Transactional Sex among Men and Women in the South at High Risk for HIV and Other STIs

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ABSTRACT *Transactional sex refers to selling sex (exchanging sex for money, drugs, food, shelter, or other items) or purchasing sex (exchanging money, drugs, food, shelter, or other items for sex). These activities have been associated with a higher risk for HIV and other sexually transmitted infections in a variety of populations and settings. This paper examines correlates of purchasing and selling sex in a large sample of drug users, men who have sex with men, and sex partners of these groups. Using respondent-driven sampling, participants were recruited between 2005 and 2008 in two urban and two rural counties in North Carolina. We used multiple logistic regressions to examine separate models for selling and purchasing sex in men and women. In addition, we estimated direct and indirect associations among independent variables in the logistic regression models and transactional sex using structural equation models. The analysis shows that factors associated with women selling and buying sex include being homeless, use of stimulants, bisexual behavior, and neighborhood disorder. There was also a significant difference by race. For men, the factors associated with selling and buying sex include being homeless, bisexual behavior, and not being in a relationship. Although neighborhood violence and disorder show significance in bivariate associations with the outcome, these associations disappear in the structural equation models.*

KEYWORDS *Transactional sex, Sex trading, Sexual risk, Men who have sex with men, Women, HIV*

INTRODUCTION

Transactional sex refers to purchasing sex (exchanging money, drugs, food, shelter, or other items for sex) and selling sex (exchanging sex for money, drugs, food, shelter, or other items).^{1–5} Although both males and females may purchase and sell sex,^{6,7} there are significant gender differences. For example, purchasing sex is much more common among men than among women, whereas women are somewhat more likely than men to sell sex.^{8,9} Moreover, rates of selling and purchasing sex vary among men who have sex with men (MSM) and among substance users. Several studies, for example, show high rates of selling and purchasing sex among drug-using MSM and among drug users that use stimulants.^{6,8,10}

Selling sex by both men and women has been associated with higher rates of HIV and sexually transmitted infections (STIs).^{11–16} Although there have been fewer studies of men purchasing sex, the studies that have been conducted suggest that the

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proportion of men that report purchasing sex varies widely by region, ranging from a low of 1% to 25%.^{17,18} In addition, studies of men purchasing sex suggest that they are at increased risk of HIV and other STIs.^{19–21} Studies of women purchasing sex appear to be very rare,²² as there do not appear to be any quantitative studies in the literature of risk behaviors or HIV and other STIs among women purchasing sex.

Additionally, environmental factors, sexual risk, psychological distress, and transactional sex are interwoven. In previous studies, perceived neighborhood disorder and perceived neighborhood violence have been associated with higher levels of sex risk behavior²³ and with psychological distress.²⁴ Selling sex has also been associated with higher levels of psychological distress among both men and women.²⁵ For example, individuals who sell sex have higher rates of depressive symptoms,^{26,27} and depressive symptoms have been associated with unsafe sex behaviors.^{28,29}

There is also a high correlation between transactional sex and drug use. For instance, heroin use has been associated with selling sex for money,³⁰ whereas the use of crack cocaine and other stimulants is often associated with trading sex for drugs as well as money.^{8,9,31} Individuals who trade sex are more likely than those who do not trade sex to report current daily crack use, to meet the criteria for drug dependence, and to have more crack smokers in their social networks.^{2,8,25,32,33} In addition to crack use, methamphetamine use has been associated with selling sex, particularly among MSM but also among heterosexuals.^{34–36}

Compared with people who do not trade sex, individuals who trade sex are more likely to have multiple sex partners, have high-risk sex partners, engage in bisexual sex, and have more new sex partners.^{32,37,38} Moreover, prevalence of HIV and other STIs is substantially higher among men who purchase sex from women than among men who do not purchase sex.^{19–21} Individuals who sell sex are more likely to engage in high-risk sex with their primary partners³⁹; however, some may engage in unprotected sex with clients as well.³² Victimization, forced sex, and sexual and physical abuse are associated with transactional sex both historically and in conjunction with engaging in transactional sex.^{26,33,40} Homeless women who trade sex are at particularly high risk of victimization.² Research suggests that transactional sex among gay and bisexual men is associated with substance use and high-risk sex behaviors.³⁸

Few studies have examined the differences in purchasing and selling sex separately among men and women. However, to the extent that men who purchase sex have different risks than men who sell sex or women who sell sex or purchase sex, these differences may suggest a need for tailored interventions. Therefore, this study describes correlates of purchasing and selling sex by gender in an effort to delineate factors that may be used to develop tailored interventions to reduce HIV and STI risks associated with transactional sex.

Conceptual Model

In addition to describing correlates of transactional sex, based on previous research,^{23,24} we hypothesized more complex mediating relationships in which perceived neighborhood violence and neighborhood disorder would be associated with higher levels of psychological distress, which in turn may be associated with drug use and with sex risk behaviors. These relationships cannot be examined within the framework of a single multivariate regression model, which is also complicated by the inclusion of several potentially correlated indicators corresponding to the mediating factors. Thus, we used structural equation models

(SEMs) to test the hypothesized direct and indirect relationships among perceived neighborhood conditions, psychological distress, drug use, and transactional sex in a large sample that included MSM, injecting drug users, noninjecting drug users, and sex partners of MSM and drug users.

In the conceptual model, we hypothesized that transactional sex would be associated with the perception of high levels of neighborhood disorder and violence, individual psychological distress, drug use, and risky sex behavior. Additionally, we hypothesized that neighborhood conditions (i.e., violence and disorder) contribute to psychological distress and that both neighborhood conditions and psychological distress impact drug use and high-risk sex behavior. Our SEMs controlled for a number of moderating factors, including age, education, being homeless, having a regular job, and having been forced to have sex the first time. Although some of the variables—being homeless, being in a relationship, having a job—could potentially act as mediators, we considered them only as moderators. We used SEM to test the hypothesized direct and indirect relationships between the study outcomes and the associated risk factors. This paper describes the study and measures as well as the statistical analytic steps, presents the results of the regression analysis and SEM, interprets the findings, and discusses the limitations of the study.

METHODS

This study was part of the Sexual Acquisition and Transmission Cooperative Agreement Program (SATH-CAP) funded by the National Institute on Drug Abuse. Field sites for the North Carolina (NC) SATH-CAP project were located in Durham, Wake, Johnston, and Chatham Counties. Wake and Durham Counties include the cities of Raleigh and Durham, respectively. Johnston and Chatham Counties are more rural counties that border Wake and Durham Counties. All four counties are located in central North Carolina, which is part of the southern region of the USA, an area that has experienced a disproportionate increase in HIV, particularly among African-Americans, in both rural and urban areas.^{41,42}

A total of 1,985 MSM, drug users, and their sex partners were recruited through respondent-driven sampling (RDS) between September 2005 and August 2008. RDS is a specialized type of chain referral sampling in which individuals are recruited as seeds or index cases. Each seed is given a specified number of coupons to distribute to other eligible individuals who are in turn given coupons to distribute to other people they know who may meet the study eligibility criteria. All of the coupons are numbered, which permits linking recruits to recruiters. The NC SATH-CAP site enrolled a total of 214 participants as seeds (51 in wave 1 and 163 in wave 2). The number of recruitment waves per seed ranged from zero to 19, with a mean of 2.06 and a standard deviation (SD) of 3.69; the number of participants per seed group ranged from one to 195. The mean number of recruits per seed group was 9.28 (SD=23.20). The overall RDS methods are described by Iguchi and colleagues elsewhere in this issue.

Eligibility

All study participants were required to be male and at least 18 years of age and to provide written informed consent. Additional study eligibility criteria varied by risk group (i.e., drug user, MSM, sex partner). Participants recruited as drug users were required to report use of heroin, powder cocaine, crack cocaine, methamphetamine, or injecting drug use in the previous 6 months. Men recruited as MSM were

required to report anal sex with a man in the previous 6 months. Participants recruited as sex partners were required to report engaging in sex with their recruiter in the previous 6 months.

Behavioral data were collected via Audio Computer-Administered Self-Interviewing (ACASI) to minimize underreporting of stigmatized behaviors.^{43,44} The NC SATH-CAP collected biological specimens for HIV, hepatitis C virus (HCV), syphilis, gonorrhea, and chlamydia testing. Rapid HIV tests were performed using OraQuick, and positive results were confirmed by Western blot on OraSure specimens. HCV and syphilis tests were performed on blood samples. Participants were screened for HCV antibodies using the HCV EIA 3.0 test (Orthoclinical Diagnostics, Rochester, NY, USA), with a signal to cutoff ratio of >8 . Syphilis screening was performed using the Venereal Disease Research Laboratory test, and active infection in reactive samples was confirmed with a rapid plasma reagin test. Gonorrhea and chlamydia tests were performed on urine specimens using the COBAS Amplicor polymerase chain reaction test. Payment for the baseline interview was \$35, with additional \$15 payments for each additional eligible individual recruited into the study.

Measures

All study participants were asked a series of questions about each of three recent sex partners during the previous 6 months. Some participants, however, were asked about up to three additional partners, including a main partner, their recruiter (i.e., the person who gave them their RDS coupon), and a female partner of a behaviorally bisexual man, if these partners were not included in the three partners.

For each partner, purchasing sex was assessed with the question, "In the past 6 months, did you give ____ drugs, money, or other goods in exchange for sex?" Similarly, for each partner, selling sex was assessed with the question, "In the past 6 months, did you receive drugs, money, or other goods from ____ in exchange for sex?"

The current analyses focus on purchasing and selling sex at the participant level, not at the partnership level. Thus, each individual was assigned a binary outcome indicator for each of buying sex or selling sex based on self-report.

Bisexual behavior was based on response to the question, "In the past 6 months, have you had sexual activity with men, women, or both men and women?" Participants who reported sex with both men and women were coded as engaging in bisexual behavior.

The domains of interest could be defined in a number of ways. We took an empirical approach of using latent variables that would be related to particular domains. Thus, for each domain, we used related measures that were identified in the SATH-CAP data. Symptoms of psychological distress were measured with the depression, anxiety, and somatization subscales of the Brief Symptom Inventory 18.⁴⁵ Each of the subscales consists of six items, with each item scored from 1 to 5 and possible scores for each subscale ranging from 5 to 30. In this sample, coefficient alpha was 0.92 for the depression subscale, 0.91 for the anxiety subscale, and 0.89 for the somatization subscale. Correlations among the subscales ranged from 0.76 between the somatization and the depression subscales to 0.86 between the depression and anxiety subscales. The means and standard deviations for each subscale were 8.51 (SD=6.08) for depression, 7.28 (SD=5.38) for anxiety, and 6.95 (SD=4.92) for the somatization subscale.

Neighborhood violence and neighborhood disorder were measured with the City Stress Index,⁴⁶ a self-report questionnaire that asks people about things in their neighborhood. Thus, the index measures perceived rather than actual neighborhood

conditions. The neighborhood violence subscale consists of seven items, and the neighborhood disorder subscale consists of ten items. Scores for individual items range from 0 to 3. Possible scores for the neighborhood violence subscale range from 0 to 30; possible scores for the neighborhood disorder subscale range from 0 to 21. In this sample, the coefficient alpha was 0.89 for the neighborhood violence subscale and 0.94 for the neighborhood disorder subscale. The correlation coefficient between the two scales was 0.63. The mean score for the neighborhood violence subscale was 3.57 (SD=4.49), and the mean score for the neighborhood disorder subscale was 12.89 (SD=8.05). Moreover, we did consider forming several latent constructs: perceived neighborhood violence from the individual's perception of neighborhood disorder and neighborhood violence; psychological distress from somatization, depression, and anxiety; drug use from the use of methamphetamine, speedball, crack, cocaine, heroin, or drug injection in the past 30 days, as well as more than five binge drinking days in the past month; and risky sex behavior from bisexual behavior, partner change within 6 months, HIV, any STIs, and unprotected intercourse. However, as discussed in the analysis and results sections, not all variables were eventually included in the latent constructs.

Analyses

Males and females were analyzed separately to assess variables associated with selling sex and purchasing sex. Variables that were significant at $p < 0.1$ were entered into a multiple logistic regression analysis. Four multiple logistic regression models were developed to identify variables that were independently associated with males purchasing sex and selling sex and with females purchasing sex and selling sex.

We also used an SEM approach to consider more complex associative relationships, as described in the conceptual model. Structural equations are useful for answering questions that imply complex relationships between the constructs that are measured directly and indirectly (latent constructs). Confirmatory SEMs start with a hypothesis expressed in terms of the structural (causal) relationship between the variables and latent constructs, and then the model parameters (scaled correlations) could be tested using maximum likelihood estimation techniques. In our SEM analysis, we used M-plus software (www.statmodel.com).

The SEM consisted of four latent constructs, an outcome, and a set of independent individual variables used for controlling for demographics and important risks, such as age, race, high-school education, being in a relationship, employment status, income greater than \$500 per month, having had a forced first sexual encounter, and being homeless. Because perceived neighborhood violence variables were defined at the individual level, no hierarchical structure is used in model estimation.

We started the SEM analysis by examining latent variable loadings and identified which variables should define the latent constructs. Some of the variables that were initially thought as candidates for the constructs did not show correlation with the other variables in the bunch. For example, heavy alcohol use was not correlated with hard drug use and, thus, was not included in the drug use scale but considered as an independent covariate.

Then, we developed a full SEM model with all hypothesized links present and moved toward a parsimonious model by sequentially removing the variables and structural links that showed the least significance. Because the focus of the SEM analysis was to evaluate the relationship between the latent constructs and transactional sex, we did not use a single set of controlling variables but rather selected the ones that seem potentially confounding to the structural relationships.

Loadings and mediating coefficients in the SEMs are defined in terms of the latent variable scales and consequently do not lend themselves to clear practical interpretation. Statistical significance, however, indicates the strength of the association of the latent constructs and between the latent constructs and the outcomes. Thus, the parsimonious SEM represents the results that indicate strong associations.

RESULTS

The sample is 39% female and 76% African-American; 65% were 35 years of age or older. Among participants, 54% reported a history of incarceration and 50% had been in substance abuse treatment (Table 1). Purchasing sex and selling sex were common among sexually active males and females in this sample. Overall, 30% (203/677) of females and 25% (261/1,043) of males reported selling sex to one of their last three partners. In addition, 13% (86/677) of females and 37% (388/1,043) of males reported purchasing sex from one of their last three partners.

SEM analysis revealed strong clear definitions of the latent constructs. The risky behavior latent variable consistently and heavily loaded on multiple partners, having unprotected sex, and bisexual activity. For males, the factor also loaded on engaging

TABLE 1 Characteristics of the sample by gender

Variable	Female (<i>n</i> =677)	Male (<i>n</i> =1,043)	Total (<i>n</i> =1,730)	<i>p</i> value
% ≥35 years of age	57.5	70.5	65.4	<0.001
% African-American	72.2	77.1	75.2	0.023
% completed high school	65.9	68.9	67.7	0.185
% married or living as married	13.7	10.4	11.7	0.040
% working full or part time	29.0	29.3	29.2	0.892
% homeless	35.5	46.2	42.0	<0.001
% ever incarcerated	42.9	60.9	53.7	<0.001
% ever in substance abuse treatment	42.5	54.8	50.0	<0.001
% recruited in a rural county	37.5	24.5	29.7	<0.001
Mean # days drank ≥5 drinks in 2 h (SD)	3.0	4.2	3.7	
# days used stimulants previous 30 days				
% none	39.5	34.1	36.2	0.088
% 1 to 10	33.5	34.1	33.9	
% 11 to 20	11.0	13.4	12.5	
% 21 or more	15.9	18.4	17.4	
% Ever injected	21.7	34.7	29.6	<0.001
% Used heroin previous 30 days	4.5	9.1	7.3	<0.001
Gender of partners previous 6 months				
Opposite sex only	82.0	73.9	77.1	<0.001
Same sex only	3.3	9.3	6.9	
Both sexes	14.8	16.8	16.0	
% first sexual encounter forced	12.7	37.2	27.6	<0.001
% purchased sex from any of last 3 partners	30.0	25.0	27.0	0.024
% sold sex to any of last 3 partners	58.2	46.1	50.9	<0.001
% any unprotected intercourse with last 3 partners	13.0	16.8	15.3	0.033
% 6 or more partners previous 6 months	5.2	9.1	7.6	0.003
% HIV positive	15.2	19.0	17.5	0.051
% HCV positive	8.7	6.5	7.4	0.089
% any current sexually transmitted infections (i.e., syphilis, gonorrhea, chlamydia)	25.2	21.2	22.8	<0.001
Mean global severity index score (SD)	12.2	12.6	12.5	0.339
Mean City Stress Index neighborhood disorder score (SD)	3.4	3.7	3.6	0.174
Mean City Stress Index neighborhood violence score (SD)	57.5	70.5	65.4	<0.001

in anal and/or vaginal sex. This latent variable did not load significantly on HIV and other STIs. The latent variable for drug use is heavily loaded on cocaine, heroin, injection, methamphetamine, speedball, and crack. Alcohol use was not associated with the drug variable.

Among males, we observed a strong association between being homeless and being previously incarcerated, as well as a strong association between being homeless and perceived neighborhood violence. These observations suggest that the results should be interpreted cautiously because of the high intercorrelation among the variables in the multivariate setting.

The structural relationships turned out to be very robust with respect to the set of controlling variables. The set of controlling variables in a parsimonious model for males was reduced to age and being homeless, whereas the set of controlling variables for women contained being homeless and having any job. For the presented set of analytic runs, we have expanded the sets of controlling variables by adding ones that either showed significance in the regression models (e.g., forced first sexual encounter) or that have a conceptual importance (e.g., race). Adding these variables did not change the significance in the female models, whereas, in male models, adding these variables shifted the significance from age to alcohol use and being in a stable relationship. In all of the models, structural relationships between the latent constructs were consistently significant.

Males Selling Sex

Being in a relationship and being employed were associated with decreased odds of males selling sex in bivariate analyses. Older age, homelessness, a history of incarceration, a history of injection, reporting a forced first sexual encounter, more frequent use of stimulants, higher levels of alcohol use, and heroin use in the previous 30 days were positively associated with males selling sex (Table 2). Higher levels of psychological distress, perceived neighborhood disorder, and perceived neighborhood violence were also associated with males selling sex in bivariate analyses.

In multiple logistic regression analysis, homelessness, a history of injection, bisexual behavior, being forced to have sex, and perceived neighborhood violence were independently associated with increased odds of males selling sex (Table 2). Being in a relationship was negatively associated with males selling sex.

Not surprisingly, the SEM displayed many similar relationships to those in the multivariate regression. The SEM results indicate that perceived neighborhood conditions, risky behavior, and alcohol use were associated with selling sex, whereas drug use was not associated. Psychological distress, which is associated with perceived neighborhood conditions, was strongly associated with drug use and risky sex behavior. Age and being homeless were positively associated and being in a stable relationship was negatively associated with selling sex (Figure 1).

Males Purchasing Sex

In bivariate analyses, older age, African–American race, being homeless, a history of incarceration, and a history of injection drug use were associated with increased odds of purchasing sex among males. Higher levels of alcohol use and more frequent stimulant use were also positively associated with males purchasing sex. Other variables associated with purchasing sex among males include bisexual behavior, reporting a first forced sexual encounter, higher levels of psychological distress, higher levels of perceived neighborhood disorder, and perceived neighborhood

FIGURE 1. Structural equation diagram for men selling sex. *Shaded box* is the outcome. *Circles* indicate latent variables. *Arrows outgoing* from the *circles* to the *rectangles* indicate statistically significant loading. *Arrows connecting* the *circles* indicate relationships between the latent constructs. *Arrows* from the latent variables to the outcome correspond to significant linear relationship. *Arrows* from the *rectangular boxes* to the outcome indicate moderating relationships and *bold* indicates statistical significance.

violence. Being in a relationship, being employed, and being recruited in a rural county were negatively associated with males purchasing sex.

In multiple logistic regression analysis, older age, being homeless, bisexual behavior, psychological distress, and perceived neighborhood disorder were independently associated with increased odds of males purchasing sex. Being in a relationship was associated with decreased odds of males purchasing sex.

In the SEM for males, purchasing sex indicates the same structure as in the model for males selling sex; however, age has a larger association with the outcome. Being homeless and alcohol use were associated with purchasing sex, whereas being in a relationship was negatively associated (Figure 2).

Women Selling Sex

Among females, older age, African-American race, being homeless, and a history of incarceration were associated with selling sex. In multiple logistic regression analysis, African-American race, being homeless, and frequency of stimulant use were independently associated with females selling sex (Table 2). Bisexual behavior, higher levels of psychological distress, and perceived neighborhood disorder also were associated with this outcome.

The SEM for females selling sex shows a slightly different pattern than the SEM for males. In particular, there is no significant association between psychological distress and drug use. However, the path from drug use to risk behavior to selling sex is significant. The relationship between psychological distress and perceived neighborhood conditions is also significant. Being homeless was positively

FIGURE 2. Structural equation diagram for men purchasing sex. *Shaded box* is the outcome. *Circles* indicate latent variables. *Arrows outgoing* from the *circles* to the *rectangles* indicate statistically significant loading. *Arrows connecting the circles* indicate relationships between the latent constructs. *Arrows* from the latent variables to the outcome correspond to significant linear relationship. *Arrows* from the *rectangular boxes* to the outcome indicate moderating relationships and *bold* indicates statistical significance.

associated and working full time or part time was negatively associated with selling sex (Figure 3).

Females Purchasing Sex

In multiple logistic regression analysis, older age, more frequent stimulant use, and bisexual behavior were independently associated with women purchasing sex (Table 2). Higher levels of psychological distress and perceived neighborhood violence were also associated with females purchasing sex in the model.

The SEM suggested a mediating effect of risk behavior that mediates both drug use and perceived neighborhood conditions. Being homeless was the only significant moderating factor (Figure 4).

DISCUSSION

Among the models, there were similarities and differences in correlates of purchasing and selling sex among females and males as well as some overlap between their risk and protective factors. For example, being homeless, bisexual behavior, perceived neighborhood conditions, and psychological distress were associated with transactional sex in almost all models. Age was significantly associated with purchasing sex but not with selling sex in both the male and female models. There were, however, differences between males and females in the structure of risk factors. For example, drug use was a significant factor in one of the female models but not in the male models. Psychological distress was associated with risky sex behavior in males but not in females.

It was encouraging to observe that statistically significant structural relationships between the latent construct are quite robust with respect to the presence of

FIGURE 3. Structural equation diagram for women selling sex. Shaded box is the outcome. Circles indicate latent variables. Arrows outgoing from the circles to the rectangles indicate statistically significant loading. Arrows connecting the circles indicate relationships between the latent constructs. Arrows from the latent variables to the outcome correspond to significant linear relationship. Arrows from the rectangular boxes to the outcome indicate moderating relationships and bold indicates statistical significance.

other explanatory variables. For example, being homeless is consistently associated with transactional sex in both males and females, perhaps one of the most important findings of the study. While it is not unexpected that risky sex behavior is associated with transactional sex, the association with perceived neighborhood violence suggests the need for neighborhood-level interventions.

The SEMs provided insight into why multivariate results differ from the bivariate results. One explanation for the observed differences is the correlation between the constructs. For example, both perceived neighborhood violence and neighborhood disorder are strongly correlated (i.e., highly associated with the latent neighborhood construct). Thus, the inclusion of both variables in a multivariate regression will substantially decrease the significance of one of the indicators.

Additionally, the SEMs revealed structural differences in the way that factors were correlated in males and females. We observed more similarity in the structure of SEM between the models for selling sex and purchasing sex for the same gender group than for the same type of exchange (i.e., buying or selling) for different genders. The SEMs showed that alcohol and drug use are not closely associated and are not loaded on the same latent construct. Similarly, HIV or STI status was not correlated with risky sex behavior. While many individual variables demonstrated significant bivariate relationships with the outcomes, some associations disappeared when combined in a multivariate and SEM context. The variables that are the basis of latent constructs were the same for males and females, with the exception of having both vaginal and anal intercourse, which was only present in the male model. Interestingly, reporting a forced first sexual experience exhibited a strong relationship in the multiple-regression model for males and the bivariate model for

FIGURE 4. Structural equation diagram for women purchasing sex. *Shaded box* is the outcome. *Circles* indicate latent variables. *Arrows outgoing from the circles to the rectangles* indicate statistically significant loading. *Arrows connecting the circles* indicate relationships between the latent constructs. *Arrows from the latent variables to the outcome* correspond to significant linear relationship. *Arrows from the rectangular boxes to the outcome* indicate moderating relationships and *bold* indicates statistical significance.

females selling sex but not in any of the SEMs. These discrepancies may arise from the presence of a strong interaction between the variable and other SEM constructs. However, more research is needed to understand how various risk factors cluster around a latent conceptual construct.

The strong effect of being homeless as a factor associated with transactional sex raises the possibility that selling sex by homeless participants in this sample may be used as a means of obtaining food and shelter as well as money and drugs. The association between being homeless and purchasing sex is less clear. One possible explanation is that people in homeless camps and shelters, for example, may exchange food, alcohol, and other materials for sex among themselves.

Drug use appeared to have minimal effect on males purchasing sex or selling sex, but it demonstrated strong direct and indirect effects in females purchasing sex and selling sex, respectively. Although in bivariate analysis there is a strong association between drug use and selling/purchasing sex, the association disappears when other variables are added to the model. These results suggest further investigation beyond the simple issue of statistical power difference between bivariate and multivariate models. While it is difficult to establish causality in regression analysis of cross-sectional data, other methods, such as ethnographic decision tree analysis and/or ecological momentary assessment, could help identify the sequence of events and decisions.

Limitations

As with most studies of stigmatized and illegal behaviors, this study has a number of limitations. Although data were collected using ACASI technology, to minimize

socially desirable responses, the validity and reliability of self-reported data are difficult to assess.

In addition to limitations regarding the reliability and validity of responses, the representativeness of the sample is unknown. While RDS was used to reduce bias associated with most forms of nonprobability sampling, the study targeted MSM and drug users, not people who were engaged in transactional sex. Therefore, even if RDS worked perfectly, caution should be exercised in generalizing these results to non-drug-using heterosexuals who engage in transactional sex. Moreover, this is one of the first studies that used RDS to recruit multiple groups (i.e., drug users, MSM, and sex partners of drug users and MSM), so it is possible that some of the assumptions of RDS may not have been met.

While drug users in this sample were relatively similar to samples of drug users in the area recruited through other methods,^{34,47,48} the MSM in the sample were very different from MSM participating in “Gay Pride” or attending other local events, such as the North Carolina Gay and Lesbian Film Festival, which is held in Durham. In particular, impoverished drug users and MSM appear to be overrepresented in the sample, whereas middle-class MSM and drug users appear to be underrepresented. From a public policy perspective, however, the participants in this study may be particularly important because they are more likely than middle-class drug users and MSM to be incarcerated and to require publicly funded substance abuse treatment and publicly funded treatment for HIV and other health problems. Although generalizing the results presented here to other populations is questionable, the hypotheses could be tested by applying the same approach to similar data from the other SATH-CAP research sites.

Although SEM methodology allows for the development of meaningful constructs and the study of the structure of complex interactions, without clear conceptual models, the number of possible arrangements and structures could quickly become large and unmanageable. Thus, it is important to narrow the list of considered options that are supported by theoretical concepts. In the present study, we narrowed the focus to specific interactions between neighborhood violence, psychosocial distress, drug use, and risky sex behavior. At the same time, there may be alternative hypotheses that could be represented and tested in this rich dataset. For example, we did not examine the relationships between transactional sex and HIV/STIs, which could be a topic of future research.

Conclusions

All forms of transactional sex were common in this sample of impoverished drug users and MSM. The findings suggest that RDS may be an efficient method for recruiting impoverished drug users and MSM in rural and urban settings who may be at high risk of HIV and other infectious diseases. To the extent that transactional sex is related to survival, it may be difficult to reduce this risky behavior in populations with high rates of homelessness, unemployment, and drug use. Additional research is needed to clarify the relationship between bisexual behavior and transactional sex and to determine if this presents risks for the spread of HIV and STIs from impoverished drug users and MSM to other groups in the general population.

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