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## Basic Body Knowledge in Street-Recruited, Active Drug-Using Women Enrolled in a “Body Empowerment” Intervention Trial

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### Abstract

**Background**—Drug-using women remain at high risk for HIV infection. Female condoms (FC) have proven potential and cervical barriers have promise to reduce HIV risk; their effective use may be boosted by familiarity and confidence about female anatomy. Women with high levels of crack cocaine use were assessed for their knowledge about reproductive anatomy, HIV/ STI risk, as well as cancer screening behaviors.

**Methods**—Women were recruited for a randomized trial of a behavioral intervention via mobile vans in Philadelphia known for high crack use and sex exchange. Knowledge and behavioral data on 198 women were collected via interviewer-administered questionnaire. Women were randomized into Control (n=99) and Intervention (n=99) arms. Five weekly, small-group, intervention sessions stressed “body empowerment” and teaching use of female-initiated barrier methods. Follow-up body knowledge data were collected at 12 months. Changes in and correlates of body knowledge were analyzed and compared.

**Results**—Most participants were African-American (66%); their mean age was 39.6 years. At baseline, 44% of the sample erroneously believed women have sex and urinate from the same place; 62% erroneously believed that tampons could get lost in the abdominal cavity. Only 27% knew douching increased STI transmission risk; only 10% knew condoms reduce cervical cancer risk. At follow-up, overall body knowledge improved substantially, across both arms. Race was associated with high body knowledge at baseline but not at follow-up.

**Conclusions**—Knowledge favoring use of women-initiated methods and cervical cancer prevention was very low in this hard-to-reach sample. Body knowledge improved substantially with enhanced VCT as well as the women-focused intervention. Body knowledge education must be targeted and tailored to drug-using women.

### Keywords

Drug-using women; female condom; body knowledge; HPV knowledge; HIV prevention; behavioral intervention; women-controlled methods; cervical barriers

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## Introduction

The rate of new HIV infections has not lessened in recent years among U.S. women overall, and African Americans account for 66% of new infections among all women (Centers for Disease Control and Prevention [CDC], 2011). One in 30 African-American women can expect to acquire HIV infection during their lifetimes (Fenton, 2010). Among African American women, drug-using women are at extremely high risk, due to multiple transmission modes (Lansky et al., 2010; CDC, 2007; Lashley, 2006). Among crack-using women, extraordinarily high HIV prevalence is associated with frequent sex exchange (Wechsberg et al., 2004).

Female barrier methods, such as the female condom (FC), and cervical barrier methods continue to have enormous but largely unrealized potential to reduce HIV infection among women (Nelson, 2007; Mantell et al., 2011; Mantell, Stein & Susser, 2008; Gollub, 2008). The FC is equivalent to a male condom (MC) in its level of protection against HIV if used properly (French et al., 2003). Cervical barrier methods—cervical caps and diaphragms—by blocking access to the cervical epithelium and upper reproductive tract might also reduce STI/HIV risk, especially when MCs or FCs are not used (Cervical Barrier Advancement Society [CBAS], 2012; Moench, Chipato & Padian, 2001; Gollub et al., 2001; Shihata & Brody, 2010). As research progresses on these barrier technologies to better determine anti-STI/HIV efficacy, identifying promising intervention approaches to introduce and maintain their use among diverse communities of women is critical. In particular, interventions designed to help drug-using women use female barrier protection are still few in number (Wechsberg et al., 2010; Wechsberg, Lam, Zule & Bobashev, 2004; Ross et al., 2007; Sterk, Theall & Elifson, 2003).

The study reported here tested a behavioral intervention that integrated elements from three existing theories—the Theory of Gender and Power (Connell, 1985), Community Empowerment Theory (Wallerstein, 1992) and Harm Reduction Theory—as well as an original theory of “body empowerment”. The latter draws heavily from feminist health principles espoused widely in the 1970s in such works as *Our Bodies, Ourselves* (Boston Women’s Health Book Collective, 1971), and has evolved through a series of studies on diverse populations of high-risk women (Gollub, Stein & El-Sadr, 1995; Gollub, French, Latka, Rogers & Stein, 2001; Gollub, Brown, Savouillan, Waterlot & Coruble, 2002; Gollub, Morrow, Mayer, et al., 2010). Increased body knowledge appeared to facilitate use of women’s barrier methods in these studies because risk behaviors declined. The feminist health model as applied to HIV underscores the need for holistic education about reproductive organs and genitals, rather than a narrow focus on HIV. Thus, it also addresses other topics including vaginal health, female cancer screening approaches, the menstrual cycle and normal changes in menopause. The impact of basic body education on risk behavior has not, to our knowledge, been evaluated in active substance users.

We report data on basic body knowledge from women enrolled in a one-year, randomized trial among active substance users (“Best BET”).

## Methods

### Recruitment and Eligibility, Data Collection

Recruitment and study methods have, in part, been presented in a prior publication (Gollub, Armstrong, Boney, et al., 2010). Briefly, we conducted recruitment of eligible women in Philadelphia between November 2001 and August 2003, with the use of a mobile outreach van staffed with trained interviewers and harm reduction counselors. The van was parked in designated, high-risk areas known for crack-selling and smoking activity. Interested women

gave written consent, were prescreened and invited for a second screening held at a downtown, storefront site that served as an information and referral center for drug users. At this visit, potential participants completed a series of interview-administered questionnaires as well as a risk assessment instrument delivered via audio, computer-assisted self-interview. Additional participant data included a knowledge quiz on the reproductive system, disease prevention methods via face-to-face interview. We then provided all women with enhanced voluntary counseling and testing (VCT) including demonstration of both MCs and FCs on anatomic models. Participants were tested for HIV and four other STI. HIV-negative, STI-negative women were formally enrolled and randomized to study arms. Study compensation for each visit was \$25.

Eligible women were 18 years of age or older, HIV seronegative, reporting 30% or more unprotected vaginal or anal sex acts, not currently in drug treatment other than Methadone, and reporting heroin or cocaine use, either injected, snorted, or smoked at least 12 times in past three months.

Controls received semi-annual, personalized VCT with regular follow-ups. Intervention participants received, in addition to the VCT described for controls, five weekly, small group sessions of 3 hours length, from trained peer counselors, with two booster sessions. Boosters were conducted at a community based organization (CBO) by trained CBO staff. At 12 months, all assessments were re-administered.

This study was approved by, and conducted in compliance with, the Institutional Review Board of the University of Pennsylvania. All enrolled women (n=198) provided written informed consent.

### Study Intervention

The “body empowerment” intervention sought to increase knowledge, comfort, confidence, and a sense of “ownership” of the body, especially the genitals and reproductive tract (“basic body knowledge”), in a women-only space and promoting women’s solidarity. Women were counseled in a “hierarchical approach” to protection, including MC, FC and other female barriers (Gollub et al., 2001).

Basic body knowledge was presented by peer leaders in manualized, interactive sessions, with anatomic models, diagrams, and brochures, involving role-play, brainstorming, and “role model” audiotaped stories and discussion. Sessions involved ongoing positive promotion of women’s barrier methods in distinct risk contexts (sex trade, primary partner, etc). All methods were provided free of charge.

### Outcome assessments

The primary behavioral outcomes were number and proportion of protected sex acts. A secondary aim was to measure basic body knowledge changes. Data analyzed here are from the *Body Knowledge Assessment (BKA)*, an original tool, pre-tested in prior studies and composed of 14 items covering knowledge about the reproductive tract and genitals, screening tests for breast and cervical cancer, and women’s risks of HIV/STI infection and protection options. Possible responses were close-ended: agree, disagree, and not sure.

### Data Analyses

We tallied the percent correct, incorrect, and “not sure” responses for each knowledge item, then tested for significance (via chi square) across arms. We selected ten items for which less than 90% of women answered correctly for further analyses (first 10 items of Table II). We computed a variable expressing the global proportion of correct responses (“unsure”

responses were coded as incorrect) at 12-month follow-up. We assessed predictors of knowledge by comparing mean correct of these ten items via t-test.

## Results

### Sample

One hundred ninety-eight women were enrolled and administered the BKA at baseline. Most were African-American (see Table I); mean age was 39.6 years. Most participants were unemployed and had a history of drug treatment. Crack/rock cocaine and marijuana were drugs of choice. Most participants reported sex exchange. Most participants had a primary male sex partner; many had additional casual male sex partner(s). MC use was low.

Nearly all participants responded correctly at baseline on questions asking about cancer screening techniques. Frequent incorrect responses were given to questions on female anatomy--whether all vaginal secretions were unclean (25% incorrect), whether women had sex and urinated from the same place (44% incorrect), and whether tampons could get lost in the abdominal cavity (62% incorrect). Knowledge was also low for women-specific HIV risk, douching risk, and cervical cancer prevention with condoms. There were no significant differences between arms for baseline knowledge (mean % correct, 63%).

Retention at 12 months was 98%. Women in both arms had improved body knowledge at follow-up (mean % correct, 82%; see Table II). No differences in global percentage correct at follow-up was seen across study arms ( $p=.21$ ). Also, no differences by arm were apparent in the paired t-test from baseline to follow-up for the separate items, although formal testing was not undertaken due to small sample size.

### Knowledge correlates

Race significantly predicted baseline knowledge ( $p=.007$ ); black women demonstrated lower scores than other races. Having health insurance predicted higher scores with marginal significance ( $p=.06$ ). After adjustment, race was still significant ( $p=.01$ ). None of the following variables were significant: ethnicity (Latina/not), education, has regular medical provider, crack use, injection drug use, recent drug treatment, recent STI treatment, trial arm, history of pap smear, mammogram or HIV test. At follow-up, differences by race were no longer evident ( $p=.30$ ). Recent HIV test predicted lower knowledge ( $p=.02$ ). Crack use predicted greater knowledge with marginal significance ( $p=.09$ ). After adjustment only HIV test was significant ( $p=.01$ ).

## Discussion

In this sample of active drug-using women, the level of body knowledge was low, especially regarding HIV/STI risk, as compared with knowledge on contraception and cancer screening. Knowledge improved across both trial arms; at 12 months, no differences were apparent across treatment arm. Although race was associated with poorer knowledge scores at baseline, by 12 month follow-up these differences were no longer apparent.

Most participants had incorrect responses regarding hazards of vaginal douching at baseline; at follow-up still only approximately half of the sample responded correctly. Douching is considered to raise risk of bacterial vaginosis (BV), some STI and possibly HIV (Cottrell, 2010; Hilber et al., 2010; Myer, Kuhn, Stein, Wright & Denny, 2005). For several years prior to this study, a vigorous public health campaign to discourage douching had been underway, targeting black women specifically. The poor knowledge demonstrated here may reflect a lack of effective techniques for penetration of this message into the highest risk, most isolated population sub-groups.

Additionally, the understanding that cervical cancer is largely preventable with use of condoms, and is due to a sexually-transmitted organism, was poor in this sample, even though pap smear knowledge was quite high. Our findings agree with those from the WIHS study on women at high HIV risk (Massad, Evans, Wilson et al., 2010; Massad, Evans, Weber et al., 2010), indicating race and socioeconomic status as predictors of HPV risk. In that study, few women understood cervical cancer was sexually transmitted and preventable. The authors pointed to the need for culturally-tailored interventions to improve knowledge. Cervical cancer incidence and mortality is still pronounced among minority women; mortality among blacks is twice that of whites (CDC, 2012). Our findings underscore the especially high need for cervical cancer prevention education among female drug users.

Women in this study demonstrated much confusion about pelvic anatomy - for example, whether tampons would migrate up to the abdominal cavity. From our prior work, such confusion may lead to considerable hesitancy in trying female-initiated devices such as the FC. Poor understanding of tampons has also been found by Tepe et al. (2010) to be associated with lower likelihood of trying the vaginal ring. Increasing basic body knowledge among high risk women is likely to boost use of female-initiated methods.

## Limitations

Limitations to the present analysis include the select nature of the population. Our eligibility criteria concentrated a high level of drug-related and sexual risk. Women agreed to attend five, relatively long, intervention sessions and return for follow-up assessments. Knowledge responses were collected via face-to-face interview; this process may have induced greater concordance in responses across study arms, despite standardized training of interviewers. We cannot rule out contamination as an explanation for our findings. The sample size may have been too small to identify some correlates as significant. Responses to questions were 'agree-disagree-not sure', rather than true-false, possibly causing confusion in respondents. There may have been short-term knowledge differences across arms at earlier points during follow-up.

## Conclusion

Programs incorporating interactive learning on sexual and reproductive anatomy in women in easy-to-understand language and presented in a culturally appropriate way should be expanded, focusing on venues that drug using women frequent -- drug treatment centers, drop-in testing sites, public health clinics, and family planning clinics. This marginalized population possessed high knowledge on cancer screening approaches suggesting that effective education and outreach can address knowledge gaps if it is made a priority. The continuing crisis in HIV/ STI incidence and mortality warrants a renewed focus on improved body knowledge, as a means to self-protection through negotiation of MC and use of female-initiated methods such as the FC.

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**Table I**

Characteristics of sample at baseline (N=198)

<b>Demographics</b>	
Age (mean, s.d.; range)	39.6 yrs (7.3; 18–65 yrs)
Race	
-African American	66%
-White	27%
-Other	7%
Hispanic ethnicity	7%
Had high school diploma	52%
Unemployed	93%
Had health insurance	70%
Ever in drug treatment	41%
Ever injected drugs	42%
<b>Drug use in previous 6 months</b>	
Smoked crack/rock cocaine	88%
Marijuana	62%
Snorted/sniffed cocaine	43%
Snorted/sniffed heroin	35%
<b>Sexual History</b>	
Age at first sex (mean, s.d.; range)	14.7 yrs (3.4; 3–29 yrs)
First sex was forced (% yes)	25%
Ever exchanged sex for drugs	68%
Ever exchanged sex for money	80 %
<b>Sexual Behaviors in previous 3 months</b>	
Number of partners (mean, range)	26 (1–400)
Had primary partner	83%
Had casual partner	74%
Had both primary & casual partners	59%
Primary partner injected drugs	28%
Used no STI/HIV protection w/primary partner:	73%
Used no STI/HIV protection w/casual partner:	49%
Proportion of protected sexual acts by male or female condom with <i>primary partne</i> (mean, range) <i>r</i>	.07 (0.0–1.0)
Proportion of protected sexual acts by male or female condom with <i>casual partner</i> (mean, range)	.24 (0.0–1.0)
Frequency of unprotected vaginal acts by male of female condom with <i>primary partner</i> (mean, median, range)	46, 24 (0–365)
Frequency of unprotected vaginal acts by male of female condom with <i>casual partner</i> (mean, median, range)	36, 14 (0–216)
Always used male condom:	
-with primary partner	4%
- with casual partner	12%



**Table II**

Proportion Correct Responses\* to Body Knowledge Items: Baseline to 12 Month Follow-Up Paired Analysis by Randomization Arm.

ITEM	CONTROLS (n=93)		p - value	INTERVENTION (n=93)		p-value
	BASE LINE	12 mo - FOLLOW UP - (s.d)		Baseline	12-mo Follow up	
Male condom and female condom reduce cervical cancer risk	.23	.43 <sup>a</sup>	.04	.10	.35 <sup>a</sup>	.01
Douching increases risk of STI and HIV	.31	.56	.00	.29	.47	.01
Tampon can migrate to abdominal cavity	.32	.59	.00	.36	.56	.00
Women have greater risk of HIV infection from intercourse with men than vice versa	.55	.55	1.0	.59	.59	1.0
Women have sex and urinate from the same place	.56	.70	.05	.53	.74	.00
All vaginal secretions are unclean	.67	.73 <sup>a</sup>	.40	.72	.74	.66
Women are born with 1 uterus, 2 ovaries, 2 tubes, and all eggs they will ever make	.83	.97 <sup>a</sup>	.00	.81	.93 <sup>a</sup>	.01
You can feel cervix with your finger if you squat	.89	.97 <sup>a</sup>	.06	.88	.97 <sup>a</sup>	.06
PID results from untreated STIs	.91	.97 <sup>a</sup>	.16	.88	.90 <sup>a</sup>	.77
You may still get pregnant even if you have no periods	.92	.88	.60	.95	.99	.18
Pap smears detect breast cancer	.95	.90	.21	.97	.95	.42
Self-breast exam can detect breast cancer	.97	.99	.32	.96	.98	.16
Street drugs prevent pregnancy	.98	.97	.94	.96	.96	1.0
Mammography is for detecting breast cancer	1.00	.96	.05	.99	.99	1.0

\* This analysis excludes 'not sure' responses of "agree-disagree-not sure" response list for Body Knowledge Quiz. Intervention and control pairs n=93 (each arm).

<sup>a</sup>Not sure responses >20% for pairs at either or both time points.