GENDER DIFFERENCES IN THE INITIATION OF INJECTION DRUG USE AMONG YOUNG ADULTS

MEG C. DOHERTY, MD, PHD, MPH,
RICHARD S. GARFEIN, PHD, MPH,
EDGAR MONTERROSO, MD, MPH,
CARL LATKIN, SCD, AND DAVID VLAHOV, PHD

ABSTRACT To characterize the circumstances surrounding initiation of injecting drug use, data were collected from 229 young, recently initiated injection drug users enrolled through community-based recruitment in Baltimore, Maryland. Gender differences in the pattern of initiation, the number of persons present at initiation, risky injection, and sexual behaviors at initiation, as well as behaviors after initiation, were examined. Overall, men and women were similar statistically with respect to age at initiation (19.5 years) and risk behaviors at initiation. While men were initiated by men (77%), women were more often initiated by women (65%), most of whom were friends (75%) or relatives (23%). The percentage of women infected with human immunodeficiency virus (HIV) was slightly greater than that of men, 17% versus 11% ($P < .2$), whether initiated by a man or a woman. Persons who self-initiated had a lower HIV prevalence and fewer HIV-related risk behaviors. Analysis of variance assessed differences in the HIV risk profiles of female and male IDUs who were initiated by someone of the same sex, of the opposite sex, or who self-initiated. These results indicated that (1) young women and men had similar patterns of injection initiation; (2) most women were initiated by female friends, running counter to earlier literature claims that women were initiated to injection drug use by male sex partners; and (3) women initiated by men had a marginally greater mean score on the HIV risk profile.

KEY WORDS Gender Differences, Human Immunodeficiency Virus, Initiation, Injection Drug Use, Intravenous, Substance Abuse.

Drs. Doherty, Garfein, and Vlahov are with the Infectious Disease Program, Department of Epidemiology, The Johns Hopkins School of Hygiene and Public Health, Baltimore, MD, Dr. Monterroso is with the Division of HIV/AIDS, Centers for Disease Control and Prevention, Atlanta, GA, and Dr. Latkin is with the Department of Health Policy, The Johns Hopkins School of Hygiene and Public Health, Baltimore, MD.

Correspondence and reprints: Dr. David Vlahov, Room E-6008, Department of Epidemiology, Johns Hopkins School of Hygiene and Public Health, 615 North Wolfe Street, Baltimore, MD 21205. (E-mail: dvlahov@nyam.org or dvlahov@jhsph.edu)

INTRODUCTION

Recent reports of increased heroin use and rapid initiation into injection drug use among youth around the globe has brought to light the potential risks of human immunodeficiency virus (HIV) acquisition soon after starting to inject drugs.[1-3] Ethnographic research has shown that injection drug users (IDUs) usually begin to inject within their own peer group. In fact, typically, a member of a person's social group, a relative, or a sex partner helps the first-time IDU (initiate) inject drugs at initiation.[4-10] This person, referred to in this article as the *helper*, introduces the initiate to injection drug use and often prepares and injects the drug into the vein of the initiate. The role of the helper in relation to the initiate[11,12] and how males and females are influenced differentially by their social networks have become the focus of investigations.[13,14] Because the first injection may not be planned, the initiate usually does not own injection equipment and may borrow, from the helper, syringes, a cooker (a receptacle such as a bottle top or a spoon to mix drugs and heat heroin or speedball), cotton (to filter the drug), and rinse water. Historical reports describe helpers as relatively new to injection and unlikely to be experiencing problems due to injection drug use.[5,15] However, recent studies indicate that IDUs who give injections to others are more likely to have shared syringes[11] and more likely to be unemployed, polysubstance users, and dealers.[12]

Reports of gender differences at the initiation of injection drug use have described women as dependent on men for help acquiring and injecting the drug. For example, Hser and Anglin[4,16,17] conducted a series of studies of sex differences in addiction histories among heroin users who were attending methadone maintenance programs in Los Angeles. Women were younger than men at the time of first use of illicit drugs, and most women were introduced to heroin by men, especially by sex partners. Younger women, however, reported active involvement in their drug habit, including self-initiation into heroin use, polysubstance use, and drug dealing.[4] Other studies indicated that women were more likely to be introduced to injecting by a spouse or common-law mate, while men were introduced by male peers in group situations.[18-20] Most initiates received their first drugs as gifts, yet more women than men continued to receive drugs as gifts. More women than men were unemployed and received welfare or disability at the time of initiation into injection drug use.[4] These findings were supported by several other studies.[8,21-23]

The dynamics of gender differences in the initiation into injection drug use have been explored in the context of HIV risk. Battjes et al.[3] found young initiates reported increased drug-using risk behaviors and were more likely than older

initiates to be HIV infected. Among females, initiation at a young age correlated with increased risky sexual behaviors.[3] Studies from New York City found higher HIV seroprevalence rates among newer female IDUs when compared with newer male IDUs.[24] Injection network factors, such as a network member who was 5 years older, a network member who had been known for less than a year, or a network member who injected more than once a day, were associated with elevated HIV prevalence for women. A recent study reported that, among new injectors, women were more likely than men to be HIV positive.[25] These results implied that, among new IDUs, women were at greater risk than men for acquiring HIV soon after starting to inject due to a complex matrix of social circumstances and injection network factors.

Although the mechanism for this higher rate among new female IDUs is unclear, circumstances at initiation might contribute to increased risk. Women often inject after men, receptively sharing needles and syringes. Many studies of behaviors after initiation support these findings.[26–31] Sotheran et al.[26] noted that women injected more often with others present, were more likely to be in injection networks that contained sex partners, and used injection equipment obtained from network members rather than purchased on the street. Latkin et al.[13] reported a similar overlap of sexual and injection networks among women. More recently, Neaigus et al.[32] reported that sharing syringes and having high-risk network members, along with sex trade, independently contributed to HIV infection among new IDUs. While many of these studies were among experienced drug users, few studies have examined gender-specific injection network factors and circumstances at initiation relative to HIV infection, specifically among recent initiates to injection drug use.

The purpose of our study was to describe the circumstances at initiation of injection drug use and to compare gender differences in behaviors. We enrolled a cohort of young adult recently initiated IDUs to assess the various risks for HIV infection at initiation and soon afterward to determine correlates of the increased HIV rates reported for young female IDUs. We hypothesized that there could be an increased risk for HIV infection at the first injection or soon thereafter due to direct and indirect sharing of injection equipment or sexual exposures between the helper and the initiate.

METHODS

Study Design and Population

In Baltimore, Maryland, the Risk Evaluation and Assessment of Community Health (REACH) project enrolled 250 IDUs through street outreach from August

1994 through May 1996. A cohort of 50 persons who did not inject was enrolled simultaneously to eliminate an incentive among non-IDUs to falsify an injection history to obtain study entry. Project outreach workers approached young IDUs on the street, placed advertisements in shops, and handed out information cards to interested persons. Advertisements were placed in a local free paper, in a newsletter for IDUs, at local clinics and departments of social services, and on bus placards. Participants also were recruited by word of mouth from enrolled participants.

Inclusion criteria included age 18 to 29 years, verified by photo identification, and having injected within the year preceding enrollment. Current injection status was verified by presence of injection marks. The mean age was 22.8 years, and 6 persons (2.6% of the cohort) who were 26 to 29 years old were enrolled. Although time since onset of injection was not an inclusion criterion, we sought to enroll persons with short injection histories. The median duration of injection was 3 years. Final analyses were conducted on 229 IDUs for whom we had complete data.

An active community advisory board consisting of leaders from local youth organizations, drug treatment centers, homeless shelters, job placement programs, and the city health department was formed prior to recruitment to provide feedback on the study protocol and the interview instrument. The board recommended services appropriate for young IDUs and facilitated the development of referral protocols for HIV case management, clinical treatment, and drug treatment programs. The Institutional Review Board of the Johns Hopkins School of Hygiene and Public Health approved the study.

Data Collection

Structured confidential interviews were conducted in a storefront on the east side and in a city health department clinic on the west side of the city of Baltimore. During the initial visit, participants underwent a face-to-face screening interview. Once participants were found eligible for the study, the research protocol was explained in detail, and informed consent was obtained. A longer baseline interview covering initiation to injection drug use, lifetime drug use, and sexual behaviors was administered. After the interview, participants underwent HIV pretest counseling and venipuncture by a trained counselor. At that time, participants could ask about and receive referrals to drug treatment and other social services. They were given an appointment to return to the study site within 2 weeks to learn the HIV test results and to receive HIV post-test counseling in person. All persons who tested positive for HIV were referred for medical care. Participants received a small remuneration at the end of each visit. Venous

blood drawn at each visit was assayed for antibody to HIV using enzyme-linked immunoassay (Genetics Systems, Seattle, WA), and was confirmed by Western blot (DuPont, Wilmington, DE) according to standard guidelines.

Study Variables

The variables included demographic characteristics such as age, gender, race, educational level, income, history of incarceration, and homelessness. HIV testing history and current HIV infection also were ascertained. Variables specific for circumstances before the first injection included observing others inject, the relationship to persons most often observed injecting, past opportunities to inject drugs, if the first injection was planned, time from first drug use to first injection, and the main reason for initiating injection drug use. Other variables characterized the first injection experience and included the initiate's age at first injection, history of self-initiation, the number and characteristics of the people present, the place of initiation, the drug of choice, how drugs and needles were obtained, and risky behaviors related to HIV (sharing needles or allowing someone else to inject first). Injection practices after initiation included the number of "trainers" (persons who injected the drug for the initiate before he or she learned to self-inject) and the number of days before the initiate could inject without help.

The intent of the interview was to profile the potentially risky behaviors and characteristics of the people who helped the initiate. The participant thus was asked to list all the people at initiation and to identify the person who was the most influential during the first injection (the helper). Sometimes, this person acted solely as an introducer to injection, other times as the "hitter" or "doctor" (the person who injected the drug).[11,33] More often than not, the helper acted as both introducer and doctor. Variables specific to the characteristics of the helper included gender, HIV status at the time of the interview, the relationship to the initiate, his or her role at initiation, age difference between helper and initiate, and years of injection experience. Variables of noninjection risks for HIV shared by the helper and initiate included having sex in the 30 days before initiation and giving money or drugs at initiation. A five-level variable consisting of the four types of helper-initiate pairings (i.e., male-female, female-male, female-female, male-male) and self-initiators was constructed to compare HIV-related risk profiles. Separate summary scores were developed for HIV-related behaviors at initiation, drug use practices (injected cocaine, smoked crack, shared needles, always used a new needle) and sexual behaviors (IDU sex partner, raped, more than 100 sex partners, traded sex). The risk variables selected for the score were associated significantly with HIV seroprevalence in this study population and

are reported elsewhere.[34] A person received a score of 1 for each risk behavior practiced, and the risk scores were summed to produce an overall individual score, which was then used to produce a mean score across the population. This score was not weighted qualitatively with regard to the amount of risk associated with each behavior; it simply is used here to quantify the number of risk behaviors for each person.

Statistical Analysis

Univariate and bivariate analyses were conducted for all variables. For normally distributed continuous variables, means and standard deviations were assessed. When appropriate, continuous variables were dichotomized according to the mean or median or in response to a natural cut in the data. Categorical data were analyzed using the Mantel-Haenszel chi-square test for differences in proportions and by odds ratios (ORs) with 95% confidence intervals (CIs). The Fisher exact test was used when numbers were sparse. The Cochran-Mantel-Haenszel general association test was used to evaluate significance for variables with more than two categories. Analysis of variance (ANOVA) was used to assess the within- and between-group differences in mean scores. Post hoc tests using the studentized maximum modulus were made for pairwise comparisons of group means in the ANOVA analysis.

RESULTS

Factors at Initiation

Table I shows selected demographic characteristics, by gender, of the 229 young IDUs enrolled in the REACH project. Overall, the sample was distributed fairly evenly by gender (54% female and 46% male) and did not differ significantly by age at enrollment (mean = 23.3 years) or by race. A greater proportion of women compared to men were HIV infected (17% vs. 11%, $P = .238$). The women, however, compared with the men, were significantly less likely ($P < .05$) to have completed a high school education (30% vs. 50%), less likely to receive an income from work (13% vs. 32%), and more likely to receive public assistance (35% vs. 11%). There was no difference in the percentage of women and men who engaged in illegal activities such as selling drugs, theft, or sex trade to obtain money. Within the past year, men were significantly more likely than women to have been incarcerated (82% vs. 42%, $P = .001$). Men reported more homelessness than women (51% vs. 43%); this trend was nonsignificant.

Table II describes circumstances before initiation by gender. Most of the behaviors were not different statistically for this cohort, which differs from previ-

TABLE 1 Characteristics, by Gender, of 229 Young Adult Injection Drug Users Enrolled in the REACH Project, Baltimore, Maryland, 1994–1996

	Female (N = 124)		Male (N = 105)		M-H χ^2
	n	(%)	n	(%)	*P**
HIV-positive test					
Yes	21	(17)	12	(11)	
No	103	(83)	93	(89)	.238
Age at enrollment (years)					
≤23	50	(40)	39	(37)	
>23	74	(60)	66	(63)	.624
Race					
White	13	(10)	24	(23)	
African-American	104	(84)	76	(72)	
Other	7	(06)	5	(5)	.157
Education (years)					
<12	87	(70)	52	(50)	
≥12	37	(30)	53	(50)	.001
Income source in past 6 months					
Work	16	(13)	34	(32)	
Public assistance	43	(35)	12	(11)	
Illegal sources	37	(30)	37	(35)	
Relative	21	(17)	17	(16)	.000
Incarcerated in past year					
Yes	52	(42)	86	(82)	
No	72	(58)	19	(18)	.001
Homeless in past year					
Yes	53	(43)	54	(51)	
No	71	(57)	51	(49)	.190

**P* values based on Mantel-Haenszel chi-square test of proportions.

ous reports and thus is important to describe. Almost all (85%) had observed another person inject; about half of the persons watched were friends, and one-fourth were relatives (parent, sibling, aunt, or uncle). The majority of the women (62%) and the men (71%) had opportunities to inject drugs before the first injection, yet two-thirds had not planned their first injection. There were 19% of women and 17% of men who started to inject within 1 year of first illicit drug use. Reasons for starting to inject differed significantly by gender. Half the men responded that injection was necessary because they could no longer get a satisfactory high from snorting or smoking heroin or cocaine; half the women stated that they injected out of curiosity. For both men and women, 15% or fewer

TABLE II Circumstances Before Initiation of Injection, by Gender, of 229 Young Adult Injection Drug Users in Baltimore, Maryland, 1994–1996

	Female (N = 124)		Male (N = 105)		M-H χ^2
	n	(%)	n	(%)	P*
Observed others inject					
Yes	108	(87)	88	(84)	
No	16	(13)	17	(16)	.481
Persons observed most often					
Friends	64	(52)	53	(50)	
Relatives	32	(26)	21	(20)	
Others	28	(23)	31	(30)	.147
Had prior opportunity to inject					
Yes	77	(62)	75	(71)	
No	47	(38)	30	(29)	.137
Planned first injection					
Yes	38	(31)	42	(40)	
No	86	(69)	63	(60)	.140
Time from first drug use to initiation (years)					
≤1	24	(19)	18	(17)	
>1	100	(81)	87	(83)	.667
Reason injected first time†					
Addicted/needed the drug	30	(29)	49	(51)	
Curious/for fun	50	(48)	37	(38)	
Peer influence	14	(13)	15	(15)	
Other‡	11	(10)	6	(6)	.050

*P values based on Mantel-Haenszel chi-square test of proportions.
†Asked of only 202 persons.
‡Other includes depression and stress.

said they had injected as a result of peer pressure or desire to please a friend or sex partner.

Table III shows circumstances at the time of initiation by gender. The mean age at first injection was 19.5 years (range 12 to 25 years). Age at initiation did not differ by gender, although women were marginally more likely to initiate at age 16 or younger (19% vs. 12%). Men were significantly more likely than women to have self-injected at initiation (22% vs. 12%, $P = .047$). Most of the initiates had only one other person present at initiation. Men and women stated that most of the persons who injected the drug for them were already high from drug or alcohol use before the first injection. The drug of choice for men and

TABLE III Circumstances at the Time of Initiation into Injection Drug Use, by Gender, of 229 Young Adult Injection Drug Users in Baltimore, Maryland, 1994–1996

	Female (N = 124)		Male (N = 105)		M-H χ^2
	n	(%)	n	(%)	P*
Age first injection (years)					
≤16	24	(19)	13	(12)	
>16	100	(81)	92	(88)	.154
Injected by					
Self	15	(12)	23	(22)	
Another	109	(88)	82	(78)	.047
Number of other people present					
0	9	(7)	13	(12)	
1	62	(50)	47	(45)	
≥2	53	(42)	45	(43)	.112
Condition of person who injected					
High/other†	80	(65)	66	(63)	
Sober	44	(35)	39	(37)	.795
Injected cocaine or speedball					
Yes	26	(21)	31	(30)	
No	98	(79)	74	(70)	.137
Place					
Own home	26	(21)	29	(28)	
Friend's home	55	(44)	32	(30)	
Relative's home	23	(19)	21	(20)	
Lover's home	6	(5)	4	(4)	
Other‡	14	(11)	19	(18)	.112
How drug obtained					
Bought it	66	(54)	62	(61)	
Gift/treat	38	(31)	21	(21)	
Other	18	(15)	19	(19)	.273
How needle was obtained					
Bought it	54	(44)	34	(32)	
Gift	34	(27)	35	(33)	
Borrowed	18	(15)	15	(14)	
Other	18	(14)	21	(20)	.159
Needle was used before					
Yes	22	(18)	22	(21)	
No	102	(82)	83	(79)	.321
Number of trainers§ before could self-inject					
≥2	52	(42)	40	(38)	
0–1	72	(58)	65	(62)	.556

(continued)

TABLE III Continued

	Female (N = 124)		Male (N = 105)		M-H χ^2
	n	(%)	n	(%)	P^*
Number of days before could self-inject					
>60	42	(34)	30	(29)	
≤60	82	(66)	75	(71)	.390

*P values based on Mantel-Haenszel chi-square test of proportions.
†Other includes in drug withdrawal, emotional.
‡Other includes abandoned homes, on the street, public bathrooms, public areas, shooting galleries.
§A person who gave injections to the initiate before the initiate was able to inject without help.

women was heroin; comparatively more men than women used cocaine (30% vs. 21%). The first time, 44% of the women and 30% of the men injected at a friend's place; few injected at the home of a lover. More than half of the initiates reported that they bought their own drugs at initiation (54% of women and 61% of men); only a third of the women had depended on another person to supply the drug as a gift or treat.

Access to needles at the first injection and several important HIV-related injecting practices were not significant by gender. However, these results are reported in Table III since both genders participated in potentially risky behaviors. For example, 44% of the women and 32% of the men bought her or his own needle the first time, meaning that most relied on their helper to provide a needle. Even though 15% "borrowed" their needle, 82% of women and 79% of men were not sure if their needle had been used prior to their first injection (indicating that a needle received as a gift or obtained from another source might have been used). Data not shown in Table III indicated that two-thirds of the population shared their drugs the first time, providing opportunities for the indirect sharing of needles to split the drugs. A little more than half reported that they or their helper had used the cooker first and were first to inject or be injected. Almost 90% said that they used their own needle first, before any of the other people present. During most initiations, more than one needle was available.

To determine whether injection practices after initiation differed by gender, we asked a series of questions to determine the initiate's dependence on others for help injecting soon after initiation. Gender comparisons were not significant for behavioral differences (Table III). Slightly more females than males (42% vs. 38%) needed two or more trainers before they were able to self-inject, and more women than men needed more than 60 days to learn how to self-inject (34% vs. 29%).

Table IV describes some of the characteristics by gender of the people present at the first injection. Because 22 participants self-initiated, 207 participants reported a helper. Women were significantly more likely to report that their helper was

TABLE IV Characteristics of the Helper at Initiation, by Gender, of 207* Young Adult Injecting Drug Users in Baltimore, Maryland, 1994–1996

	Female (N = 115)		Male (N = 92)		M-H χ^2
	n	(%)	n	(%)	*P*†
Gender of helper					
Female	75	(65)	21	(23)	
Male	40	(35)	71	(77)	.001
Helper HIV positive now					
Yes	14	(12)	3	(3)	
No	101	(88)	89	(97)	.022
Relationship					
Friend	72	(63)	56	(61)	
Relative	26	(23)	20	(21)	
Spouse/sex partner	17	(15)	10	(11)	
Other‡	0	(0)	6	(6)	.044
Role of helper					
Injecting drug for initiate	105	(91)	77	(84)	
Other	10	(9)	15	(16)	.096
Years helper was older than initiate					
≥5	73	(63)	53	(58)	
<5	42	(37)	39	(42)	.391
Years helper had been an IDU§					
≥5	44	(42)	33	(41)	
<5	61	(58)	48	(59)	.873
Sex with helper 30 days before initiation					
Yes	19	(17)	11	(12)	
No	96	(83)	81	(88)	.355
Gave money for help injecting					
Yes	10	(9)	7	(8)	
No	105	(91)	85	(92)	.778
Gave drugs for help injecting					
Yes	36	(31)	32	(35)	
No	79	(69)	60	(65)	.597

*22 persons self-initiated; therefore, only 207 persons had one or more helpers at initiation. Helper was defined as the person who helped the initiate most at initiation.

†*P* values based on Mantel-Haenszel chi-square test of proportions.

‡Other includes stranger, jailmate, acquaintance.

§Based on n = 186 because of missing data.

female (65%), just as men were more likely to report that their helper was male (77%). Female initiates were four times more likely than their male counterparts to know that their helper was HIV infected by the time of the interview. Most of the helpers were friends (63% for women and 61% for men), not sex partners (15% and 11% for women and men, respectively). Most of the helpers (91% and 84% for women and men, respectively) played the role of both introducer and doctor, and two-thirds were 5 or more years older than the initiate. All the helpers had a history of injection drug use, and almost 60% had injected for less than 5 years. Few of the initiates had had sex with their helpers (17% of women and 12% of men), although there was a trend for more women to have a sexual relationship with their helpers. Few gave money for help with injecting, but almost a third reimbursed their helper with drugs.

HIV-Related Risk Behaviors

Our finding that women were introduced to injection drug use by other women is a departure from earlier reports about the initiation of injection drug use. We closely examined the helper-initiate pairings to determine whether HIV-related risk behaviors might differ among the pairs. For example, based on previous literature, we hypothesized that HIV seroprevalence would be greater for women who were initiated by men, and that each pairing would exhibit a different profile of risk behaviors known to be associated with HIV infection. However, male-female pairs and female-female pairs had similar HIV prevalence of approximately 17% (Table V). Bivariate associations between each helper-initiate pair and HIV infection showed a nonsignificant trend for increased HIV seroprevalence among women, whether they were initiated by a another woman (OR = 2.10, 95% CI 0.41–20.6) or by a man (OR = 2.12, 95% CI 0.4–22.6) when compared to a baseline prevalence among persons who self-initiated.

To determine whether the difference in HIV infection rates between women and men was attributable, for each helper-initiate pair, to gender-specific risk profiles, we examined the proportion of behaviors reported for circumstances at initiation and drug use and sexual behaviors previously shown to be associated with HIV acquisition.[34] Table V shows significant associations. Same-gender helper-initiate pairs were more likely to be friendship pairs; opposite-gender pairs were split equally between friendship and sex-partner pairings. Female-female pairs were marginally more likely than all other pairs (13% vs. 10%, 4%, and 0% for male-female, male-male, and female-male pairs, respectively) to report that their helper was known to be HIV infected by the time of interview. Self-initiators reported fewer HIV-related risk behaviors than did all others. They

TABLE V HIV-Related Risk Profile, by Genders of Helper-Initiate Pair* of 229 Young Adult Injection Drug Users in Baltimore, Maryland, 1994–1996

	Male-Female (n = 40) (%)	Female-Male (n = 21) (%)	Female-Female (n = 75) (%)	Male-Male (n = 71) (%)	Self-Initiate (n = 22) (%)	CMH *P*†
HIV prevalence	17.5	9.5	17.3	12.7	9.1	.290
Initiation						
Relationship to helper						
Friend	40	33	75	69		
Relative	22	14	23	24		
Sex partner	38	43	2	1		
Other	0	10	0	6	—	.001
Helper HIV positive now	10	0	13	4	—	.106
Drug use behaviors‡						
Ever injected cocaine or speedball	70	71	64	76	50	.191
Smoked crack daily in past 6 months	23	10	32	6	5	.001
Shared needles in past 6 months	50	52	27	49	18	.004
Always used new needle in past 6 months	10	24	23	20	41	.081
Sexual behaviors§						
Ever had sex partner who was an IDU	65	71	55	46	27	.016
Ever raped	53	19	45	6	23	.001
>100 lifetime sex partners	18	10	7	3	0	.032
Type of sex traded for money or drugs after initiation of injection						
Penile-vaginal sex	53	29	44	11	23	.001
Oral sex	33	29	29	7	14	.003
Anal sex	3	19	4	3	0	.014

*Gender of helper is listed first; initiate is listed second (i.e., helper-initiate).

†Cochran-Mantel-Haenszel ((CMH) general association *P* value.

‡Variables for backload, inject ≥5 times per day, and time from first drug use to first IDU <1 year are not shown because they are not significant.

§Variable for sexual preference not shown because it is not significant by the CMH *P* value.

reported the highest levels of always using new needles (41%) and using needle-exchange programs (data not shown), and they reported the lowest levels of risky injection behaviors such as injecting cocaine or speedball, smoking crack daily, or sharing needles. Women who were initiated by men reported a greater proportion of lifetime risky sexual behaviors, such as having sex partner who was an IDU (65%), having been raped (53%), having more than 100 lifetime sex partners (18%), and trading vaginal sex after starting to inject drugs (53%).

The proportion of behaviors reported by each helper-initiate pairing are explored further in Table VI. Mean scores, reflecting the mean number of risk

TABLE VI Mean Scores for Drug Use Practices and Sexual Behaviors, by Gender of Helper-Initiate Pair, Determined by Analysis of Variance (ANOVA), REACH Project, Baltimore, Maryland, 1994–1996

	Male-Female (n = 40)		Female-Male (n = 21)		Female-Female (n = 75)		Male-Male (n = 71)		Self-Initiate (n = 22)		ANOVA F-test
Score for variables	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	*P*
Initiation*	1.93	(0.92)	1.71	(1.01)	1.61	(1.03)	1.41	(1.02)	—		.0738
Drug use†	3.05	(1.55)	2.90	(1.79)	2.41	(1.22)	2.61	(1.41)	1.82	(1.71)‡	.0164
Sex§	2.30	(1.56)	1.90	(1.55)	1.93	(1.63)	0.86	(1.05)‡	0.86	(1.36)‡	.0001
Composite for drug and sex‖	5.35	(2.60)	4.81	(3.08)	4.35	(2.30)	3.46	(2.04)‡	2.68	(2.77)‡	.0001

*Variables = helper is sex partner, helper is ≥5 years older than initiate, helper is now HIV infected, ≥2 trainers before being able to self-inject, taking >60 days before able to self-inject.

†Variables = ever injected cocaine or speedball, smoked crack cocaine daily, shared needles in past 6 months, do not always use a new needle, inject ≥5 times per day, backload, time from first drug use to first injection <1 year.

‡Post-hock comparisons (the studentized maximum modulus and Sidak's uncorrelated *t*) show pairs not significantly different from each other, but significantly different from other unmarked pairs. Unmarked pairs are not significantly different from each other.

§Variables = gay/lesbian/bisexual, ever had a sex partner who was an IDU, had more than 100 lifetime sex partners, ever been raped, type of sex traded for money or drugs after initiation (penile-vaginal, oral, or anal sex).

‖Drug use score + sex score; initiation variables were not considered in the composite score because across all strata were not available (e.g., self-initiators did not have data on a helper at initiation).

¶Scores based on significant and insignificant HIV-related risk variables presented in Table V. This was done so that the scores did not select outright for a difference between the groups on ANOVA.

behaviors practiced by members of each pair, were determined independently for initiation behaviors, drug use practices, sexual behaviors, and a composite variable for drug and sex behaviors. The ANOVA F statistics were significant for scores on drug use, sexual behavior, and the composite variable indicating a between-group difference in risk profiles. Post hoc comparisons suggested that these group differences were due to the lower mean risk scores for the self-initiates (1.82 ± 1.71 for drug variables and 0.86 ± 1.36 for sex variables). Low mean risk scores for sex behaviors also were reported by male-male initiates (0.86 ± 1.05). The risk scores for women did not differ by helper-initiate pairing. However, female-female pairs showed a high mean score for sexual behaviors (1.93 ± 1.63) and a lower mean score for drug use (2.41 ± 1.22) when compared with male-male pairs. Male-female pairs had the greatest mean composite (5.35 ± 2.60) and individual risk scores, although these did not differ significantly from mean scores reported for female-male and female-female pairs (4.81 ± 3.08 and 4.35 ± 2.30, respectively).

DISCUSSION

A major finding of this study is that, among young adult, recently initiated IDUs, women were more likely to have been initiated into injection drug use by other women, just as men were more likely to have been initiated by other men. These results are in stark contrast to published reports suggesting that women were likely to be initiated by men.[4,16,17] Also, the women in our study began to use illicit drugs and to inject drugs at nearly the same age as their male counterparts. Women were more likely to report that they had initiated injection drug use out of curiosity, were less likely to have self-injected the first time, and were more likely to know by the time of the interview that their helper was HIV infected. For other behaviors at initiation, gender differences were not significant, indicating that the young women enrolled in the REACH project had equal access to purchasing drugs, were as likely to have witnessed injection, and had similar opportunities to inject. In contrast to suggestions that female IDUs play a submissive role, at least during the initiation process, the young female IDUs in our cohort were self-reliant and similar to men in their drug use patterns. The discrepancy between our data and those from earlier studies may reflect changing societal norms or possibly a sampling bias in our cohort. Ethnographic data from Miami[35] are consistent with our results, suggesting a shift in norms.

Another finding, which is consistent with those in published reports, indicates that women who were initiated by men reported a slightly higher mean score on the HIV-related risk profile. These women had higher proportions of both drug and sexual risks, whereas women who were introduced by other women had high risk for sexual exposure, but a comparatively lower risk from drug use exposures (except for smoking crack daily). Men who were initiated by women reported a high number of injection risks. Men who were initiated by men and self-initiators had equally low composite scores, perhaps reflecting their autonomy and control over the injection experience. Initial independence regarding injection might translate later into greater ability to adhere to harm reduction measures or may be characteristic of certain drug use patterns (i.e., heroin use vs. cocaine use).

Many investigators[4,14,16,17,19,20,31] have postulated that women are influenced highly by male sex partners at the time of initiation or when interacting with members of their injection networks. A recent study noted that a significant other initiated the new injector most often.[12] In contrast, the members of our cohort initiated injection drug use just as they might initiate the use of any licit or illicit drug—with members of their own peer group, who were primarily friends and not sex partners. Being a woman and having a female helper was associated

with increased levels of other HIV-related risk behaviors, namely, daily crack smoking and having a helper known to be HIV infected. These women may be different from women who initiated injection drug use before the crack epidemic, as crack addiction may be associated with a constellation of overlapping drug use and sexual risk behaviors.[36–38] Nevertheless, the differential risk profiles did not translate into significantly different HIV prevalence rates in this cohort.

Of the 40 women who were initiated to injection drug use by a man (Table V), 50% reported having shared injection equipment in the 6 months before the interview. The consistency of this result with previously published reports may reflect a recruitment bias in the studies of older female IDUs. Since REACH was able to recruit young adults who had begun to inject drugs recently, the cohort was less susceptible to survival bias. The women enrolled in earlier studies may have represented a sample of female injectors who were influenced more highly by men owing to the duration of their injection careers. It has been hypothesized that, as women become more fully ensconced in injecting, they may acquire new friends and possibly new sex partners who are IDUs. These sex partners may become their drug-sharing partners over time. Studies that did not enroll recent initiates or younger IDUs might have undersampled women who were less dependent on men or who had limited injection networks. Because the women in these previous studies may have injected, on average, a greater number of years than the women in REACH, the women would have had more time to develop extensive injection and personal networks with other male IDUs.

Another possible explanation for these results is that the environment is changing for young drug users. Drugs are easily accessible; many of the women in REACH reported that they sold drugs as a source of income. All of the participants were polysubstance users who had snorted heroin or cocaine for an average of 2 years before their first injection. These results are consistent with data indicating that transition from intranasal to injection drug use may take up to 2 years.[39,40] Curiosity and thrill seeking were the main reasons for starting to inject; others said that injecting was just another way to get high. If initiation of injection is viewed simply as the next step in drug experimentation (a possible extrapolation of the gateway theory of drug use),[41,42] it might make sense that young women and young men would initiate within their same-sex peer groups.

Other interesting findings in this study reflect the practice of harm reduction at initiation: 44% of women and 33% of men bought their own needle for the first injection, and 90% reported using their needle first, although approximately 80% were not sure if the needle was clean. These results imply that the initiates had access to clean injection equipment and acquired harm reduction principles

prior to the first injection, but were not able to ensure the sterility of the needles. These findings are consistent with a study conducted in Australia that found 50% of initiates used their own needle.[12] About 40% of the initiates were dependent on more than two persons to give injections prior to learning how to self-inject. This period of dependence on doctors increases the risk of acquiring HIV (data reported elsewhere[34]). Involvement in the Baltimore needle/syringe-exchange program cannot explain the relatively easy access to clean needles or knowledge of harm reduction among this cohort. The Baltimore needle-exchange program opened in August 1994, and the majority of this cohort initiated injection prior to 1994. At the time of the interview, only 22% of this cohort had ever attended the mobile needle/syringe-exchange program in Baltimore.

Before firm conclusions are drawn, several study limitations need to be acknowledged. The generalizability of these findings is unknown because few studies of initiation among young IDUs have been published. Although we enrolled participants soon after initiation of injection drug use, we have relied on personal recall of all events at initiation. These results may suffer from our inability to validate all self-reports. The risk profile score provides a simple index of the quantity of risk behaviors practiced by participants; however, it does not account for the qualitative differences in risk. It thus can be interpreted as a very simple measure of comparison across groups in this study population, but it cannot be applied to other populations. Finally, the results from this study may differ from those of earlier studies because of many factors, including differences in recruitment strategies and criteria and calendar time of the studies.

Nevertheless, these results have public health implications. The young women in our study appeared to be involved actively in initiating injecting drug use. Therefore, interventions to reduce initiation and the potential excess risk for HIV among women who have already started to inject may be most successful if they are (1) designed as gender-specific peer interventions and (2) targeted, most urgently, toward women who have been initiated by men. Sexual partner interventions may be effective as well. These interventions could be implemented at young adult clinics or at needle-exchange programs that serve young clients. In the broader community of IDUs, more experienced injectors who act as helpers or doctors would benefit from interventions to help discourage their role in initiating others and encourage harm reduction education should an initiation occur.

ACKNOWLEDGEMENT

We gratefully acknowledge the contributions of the staff of the REACH Project, including Donald Brown, Bertha Queen, William Gray, Hahn Huang, Susan

Patania, Margaret Park, and the REACH Community Advisory Board. We thank Hazel Hamond-Terry for manuscript preparation. The study was supported by cooperative agreement 309690 from the Centers for Disease Control and Prevention and by grant DA04334 and National Research Scientist Award grant F31 DA05556-02, both from the National Institute of Drug Abuse.

REFERENCES

1. UNAIDS, WHO. *Report on the Global HIV/AIDS Epidemic: June 1998.* Geneva, Switzerland: UNAIDS, WHO, *Global HIV/AIDS and STD Surveillance; 1998.*
2. Fennema JSA, van Ameijden EJC, van den Hoek A, Coutinho RA. Young and recent-onset injecting drug users are at higher risk for HIV. *Addiction.* 1997;92(11):1457–1465.
3. Battjes RJ, Leukefeld CG, Pickens RW. Age at first injection and HIV risk among intravenous drug users. *Am J Drug Alcohol Abuse.* 1992;18(3):263–273.
4. Hser YI, Anglin MD, McGlothlin W. Sex differences in addict careers. 1. Initiation of use. *Am J Drug Alcohol Abuse.* 1987;13(1&2):33–57.
5. Zinberg NE. *Drug, Set, and Setting: the Basis for Controlled Intoxicant Use.* New Haven, CT: Yale University Press; 1984.
6. Chein I, Gerard DL, Lee RS, Rosenfeld E. *The Road to H: Narcotics, Delinquency, and Social Policy.* New York: Basic Books; 1964.
7. Friedman SR, Des Jarlais DC, Neaigus A, et al. AIDS and the new drug injector. *Nature.* 1989;339:333–339.
8. Stenbecka M. Initiation into intravenous drug abuse. *Acta Psychiatr Scand.* 1990;81:459–462.
9. Hughes PH, Barker NW, Crawford GA, Jaffe JH. The natural history of a heroin epidemic. *Am J Public Health.* 1972;62:995–1001.
10. de Alarcón R. The spread of heroin abuse in a community. *Community Health.* 1969; 1(3):155–161.
11. Kral AH, Bluthenthal RN, Erringer EA, Lorvick J, Edlin BR. Risk factors among IDUs who give injections to or receive injections from other drug users. *Addiction.* 1999;94(5): 675–683.
12. Crofts N, Louie R, Rosenthal D, Jolley D. The first hit; circumstances surrounding initiation into injection. *Addiction.* 1996;91(8):1187–1196.
13. Latkin CA, Mandell W, Knowlton AR, et al. Gender differences in injection-related behaviors among injection drug users in Baltimore, Maryland. *AIDS Educ Prev.* 1998;10(3):257.
14. Friedman SR, Neaigus A, Jose B, Goldstein M, Curtis R, Des Jarlais DC. Gender differences in HIV seroprevalence among new drug injectors vary by city and by social network. Paper presented at: *HIV Injection in Women Conference;* February 22–25, 1995; Washington, DC. Abstract 82.
15. Gamella JF. The spread of intravenous drug use and AIDS in a neighborhood in Spain. *Med Anthropol Q.* 1994;8:131–160.
16. Anglin MD, Hser YI, McGlothlin WH. Sex differences in addict careers. 2. Becoming addicted. *Am J Drug Alcohol Abuse.* 1987;13(1&2):59–71.
17. Hser YI, Anglin MD, Booth MW. Sex differences in addict careers. 3. Addiction. *Am J Drug Alcohol Abuse.* 1987;13(3):231–251.
18. Almog YJ, Anglin MD, Fisher DG. Alcohol and heroin use patterns of narcotics addicts: gender and ethnic differences. *Am J Drug Alcohol Abuse.* 1993;19(2):219–238.
19. Hartel D. Context of HIV risk behavior among female injecting drug users and female sexual partners of injecting drug users. In: Battjes RJ, Sloboda Z, Grace WC, eds. *The Context of HIV Risk Among Drug Users and Their Sexual Partners.* Rockville, MD: US Department of Health and Human Services; 1994:41–47.
20. Powis B, Griffiths P, Gossop M, Strang J. The differences between male and female drug users: community samples of heroin and cocaine users compared. *Subst Use Misuse.* 1996;31:529–543.

21. Gerstein DR, Judd LL, Roviner SA. Career dynamics of female heroin addicts. *Am J Drug Alcohol Abuse.* 1979;6:1–23.
22. Helzer JE, Robins LN, Davis DH. Antecedents of narcotic use and addiction. A study of 898 Vietnam Veterans. *Drug Alcohol Depend.* 1975;1:183–190.
23. Ronald PJM, Robertson JR. Initial and current drug use: how are they related? *Addiction.* 1993;88:1225–1231.
24. Friedman SR, Neaigus A, Jose B, et al. Female injecting drug users get infected sooner than males. Paper presented at: *Ninth International Conference on AIDS;* June 7–11, 1993; Berlin. Abstract PO-DO3-35122.
25. Des Jarlais DC, Friedman SR, Perlis T, et al. Risk behavior and HIV infection among new drug injectors in the era of AIDS in New York City. *J Acquir Immune Defic Syndr Human Retrovirol.* 1999;20(1):67–72.
26. Sotheran JL, Wenston JA, Rockwell R, Des Jarlais DC, Friedman SR. Injecting drug users: why do women share syringes more often than men? Paper presented at: *American Public Health Association Annual Meeting;* November 8–12, 1992; Washington, DC.
27. Dwyer R, Richardson D, Ross MW, Wodak A, Miller ME, Gold J. A comparison of HIV risk between women and men who inject drugs. *AIDS Educ Prev.* 1994;6:379–389.
28. Barnard MA. Needle sharing in context: patterns of sharing among men and women injectors and HIV risks. *Addiction.* 1993;88:805–812.
29. Hindin R, Bigelow C, Vickers-Lahti M, Lewis B, McCusker J. Gender differences in sharing behavior among intravenous drug users (IVDUs). Paper presented at: *Eighth International AIDS Conference;* July 19–24, 1992; Amsterdam. Abstract 8:C287.
30. Wells EA, Clark LL, Caslyn DA, Saxon AJ, Jackson TR, Wrede AF. Reporting of HIV risk behaviors by injection drug using heterosexual couples in methadone maintenance. *Drug Alcohol Depend.* 1994;36:33–38.
31. Davies AG, Dominy NJ, Peters AD, Richardson AM. Gender differences in HIV risk behaviour of injecting drug users in Edinburgh. *AIDS Care.* 1996;8:517–527.
32. Neaigus A, Friedman SR, Jose B, et al. High-risk personal networks and syringe sharing as risk factors for HIV infection among new drug injectors. *J Acquir Immune Defic Syndr Human Retrovirol.* 1996;11:499–509.
33. Murphy S, Waldorf D. Kickin' down to the street doc: shooting galleries in the San Francisco Bay area. *Contemp Drug Probl.* 1991;18:9–29.
34. Doherty MC, Garfein RS, Monterroso EM, Brown D, Vlahov D. Correlates of HIV infection among young adult short-term injection drug users. *AIDS.* 2000;14:717–726.
35. Page B. Aggregation of in-depth interviews: Cultural patterns among intravenous drug users. Paper presented at: *Annual Meeting of the Society for Applied Anthropology;* March 29–April 2, 1995; Albuquerque, NM.
36. Edlin BR, Irwin KL, Faruque S, et al. Intersecting epidemics—crack cocaine use and HIV infection among inner-city young adults. *N Engl J Med.* 1994;331:1422–1427.
37. Edlin BR, Irwin KL, Ludwig DD, et al. High-risk sex behavior among young street-recruited crack cocaine smokers in three American cities: an interim report. *J Psychoactive Drugs.* 1992;24:363–371.
38. Chiasson MA, Stoneburner RL, Hildebrandt DS, Ewing WE, Telzak EE, Jaffe HW. Heterosexual transmission of HIV-1 associated with the use of smokable freebase cocaine (crack). *AIDS.* 1991;5:1121–1126.
39. Des Jarlais DC, Casriel C, Friedman SR, Rosenblum A. AIDS and the transition to illicit drug injection—results of a randomized trial prevention program. *Br J Addict.* 1992; 87:493–498.
40. Griffiths P, Gossop M, Powis B, Strang J. Extent and nature of transitions of route among heroin addicts in treatment—preliminary data from the Drug Transitions Study. *Br J Addict.* 1992;87:485–491.
41. Yamaguchi K, Kandel DB. Patterns of drug users from adolescence to young adulthood: III. Predictors of progression. *Am J Public Health.* 1984;74(7):673–681.
42. Chen K, Kandel DB The natural history of drug use from adolescence to the mid-thirties in a general population sample. *Am J Public Health.* 1995;85(1):41–47.