Research

Primary source of income is associated with differences in HIV risk behaviors in street-recruited samples

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Abstract

Background: The relationship between primary source of income and HIV risk behaviors and the racial/ethnic differences in risk behavior profiles among disadvantaged populations have not been fully explored. This is unusual given that the phenomenon of higher risk in more disadvantaged populations is well-known but the mechanisms remain unclear. We examined the relationship between primary source of income and differences in HIV risk behaviors among four racial/ethnic groups in the southern United States.

Methods: Self-reported data on primary source of income and HIV risk behaviors were collected from 1494 African American, Hispanic, Asian, and White men and women in places of public congregation in Houston, Texas. Data were analyzed using calculation of percentages and by chi-square tests with Yates correction for discontinuity where appropriate.

Results: Data revealed that a higher proportion of whites were involved in sex for money exchanges compared to the other racial groups in this sample. The data suggest that similar street sampling approaches are likely to recruit different proportions of people by primary income source and by ethnicity. It may be that the study locations sampled are likely to preferentially attract those involved in illegal activities, specifically the white population involved in sex for drug or money exchanges. Research evidence has shown that people construct highly evolved sexual marketplaces that are localized and most unlikely to cross racial, ethnic, and socioeconomic or geographical boundaries. Thus, the areas that we sampled may have straddled a white sexual marketplace more than that of the other groups, leading to an over-representation of sex exchange in this group. Drug use was highest among those with illegal primary sources of income (sex exchange and drug dealing and theft), and they were also those most likely to have injected drugs rather than administered them by any other route (p < 0.001). In addition, bisexual or homosexual identification was reported by more respondents in the sex exchange as primary source of income category. The number of sexual partners in the last three months followed a similar pattern, with those whose primary source of income was drug dealing or theft reporting relatively high partner numbers.

Conclusions: These data suggest that social disadvantage is associated with HIV risk in part by its association with drug and sex work for survival, and offers one variable that may be associated with the concentration of disease among those at greatest disadvantage by having an illegal and unstable primary income source.

Primary Source of Income is Associated with Differences in HIV Risk Behaviors in Street-Recruited Samples

Equity in health access among minority populations is often compounded by the operation of Hart's Inverse Care Law [1]: those with the greatest need for care have the least access to it. Where risk of infection with HIV is concerned, the risk is reported to be higher among the disadvantaged. For example, although Latinos constitute approximately 9% of the population in the United States (US), they represent 18% of AIDS cases [2]. Similarly, African Americans account for 34% of the total AIDS cases while comprising only 12% of the US population [2]. A complexity of issues places minority populations at heightened risk for HIV infection. The imbalance in negotiation power in relationships between men and women, high rates of unemployment and the associated drug related economic activities, and money-for-sex and drugs-for-sex exchanges have all been identified as factors that contribute to the efficiency of HIV transmission in disadvantaged populations [3,4].

The association between low socioeconomic status and risk of HIV infection has been well documented in the scientific literature [5-7]. In a cross-sectional study designed to examine the relationship between socioeconomic status and risk of HIV infection, Hargreaves and colleagues [5] found that men and women of low socioeconomic status are at greater risk of newly acquired HIV infection. El-Bassel et al., [7] in a report on sexual abuse by intimate and commercial sex partners among street-based sex workers noted that women who reported exchanging sex for drugs and money as their main source of income were also more likely to report combined physical and sexual abuse. It has been suggested that the legal and social risks associated with these exchanges limit the likelihood of safer sex practices during these encounters [8]. Thus, understanding the relationship between primary source of income and HIV risk behavior, particularly among ethnic minority populations, could be helpful in formulating public policies and prevention strategies for HIV prevention. To date, only a limited number of studies have examined this relationship and the racial/ethnic differences in risk behavior profiles among disadvantaged populations. This is unusual given that the phenomenon of higher risk in more disadvantaged populations is well-known, but the mechanisms remain unclear. It may be that this relates to the limited occupational choices available to those most disadvantaged because of their social and personal circumstances. This study was designed to build on the existing knowledge of the relationship between income and HIV transmission by identifying the relationship between primary source of income and differences in HIV risk behaviors among four racial/ethnic groups in the southern United States.

Methods

Data for this analysis were abstracted from a larger dataset of a community-based anonymous survey designed to determine knowledge, misconceptions, and sources of information in minority populations regarding HIV transmission. The study relied on self-administered questionnaires and respondents were recruited from places of public congregation, such as churches, civic clubs, public parks, public housing projects, malls and neighborhoods having substantial minority populations in southwest and downtown areas of Houston, Texas. Permission was obtained prior to data collection by contacting and receiving approval from appropriate management authorities and a table was placed in a salient position in each location to obtain the street intercept samples. The interviewers also carried required identification tags. Data were collected between January 1997 and June 1998. Inclusion criteria were age above 18 and ability to complete a questionnaire in English. Trained interviewers asked for subjects' participation in the study and all participants were advised that they could refuse to answer any questions and that participation was both voluntary and anonymous. Those who agreed to participate were given the questionnaire to complete and subsequently deposit in a sealed box; those who declined to participate were counted as non-responders. Return of the questionnaire was taken as evidence of consent. The duration for completing the questionnaire was approximately 45 minutes per subject and each subject received $25 for its completion. Additional details about the study are published elsewhere [9,10]. The study was approved by the relevant university human subjects review board.

The variables reported in this study are: primary source of income, drug use behaviors, sexual identity, and alcohol/drug use during the last sexual encounter. The primary source of income question was "What is your primary source of income?" (Circle one: legal employment, welfare, trading sex for drugs or money, trading sex for gifts, drug dealing/theft. The sexual identity question was "How do you identify yourself?' (Circle one: heterosexual, bisexual, homosexual). Questions on drug use behaviors and alcohol/drug use during the last sexual encounter were: Do you or have you ever used drugs (yes, no); if yes, how did you take these drugs (inject, snorting, smoking, taking pills); If you have used injected drug, have you ever shared your needles with other drug users?" (Circle one: yes, no); Have you ever traded sex for drugs?" (Circle one: yes, no); Did you drink alcohol or use drugs before the last time you had sexual intercourse?" (Circle one: yes, no). Frequency of sexual contact was asked as "How many sexual partners did you have in the past three months?" (Circle one: none, 1–5, 6–10, 11–19, 20 and above). For analysis of primary source of income, respondents were grouped into four categories: (1) legally employed; (2) receiving

welfare or social security (welfare); (3) exchanging sex for money, drugs, or gifts/favors (sex exchange); and (4) dealing drugs or theft/hustle (drugs/theft). For data analysis, exchanging sex for drugs and dealing drugs or theft/hustle were collapsed into a single category called "illegal employment". Data were analyzed using calculation of percentages and by chi-square (with Yates correction for discontinuity where appropriate) using SPSS 11.0 (SPSS, 2001). The measure for statistical significance was established a priori as $p < 0.05$.

Results

Demographic data (n = 1,494) are presented in Table 1. Refusal rates were for African Americans 48%, Hispanics 44%, Whites 42%, and Asians 43%. Lack of time was the excuse given by the majority of non-responders, followed by lack of facility in English. Collapsing Vietnamese American, Chinese American, Filipino American and Japanese American created the "Asian" category after preliminary analysis revealed similar patterns in the data obtained from these four groups.

Table 2 shows income categories by race/ethnicity and gender. There was a higher proportion of Asians legally employed (78%) compared to African Americans (56%) and Latinos (44%), and a higher proportion of whites (51%) involved in sex exchange in this sample compared to Latinos (27%) and African Americans (17%). More women were involved in legal employment and more men in drug dealing and theft. Table 3 shows the relationship between drug use and primary source of income. Drug use was highest among those with illegal primary sources of income (sex exchange and drug dealing and theft), and they were also those most likely to have injected drugs rather than administered them by any other route ($p < 0.001$). Likewise, sharing of injection equipment was highest among those with illegal primary sources of income ($p < 0.001$). A greater degree of drug use, as measured by use on the day of the survey, was also apparent in those with illegal primary sources of income compared with those on welfare and those who reported a legal form of employment ($p < 0.001$). The relationship between sexual behavior and primary sources of income also revealed a similar pattern. As shown in Table 4, bisexual or homosexual identification was reported by more respondents in the sex exchange as primary source of income category. The number of sexual partners in the last three months followed a similar pattern, with those whose primary source of income was drug dealing or theft reporting relatively high partner numbers second only to those in the sex exchange category ($p < 0.001$).

Discussion

These data must be interpreted with the caveats that they are based on a nonrandom convenience sample, an Eng-

lish questionnaire, and on data being collected in public places with a refusal rate approaching half. Those not fluent in English are underrepresented and those who regularly frequent the public places targeted are strongly over-represented. This latter point could possibly account for the inflation in the proportion of unemployed and, probably, of those seeking sexual contact or dealing drugs. As the study was based on street outreach to obtain responses on HIV/AIDS knowledge and questions about sexual identity and behavior were asked toward the end of the questionnaire, we might assume that street outreach sampling in places of public congregation is likely to recruit a much higher proportion of homosexual/bisexual people and those engaged in sex work and illegal activities.

The data indicate that similar street sampling approaches are likely to recruit different proportions of people by primary income source and by ethnicity. It may be that the study locations sampled are likely to preferentially attract those involved in illegal activities, specifically the white population involved in sex for drug or money exchanges. Laumann et al., [11] report that people construct highly evolved sexual marketplaces that are localized and most unlikely to cross racial, ethnic, and socioeconomic or geographical boundaries. Thus, the areas that we sampled may have straddled a white sexual marketplace more than that of the other groups, leading to an over-representation of sex exchange in this group. For drug and HIV-associated risk behaviors, respondents involved in illegal activities were significantly more likely to have ever used and to have injected drugs, the major risk behavior for HIV transmission. Over half of those who had injected and reported an illegal source of income also reported sharing injection equipment. Over 40% of those in the illegal source of income category had also used drugs on the day of survey completion, suggesting that illegal primary sources of income are among the few avenues available to those dependent on drugs.

Sexual risk behavior followed a similar pattern, with those identifying themselves as homosexual or bisexual having an illegal primary source of income, and specifically being involved in sex for money, drugs or gifts/favors. Not surprisingly, these groups reported the highest numbers of sexual partners in the past 3 months, and nearly two-thirds of them used alcohol or drugs in their last sexual encounter, factors which would likely decrease the probability of condom use.

Across all ethnic/racial groups, those who reported exchanging sex for money or drugs and drug dealing and theft were more likely to have used drugs, more likely to have injected, more likely to have shared injection paraphernalia, and more likely to have used drugs on the day of the interview. These findings suggest that illegal pri-

Table 1: Demographic characteristics of the study sample

	African Americans (*n* = 441)	Hispanic Americans (*n* = 456)	Whites (*n* = 297)	Asians (*n* = 300)
Sex				
Male	206 (46.7%)	252 (55.3%)	200 (67.3%)	148 (48.7%)
Female	235 (53.3%)	204 (44.7%)	97 (32.7%)	154 (51.3%)
Age (years)				
18–29	122 (27.7%)	208 (45.6%)	36 (12.1%)	126 (42.0%)
30–39	195 (44.2%)	162 (35.5%)	164 (55.2%)	120 (40.0%)
40–49	111 (25.2%)	77 (16.9%)	92 (31.0%)	39 (13.0%)
50+	11 (2.5%)	8 (1.8%)	5 (1.7%)	15 (5.0%)
	Missing *n* = 2	Missing *n* = 1		
Education				
High School/GED	236 (53.5%)	314 (68.9%)	89 (30.0%)	120 (40.5%)
Above high school	203 (46.0%)	131 (28.7%)	202 (68.0%)	176 (59.5%)
	Missing *n* = 2	Missing *n* = 11	Missing *n* = 6	Missing *n* = 4
Income				
Legally employed	249 (56.5%)	199 (43.6%)	188 (63.5%)	234 (78.0%)
Welfare	75 (17.0%)	80 (17.6%)	71 (24.0%)	30 (10.0%)
Illegal activities	117 (26.6%)	164 (36.0%)	34 (11.5%)	36 (12.0%)
		Missing *n* = 13	Missing *n* = 4	
No sexual activity past 3 months				
Males	42 (21.8%)	46 (20.5%)	34 (21.9%)	13 (9.4%)
Females	48 (22.9%)	49 (26.1%)	20 (27.4%)	36 (24.0%)
Reported sexual identity				
Males-Homosexual	24 (12.4%)	49 (21.9%)	41 (26.5%)	11 (8.0%)
Males-Bisexual	55 (28.5%)	84 (37.5%)	60 (38.7%)	38 (27.5%)
Males-Heterosexual	114 (59.1%)	91 (40.7%)	54 (34.8%)	89 (64.5%)
Female-Homosexual	10 (4.8%)	20 (10.6%)	5 (6.9%)	7 (4.7%)
Female-Bisexual	40 (19.1%)	50 (26.6%)	23 (31.5%)	30 (20%)
Female-Heterosexual	160 (76.2%)	118 (62.8%)	45 (61.6%)	113 (75.3%)

Note: As a result of missing data, some of the percentages do not sum to 100.

Table 2: Racial/ethnic and gender differences in primary source of income

INCOME	Legal	Welfare	Sex exchange	Drugs/theft
RACE*				
African American	56.6%	17.0%	19.7%	6.8%
Latino/a	44.8%	18.1%	27.6%	9.5%
Asian	78.0%	10.0%	10.0%	2.0%
White	11.6%	24.2%	51.9%	12.3%
GENDER**				
Male	42.2.%	16.8%	30.1%	11.2%
Female	55.9%	18.3%	22.1%	3.7%

*Race/ethnicity, χ^2 = 293.6, df = 9, p < .001 **Gender, χ^2 = 50.6, df = 3, p < .001

mary source of income rather than ethnicity/race may be the determinant of high risk sexual behaviors in disadvantaged populations.

These data taken together confirm that those recruited by street outreach with legal primary sources of income have lower HIV risk behaviors than those on welfare who in turn have significantly lower HIV risk behaviors than those engaged in activities leading to an illegal primary income source. For both sexual and drug-related risks, the exchange of sex for drugs, money or gifts/favors becomes an intersection for drug and sexual risk and thus those individuals are at higher risk than any of the other individuals in other categories. Such "survival sex" places one at

Table 3: Drug use risk behaviors by primary income source

Income source	Legal	Welfare	Sex exchange	Drugs/theft
Risk behavior				
*Total ever used drugs**	44.7%	54.6%	70.6%	72.4%
African American	35.1%	63.0%	76.7%	86.2%
Hispanic	49.2%	56.4%	67.0%	64.9%
Asian	50.2%	26.7%	60.7%	66.7%
White	54.5%	55.2%	71.7%	69.7%
How took drugs**				
Total inject^a	21.9%	55.0%	62.1%	64.0%
African American	13.0%	56.4%	80.3%	86.2%
Hispanic	42.2%	55.6%	50.5%	38.9%
Asian	4.7%	33.3%	23.8%	60.0%
White	70.0%	56.0%	66.9%	73.3%
Total snort^a	18.1%	22.5%	20.7%	17.0%
African American	13.0%	18.2%	14.5%	3.4%
Hispanic	22.5%	24.1%	30.7%	27.8%
Asian	20.3%	44.4%	23.8%	0.0%
White	5.0%	22.0%	15.7%	20.0%
Total smoke^a	45.6%	18.9%	14.4%	16.0%
African American	68.5%	23.6%	5.3%	10.3%
Hispanic	27.5%	18.5%	14.9%	27.8%
Asian	47.6%	0.0%	38.1%	20.0%
White	20.0%	18.0%	15.7%	6.7%
Total take pills^a	14.3%	3.6%	2.8%	3.0%
African American	5.4%	1.8%	0.0%	0.0%
Hispanic	7.8%	1.9%	4.0%	5.6%
Asian	27.3%	22.2%	14.3%	20.0%
White	5.0%	4.0%	1.7%	0.0%
Total if injected, shared*^{a}	23.2%	43.0%	58.6%	56.6%
African American	15.6%	41.9%	72.1%	80.0%
Hispanic	32.9%	41.7%	60.2%	34.1%
Asian	20.6%	53.8%	26.9%	50.0%
White	33.3%	42.9%	55.0%	63.9%
Total used drugs today***	19.2%	32.8%	40.9%	45.1%
African American	19.4%	33.3%	44.9%	41.4%
Hispanic	30.3%	33.3%	46.3%	48.6%
Asian	7.7%	12.5%	33.3%	16.7%
White	30.0%	35.3%	35.4%	50.0%

*χ^2 = 79.9, df = 3, p < .001 **χ^2 = 181.9, df = 9, p < .001 ***χ^2 = 128.1, df = 3, p < .001 ****χ^2 = 174.4, df = 12, p < .001 (not all data shown in table)
^{a}Percentages for race/ethnicity breakdowns frequently based on small cell sizes (≤5)

Table 4: Sex risk behavior by primary income source

Income source	Legal	Welfare	Sex exchange	Drugs/theft
Sexual identification*^{a}				
Total heterosexual	73.0%	54.2%	39.3%	60.4%
African American	84.0%	49.3%	40.2%	67.9%
Hispanic	64.9%	46.1%	32.2%	51.2%
Asian	71.7%	80.0%	50.0%	83.3%
White	50.0%	56.3%	42.4%	61.1%
Total bisexual	19.0%	34.0%	43.2%	24.3%
African American	11.9%	41.3%	41.4%	21.4%
Hispanic	20.2%	38.2%	52.1%	26.8%
Asian	22.1%	13.3%	43.3%	16.7%

Table 4: Sex risk behavior by primary income source *(Continued)*

White	41.2%	31.0%	37.1%	25.0%
Total homosexual	7.9%	11.9%	17.5%	15.3%
African American	4.1%	9.3%	18.4%	10.7%
Hispanic	14.9%	15.8%	15.7%	22.0%
Asian	6.2%	6.7%	6.7%	0.0%
White	8.8%	12.7%	20.5%	13.9%
Partners in past 3 months**				
0 partners[a]	25.8%	19.4%	15.4%	17.3%
African American	25.2%	23.0%	10.3%	3.4%
Hispanic	29.3%	23.7%	22.3%	35.0%
Asian	26.2%	26.7%	40.0%	40.0%
White	8.8%	7.0%	7.9%	5.6%
1–5 partners[a]	55.4%	40.5%	28.0%	30.0%
African American	63.0%	31.1%	24.1%	37.9%
Hispanic	44.0%	46.1%	32.2%	22.5%
Asian	61.8%	56.7%	40.0%	20.0%
White	23.5%	38.0%	24.5%	33.3%
6–10 partners[a]	11.0%	27.8%	30.6%	32.7%
African American	8.8%	33.8%	26.4%	34.5%
Hispanic	14.1%	18.4%	26.4%	25.0%
Asian	6.2%	13.3%	3.3%	40.0%
White	41.2%	38.0%	41.7%	38.9%
11–20 partners[a]	5.5%	9.5%	17.7%	16.4%
African American	1.7%	10.8%	24.1%	20.7%
Hispanic	8.9%	7.9%	10.7%	12.5%
Asian	4.0%	0.0%	6.7%	0.0%
White	23.5%	14.1%	21.9%	19.4%
>20 partners[a]	2.2%	2.8%	8.2%	3.6%
African American	1.3%	1.4%	14.9%	3.4%
Hispanic	3.7%	3.9%	8.3%	5.0%
Asian	1.8%	3.3%	10.0%	0.0%
White	2.9%	2.8%	4.0%	2.8%
Used alcohol or drugs last time had sex***[a]	37.7%	49.1%	64.2%	68.2%
African American	35.8%	58.6%	76.8%	83.3%
Hispanic	42.4%	44.6%	60.5%	52.8%
Asian	34.7%	41.7%	60.0%	50.0%
White	39.4%	46.0%	60.6%	74.3%

* χ^2 = 124.0, df = 6, p < .001; **χ^2 = 190.1, df = 12, p < .001; ***χ^2 = 77.4, df = 3, p < .001

the highest risk; however, it is interesting that persons recruited by street outreach who are involved in other illegal activity such as theft/drug dealing that is not by definition associated with sex, also have a high level of sexual risk. The high level of drug risk in this category is probably associated with drug dealing and theft to support a drug habit. These data illustrate, in a large multi-ethnic street sample in Texas, that the highest HIV risk is associated with the highest level of social disadvantage. These data support the findings of Hargreaves et al., (2002) and suggest that social disadvantage is associated with risk in part by its association with drug and sex work for survival. The most disadvantaged and those at highest risk for HIV infection within this population are individuals lacking a primary source of income. Their risk is increased when they are involved in illegal activities, suggesting the need for dual social programs that address the factors surround-

ing unemployment and drug use. These interventions would lessen the socioeconomic impact of caring for these individuals if they become ill and would add resources to the economy with participants' ability to return to productivity. Because there is an increasing tendency for HIV, STDs and other infectious diseases to sediment at the lowest levels of the social stratum, these data offer one illustration of the variables that may be associated with the concentration of disease among those at greatest disadvantage by having an illegal and unstable primary source of income.

Competing Interests
None declared.

Contributors
EJE, AFM and MWR conceived and designed the study. EJE, MWR, MLW and MF-E jointly planned and executed the data analyses. EJE wrote the paper with assistance from AFM, MWR, RJP, and GOO.

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