

Highly Effective Birth Control Use Before and After Women's Incarceration

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Abstract

Background: We examined factors associated with women's use of highly effective birth control before and after incarceration, since women with ongoing criminal justice involvement bear a disproportionate burden of sexual and reproductive health problems, including high rates of unintended pregnancy and inconsistent contraceptive use.

Methods: Using a longitudinal study design, we conducted surveys with 102 women in an urban midwestern jail and then followed up with 66 of them 6 months after incarceration. We used stepwise logistic regression to assess individual, interpersonal, resource-based, organizational, and environmental factors associated with utilizing highly effective birth control.

Results: Forty-two percent of women reported utilizing highly effective birth control (e.g., sterilization or other highly effective reversible methods) prior to incarceration, and 54% reported using these methods after release from jail ($p < 0.001$). Ninety percent of women reported not wanting to get pregnant. Consistent use of birth control ($p = 0.001$) and alcohol problems ($p = 0.027$) were associated with utilization of highly effective birth control prior to incarceration. Previous pregnancies ($p = 0.012$) were the only factor associated with utilization of highly effective birth control after release from jail.

Conclusions: Clinicians and public health practitioners can use findings from this study to develop clinical and intervention efforts aimed at improving unintended-pregnancy prevention among incarcerated women both during their confinement and during the tumultuous period after their release from jail.

Introduction

RATES OF PRIOR UNINTENDED PREGNANCY among women moving through the US criminal justice system are as high as 83% compared to the national average of about 50%.^{1,2} These high rates of unintended pregnancy are compounded by inconsistent use of birth control (up to 66%), including condoms (80%).^{1,3} Most of the 1 million women under correctional supervision in the US are poor, are of racial/ethnic minority groups, and have at least one child under the age of 18.⁴ After release from jail—days, weeks, and months after arrest—it can be extremely challenging for these women to navigate personal relationships, access resources, and sustain community networks in order to initiate or continue a contraceptive method. Women immediately face multiple and competing needs to generate income, find

housing, and reunify with families and partners.^{5,6} Given that 60%–90% of these women have histories of abuse, substance use, and mental health problems,^{6,7} their ability to prioritize preventive health services upon release from jail is often compromised.⁸ Additionally, the costs of unintended pregnancies are high for women with existing children, given the need to negotiate a patchwork of childcare solutions ranging from grandparents, relatives, friends, and unwanted reliance on the foster care system throughout their involvement with the criminal justice system.^{9,10} In one study, 77% of women had experienced at least one prior incarceration in addition to their current incarceration⁶; another study showed that 39% of women were reincarcerated within 1 year after release,⁸ all of which potentially creates an ongoing need for family planning.

In preparing to leave jail, more than 80% of women reported intending to have sex with men soon after release,^{1,3}

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and half reported not wanting to get pregnant after release.³ In another study, 90% of incarcerated women stated having negative or ambivalent pregnancy attitudes,¹¹ demonstrating a need for effective birth control options.

Numerous barriers interfere with the women's desire to implement effective birth control methods, not the least of which are factors at the individual, interpersonal, and health systems levels.¹²⁻¹⁴ Although several programs have reported connecting incarcerated women to health care services for HIV, drug use, and mental health problems,^{15,16} only one researcher to our knowledge has connected incarcerated women to sexual and reproductive health services that address unintended-pregnancy prevention upon release from jail.^{17,18} Little is known about the factors associated with effective birth control use among women with criminal justice involvement: in particular, immediately upon their release from jail into the community. As a result, there is a dearth of information on what works when it comes to connecting women with effective birth control methods upon leaving jail and once they have reentered the community.

Using the broad framework of fundamental-cause theory, especially the idea that people's access to resources facilitates health,¹⁹ we investigated the multiple factors that might explain use of highly effective birth control. We chose to focus on sterilization or use of other highly effective reversible methods as the most effective types of birth control, since we know that women using these methods (as opposed to condoms or the rhythm method, for example) have a significantly reduced risk of unintended pregnancy.²⁰⁻²² To the extent that unintended pregnancy is the "disease" we hoped to understand, we used fundamental-cause theory—the idea of access to people, resources, organizations, and environments as the fundamental causes of disease—to frame our selection of variables. We sought to move beyond the individual-level characteristics associated with birth control use, such as attitudes and health risk behaviors, and examine these factors alongside interpersonal, resource-based, organizational, and environmental factors.

Materials and Methods

Size and sampling

Recruitment for this study took place in the spring, summer, and fall of 2012 at the municipal jail in downtown Kansas City, Missouri. The facility houses men and women serving a sentence of 1 year or less. The average daily population of women at the municipal jail is 50, and women comprise about 10% of the total population. Because we were interested in the experiences of women leaving jail, particularly factors associated with sexual healthcare use, we recruited women as they were being released. We met our recruitment goal (100–110) with 102 women recruited over 7 months. Based on the flow of inmates and study staff schedules, we estimated that we reached about half the women leaving the jail during the study period.

Procedures

All baseline study activities took place within a medical exam room on the same floor housing female inmates who were eligible to participate. The daily assigned correctional officers brought female inmates interested in participating in

the study into the medical exam room one at a time. The door to the exam room remained open at all times as a safety precaution, although the guard on duty sat an appropriate distance away to respect the privacy of the study participants.

Inmates interested in participating in the research received a copy of the study consent form written in English for review. The research associate orally explained the main objectives of the research being conducted and outlined requirements for study participation. It was reiterated that participation was voluntary and had no effect on incarceration or parole status. The University of Kansas School of Medicine Institutional Review Board approved the protocol for this study. Women completing study activities received a \$10 gift card in return for their participation in baseline activities. Baseline study activities took approximately 30 minutes for each participant to complete.

The goal window for completing the 3-month follow-up survey was ± 30 days from the 3-month postrelease date. During the baseline survey, we collected various sources of contact information for participants to facilitate follow-up: home, work, and/or cell phone numbers; current home address; e-mail address; name and number of a close friend or relative; and the name of a place in the community where the participant spent a lot of free time (e.g., church, bar, community center). Participants were told to expect a phone call from a research staff member roughly once a month until the date of the 3-month follow-up. Participants with a scheduled appointment received a letter in the mail detailing the location, date, and time of the follow-up visit, along with the research associate's contact information.

The research associate made every attempt to schedule all follow-up visits at one of two centrally located community clinics, including a city health department and a free clinic. The participant chose which location best fit her traveling needs. In the event that participants reported an inability to meet at either location for a particular reason (e.g., transportation, money, distance), the research associate allowed them to suggest an alternative public meeting place (e.g., fast-food restaurant or public library). Women completing the community-based follow-up survey received a \$50 gift card. Community-based follow-up visits took 30–45 minutes each to complete.

Measures

An interviewer administered a 166-item baseline survey and 102-item follow-up survey assessing the following information: demographics and criminal justice history; health service use and health history; reproductive health history and sexual practices; and social networks, resources, community involvement, and neighborhood environment. The dependent variable, highly effective birth control utilization, was assessed by asking women how they most often prevented pregnancy prior to incarceration and then after release from jail. Highly effective birth control users were coded "1" if they reported reliance on tubal ligation, vasectomy, birth control pills, or other highly effective reversible methods (depo medroxyprogesterone acetate (DMPA), contraceptive patch, contraceptive ring, contraceptive implants, or intrauterine devices (IUDs), both hormonal and nonhormonal). Less-effective birth control users were coded "0" if they reported use of condoms, withdrawal or "pulling out"; not

having sex during certain times of the month; using hope, prayer, or luck as a method; or not using any methods to prevent pregnancy. Independent-variable measures are described in full in Table 1.

Analyses

Chi-square tests of independence (for categorical variables) or paired-samples *t*-tests (for continuous variables) were conducted to compare baseline and follow-up characteristics of participants, as shown in Table 2. When the chi-square test showed expected counts of less than 5 owing to small sample size, which violates power assumptions, we used the Fisher–Irwin test with two-sided tests instead.²³ Only women who participated in both baseline and follow-up surveys were used for analyses in Table 2. For Table 3, chi-square tests of independence (for categorical variables) or generalized linear models (for continuous variables) were used to compare women who reported utilization of highly effective birth control and women who reported using less-effective methods. These comparisons were conducted separately for the time periods prior to incarceration and after release from jail. Stepwise logistic regression was then performed to estimate the relationship between the outcome variable, which was utilization of highly effective birth control (where 1 = highly effective birth control user and 0 = less-effective birth control user), and the predictor variables that were statistically significant in Table 3 ($p < 0.05$). Then a series of nested-model deviance tests were conducted in order to determine parameter significance. The results from these analyses are in Table 4.

Results

Participant characteristics

Prior to incarceration and after release from jail, the women in our study were on average 35.1 years old at both baseline and the follow-up survey (Table 2). Among women who completed both the baseline and follow-up surveys ($n = 66$), most were black (77.3%), and two-thirds (66.7%) had completed high school or more education.

Although our original follow-up window was 3 months from the baseline interview, it took 172 (standard deviation [SD] = 93) days on average, or about 5.7 months, to reach participants for follow-up after the pre-release interview. We successfully followed 66 out of 102 women. Women who completed the follow-up survey ($n = 66$) were more likely to have a medical home—a place where they usually go for medical care ($p = 0.04$) and have received public benefits prior to incarceration ($p = 0.045$), compared to those women who did not complete the follow-up survey ($n = 36$).

In our examination of statistically significant changes in variables from before and after incarceration, we found statistically significant differences in type of birth control used most often (the top four ranked types were consistent for responses at baseline and at follow-up and were tubal ligation or vasectomy, condoms, no method, and other hormonal birth control, $p < 0.001$); always having used condoms during sex (26.4% at follow-up and 28.6% at baseline, $p = 0.035$); type of sex partners (the majority reported that they had sex with men only, the second-highest type was sex with both men and women, $p = 0.002$); health

insurance (49.2% at both baseline and follow-up, $p < 0.001$); receipt of public benefits (65.5% at follow-up and 59.6% at baseline, $p < 0.001$); main mode of transportation (few women walked, more used a car or public transportation, $p = 0.001$). Results of the paired-samples *t*-tests showed that women at follow-up had less experience with observing neighborhood violence (summary neighborhood violence score 0.85 at follow-up vs. 1.71 at baseline, $p = 0.001$), and they also had fewer experiences of discrimination (summary neighborhood violence score 1.91 at follow-up vs. 3.2 at baseline, $p = 0.016$).

Reproductive health

Prior to incarceration and after release from jail, 2% of women reported having had a hysterectomy, and 28.4% reported not having had a period in the past 3 months. At baseline, 41.7% of women were using highly effective birth control, and 53.7% had initiated or continued a highly effective birth control method since release from jail ($p < 0.001$). Thirty-three percent of participants reported using condoms as their main birth control method at baseline; at the follow-up survey, 31.5% of participants reported using condoms as their birth control method. Respectively, 15% and 12% of participants said that they had used a birth control method besides condoms every time they had sex in the 3 months prior to incarceration or after release from jail. Close to 90% of women at both time points (88.9% at baseline and 89.7% at follow-up) said that they did not want to get pregnant. Thirty-seven percent of participants said they that would like to initiate a birth control method other than condoms upon release from jail; two-thirds of them would be interested in initiating birth control while still in jail and prior to leaving.

Factors associated with utilization of highly effective birth control

On average, the subgroup of women utilizing highly effective birth control was older ($M = 37.65 - 38.34$) than the group of less effective users ($M = 30 - 30.89$) ($p = 0.001$) (Table 3 for bivariate tests of association with highly effective birth control use). This statistically significant difference existed both at baseline and at follow-up. Similarly, the women using highly effective birth control had a higher average number of full-term pregnancies in their lifetime ($p = 0.01$ at baseline and $p < 0.001$ at follow-up). These same women also reported, on average, living in their neighborhoods for much longer ($M = 16.07$ years for baseline group, $M = 17.16$ years for respondents in the follow-up survey group) than those who were less effective users ($M = 8.30$ and 4.69, respectively). Interestingly, the users of highly effective birth control reported higher levels of lifetime alcohol problems (43.6% for baseline group and 42.9% for follow-up survey groups) when compared to users of less effective birth control (19.6% for baseline group and 16% for follow-up survey groups). They were also more likely to report having used noncondom birth control every time they had sex in the past 3 months ($p = 0.003$ for the baseline interview only). The women using highly effective birth control were more likely to report having a medical home as well as having a cell phone prior to incarceration ($p = 0.042$ and $p = 0.013$ for the baseline interview only).

TABLE 1. INDEPENDENT-VARIABLE MEASURES

<i>Variables</i>	<i>Description</i>
<i>Individual Level</i>	
Age	Calculated from date of birth at both time points.
Race/ethnicity	White, black, Asian/Pacific Islander, American Indian or Alaska native, biracial, other, Hispanic. Categories collapsed to make Hispanic a mutually exclusive category.
Educational attainment	Graduated from high school/GED
Employment	Full time, part time, or on and off.
Marital status	Single
Stably housed	Not living in a shelter, place-to-place, homeless, on the streets, or in an institution.
Parity	Number of pregnancies ever carried to full term.
Unintended pregnancy	Lifetime history of having a pregnancy that was a surprise, not planned, or unintended.
Transactional sex	Lifetime history of exchanging sex for money, drugs, or life necessities.
Sexually transmitted infections	Lifetime diagnosis of hepatitis B or C, HIV/AIDS, syphilis, gonorrhea, chlamydia, trichomoniasis, bacterial vaginosis, herpes, or human papillomavirus.
Pregnancy intentions	Agreeing or strongly agreeing with the statement "I want to be pregnant soon after I get out of jail/now." ¹⁷
Consistency of birth control use	Used a birth control method, besides condoms, every time having sex in 3 months prior to incarceration; since release from jail.
Consistency of condom use	Used condoms every time having sex in 3 months prior to incarceration; since release from jail.
Drug dependence	Assessed with DSM IV ²⁴ in year prior to incarceration.
Alcohol problems	Lifetime alcohol problems assessed with CAGE questionnaire. ²⁵
Months spent incarcerated	Number of total months spent incarcerated in lifetime.
Recidivism	Whether arrests after release from jail led to an incarceration.
<i>Interpersonal Level</i>	
Number of sex partners	Lifetime number of sex partners.
Type of sex partners	Past year/since release from jail sex with men only, women only, both men and women.
Interpersonal violence	Experience of being physically hurt, insulted, or screamed at on a regular basis by a partner, adapted from Verbal HITS Scale ²⁶ in year prior to incarceration.
Child-abuse history	Experience before age 16 of physical or sexual abuse, adapted from Childhood Experiences of Violence Questionnaire. ²⁷
Close friends	Number of people you feel at ease with, can talk to about private matters, and can call on for help, taken from CARDIA social network questionnaires. ²⁸
Close relatives	Number of relatives you feel close to, taken from CARDIA social network questionnaires. ^{28,29}
Social support	Mean social support score across 11 items, adapted from Multidimensional Scale of Perceived Social Support. ³⁰ Lower score indicates more social support.
<i>Resource Level</i>	
Health insurance	Having private insurance, Medicaid, Medicare, VA, or some other kind.
Personal doctor or nurse	Having a personal doctor or nurse who knew you best prior to incarceration.
Medical home	One place that you usually went for medical care, that had your records and knew about you prior to incarceration.
Benefits	Having food stamps, disability, social security, or cash assistance.
Transportation	Main source of transportation: walking, car, or public.
Cell phone	Having a cell phone.
Organizational	
Organizational-involvement score	Summary score across belonging to a social or recreational group, labor union, commercial group, professional organization, church group, a group concerned with children, a group concerned with community betterment, charity, or service, or some other group. ^{28,29}
<i>Environmental Level</i>	
Residence permanency	Number of years lived in neighborhood prior to incarceration.
Neighborhood violence	In past 6 months in neighborhood/since release from jail, a summary score across hearing about a fight in which a weapon was used, a violent argument between neighbors, a gang fight, a sexual assault or rape, a robbery or mugging, or a murder. ^{31,32}
Discrimination	A summary score across items referring to frequency of ever experiencing discrimination prior to incarceration/since release from jail based on race or color in school, when getting a job or housing, at work, at home, when getting medical care, on the street or in a public setting, from Experience of Discrimination Index. ³³
Collective efficacy	Mean score across 10 items of the Collective Efficacy Scale. ³¹ Higher score indicates more collective efficacy.

Variables at baseline referred to the period prior to incarceration, whereas variables at follow-up referred to the period after release from jail, unless otherwise specified in table.

GED, general equivalency degree; VA, Veterans Administration.

TABLE 2. PARTICIPANT CHARACTERISTICS PRIOR TO INCARCERATION AND AFTER RELEASE FROM JAIL

<i>Participant characteristics</i>	<i>Prior to incarceration, n=102</i>	<i>Prior to incarceration, matched n=66</i>	<i>After release from jail, n=66</i>	<i>p-value</i>
	<i>n (%) or mean (min., max.)</i>	<i>n (%) or mean (min., max.)</i>	<i>n (%) or mean (min., max.)</i>	
Age	33.72 (18, 60)	35.1 (18, 60)	35.1 (18, 60)	1.000
Race/ethnicity				
White	16 (15.7)	8 (12.1)	— ^a	— ^a
Black	73 (71.6)	51 (77.3)		
American Indian/Alaska Native	2 (2.0)	1 (1.5)		
Biracial	3 (2.9)	2 (3)		
Other	1 (1.0)	1 (1.5)		
Hispanic	7 (6.9)	3 (4.5)		
High school education or more	72 (70.6)	44 (66.7)	— ^a	— ^a
Employed	35 (34.7)	19 (29.2)	14 (21.2)	.319
Single	80 (78.4)	55 (83.3)	— ^a	— ^a
Stably housed	97 (97.0)	62 (95.4)	57 (90.5)	1.000
Number of pregnancies ever carried to full term	2.10 (0, 8)	2.3 (0, 8)	— ^a	— ^a
Ever had an unplanned pregnancy	62 (60.8)	42 (63.6)	— ^a	— ^a
Exchanged sex for money, drugs, life necessities	25 (24.8)	19 (28.8)	— ^a	— ^a
Lifetime STI history	45 (44.1)	29 (43.9)	— ^a	— ^a
Intention for pregnancy	9 (11.1)	4 (8)	4 (7.5)	.304
Type of birth control used most often				
Tubal ligation or vasectomy	29 (30.2)	24 (38.1)	23 (42.6)	
Birth control pills	3 (3.1)	2 (3.2)	1 (1.9)	
Other highly effective reversible methods (shot, patch, ring, IUD)	8 (8.3)	7 (11.1)	5 (9.3)	
Condoms	32 (33.3)	18 (28.6)	17 (31.5)	0.000***
Withdrawal or “pulling out”	3 (3.1)	2 (3.2)	0 (0)	
Not having sex during certain times of month	6 (6.3)	3 (4.8)	0 (0)	
Hope/prayer/luck	0 (0)	0 (0)	7 (13.0)	
No method	15 (15.6)	7 (11.1)		
Always used a birth control method	15 (15.3)	11 (17.5)	6 (11.5)	.060
Always used condoms	28 (28.6)	18 (28.6)	14 (26.4)	.035*
Past year drug dependence	37 (36.3)	25 (37.9)	— ^a	— ^a
Lifetime alcohol problems	30 (30.0)	20 (31.3)	— ^a	— ^a
Number of months incarcerated in lifetime	10.92 (0, 192)	12.5 (0, 192)	— ^a	— ^a
Recidivism	— ^a	— ^a	10 (15.2)	— ^a
Lifetime number of sex partners	23.22 (1, 1000)	30.81 (1, 1000)	1.98 (0, 50)	.105
Type of sex partners				
Sex with men only	85 (83.3)	55 (83.3)	48 (72.7)	
Sex with women only	5 (4.9)	4 (6.1)	2 (3)	.002**
Sex with both men and women	12 (11.8)	7 (10.6)	4 (6.1)	
Past year intimate partner violence	42 (41.6)	26 (40)	—	—
Physical or sexual abuse history before age 16	45 (44.1)	28 (42.4)	—	—
Number of close friends	1.37 (0, 4)	1.29 (0, 4)	1.3 (0, 4)	.883
Number of close relatives	2 (0, 4)	2.03 (0, 4)	1.77 (0, 4)	.110
Social support score	1.965 (1, 3.73)	1.956 (1, 3.55)	1.940 (1, 3.64)	.818
Insured	48 (49)	31 (49.2)	32 (49.2)	0.000***
Had a personal doctor or nurse	25 (24.5)	16 (24.2)	— ^a	— ^a
Had a medical home	82 (80.4)	57 (86.4)	— ^a	— ^a
Receipt of benefits	42 (51.2)	31 (59.6)	38 (65.5)	.000***
Main transportation				
Walks	13 (12.7)	7 (10.6)	10 (15.2)	
Uses car	61 (59.8)	39 (59.1)	22 (33.3)	.001**
Uses public transportation	28 (27.5)	20 (30.3)	34 (51.5)	
Had a cell phone	94 (92.2)	61 (92.4)	58 (87.9)	.107
Organizational-involvement score	0.65 (0, 4)	0.74 (0, 4)	0.79 (0, 4)	.725
Number of years lived in neighborhood	11.56 (0, 50)	12.58 (0, 48)	— ^a	— ^a
Lives at same address as prior to incarceration	— ^a	— ^a	41 (62.1)	— ^a
Neighborhood violence score	1.65 (0, 6)	1.71 (0, 6)	0.85 (0, 6)	.001**
Discrimination score	2.68 (0, 16)	3.2 (0, 16)	1.91 (0, 12)	.016*
Collective efficacy score	2.68 (1.5, 5)	2.64 (1.5, 5)	2.64 (1, 5)	0.969

^aVariable was assessed at only one time point.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ for matched comparisons of participants who completed both the baseline and follow-up surveys. IUD, intrauterine device; max., maximum; min., minimum; STI, sexually transmitted infection.

TABLE 3. PARTICIPANT CHARACTERISTICS BY BIRTH CONTROL USE PRIOR TO INCARCERATION AND AFTER RELEASE FROM JAIL

Participant characteristics	Highly effective birth control utilization, n = 37		Less-effective birth control utilization, n = 59		Highly effective birth control utilization, n = 28		Less-effective birth control utilization, n = 26		p-value
	Prior to incarceration				After release from jail				
	n (%) or mean (min., max.)	n (%) or mean (min., max.)	n (%) or mean (min., max.)	n (%) or mean (min., max.)	n (%) or mean (min., max.)	n (%) or mean (min., max.)	n (%) or mean (min., max.)	n (%) or mean (min., max.)	
Age	37.65 (22, 57)	30.89 (18, 60)	38.34 (23, 57)	30.00 (20, 60)	.001**			.001**	
White vs. all else	6 (15)	10 (17.9)	3 (10.3)	2 (8)	1.000			1.000	
Black vs. all else	31 (77.5)	36 (64.3)	23 (79.3)	21 (84)	.736			.736	
High school education or more	28 (70)	39 (69.6)	18 (62.1)	15 (60)	.876			.876	
Employed	11 (27.5)	21 (37.5)	5 (17.2)	7 (28)	.343			.343	
Single	30 (75)	45 (80.4)	23 (79.3)	24 (96)	.108			.108	
Stably housed	37 (94.9)	54 (98.2)	26 (92.9)	22 (91.7)	1.000			1.000	
Number of pregnancies ever carried to full term	2.63 (0, 8)	1.71 (0, 7)	3.31 (1, 8)	1.38 (0, 5)	.000***			.000***	
Ever had an unplanned pregnancy	26 (65)	33 (58.9)	20 (69)	15 (60)	.492			.492	
Ever exchanged sex for money, drugs, life necessities	11 (29.7)	14 (23.7)	9 (31)	8 (32)	.939			.939	
Lifetime STI history	19 (47.5)	25 (44.6)	12 (41.4)	13 (52)	.435			.435	
Intention for pregnancy	1 (2.5)	5 (8.9)	2 (10)	1 (4.3)	.590			.590	
Always used a birth control method	11 (28.2)	3 (5.7)	5 (20)	0 (0)	.052			.052	
Always used condoms	8 (20.5)	19 (35.8)	5 (19.2)	8 (36.4)	.183			.183	
Past-year drug dependence	15 (37.5)	21 (37.5)	14 (50)	8 (30.8)	.225			.225	
Lifetime alcohol problems	17 (43.6)	11 (19.6)	12 (42.9)	4 (16)	.033*			.033*	
Number of months incarcerated in lifetime	8.85 (0, 135)	9.55 (0, 90)	7.62 (0, 48)	14 (0, 135)	.294			.294	
Lifetime number of sex partners	14.53 (1, 100)	30.40 (1, 1000)	9.64 (1, 30)	63.5 (2, 1000)	.055			.055	
Sex with men only	37 (92.5)	47 (83.9)	24 (82.8)	21 (84.3)	.949			.949	
Sex with women only	0 (0)	2 (3.6)	0 (0)	0 (0)					
Sex with both men and women	3 (7.5)	7 (12.5)	2 (6.9)	2 (8)					
Past-year intimate partner violence	16 (40)	24 (42.9)	11 (37.9)	12 (50)	.378			.378	
Physical or sexual abuse history before age 16	16 (40)	27 (48.2)	10 (34.5)	12 (48)	.313			.313	
Number of close friends	1.30 (0, 4)	1.45 (0, 4)	1.34 (0, 2)	1.40 (0, 4)	.801			.801	
Number of close relatives	2.10 (0, 4)	1.91 (0, 4)	1.83 (0, 4)	1.76 (1, 4)	.790			.790	
Social support score	1.97 (1, 3.55)	1.99 (1, 3.73)	1.90 (1.09, 3.45)	1.98 (1, 3.64)	.629			.629	
Insured	17 (42.5)	29 (53.7)	13 (46.4)	15 (60)	.323			.323	
Had a personal doctor or nurse	9 (22.5)	13 (23.2)	9 (31)	5 (20)	.356			.356	
Had a medical home	36 (90)	41 (73.2)	28 (96.6)	20 (80)	.085			.085	
Receipt of benefits	18 (54.5)	21 (47.7)	17 (68)	16 (72.7)	.724			.724	
Mainly walks for transportation	7 (17.5)	6 (10.7)	1 (3.4)	4 (16)	.134			.134	
Mainly uses car	24 (60)	32 (57.1)	13 (44.8)	6 (24)					
Mainly uses public transportation	9 (22.5)	18 (32.1)	15 (51.7)	15 (60)					
Had a cell phone	40 (100)	48 (85.7)	27 (93.1)	21 (84)	.399			.399	
Organizational- involvement score	0.68 (0, 4)	0.57 (0, 3)	0.90 (0, 4)	0.68 (0, 2)	.418			.418	
Number of years lived in neighborhood	16.07 (1, 50)	8.30 (0, 37)	17.16 (1, 46)	4.69 (0, 19)	.006***			.006***	
Neighborhood violence score	1.58 (0, 6)	1.69 (0, 6)	.83 (0, 6)	1.00 (0, 5)	.663			.663	
Discrimination score	2.56 (0, 16)	2.42 (0, 12)	1.55 (0, 11)	2.04 (0, 9)	.561			.561	
Collective efficacy score	2.73 (1.5, 4.9)	2.54 (1.5, 4.25)	2.48 (1, 4.6)	2.81 (1.3, 5)	.227			.227	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

We did not present the analysis based on associations between follow-up variables as both independent and dependent variables, because no associations were statistically significant.

TABLE 4. NESTED-MODEL DEVIANCE TESTS OF THE UTILIZATION OF HIGHLY EFFECTIVE BIRTH CONTROL FOR PARTICIPANTS PRIOR TO INCARCERATION AND AFTER RELEASE FROM JAIL

	<i>-2 log likelihood of model</i>	<i>Change in chi-square</i>	<i>df</i>	<i>Sig. of variable</i>	<i>Sig. of model</i>
Model 1: Highly effective birth control utilization prior to incarceration					
Age	51.237	0.029	1	0.865	0.865
Number of pregnancies	51.054	0.183	1	0.669	0.899
Always used a birth control method	40.706	10.348	1	0.001**	0.014*
Number of years lived in neighborhood	40.182	0.524	1	0.469	0.026*
Lifetime alcohol problems	35.259	4.923	1	0.027*	0.007**
Had a medical home prior to incarceration	35.206	0.053	1	0.818	0.013*
Had a cell phone prior to incarceration	34.955	0.251	1	0.616	0.022*
Model 2: Highly effective birth control utilization after release from jail					
Age	40.127	2.038	1	0.153	0.153
Number of pregnancies	33.837	6.290	1	0.012*	0.016*
Lifetime alcohol problems	30.176	3.661	1	0.056	0.007**
Number of years lived in neighborhood	26.384	3.792	1	0.052	0.003**

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
df, degrees of freedom; sig., significance.

Table 4 shows the results of our nested-model deviance tests, which further evaluate findings in the bivariate tests by comparing changes in model fit between nested models. For the first model, which assessed correlates of utilization of highly effective birth control prior to incarceration, the omnibus tests of model coefficients indicated that the final model was statistically significant ($p = 0.022$). Model 1 included the following predictor variables, which were statistically significant in Table 3: age, lifetime number of pregnancies, always having used a noncondom birth control method in the 3 months prior to incarceration, number of years lived in their neighborhood, lifetime alcohol problems, having had a medical home prior to incarceration, and having had a cell phone prior to incarceration. Among these predictor variables, always having used a birth control method ($p = 0.001$, $X^2_d = 10.35$, $df = 1$) and lifetime alcohol problems ($p = 0.027$, $X^2_d = 4.92$, $df = 1$) were statistically significant.

Model 2 in Table 4 included the following predictor variables: age, lifetime number of pregnancies, life alcohol problems, and number of years lived in their neighborhood. The model was statistically significant ($p < 0.003$). Only lifetime number of pregnancies appeared to be statistically significant ($p = 0.012$, $X^2_d = 6.29$, $df = 1$). Yet, both lifetime alcohol problems ($p = 0.056$) and number of years lived in neighborhood ($p = 0.052$) were marginally significant in Model 2.

Discussion

We found that consistency of birth control use, alcohol problems, and parity were associated with utilization of highly effective birth control in our sample. It should come as little surprise that when women rely on sterilization or other highly effective reversible methods, they are also more consistent birth control users.²⁰ As has been found in the literature, greater number of past pregnancies was associated with use of highly effective birth control in our sample.³⁴ Women may elect to use permanent or long-acting reversible contraceptives when they have decided not to have more children.^{35,36} However, even when women wish only to avoid pregnancy for the time being, they still might not elect for

more effective birth control methods, which is certainly an area for increased public health programming efforts.

Although it appeared that highly effective birth control use increased after the women's release from jail, only about half of them reported using a highly effective birth control method, whereas 90% did not want to get pregnant. This discrepancy between behaviors and goals potentially signals a failure in contraceptive initiation, owing to multiple levels of influence—ambivalence about birth control, issues with sex partners, barriers related to finances, health insurance status, or proximity of health centers after women are released from jail.

Other studies have demonstrated that women would prefer receiving birth control as they are leaving jails,^{17,37} presumably to avoid navigating the health system amid competing obligations upon release from jail. One study also showed that when an intervention is offered, initiation of contraceptive methods increases.¹⁷ Offering birth control in jails prior to women's release would help them overcome barriers to contraceptive use related to logistics, financial resources, health insurance, time, and partner issues. But the research is limited in that very little is known about other factors that account for uptake of highly effective birth control, especially given ongoing criminal justice involvement. We know that for many women, incarceration, release, and reincarceration are ongoing events^{6,8} that are not only tumultuous but also may become part of the regular decision making around sex and contraception. Future programs would do well to take this reality into account when considering what birth control methods to offer to women.

Our sample included a large number of women who reported tubal ligation histories (30% of the sample), whereas only few used other highly effective reversible methods (8.3% prior to incarceration; 11.1% after release from jail). Public health practitioners would have to be cautious in educating about such a permanent procedure as the tubal ligation, especially in light of the stigma of criminal justice history and possibility for coercion,³⁸ though direct provider coercion may not be the primary factor in women's opting for tubal ligation in all circumstances, especially those outside of prison walls.³⁵ Our participants' low rates of highly effective

reversible contraceptive method use (and only about an additional 3% of women reported use of birth control pills) are similar to those found in other studies. LaRoche et al.³⁷ reported that 20% of their participants incarcerated in a county jail used reversible hormonal contraception, IUDs, or implants. These researchers attribute low rates of contraceptive use to logistical barriers, such as access, in addition to low levels of knowledge and lack of partner willingness. Future studies should continue studying the dynamics associated with use of reversible contraceptives, especially those methods most likely to consistently prevent unintended pregnancy.^{20–22}

We found, somewhat surprisingly, that having a lifetime history of alcohol problems was associated with the use of highly effective birth control. Without further qualitative probing, we cannot explain what that means in women's real-life experiences. However, we can offer some possible explanations. For one, women with long-term alcohol problems may have decided early on to limit childbearing in a reliable manner, as other studies have posited.³⁹ Second, women with those histories may also be connected to a network of social services (e.g., drug and alcohol treatment) that may indirectly affect access to other types of health services, including family planning. Other investigators have shown, for example, positive associations between several types of substance use with access to sexual and reproductive healthcare.⁴⁰ Further investigation into these factors is warranted. The less-optimistic view is that women with drug or alcohol problems may also be encouraged (or paid) to opt for more permanent or long-lasting methods of birth control.^{41,42}

Conclusions

We argued at the beginning of this article that fundamental-cause theory is about people's access to resources that facilitate health¹⁹: in this case, access to and, thus, use of highly effective birth control methods. Despite our exploration of variables at multiple levels of influence, we found that personal factors (consistency of birth control use, alcohol problems, and pregnancy history) were salient to reproductive-health decision making in our sample. The relationship between these variables and other levels of influence—for example, discrimination or coercion in healthcare systems for people with alcohol problem histories—should be investigated further.

Limitations of this study include its small sample size. This analysis was based on a pilot study of how women get connected to birth control and sexually transmitted infections (STI) services upon release from jail. However, our pilot results add to a very small literature on the subject of contraceptive use among women with criminal justice involvement. We also had a relatively low follow-up rate of our sample (~65%). Following men and women leaving jails is incredibly difficult, as many people in this group have unstable living and communication situations upon release. Multiple methods of outreach, including street-based outreach, have to be employed in order to generate better follow-up results. Our future work will have to address this limitation. Noting these limitations, a similar study with a larger sample size and better follow-up rates might yield more meaningful results.

Ours was also an exploratory study. Although guided by a theoretical framework in study design and selection of variables, the goal of the pilot study was also exploratory

rather than testing a hypothesis. Given these issues, it is unclear whether our findings mimic real-world conditions or generalize beyond our small sample of urban midwestern women returning to the community from jail, though we hope to use pilot results from this study to guide future local intervention efforts. Also speaking to generalizability, a limitation of our study was capturing a snapshot of the women's circumstances before and after incarceration. Given the high rates of recidivism and long histories of criminal justice involvement for many women—movement in and out of jails over the life course—we cannot generalize our findings about before- and after-jail experiences to every woman leaving jail, given the dynamics of incarceration, release, and reincarceration unique to each woman.

The public health implications of this study include an important contribution to the dearth of literature about high-risk women's unintended-pregnancy prevention planning. At the public health programming level, findings from this study and others^{1–3,17,18} can lead to intervention efforts aimed at improving unintended-pregnancy prevention among incarcerated women, both during their confinement and upon release from jail.

The majority of women incarcerated in US jails will leave within the year. Most of those women report having the goals of preventing pregnancy and resuming sexual activity upon release from jail. Yet few have plans in place to effectively prevent pregnancy. Clinical and public health programming efforts should help bridge the gap between the desire for pregnancy prevention and practice. Efforts might include facilitation of birth control initiation prior to release, connections with local health departments and jail facilities to offer comprehensive women's health planning upon release, or broader community efforts at expanding access to highly effective birth control methods, particularly long-acting reversible contraceptives. Other studies around the country,^{17,37} including our own, have shown that many women would prefer to initiate birth control prior to release. Yet the trend of corporately run, prevention-averse jail-based healthcare may stand in the way of such efforts.^{37,43,44} Utilizing the public health infrastructure to deliver comprehensive family planning services to women leaving jails may be a new direction for local jurisdictions to most effectively implement community-wide family planning efforts. Elements of the Affordable Care Act guarantee free contraceptive services for most women in the United States, including those who have left jails. Community- and jail-based clinicians, public health workers, educators, and researchers could play an important role in capitalizing on these new opportunities for unintended-pregnancy prevention.

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