Women's Relative Socioeconomic Status and Communication in Sexual Relationships

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Abstract

The socioeconomic status (SES) of women relative to their male sexual partners is increasingly considered an important factor for HIV/STI risk. The HIV/STI literature has largely focused on women's absolute levels of SES and therefore the importance of their relative SES remains understudied. This paper examines the association between women's relative SES and frequency of safer sex communication among heterosexual couples. A convenience sample of 342 couples (N = 684) recruited in New York City was asked about frequency of discussions with their partner about the need to use male condoms, about HIV prevention, and about STI prevention in the previous 90 days. Differences between partners in education, income, employment, housing, and incarceration history were combined using principal components analysis to form an index of women's relative SES. Negative binomial regression models within a generalized estimating equation framework assessed associations between woman's relative SES and communication frequency controlling for age, sex, race, ethnicity, education, and relationship type. On average, participants had 2.5, 4.2, and 4.8 discussions regarding the need to use male condoms, about HIV prevention, and about STI prevention respectively. A one standard deviation increase in a woman's relative SES score was associated with increased frequency of discussions about male condom use (adjusted rate ratio [aRR], 1.15; 95% confidence interval [CI], 1.03-1.29), about HIV prevention (aRR, 1.25; CI, 1.14-1.37), and about STI prevention (aRR, 1.29; CI, 1.18-1.41). Women's relative SES may be an important factor for sexual communication and further research on its role in HIV/STI risk may uncover avenues for intervention.

Introduction

HIV and other sexually transmitted infections (HIV/STIs) are a significant problem in the United States. The top two most commonly reported notifiable diseases in the United States—Chlamydia and Gonorrhea—are sexually transmitted and together contribute approximately 1.8 million new cases each year (Centers for Disease Control and Prevention, 2012). Injection drug use is a major transmission route for HIV and other blood-borne STIs while non-injection drug use is linked to engaging in unprotected sex, which increases the risk for HIV/STIs (Strathdee & Stockman, 2010; Trenz et al., 2012). Therefore, ongoing HIV/STI-prevention efforts among drug users are important for public health, particularly in low-income populations living in large metropolitan areas who are at the greatest risk (Centers for Disease Control and Prevention, 2014; Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, 2010).

Communication between sexual partners regarding safer sex promotes the use of safer sexual practices and is now considered an important component in HIV/STI prevention interventions (Ehrhardt et al., 2002; Noar, Carlyle, & Cole, 2006; Perrino, Fernández, Bowen, & Arheart, 2006; Sheahan, Coons, Seabolt, Churchill, & Dale, 1994; Widman, Welsh, McNulty, & Little, 2006; Wingood, Hunter-Gamble, & DiClemente, 1993). However, sexual communication regarding safer sex is limited because women's feelings of powerlessness within heterosexual relationships hinder their ability to initiate safer sex communication and negotiate for condom use (Greig & Koopman, 2003). The difficulty for women to request condom use is also hampered since such a request may be construed as a lack of trust, a discovery of infection with HIV/STI, or an intention to keep the relationship casual or to engage in sex outside of the relationship (Afifi, 1999).

There is growing consensus among policy-makers and researchers that improving women's SES is a viable, if not necessary, structural approach to control the transmission of HIV/STIs (Muchomba, Wang, & Agosta, 2014; UNAIDS, 2012). Further, social science theory supports the argument that enhancing women's SES relative to their male sexual partners would improve the women's bargaining position, which would in turn increase their ability to negotiate for safer sex practices (Conrad & Doss, 2008; Wingood & DiClemente, 2000). However, the empirical literature on the role of women's SES relative to their male partners is limited since most sexual communication studies have examined the role of absolute rather than relative SES. Those that have examined women's SES relative to their partners have focused on the age difference between sexual partners and have primarily been done in sub-Saharan Africa (Jewkes, Levin, & Penn-Kekana, 2003; Luke, 2005; Sa & Larsen, 2008; Volpe & Morrison-Beedy, 2010). What is promising is that studies that have examined the link between HIV/STI risk and measures of women's SES relative to their partners, such as women's economic dependence on their partners and educational attainment difference between partners, find that women in an equal or higher SES relative to their partners have lower risk for HIV/STI infection (Grady, Klepinger, Billy, & Cubbins, 2010; Luke, 2005; Sa & Larsen, 2008).

In this paper we examine the association between women's SES relative to their male sexual partners and couples' communication about safer sex and about HIV/STI prevention. This paper makes two contributions to the literature. First, whereas previous studies of women's relative SES have focused on sub-Saharan Africa, we use data from drug-involved couples in New York City, where an estimated 115,000 people are living with HIV (New York City Department of Health and Mental Hygiene, 2013). Second, we make a methodological

contribution by utilizing several indicators of women's relative SES to construct a relative SES index, which is a departure from studies that have focused on age differences between partners.

Methods

Study sample

A convenience sampling design was used to recruit drug-involved heterosexual couples at risk for HIV/STIs in New York City as part of a larger HIV prevention intervention study (El-Bassel et al., 2011). Research assistants (RAs) approached potential participants at homeless shelters, soup kitchens, syringe exchange programs, and on the street. Majority of the eligible participants were recruited through street outreach. RAs obtained informed consent from individuals who expressed interest and conducted a screening interview to determine eligibility. Those who met the initial eligibility criteria were given a letter introducing the study and asked to invite their main or regular sexual partner. Partners who were interested in participating were also screened and informed consent obtained. Participants completed a computer-assisted self-interview (CASI) at a private office.

In order to be eligible for the study, a couple had to meet the following criteria: 1) both were 18 years or older and at least one partner was 18-40 years old; 2) both identified each other as their main, regular partner, boy/girlfriend, spouse, or lover; 3) both reported that they had been together for at least 6 months; 4) gave similar answers when separately asked standard questions about their relationship (e.g., when and where they first met); 5) both intended to remain together for at least one year; 6) at least one partner reported using illicit drugs in the prior 90 days and was seeking or was already in drug treatment; 7) at least one partner reported having had unprotected intercourse with the other in the prior 90 days; and 8) at least one partner

reported having sex with other (outside) partners in the prior 90 days, or injecting drugs in the prior 90 days, or being diagnosed with an STI in the prior 90 days. 865 individuals met the initial eligibility criteria out of the 1616 individuals who completed the screening interview. 343 couples (686 individuals) gave informed consent and completed the CASI. We excluded two participants who were not in a heterosexual relationship from our study sample. The final sample had 684 individuals, or 342 couples.

Measures

The outcomes of interest were frequency of communication about: male condom use, HIV prevention, and STI prevention. The CASI assessed condom use communication with the question: "In the past 90 days, how many times have you discussed with your study partner the need to use a male condom?" Similar questions asked respondents to recall the number of times they discussed HIV prevention and STI prevention with their partner in the past 90 days.

The key independent variable was woman's relative SES, which was an index that aggregated partners' differences in educational attainment, monthly income, employment status, access to housing, and history of incarceration (ever spent time in jail). These variables were chosen to reflect the dimensions of SES considered important for a primarily low-income urban population. For instance, recent scholarship views incarceration as a major force of social stratification and whose effects on intimate relationships persists after incarcerated partners are released from prison (Harman, Smith, & Egan, 2007; Wakefield & Uggen, 2010). The absolute-level measure for housing was based on whether the participants had spent a night in their own home or apartment in the prior 90 days. Educational attainment was categorized as no formal schooling, less than high school diploma, high school diploma or GED, some college or 2-year degree, and 4-year college degree or higher. A participant's total monthly income excluded the

partner's contribution and was categorized as less than $400, $400-$850, $851-$1650, $1651-$2500, $2501-$330, $3301-$4100, and $4101 or more. Employment status was a binary variable (yes/no) with participants who worked full-time, part-time or occasionally/seasonally/temporary classified as employed, and the rest as unemployed.

Control variables were participant's age, sex, Hispanic or Latino ethnicity, race (Black or African American, White or Caucasian, mixed, or other), educational attainment, and type of relationship. Relationship type was categorized as married, common law spouse, or other. The category "other" included those who considered their partner to be a boyfriend/girlfriend, domestic partner, lover or regular partner, or an ex-lover. We included educational attainment in both the relative SES index and in the list of control variables to examine whether relative SES had explanatory power after accounting for an important measure of men's and women's absolute SES. Additionally, whether relative SES and absolute educational attainment have associations with sexual communication that are in the same or opposite directions has implications on whether relative and absolute SES should be treated separately in research and intervention efforts.

Construction of a Relative Socioeconomic Status Index

We created a single continuous measure of a woman's SES relative to her partner using a three-step procedure. First, we computed relative SES categorical indicators using partners' differences on five SES dimensions. Relative SES indicators for education and income were ordinal variables categorized as: woman had less than partner, woman and partner were equal, and woman had higher than partner. SES dimensions measured as binary variables (employment, housing, and incarceration) formed relative SES indicators that were categorized based on concordant and discordant partner responses. For instance, relative employment categories were:

(1) woman unemployed but partner employed, (2) both unemployed, (3) both employed, and (4) woman employed but partner unemployed. Similar categories were developed for housing and incarceration. Second, we followed a methodology popularized by Filmer and Pritchett (2001) to aggregate the relative SES indicators into one continuous variable using principal components analysis (PCA). PCA is a dimension reduction technique for extracting from a set of correlated variables a set of uncorrelated components or indices, where each component is a linear weighted combination of the initial variables. The first component is the weighted index of the initial variables that explains the largest amount of variation in the variables. Similar to Filmer and Pritchett (2001) and other researchers e.g., Houweling, Kunst, & Mackenbach, 2003; Kolenikov & Angeles, 2009), we assumed that the most important reason for couples' differences in their values of women's relative SES indicators was the relative SES of the female partners. Third, after we performed a PCA using the relative SES indicators, we used the weights from the first PCA component to compute the women's relative SES score for each couple.

Statistical Analysis

We examined the frequencies, means and standard deviations of the participants' characteristics. We then used negative binomial regression models to assess the bivariate association between each independent variable and each of the three communication outcomes. We also fit multivariable negative binomial models adjusting for participants' age, sex, race, ethnicity, education, and relationship type. To account for clustering of individuals within couples, all models used generalized estimating equations with an exchangeable correlation matrix.

Drug-involved couples might underreport income from drug sales, which could bias our results. We conducted sensitivity analysis by excluding income from the relative SES index. We

expected our results would change after excluding income if income was systematically misreported and therefore not positively correlated with other measures of SES.

An additional concern with our empirical strategy is that the relationship between couple communication and women's relative SES might be confounded by factors that we did not control for. While we cannot fully address this concern using an observational study we can conduct a falsification test to get insight into whether selection bias was driving our results. If the observed association between women's relative SES and couple communication is confounded, the unmeasured confounder is also likely to confound the relationship between women's relative SES and communication about safer sex with non-partners. We therefore performed a falsification test by examining the relationship between relative SES and communication about male condom use, HIV prevention, and STI prevention with friends and family members (i.e., relationships where we did not expect to find significant associations except if there was unmeasured confounding). Communication with friends and family members were ordinal variables representing never, almost never, sometimes, often, or very often, in response to "how often [participants] discussed with a friend or family member" the need to use male condoms, how to prevent HIV, and how to prevent STIs in the previous 90 days. We used ordinal logistic regression models to examine communication with family and friends.

Results

Sample Characteristics

Table 1 lists individual-level characteristics of the sample. Most participants had a high school diploma or lower level of educational attainment. Approximately three-fourths of the participants reported a total monthly income of less than $400 and just over 80% of participants

were unemployed. Forty four percent had not slept in their own home or apartment in the previous 90 days. Serving time in jail was another common experience in the sample. Participants had on average 2.5 discussions with their partners in the previous 90 days regarding the need to use male condoms. Sixty nine percent of participants had not discussed male condom use with a friend or family member in the previous 90 days.

Table 2 lists descriptive statistics for women's relative SES indicators and indicator weights for the first principal component. Women had less education in 37.4% of the couples, and more education in 27.8% of the couples. The proportion of couples where the woman had a higher income was about the same as those where the woman had a lower income, and in the majority of couples the man and woman had similar incomes. In about 67% of couples, both partners were unemployed. More couples had only the man employed (18.1%) than those with only the woman employed (9.6%). Couples where only the woman had not slept in her own home were more common than those where only the man had not. Men were more likely than women to be the only partner in the relationship to have ever spent time in jail. All index weights were positive, which implied, as expected, couples that had a higher value of any given women's relative SES indicator had higher relative SES index scores holding all other relative SES indictors constant. Women's relative income had the highest weight and relative experience of incarceration had the lowest weight in the relative SES index.

The first chart in Figure 1 presents the frequency distribution of participants' relative SES scores. The distribution of scores approximately follows a bell-shaped curve. The cumulative distribution of scores plotted in the bottom chart in Figure 1 shows that couples were evenly divided between those with above-average women's relative SES scores and those with below-average scores.

Association between Relative Socioeconomic Status and Communication

Table 3 presents results from adjusted negative binomial regression models of frequency of communication with a partner about male condom use, about HIV prevention, and about STI prevention in the previous 90 days. A one standard deviation increase in the woman's relative SES was associated with a 115% increase in the rate of discussing need for condom use in the unadjusted model.[1] After adjusting for age, education, relationship type, sex, ethnicity, and race, relative SES remained statistically significantly associated with condom use communication and the strength of association did not change. A woman's SES relative to her partner was also statistically significantly associated with frequency of discussing how to prevent HIV infection in both unadjusted and adjusted models. In adjusted models, a one standard deviation increase in the woman's relative SES was associated with an approximately 125% increase in the rate of discussing HIV prevention. Women's relative SES was also associated with the rate of discussing with one's partner how to prevent STI infection (aRR = 1.29). The absolute level of educational attainment had an inverse relationship with couple communication frequency with more educated participants having lower rates of communication regarding the three topics.

Sensitivity Analysis and Falsification Tests

Sensitivity analysis examined if income misreporting had biased our results. After excluding income from the relative SES index, adjusted associations between relative SES and measures of sexual communication remained qualitatively unchanged.

In Table 4 we present adjusted results of falsification tests that examined the association between women's relative SES and communication with family/friends about male condom use, HIV prevention, and STI prevention in the previous 90 days. None of the odds ratios are

[1] Results from unadjusted models are available from the authors upon request.

statistically different from one, in both unadjusted and adjusted models, indicating that women's relative SES was not associated with any of the three topics of communication with family/friends.

Discussion

Previous studies on safer sex communication have focused on the importance of absolute measures of SES. This paper expands upon existing literature by assessing the frequency of safer sex and HIV/STI communication among couples based on the woman's SES relative to her partner. Our index of women's relative SES was constructed using partners' differences in educational attainment, income, employment, housing, and history of incarceration. The findings show a positive association between women's relative SES and frequency of couple's discussions about condom use, about HIV prevention, and about STI prevention. Our analysis therefore supports previous literature that suggest couples where the woman is relatively more educated have increased rates of safer sex communication (Jewkes et al., 2003), as well as prior evidence indicating that women with higher income compared to their partners had a larger influence in condom negotiation (Grady et al., 2010).

Greater women's relative SES was associated with higher frequency of communication about safer sex and HIV/STI prevention whereas higher absolute level of educational attainment was associated with lower communication frequency. Studies that have examined the link between educational attainment and HIV/STI risk in the US have provided mixed evidence. Some studies find a protective association (Adimora et al., 2006; Painter, Wingood, DiClemente, DePadilla, & Simpson-Robinson, 2012); other studies find no associations (De Genna, Cornelius, & Cook, 2007; Grieb, Davey-Rothwell, & Latkin, 2012; Hasnain, Levy, Mensah, &

Sinacore, 2007); and others find education is associated with increased risk (Sosman et al., 2011). Our results demonstrate that analyses of the association between HIV/STI-related behaviors and women's SES can yield different results depending on whether SES is measured in absolute terms or relative to the male partner. Further, results from examining absolute SES may conclude, incorrectly, that higher SES is not beneficial for safer sex communication. Consequently, studies that examine the link between women's SES and couple communication should strive to differentiate between absolute and relative measures of SES.

This study has several limitations. First, our observational study design implies that we cannot rule out selection bias. For instance, individuals who rebel against traditional gender norms and are comfortable about discussing condom use might be more likely to have relationships where the woman has a higher relative SES than individuals who abide to traditional norms. We attempted to address this limitation by conducting falsification tests, which allowed us to rule out some factors that could confound the associations under study, such as adherence to traditional norms. Second, the study used a convenience sample of low-income couples and might not generalize to the larger US population. Notwithstanding this limitation, the findings are relevant for low-income urban populations who are the highest risk of heterosexually-transmitted HIV/STIs in the US (Centers for Disease Control and Prevention, 2011).

While improvements in educational attainment, employment opportunities, incomes, access to housing and other dimensions of SES can benefit both men and women, and therefore narrow the SES gender gap among disadvantaged populations, the results suggest that larger gains in couple communication will come from efforts that are targeted towards women such as women's empowerment programs. Currently, most women's empowerment programs are

focused on developing countries. This study indicates that investigating the effects of such programs in the US is worthwhile and may provide avenues for structural approaches to combat HIV and STIs.

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TABLE 1 Characteristics of respondents (N = 684)

Sex	Female	50.0%
Age in years, mean (SD)		36.0 (7.1)
Education attainment	No formal schooling	2.9%
	Less than high school diploma	34.6%
	High school diploma or GED	38.6%
	Some college or 2-year degree	19.6%
	4-year college degree or higher	4.2%
Monthly income	Less than $400	73.7%
	$400-$850	18.6%
	$851-$1650	5.0%
	$1651-$2500	1.6%
	$2501-$3300	0.4%
	$3301-$4100	0.3%
	$4101 or more	0.4%
Unemployed		80.6%
Never spent night in own home in past 90 days		44.0%
Ever jailed		42.3%
Relationship type	Married	31.6%
	Common law spouse	27.3%
	Other	41.1%
Hispanic/Latino		26.6%
Race	Black/African American	46.8%
	White/Caucasian	10.5%
	Mixed	3.7%
	Other	39.0%
Frequency discussed with partner in past 90 days	Male condom use, mean (SD)	2.5 (10.5)
	HIV prevention, mean (SD)	4.2 (15.5)
	STI prevention, mean (SD)	4.8 (25.0)
Frequency discussed male condom use with family/friends	Never	69.0%
	Almost never	7.0%
	Sometimes	16.4%
	Often	4.5%
	Very often	3.1%
Frequency discussed HIV prevention with family/friends	Never	68.7%
	Almost never	6.9%
	Sometimes	15.4%
	Often	5.6%
	Very often	3.5%
Frequency discussed STI prevention with family/friends	Never	67.9%
	Almost never	8.1%
	Sometimes	15.5%
	Often	5.3%
	Very often	3.2%

TABLE 2 Women's relative socioeconomic position indicators and index weights (N = 342 couples)

Socioeconomic dimension	Relative power indicator categories	%	Index weight
Education attainment	Woman has less than partner	37.4%	0.447
	Woman equal to partner	34.8%	
	Woman has higher than partner	27.8%	
Employment	Woman unemployed, Man employed	18.1%	0.578
	Both unemployed	66.7%	
	Both employed	5.6%	
	Woman employed, Man unemployed	9.6%	
Income	Woman has less than partner	17.5%	0.646
	Woman has equal to partner	64.6%	
	Woman has higher than partner	17.8%	
Housing (Ever spent night in own home/apartment in past 90 days)	Woman not in own house/apt, Man in own house/apt	24.9%	0.215
	Both not in own house/apt	24.6%	
	Both in own house/apt	36.5%	
	Woman in own house/apt, Man not in own house/apt	14.0%	
Ever in jail/prison	Woman ever in jail/prison, Man never in jai/prison	7.3%	0.051
	Both ever in jail/prison	32.7%	
	Both never in jail/prison	17.3%	
	Woman never in jail/prison, Man ever in jail/prison	42.7%	

TABLE 3 Regression results of frequency of sexual communication among couples (N = 684)

	Need for male condom use	HIV prevention	STI prevention
	Adjusted Rate Ratio (95% CI)		
Woman's relative position	1.15*	1.25**	1.29**
	(1.03 - 1.29)	(1.14 - 1.37)	(1.18 - 1.41)
Age	0.99*	0.96**	0.94**
	(0.97 - 1.00)	(0.95 - 0.98)	(0.93 - 0.96)
Female	0.93	1.02	1.00
	(0.81 - 1.07)	(0.85 - 1.23)	(0.84 - 1.19)
Education			
No formal schooling	2.65**	5.46**	17.48**
	(1.45 - 4.86)	(2.80 - 10.63)	(7.72 - 39.58)
Less than high school diploma	1.32	2.17**	9.83**
	(0.83 - 2.10)	(1.32 - 3.57)	(4.97 - 19.47)
High school diploma or GED	1.13	0.86	7.67**
	(0.71 - 1.78)	(0.52 - 1.41)	(3.88 - 15.18)
Some college or 2-year degree	0.91	1.08	5.30**
	(0.57 - 1.46)	(0.64 - 1.82)	(2.64 - 10.66)
Relationship type			
Common law spouse	2.02**	1.27*	1.84**
	(1.54 - 2.64)	(1.01 - 1.61)	(1.46 - 2.33)
Other	2.76**	1.27*	1.68**
	(2.13 - 3.57)	(1.02 - 1.57)	(1.35 - 2.08)
Hispanic/Latino	0.85	1.81**	1.02
	(0.67 - 1.09)	(1.39 - 2.37)	(0.78 - 1.33)
Race			
White/Caucasian	0.43**	0.04**	0.07**
	(0.29 - 0.63)	(0.02 - 0.08)	(0.05 - 0.12)
Mixed	1.31	0.36**	0.37**
	(0.85 - 2.04)	(0.21 - 0.61)	(0.22 - 0.61)
Other	2.08**	0.63**	0.70**
	(1.66 - 2.61)	(0.49 - 0.81)	(0.55 - 0.89)
Overdispersion paremeter	2.52**	2.62**	2.64**
	(2.33 - 2.71)	(2.44 – 2.81)	(2.46 – 2.83)

** p<0.01, * p<0.05

TABLE 4 Regression results of frequency of sexual communication with family or friends (N = 684)

	Need for male condom use	HIV prevention	STI prevention
	Adjusted Odds Ratio (95% CI)		
Woman's relative position	0.98	1.07	1.00
	(0.82 - 1.16)	(0.89 - 1.28)	(0.83 - 1.21)
Age	0.99	1.00	1.00
	(0.97 - 1.02)	(0.98 - 1.03)	(0.97 - 1.02)
Female	1.43*	1.11	1.16
	(1.03 - 2.00)	(0.79 - 1.55)	(0.84 - 1.62)
Education			
No formal schooling	3.47	4.15	3.11
	(0.78 - 15.50)	(0.95 - 18.07)	(0.78 - 12.38)
Less than high school diploma	1.82	2.84	2.40
	(0.61 - 5.43)	(0.96 - 8.39)	(0.93 - 6.18)
High school diploma or GED	1.93	2.43	2.02
	(0.65 - 5.77)	(0.83 - 7.10)	(0.79 - 5.16)
Some college or 2-year degree	1.95	2.67	2.15
	(0.65 - 5.86)	(0.90 - 7.96)	(0.84 - 5.50)
Relationship type			
Common law spouse	1.20	1.47	1.56
	(0.77 - 1.87)	(0.94 - 2.30)	(0.99 - 2.46)
Other	1.51	1.58*	1.77**
	(0.99 - 2.28)	(1.04 - 2.40)	(1.16 - 2.71)
Hispanic/Latino	0.82	1.00	1.05
	(0.49 - 1.36)	(0.61 - 1.63)	(0.65 - 1.69)
Race			
White/Caucasian	0.57*	0.39**	0.44**
	(0.33 - 0.97)	(0.21 - 0.74)	(0.25 - 0.79)
Mixed	1.14	1.07	1.34
	(0.54 - 2.42)	(0.46 - 2.49)	(0.56 - 3.17)
Other	1.41	1.30	1.29
	(0.88 - 2.26)	(0.83 - 2.04)	(0.83 - 2.03)

** $p<0.01$, * $p<0.05$

FIGURE 1 Frequency histogram and cumulative distribution of women's relative socioeconomic position index