
HIV characteristics, <i>n</i> (%)				
Disclosed HIV status to sexual partner	18/19 (94.7)	ns	12/14 (85.7)	ns
Inquire about HIV partner(s) status	14/20 (70)	ns	12/19 (63.2)	ns
History of serious HIV-related illness	3/19 (15.8)	ns	1/15 (6.7)	ns
Reported taking HIV medication	15/19 (79)	ns	12/15 (80)	ns
HIV medication adherence ^{d,e}	7 (1–7)	ns	4.7 (1–7)	ns
Sexually transmitted infections, <i>n</i> (%)				
Any history of sexually transmitted infection	13/21 (61.9)	ns	10/19 (52.6)	ns
<i>Neisseria gonorrhoeae</i>	5/21 (23.8)	ns	1/19 (5.3)	ns
<i>Chlamydia trachomatis</i>	7/21 (33.3)	ns	4/19 (21.1)	ns
<i>Trichomonas vaginalis</i>	2/21 (9.5)	ns	1/19 (5.3)	ns
Herpes simplex virus	1/21 (4.8)	ns	4/19 (21.1)	*
Pelvic inflammatory disease	3/21 (14.3)	ns	0/19	ns
Partner HIV status, <i>n</i> (%)				
Positive	4/20 (20)	*	0/19	*
Negative	10/20 (50)		13/19 (68.4)	
Unknown	6/20 (30)		6/19 (31.6)	

^aSubjects reporting withdrawal use for HIV prevention and pregnancy prevention (*n* = 17) were grouped together with those reporting withdrawal use for HIV prevention alone (*n* = 4) to compare against users of withdrawal for pregnancy prevention alone (*n* = 20).

^bSignificance at *p* < 0.05 level indicated by asterisks.

^cThis group excludes WU-H users.

^dNon-normally distributed continuous variables (age, HIV medication adherence, duration of monogamy, and number of lifetime partners) are reported as medians with interquartile range. Coitarche was normally distributed and thus is reported as mean with standard deviation.

^eHIV medication adherence refers to how many days of the week subjects report taking their HIV medications.

IQR, interquartile range; ns, not significant; WU-H, withdrawal users for HIV prevention.

sex partner ($p=0.03$), sexually active with a partner living with HIV ($p=0.02$), and cite sexual education from family ($p=0.03$; Table 2).

WU for pregnancy prevention ($n=20$) were more likely not to know a partner's HIV status ($p=0.04$). Some participants did not disclose their status if they abstained from sexual activity, whereas others were afraid to disclose to partners. According to one participant, "It's kind of hard when you feeling someone to actually have the words, 'I'm HIV positive' slip from your lips."

Withdrawal use was not a prominent strategy for prevention of HIV transmission among youth living with HIV. Approximately half of our respondents reported using withdrawal for HIV and pregnancy prevention. We found that very few respondents primarily rely on withdrawal as their contraceptive method (5.3% among males and 5.6% among females), with the majority also using male condoms. Risk reduction counseling targeted to youth living with HIV regarding withdrawal use could involve discussion of risks/benefits of withdrawal, use of this method in the overall context of decreasing the risk of HIV transmission to a sexual partner alone, and concurrently with condom use.

Acknowledgments

This study was funded by SCTR-Biomedical Informatics Center (BMIC) grant support (NIH/NCATS UL1 TR001450).

Author Disclosure Statement

No competing financial interests exist.

References

1. Ilaria G, Jacobs JL, Polsky B, et al. Detection of HIV-1 DNA sequences in pre-ejaculatory fluid. *Lancet* (London, England) 1992;340:1469.
2. Baeten JM, Kahle E, Lingappa JR, et al. Genital HIV-1 RNA predicts risk of heterosexual HIV-1 transmission. *Sci Transl Med* 2011;3:77ra29.
3. de Vincenzi I. A longitudinal study of human immunodeficiency virus transmission by heterosexual partners. *European Study Group on Heterosexual Transmission of HIV*. *N Engl J Med* 1994;331:341–346.
4. Horner JR, Salazar LF, Romer D, et al. Withdrawal (coitus interruptus) as a sexual risk reduction strategy: Perspectives from African-American adolescents. *Arch Sex Behav* 2009;38:779–787.
5. Higgins JA, Wang Y. Which young adults are most likely to use withdrawal? The importance of pregnancy attitudes and sexual pleasure. *Contraception* 2015;91:320–327.
6. Sznitman SR, Romer D, Brown LK, et al. Prevalence, correlates, and sexually transmitted infection risk related to coitus interruptus among African-American adolescents. *Sex Transm Dis* 2009;36:218–220.
7. Koenig LJ, Hoyer D, Purcell DW, Zaza S, Mermin J. Young people and HIV: A call to action. *Am J Public Health* 2016;106:402–405.
8. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform* 2009;42:377–381.
9. Higgins JA, Gregor L, Mathur S, Nakyanjo N, Nalugoda F, Santelli JS. Use of withdrawal (coitus interruptus) for both pregnancy and HIV prevention among young adults in Rakai, Uganda. *J Sex Med* 2014;11:2421–2427.
10. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;3:77–101.

Address correspondence to:

Anna Maya Powell, MD, MSCR
Department of Obstetrics and Gynecology
Johns Hopkins Bayview Medical Center
Baltimore, MD 21224

E-mail: apowell32@jhmi.edu