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Education level as a predictor of condom use in jail-incarcerated women, with fundamental-cause analysis

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Abstract

Objective: To model condom usage by jail-incarcerated women incarcerated in U.S. local jails and understand results in terms of fundamental cause theory.

Design, Sample, Measurements: We surveyed 102 women in an urban jail in the Midwest U.S. Chi-square tests and generalized linear modeling were used to identify factors of significance for women who used condoms during last-sex compared with women who did not. Stepwise multiple logistic regression was conducted to estimate the relation between the outcome variable and variables linked to condom use in the literature.

Results: Logistic regression showed that for women who completed high school odds of reporting condom use during last sex were 2.78 times higher ($p = .043$) than the odds for women with less than a high school education. Among women who responded no to ever having had a sexually transmitted infection, odds of using a condom during last sex were 2.597 times ($p = .03$) higher than odds for women who responded that they had had a sexually transmitted infection.

Conclusions: Education is a fundamental cause of reproductive health risk among incarcerated women. We recommend interventions that creatively target distal over proximal factors.

Keywords

women's health; sexually transmitted diseases (STDs); underserved populations; prisoners; socioeconomic factors

Introduction

Women who are or have been incarcerated or are on some form of community corrections, referred to hereafter as *justice-involved*, make up a sizable, vulnerable population with well-studied pathways to incarceration. The pathways model of women's crime arose from a

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recognition by feminists and others beginning in the 1990s that women's and men's experiences prior to criminal offending tend to differ and, as a result, their experiences of punishment, rehabilitation, and community reentry often differ as well (Belknap, 2001/2007; Chesney-Lind, 1997/2004; Daly, 1994; Steffensmeier & Allan, 1996). The pathways model of women's crime maps the distinctive life course experiences that women with criminal justice involvement hold in common, such as homelessness, limited education, small children at home, mental illness and substance use disorder (DeHart, Lynch, Belknap, Dass-Brailsford, & Green, 2014; Harlow, 2003; Salisbury & Van Voorhis, 2009; Harlow, 2003; Solomon, Johnson, Travis, & McBride, 2004). Perhaps most distinctive to the pathways model is the prominence of trauma. Women who have a history of incarceration report disproportionately high rates of childhood sexual abuse, adult intimate partner abuse, rape, and having been witness to the violent injury or death of another (Grella, Lovinger, & Warda, 2013). The combined effects of these challenges is cyclical and synergistic, notoriously difficult to address, and potentially devastating to women's health and well-being (Kelly, Cheng, Spencer-Carver, & Ramaswamy, 2014).

Among the most common health challenges of women with history of incarceration are sexually transmitted infections. Women with significant histories of criminal justice involvement report higher rates of STIs than women in the general population (Berzofsky, Unangst, & Maruschak, 2015; Binswanger, Krueger, & Steiner, 2009; Kouyoumdjian, Leto, John, Henein, & Bondy, 2012). Cross-sectional studies in both U.S. jails (usually providing short-term incarceration and detention) and prisons (typically for felony sentences over a year) document lifetime STI rates for incarcerated adults in the range of 20–40%, with gonorrhea rates up to 24 times higher and syphilis rates up to 32 times higher among women in jail than women in general (Allsworth, Secura, Zhao, Madden, & Peipert, 2013; Javanbakht et al., 2014; Wiehe et al., 2015). High rates of STIs are concerning, especially since, beyond their expense and discomfort, STIs are a risk factor for more serious conditions, including increased susceptibility to HIV infection, infertility, life-threatening ectopic pregnancy, liver disease, transmission to newborns, and cervical cancer (Binswanger et al., 2009; U.S. Centers for Disease Control and Prevention, 2013; U.S. Centers for Disease Control and Prevention, 2011, 2013).

There has been little research to assess sexual health risk in this population specific to the use or non-use of condoms, though there are a number of studies that include condom use in their measures (Clarke et al., 2006; Laroche et al., 2012; Ramaswamy, Chen, Cropsey, Clarke, & Kelly, 2015; Schonberg, Bennett, Sufrin, Karasz, & Gold, 2015; Swan & O'Connell, 2012). But research in general with women who are incarcerated or have a history of justice-involvement remains comparatively sparse offering no consensus about with whom, why, or when women with a history of incarceration use condoms and, consequently, no clear direction as to how to bring about higher rates of use.

Guided by the socioecological and developmental assumptions of the pathways model, we adopted Phelan and Link's (1995) fundamental cause theory as a theoretical framework for this study. Fundamental cause theory holds that beneath many health disparities lie broad social determinants, such as income and education, that affect the access that groups have to health-related resources in graded and persistent ways (Link & Phelan, 1995; Phelan, Link,

& Tehranifar, 2010). Understanding these fundamental cause factors can help public health nurses and other providers who endeavor to address sexual health promotion with women who are justice-involved.

We present a secondary analysis of data from a parent survey the purpose of which was to learn more about the barriers to sexual health that women experience before and after a jail incarceration. Previously published results from the parent study reported change in women's highly-effective contraception use (i.e., sterilization, long-acting reversible contraception) before and after an incarceration and implications for unplanned pregnancy (Ramaswamy et al., 2015). In the present analysis, we asked, "What social factors are associated with women's use and non-use of condoms prior to an incarceration." Fundamental cause theory was used to explain our findings and to frame next steps for public health nurses and other providers.

Methods

Design and Sample

Participants for the cross-sectional parent survey were recruited in 2012 from a moderate-sized, urban jail located in a large U.S. metropolitan area in the Midwest. The jail serves as a detention center for persons held on misdemeanor and felony sentences that carry terms of one year or less, persons arrested for parole and probation violations, and those denied bond and awaiting trial. Eligibility for the parent study was age 18 years or older, ability to read English, and not being in segregation (solitary confinement). The one exclusion criterion (because the parent study included a post-incarceration follow-up) was certainty that one's stay would be longer than one week. The average daily census for this jail was 50 women. Recruitment for the study yielded 102 participants (with a recruitment goal of 100–110) over seven months. Based on daily census in the facility, we estimate that approximately one half of the women who moved through the jail during that period were enrolled.

Surveys were administered to participants by study staff in a meeting room at the jail. Although jail staff also accompanied participants and remained nearby during completion of study activities, these remained outside the room at a respectful distance to ensure participants' privacy. Surveys were completed by the women in paper-and-pen format. All participants were consented per terms approved by jail administrators and the institutional review boards of [Blinded for review]. Women were assured that completing or not completing the survey would have no bearing on the terms of their discharge or the disposition of their case. For their participation, the women who submitted a survey received a \$10 gift card.

Measures

Design of the 161-item, 30-minute survey was guided by fundamental cause theory and the pathways literature that addresses health risk among women with criminal justice involvement. Broadly, these included 1) *psychological health*—i.e., substance abuse history and experiences with adult and childhood abuse; 2) *personal and social support*; and 3) *reproductive health history and sexual practices* (e.g., STI history, contraceptive use, and

beliefs and practices related to sexual partnerships. Additional items related to financial resources and transportation, community/organizational belonging, and perceived safety in home and neighborhood were included.

Instruments used in or adapted for the survey included the Relationship with Provider Scale (Knowlton et al., 2010), the CES-D Depression Scale (Radloff, 1977), the CAGE Questionnaire (for alcoholism) (Ewing, 1984); the Childhood Experiences of Violence Questionnaire (Walsh, MacMillan, Trocmé, Jamieson, & Boyle, 2008), the Multidimensional Scale of Perceived Social Support (Zimet, Powell, Farley, Werkman, & Berkoff, 1990), the Norbeck Social Support Scale (Norbeck, Lindsey, & Carrieri, 1981), an adapted version of the Social Support Questionnaire (Sarason, Levine, Basham, & Sarason, 1983), and the Black Youth Project Survey (2005/2015). Questions were also adapted from Clarke et al. (2006); Compton, Grant, Collier, Glantz, & Stinson (2004); Daniels, Crum, Ramaswamy and Freudenberg (2011); Purcell et al. (2004); Earls and Visser (1997); Sampson, Raudenbush, and Earls (1997); and Wright et al. (2004).

We measured condom use with a dichotomous item that asked whether a condom was used the last time a woman had sex. Researchers have found the last-sex measure a reliable and valid proxy indicator for consistent condom use (Younge et al., 2008). Cross tabulation using Fisher's exact test for the last-sex condom use variable and for a second condom-use variable from the survey ("always use a condom/sometimes or never use a condom") was positive and statistically significant ($\Phi = .626$, $p = .000$), further suggesting good concurrence of measurement on the construct of consistent condom use.

Analytic Strategy

Frequency distributions and comparison of means for sample characteristics and the outcome measure were calculated using IBM SPSS Statistics version 22.0. We conducted comparison of means using 2×2 cross tabulation with chi-square testing (Fisher-Irwin for counts less than five) and general linear modeling for continuous variables. Statistically significant correlates found in comparisons of means were applied in multivariate logistic regression modeling, using stepwise entry method and nested-model deviance testing, to identify statistically significant predictors of variance in last-sex condom use.

Results

Descriptive Results

Table 1 depicts frequencies for selected demographic characteristics in the survey. Of the 102 women in our survey, 75.5% were Black, 78.4% single, and 61.8% had at least one child under age 18. Only 21% of the women had more than a high school education or General Educational Development (GED), and 54.9% were unemployed at the time of their most recent arrest. Thirty-eight percent ($n = 39$) of the women who took the survey reported last-sex condom use. In response to a survey question that listed diagnoses of specific sexually transmitted infections, 44% participants responded *yes* to ever having been diagnosed with an STI, including chlamydia, gonorrhea, hepatitis B or C, *human papillomavirus* (HPV), human immunodeficiency virus (HIV), herpes, syphilis, or trichomoniasis. Lifetime

diagnosis rates for common individual infections, including chlamydia, gonorrhea, and trichomoniasis, ranged from 18% to 25.5%.

In Table 1, we also reported means and two-tailed statistical significance at $p = .05$ level for relationships between the outcome variable (use of a condom during the last time having sex) and selected personal, interpersonal, and environmental factors. Two significant correlates for last-sex condom use were identified: having attained a high school education/GED or more (82.1% of those who used a condom during last sex had at least a high school education compared with 63.5% of those who did not use a condom, $p = .046$) and lifetime STI history (30.8% of those who used a condom during last sex had a history of STI diagnosis compared with 52.4% of those who did not use a condom; $p = .033$). We also found a statistically significant relationship between the use of condom during last time having sex and the independent alternative condom-use variable, “always used condoms” ($p = .000$).

Logistic model

The stepwise logistic regression analysis fitted a model (Table 2) for last-sex condom use that included three factors: high school education/GED or more, lifetime STI history, and always used condoms. After removing the always used condoms variable, a significant model ($p = .01$) was estimated, showing that women who completed high school/GED had odds of reporting use of a condom during last sex that were 2.78 times higher than the odds of women who had less education. Among women who responded *No* to ever having had an STI, odds of using a condom during last sex were 2.597 times ($p = .03$) higher than the odds for women who responded that they had had an STI.

Discussion

We sought to identify factors associated with condom use among women incarcerated in a county jail, a group who experience a disproportionate burden of STIs. To understand more about what constitutes their risk, we assessed a number of personal, structural, and environmental variables. Multivariate nested modeling indicated that, among criminal justice-involved women, only higher levels of attained education and not having been previously diagnosed with an STI were significantly related to last-sex condom use.

History

Our findings showed that never having had an STI was predictive of higher likelihood of condom use by participants. The lifetime diagnosis rate for any STI was 44%. The U. S. Centers for Disease Control and Prevention (CDC) (2011), which monitors rates of chlamydia, gonorrhea, syphilis, and HIV, have reported that the rates submitted by correctional populations are among the highest of any setting. Prevalence studies in jails and prisons have likewise documented lifetime STI rates among incarcerated persons in the 20–40% range, slightly lower than what we found (Allsworth et al., 2013; Hogben, St. Lawrence, & Eldridge, 2001).

The association between having never had an STI and a higher likelihood of condom use during last sex was not surprising, since last-sex condom use proxies for consistent condom

use, and consistent condom use is effective in preventing STIs (U. S. Centers for Disease Control and Prevention, 2014). The obverse, that women who *do* have a history of STI are less likely than those with no such history to use a condom is more troubling. After all, a history of STI diagnosis presumably means having received treatment, including, hopefully, some teaching related to risk and prevention. If having had an STI in the past predicts inconsistent condom use in the present, there would appear to be a breakdown in the chain of prevention, a weakness in the means used to effect change at point of care or more generally in outreach to a vulnerable population via public health channels. On its own though, lifetime STI is an opaque indicator that calls for further investigation to parse out mechanisms that connect lack of STI history with propensity to use a condom.

Education as fundamental cause

The key finding in this study was that last-sex condom use was higher among those with more than high school education than those with less. Education has been recognized as a structural determinant of health, one of the so-called “causes of causes” (Braveman & Gottlieb, 2014). Higher education is a flexible resource in terms of fundamental cause theory, because higher education gives those who have it—often those of higher social-economic status—wide ranging and persistent protection against many threats to health (Link & Phelan, 1995). Meta-analyses support this view, with researchers demonstrating that higher educational attainment is not only associated with better health but is independently related to lower mortality, exclusive of other factors including income level and race/ethnicity (Hummer & Hernandez, 2013; Montez, Hummer, & Hayward, 2012).

Our findings in this study were consistent with other work documenting links between education and health in the realm of women’s sexual and reproductive health (Biggs, Karasek, & Foster, 2012; Nijhawan, Salloway, Nunn, Poshkus, & Clarke, 2010; Painter, Wingood, DiClemente, Depadilla, & Simpson-Robinson, 2012), including studies of women in carceral settings (Bonney, Clarke, Simmons, Rose & Rich, 2008; Nijhawan et al., 2010). In one recent investigation, incarcerated women with greater than a high school education were found 3.9 times more likely to have obtained a Pap test in the previous year than women reporting less than a high school education (Nijhawan et al., 2010). Biggs et al. (2012) discovered that female family planning clinic visitors with less than a college education were more likely to have had unprotected intercourse than those with more education. In another study, researchers determined that among African American women less than a college education predicted lower condom communication skill levels, lower degrees of self efficacy, and less perceived control over condom use (Painter et al., 2012). Radecki and Beckman (1994) found that women with a high school education or less were 3.5 times more likely to be inconsistent in their condom use than women with more than a high school education.

Precisely *how* education translates into women’s sexual health and health-risk prevention behaviors like consistent condom use remains uncertain (Hummer & Hernandez, 2013). In an oft-cited study involving data from U.S. national surveys of over 5,000 men and women, Ross and Wu (1995) identified three pathways through which higher educational attainment likely impacts health: work and economic conditions, social and psychological resources,

and lifestyle. Other research has indicated that the cognitive abilities fostered by education—and especially the decision-making and reasoning capacities developed through educational experience—are more predictive of health outcomes than simple knowledge acquisition (Baker, Leon, & Collins, 2011). Associated proficiencies, such as verbal reasoning and communications skills, appear to weigh into the relationship between cognitive development and women's sexual health as well (Painter et al., 2012).

In our sample, women with higher levels of formal education reported using condoms with more consistency than those with less education. The mechanisms by which education translates into women's reproductive and sexual health remain unclear, but fundamental cause theory usefully urges us to look closer. Among other things, the literature on education and health, and particularly sexual health decision making and preventive behaviors, suggests that the health-enhancing mechanisms of education may include greater cognitive development (Baker, Leon, Smith Greenaway, Collins, & Movit, 2011), better psychosocial and verbal skills (Muchomba, Chan, & El-Bassel, 2015; Painter et al., 2012), and more access to social groups among whom health-seeking behaviors are common (Ross & Wu, 1995).

Implications for Practice and Policy

If we take seriously fundamental cause theory and the research that supports it, we must recognize that proximal causes, such as substance abuse or lack of transportation, loom large in part *because* they are proximal (Phelan et al., 2010). Yet, addressing the mechanism at hand without addressing the fundamental causes of inequality will lead us merely to encounter the same gradient in a new health threat on a different day. Short of direct political advocacy or activism—which should not be out of the question for public health nurses—how can we address the effects of well-entrenched social and economic disparities that underlie sexual health risks for women in marginalized groups? An obvious and necessary first step is to acquire a firmer education and research base in how the theories that incorporate the concept—including fundamental cause theory—explain health-risk phenomena in populations. This is a step some have argued is too often bypassed in nursing and other educational, theoretical, and practice environments where tailored plans and personalized treatments—individuals and their bootstraps—represent the dominant approach (Draine, McTighe, & Bourgois, 2011; Falk-Rafael & Betker, 2012).

Additionally, advocating for increased funding and incentives to improve educational opportunities for women with criminal justice involvement and encouraging women in socioeconomically marginalized groups to stay in school longer are obvious musts. Beyond that, we recommend that nurse interventionists adopt critical health literacy and empowerment education principles in designing programming for women marginalized by legal status.

Conclusion

Criminal justice involved women represent a population for whom reproductive health risks are prominent and persistent. As the theory of fundamental causes helps to clarify, the health disparities women confront are partly an outcome of larger social-economic disparities

(Phelan et al., 2010). Decisions people make and the actions they take to protect their health—including decisions such as whether or not to use a condom—are shaped by complex interactions between personal factors and contextual factors, including systemically supported income and wealth inequalities, gender power differentials, and the uneven educational and employment opportunities that help to perpetuate them. Improving health equality *can* involve, as an interim approach, addressing attitudes and behaviors of individual women, but as theorists have warned, merely changing the personal risk factors of disease without tackling structural and systemic inequalities that bring them into being will never get us very far toward achieving health parity for women with criminal justice involvement.

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Table 1:

Participant Characteristics by Birth Control Use

<i>Participant characteristics</i>	<i>Used condom during last sex, N=39</i>	<i>Not used condom during last sex, N=63</i>	<i>P-value</i>
	<i>N (%) or Mean (min, max)</i>	<i>N (%) or Mean (min, max)</i>	
Age	33.82 (21, 53)	33.65 (18, 60)	.935
White vs. all else	5 (12.8)	11 (17.5)	.531
Black vs. all else	29 (74.4)	44 (69.8)	.623
High school education or more	32 (82.1)	40 (63.5)	.046*
Employed	15 (38.5)	20 (32.3)	.524
Single	31 (79.5)	49 (77.8)	.838
Stably housed	38 (100)	59 (95.2)	.087
Number pregnancies carried full term	2 (0, 7)	2.16 (0, 8)	.661
Ever had an unplanned pregnancy	22 (56.4)	40 (63.5)	.477
Ever exchanged sex for money, drugs, life necessities	10 (26.3)	15 (23.8)	.777
Lifetime STI history	12 (30.8)	33 (52.4)	.033*
Always used condoms	24 (64.9)	4 (6.6)	.000**
Past year drug dependence	13 (33.3)	24 (38.1)	.627
Lifetime alcohol problems	12 (31.6)	18 (29)	.787
Number of months incarcerated in lifetime	17.23 (0, 192)	6.95 (0, 90)	.065
Lifetime number of sex partners	14.11 (0, 100)	29.07 (1, 1000)	.455
Past year intimate partner violence	12 (30.8)	30 (48.4)	.080
Physical or sexual abuse before age 16	16 (41)	29 (46)	.621
Number of close friends	1.36 (0, 4)	1.38 (0, 4)	.914
Number of close relatives	1.87 (0, 4)	2.08 (0, 4)	.415
Social support score	1.97 (1, 3)	1.96 (1, 3.73)	.989
Insured	17 (43.6)	31 (49.2)	.504
Had a medical home	29 (74.4)	53 (84.1)	.227
Receipt of benefits	17 (48.6)	25 (53.2)	.679
Mainly walks for transportation	5 (12.8)	8 (12.7)	
Mainly uses car	22 (56.4)	39 (61.9)	.829
Mainly uses public transportation	12 (30.8)	16 (25.4)	
Had a cell phone	37 (94.9)	57 (90.5)	.707
Organizational involvement score ^a	.59 (0, 3)	.68 (0, 4)	.598
Number of years lived in neighborhood	10.86 (1, 46)	12.08 (0, 50)	.718
Neighborhood violence score ^b	1.47 (0, 5)	1.76 (0, 6)	.450
Perceived discrimination score ^c	3.03 (0, 16)	2.47 (0, 14)	.480
Collective efficacy score ^d	2.53 (1.5, 5)	2.77 (1.6, 4.9)	.133

*
= $p < .05$,**
= $p < .001$ /

a = averaged for five items, on a Likert scale of 0 – 5 (5 = most involved), related to community, neighborhood, and other organizational involvement;

b = summary score of seven items related to neighborhood violence (range 0 – 7) (7 = most violent);

c = seven items, on a Likert scale of 0 – 3 (21 = most experiences), related to discrimination as a result of criminal justice history;

d = 10 items, from a Likert scale of 0 to 5, (5 = most collective efficacy) and related to feelings of social support from and trust in neighbors around issues of keeping collectively safe and promoting mutual respect.

Table 2:

Logistic regression on significantly associated factors prior to jail, before and after adjusting for “Always used condoms”

	<i>Unadjusted</i>				<i>Adjusted</i>			
	B	OR	CI (95%)	Sig.	B	OR	CI (95%)	Sig.
High school/GED or higher	.773	2.165	.613 – 7.645	.230	1.022	2.780	1.034 – 7.472	.043
Ever had STI	.961	2.615	.848 – 8.066	.094	.955	2.597	1.098 – 6.145	.030
Always used condoms	3.164	23.659	6.830 – 81.949	.000				
Constant	–2.587	.075		.000	–1.790	.167		.001