Prevalence and Risk Factors associated with Homelessness among Drug Users in Puerto Rico

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Objective: This study aimed to determine the association between years of drug injection and homelessness among drug users in rural Puerto Rico.

Methods: Respondent-driven sampling methods allowed us to obtain a sample of 315 intravenous drug users (IDUs) in rural Puerto Rico. Information about sociodemographic characteristics, drug use patterns, homelessness and risk behaviors was obtained through structured interviews. HIV and HCV statuses were assessed via rapid antibody tests. Frequency distributions were used to describe the study sample. Bivariate analysis and multivariate logistic regressions were used to assess covariates of homelessness. The study received IRB approval through the University of Nebraska-Lincoln and the University of Puerto Rico.

Results: Almost 91% of the study participants were males. The mean age was 41.7 years and the majority of the participants had not completed high school (47.6%). The prevalence of current homelessness was 21.9%. After controlling for sociodemographic characteristics, homelessness was strongly associated with the number of years of injection drug use. The odds of being homeless for IDUs with 21 years or more of drug injection was almost 3 times higher than were the odds of being homeless for IDUs with fewer than 10 years of injection (OR = 2.58 95%; CI=1.21,5.48).

Conclusion: In rural Puerto Rico, the prevalence of current homelessness in IDUs was 21.7%. In the sample, 6.0% were HIV positive and 78.4% were HCV positive. Our results highlight the necessity of increasing accessibility to substance abuse treatment and establishing additional needle-exchange programs (currently, there is only 1) in rural Puerto Rico. [*P R Health Sci J 2019;38:54-59*]

Key words: Homelessness, Risk factors, Drug users

Injection drug use is an important topic in public health because it is a risk factor not only for premature mortality but also for Human immunodeficiency virus (HIV) and hepatitis C virus (HCV) infection; it also poses a significant threat to public health, affecting, both directly and indirectly, a large proportion of the population (1). The networks formed by the users of such drugs potentially serve as hidden reservoirs of infection, thus representing a danger to the populations that interact or are otherwise involved with those networks (2). According to the World Health Organization (3) the global population of people who inject drugs is approximately 13 million; of them, 1.7 million have been infected with HIV. Approximately 10% of the HIV infections that occur globally are linked to injected drug use (3). People who inject drugs are also affected by HCV, which has an estimated global prevalence of 67% (3). Furthermore, worldwide there are approximately 2.2 million people with HIV–HCV co-infections, more than half of which occur in people who inject drugs (3).

In 2013, according to the Centers for Disease Control and Prevention (CDC), 7% (3,096) of the estimated 47,352 diagnosed HIV infections in the United States were attributable to injection drug use; men accounted for 63% (1,942) and women accounted for 37% (1,154) of all injection drug use associated HIV infections (4). Another 3% (1,270) of all the estimated cases of HIV infections were among men who engaged in both injection drug use and male-to-male sexual contact (4). In Puerto Rico, the rates of injection drug use associated HIV infections are even higher. According to the Puerto Rico HIV surveillance summary (5), the cumulative HIV cases diagnosed as of August 31, 2016, comprising adults and adolescents, totaled

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10,330. Injection drug use has been linked to 3,046 (29% of the HIV cases on the island) of the total cases. Of these, 2,422 were in men (79.5%) and 624 were in women (20.5%) (5). In addition, the HCV rates for IDUs in Puerto Rico are among the highest in the United States (6,7).

Homelessness has been consistently associated with injection drug use (8). At the same time, several factors associated with homelessness are also related to injection drug use, among which factors are poverty, inequitable housing, incarceration, lack of adequate social networks, and poor mental health (1,9). However, it remains unclear if substance abuse is a direct factor in the onset of homelessness or one that operates by placing individuals at greater risk of losing their home (1,10). If the social selection model is used, we can assume that the heavy use of drugs, alcohol, or both causes some individuals to become homeless as their affliction gradually exhausts their social and economic resources. In contrast, if the social adaptation model is used, the assumption is that substance usage occurs as individuals adapt to their homeless condition (11). For example, homeless individuals may abuse alcohol and/or other drugs as a method of coping with the stresses and dangers of street existence. It has also been observed that some homeless individuals abuse drugs and/or alcohol as an attempt to provide self-medication for psychiatric or physical health problems or as a result of the socialization process (1,11). Both homelessness and drug use are known to be influenced at least in part by structural elements of the social environment over which individuals have very little control; such elements include, for example, economic conditions, employment opportunities and the supply and cost of illicit substances (11,12).

This study aimed to determine the association between years of drug injection and homelessness among drug users in rural Puerto Rico.

Materials and Methods

Data

This paper utilizes data from 315 injection drug users (IDUs) residing in 4 rural towns in the mountainous area of central Puerto Rico, about 30 to 40 miles from San Juan (13). These sites were chosen in part due to the presence of "El Punto en la Montaña", the only syringe exchange program operating in rural Puerto Rico, and with whom we established a close collaboration that facilitated data collection within this population. Interviews were completed from April 2015 through June 2015. Sample recruitment was managed using respondent driven sampling (RDS) (14), and we started with 2 "seeds" (initially recruited participants belonging to the population of interest) in each of the 4 towns (for a total of 8 seeds, 307 recruits). Participants who completed our study survey were given 3 referral coupons to pass out to other IDUs they knew and who had not previously participated in the study. Every eligible referral earned the recruiter an additional $10. Upon completion of the questionnaire, participants were given $25. RDS has proven effective in recruiting hard to reach populations (15,16,17). Participants were 18 years old or older, alert at the time of the interview, and active IDUs (i.e., had injected drugs within the last 30 days). Verification of current injection use was accomplished through the visual inspection of injection track marks as well as through a questionnaire that measured knowledge of injection practices (18,19).

The questionnaire was interviewer-administered and based on the CDC NHBS IDU Round 3 Questionnaire version 13. In addition to demographic variables and measures of homelessness, we collected information about type and frequency of drug use, as well as about those HIV and/or HCV risk behaviors practiced by the respondent, such as the sharing of needles, cookers, cotton, and/or rinse water; in addition, we gathered information about sexual behaviors and alcohol use (7). HIV and HCV statuses were assessed by using the INSTI HIV-1/HIV-2 Rapid Antibody Test (bioLytical Laboratories) and OraQuick HCV Rapid Antibody tests (OraSure Technologies). Every participant was compensated an additional $5 for each rapid test he or she took. Participants who tested positive for HCV or HIV were offered referral and transportation to a primary care doctor for confirmatory testing. The study received IRB approval through the [MASKED FOR ANONYMOUS REVIEW] (IRB# 20131113844FB) and the [MASKED FOR ANONYMOUS REVIEW] (IRB# A8480115).

Measures

Current homelessness was measured by the response to the question "Are you currently homeless?" which was a follow-up to the question "In the last 12 months, have you been homeless at any time? By homeless, I mean you were living on the street, in a shelter, or in a car, or were staying with friends (and not paying rent)". *Education* was calculated by using the responses given to the question "What is the highest level of education you completed?" The responses were coded as "less than high school", "high school (or GED)", and "more than high school". *Marital status* was collapsed into 3 categories "married" (which includes married and living together as married), "widowed or divorced" (which includes separated, divorced, and widowed), and "single never married". *Employment* was categorized as "yes" if a respondent was employed full or part time, and "no" if he or she was a full-time student, retired, unable to work for health reasons, or unemployed. *Health insurance* was measured using an item that asked whether the participant currently had health insurance or health care coverage by which "We mean[t] health plans people get through employment or [that are] purchased directly, as well as government programs like Medicare or Medicaid that provide medical care or help pay medical bills." *Years of injection* was calculated by subtracting the age at which the respondent reported first injecting drugs from his or her current age, and then was collapsed into categories of 0-9 years, 10-15 years, 16-20 years and 21 years or more. *HIV status* and *HCV status* were determined by the results of the INSTI rapid HIV and OraQuick rapid HCV test. *Co-infection* indicates an HIV-positive and HCV-positive result.

Table 1. Description of the study sample by homelessness status

Socio-demographic characteristic	Total sample		Current homelessness		P-value
	N	(%)	n	(%)	
Overall	315		69	21.9	
Gender					0.112
Female	30	9.5	10	33.3	
Male	285	90.5	59	20.7	
Age					0.362
18-24 years	17	5.4	1	5.9	
25-34 years	65	20.6	13	20.0	
35-44 years	102	32.4	23	22.5	
45 years or older	131	41.6	32	24.4	
Education					0.236
Less than high school	150	47.6	39	26.0	
High school	106	33.7	20	18.9	
More than high school	59	18.7	10	16.9	
Marital status					0.018
Married	70	22.2	7	10.0	
Widowed or divorced	97	30.8	27	27.8	
Single never married	148	47.0	35	23.6	
Employment					0.033
No	289	92.6	68	23.5	
Yes	23	7.4	1	4.3	
Health insurance					0.034
No	55	17.5	18	32.7	
Yes	259	82.5	51	19.7	
Years of injection					0.021
0-9 years	49	15.6	6	12.2	
10-15 years	48	15.2	8	16.7	
16-20 years	116	36.8	27	23.3	
21 years or more	102	32.4	28	27.5	
HIV Status					0.632
Negative	296	94.0	64	21.6	
Positive	19	6.0	5	26.3	
HCV status					0.105
Negative	68	21.6	10	14.7	
Positive	247	78.4	59	23.9	
Co-infection					0.259
None	68	21.6	10	14.7	
HCV positive only	228	72.4	54	23.7	
Co-infection (HIV & HCV)	19	6.0	5	26.3	

Table 2. Unadjusted and adjusted odds ratios for homelessness among injection drug users in Puerto Rico

Variable	Current homelessness			
	Unadjusted OR	95% CI	Adjusted OR	95% CI
Gender				
Male	1.00		1.00	
Female	1.92	0.85, 4.35	3.25	1.25, 8.47
Age				
18-24 years	1.00		1.00	
25-34 years	4.00	0.48, 32.98	3.52	0.35, 35.14
35-44 years	4.66	0.59, 37.08	2.74	0.27, 28.05
45 years or older	5.17	0.66, 40.55	2.31	0.23, 23.67
Education				
Less than high school	1.00		1.00	
High school	0.76	0.42, 1.36	0.64	0.33, 1.24
More than high school	0.68	0.33, 1.43	0.73	0.32, 1.67
Marital status				
Married	1.00		1.00	
Widowed or divorced	1.62	0.93, 2.82	3.93	1.45, 10.62
Single never married	1.21	0.71, 2.07	2.99	1.17, 7.68
Employment				
No	1.00		1.00	
Yes	0.15	0.02, 1.12	0.16	0.02, 1.23
Health insurance				
No	1.00		1.00	
Yes	0.50	0.27, 0.96	0.37	0.17, 0.78
Years of injection				
0-9 years	1.00		1.00	
10-15 years	1.43	0.46, 4.49	1.36	0.38, 4.91
16-20 years	2.17	0.84, 5.66	2.36	1.10, 5.07
21 years or more	2.71	1.14, 7.07	2.58	1.21, 5.48
HIV status				
Negative	1.00		1.00	
Positive	1.30	0.45, 3.73	1.36	0.41, 4.50
HCV status				
Negative	1.00		1.00	
Positive	1.82	0.88, 3.79	1.62	0.68, 3.84

Analysis

Frequency distributions were used to describe the study sample. Univariate analysis using a chi-square test of independence was used to examine the association between current homelessness and sociodemographic characteristics as well as years of injection, HIV status, HCV status and co-infection. Bivariate analyses were used to assess covariates of homelessness. Lastly, multiple logistic regression models were fitted to assess the effect of years of injection on homelessness after adjusting for sociodemographic characteristics and other covariates. All the statistical analyses were performed using SPSS Statistics for Windows, Version 17.0 (Chicago: SPSS Inc.).

Results

The sociodemographic characteristics of the participants are shown in Table 1. Almost 91% of the study participants were males. The majority were 35 years old or older, had not completed high school, and were single or never married. Over 92% of the subjects were unemployed (at the time they were surveyed) but only 17.5% of the sample was uninsured. In the sample, 69.2% reported 16 years or more of injection drug use. Overall, we found that 6.0% of the sample was HIV positive while 78.4% was HCV positive. The prevalence of coinfection was 6.0%. Finally, the prevalence of current homelessness was 21.7%.

Table 2 shows the results of the bivariate and multiple logistic analyses. The IDUs who were homeless were likely to be: female, widowed, divorced or never married and uninsured. The adjusted odds of females being homeless were more than 3 times the odds of males being the same (OR = 3.25, 95% CI = 1.25, 8.47). The odds of being homeless for IDUs who were widowed or divorced were almost 4 times higher than were the odds of being homeless for married IDUs (OR = 3.3.93, 95% CI = 1.45, 10.62). Years of drug injection was strongly associated with homelessness; as the years of drug injection increased, so did the odds of being homeless. The odds of being homeless for IDUs with 21 years

or more of drug injection were almost 3 times higher than were the odds of being homeless for IDUs with less than 10 years of drug injection (OR = 2.58, 95% CI = 1.21, 5.48).

Discussion

In this study, we observed that the prevalence of current homelessness was very high among IDUs in Puerto Rico (21.7%). Among the sample, it was found that 6.0% were HIV positive while 78.4% were HCV positive. The IDUs that were homeless were likely to be female, widowed, divorced or never married, and uninsured. As the years of injection drug use increased, there was a correspondingly greater risk of being homeless.

When comparing our results to those of previous studies, we found that the prevalence of homelessness was very high among IDUs in Puerto Rico (20, 21). In the year 2015, 4,518 individuals were identified as being homeless in Puerto Rico, of which 26.3% presented substance abuse problems (20). In contrast, in the year 2017, 3,501 individuals were identified as being homeless, with 30.6% having a problem with drug use (21). In the same manner, a study performed in the year 2005, in the north metro health care region of Puerto Rico, found that the prevalence of homelessness for the sample was 16% (22). Our study results, the data from the study performed in the metropolitan area (22), and the data from the general population of Puerto Rico (20,21) indicate that drug use is one of the major causes of homelessness among the Puerto Rican population and intimate that special attention should be given to the IDUs on the island.

It was found that IDUs in Puerto Rico have a very high prevalence of HCV (23,24); this same fact was also observed in an individual study performed in the San Juan metropolitan area, which study found that the prevalence of HCV among IDUs was 89% (25). This prevalence might be explained by the fact that homeless IDUs are exposed to unhygienic and unsafe injection practices, such as sharing injection equipment and using drug in public places (23). Other factors related to being HCV seropositive are having multiple sex partners, having a low level of education, the duration of a given individual's drug use, and being infected with HIV, HBV, or both (24). Other factors, such as unique serosorting dynamics, may play a role as well (26). On the other hand, the prevalence of HIV among IDUs in Puerto Rico has remained relatively low (25); we found that the prevalence was 6.0%, and the study performed in the metropolitan area found that the prevalence was 17.0%.

Our results that the odds of females being homeless were over 3 times those of males being homeless contrast with some previous studies that have found that the risk of being homeless is greater among men than women (1,27,28,29,8). According to the Colorado Coalition for the Homeless and Kisor et al., the reasons that lead women to become homeless are the following: domestic violence, family disputes, abuse or neglect by family members, mental health problems, lack of employment, job loss, lack of affordable housing, and substance use and drug addiction (30). Homeless women experience sexual exploitation for drugs and money by being obligated to perform sex acts in order to gain access to different resources (31). The previously mentioned studies highlight the importance of doing research on homeless women who are IDUs to gain a better perspective of the reasons that made them become homeless and the different situations that increase their risk of becoming infected with HIV, HCV, or both. They also reinforce prior findings that show how social determinants, rather than individual behaviors, play an important role in infection/co-infection dynamics (32).

This study had several limitations. To determine whether an individual was homeless, that person was asked where he or she was currently living; those who answered in the street, in a shelter, in a car, or at a friend's (without paying rent) were determined to be homeless. Previous studies (28,29), however, have established an individual as being homeless if he or she had been living in unstable housing any time in the 6 months prior to being surveyed. In the study, we found that women were at a greater risk than men of being homeless, but this finding may be due to the small number of women (n = 30) that were included in the study. The sample was recruited using RDS, which may induce auto-selection and the homogeneity of the sample. In addition, selecting the RDS seeds with the help of a syringe-exchange program may have resulted in a sample population that was not representative of IDUs in Puerto Rico, as a whole. Of the final sample, 58% had visited a syringe-exchange program in the year prior to the survey. Recent studies have reported that differential access to syringe exchange programs may influence overall outcomes (33). A final limitation is that the study design (cross-sectional) does not allow us to determine a temporal relationship between homelessness and injection drug use.

The results of this study suggest that chronic drug use often leads to problems related to social isolation, which problems cause poor physical and mental health in the individual engaged in such use. Future research should explore the presence of mental disorders, injection- related risk behavior, and sexual risk behavior in homeless IDUs because these are factors that could have led to their homeless status (1). Furthermore, such research could explore how being homeless can trigger relapse into injection drug use among those who have stopped injecting. Our results highlight the importance of increasing the accessibility of substance abuse treatment and establishing additional needle-exchange programs (currently, there is only 1) in rural Puerto Rico. Housing programs could be established to help in the process of rehabilitation and the recovery from addiction; in addition, such programs could be focus on helping women gain access to housing. Ambulatory care clinics should be established near drug hotspots to ensure that IDUs have access to medical care. More attention should be given to IDUs to increase their quality of life and lower their risk of becoming homeless.

Resumen

Objetivo: El propósito de este estudio era determinar la asociación entre los años de uso de drogas intravenosas y la falta de vivienda en la zona rural Puerto Rico. Metodología: Mediante el uso de métodos de muestreo dirigidos por encuestados, se obtuvo una muestra de 315 usuarios de drogas intravenosas de una zona rural de Puerto Rico. A través de una entrevista estructurada, se recopiló información sobre características sociodemográficas, patrones de uso de drogas, la falta de vivienda y conductas de riesgo. Utilizando pruebas rápidas de anticuerpos se determinó si el participante estaba infectado con VIH, VHC o ambas. Para describir la muestra se utilizaron distribuciones de frecuencia. Luego, se procedió a utilizar análisis bivariados y regresiones logísticas multivariadas para determinar las variables relacionadas a la falta de vivienda. Este estudio recibió aprobación de la Oficina para la protección de participantes humanos en investigación (OPPHI) a través de la Universidad de Nebraska y la Universidad de Puerto Rico. Resultados: Casi un 91% de los participantes del estudio eran hombres. La mediana de edad era 41.7 años y la mayoría no había completado escuela superior (47.6%). La prevalencia de personas sin vivienda fue de 21.9%. Al controlar por variables sociodemográficas, estar sin vivienda se encontraba fuertemente relacionado con los años de uso de drogas intravenosas. Los usuarios de drogas intravenosas con 21 años o más de uso tuvieron casi 3 veces la posibilidad de estar sin vivienda en comparación con los usuarios de drogas intravenosas con menos de 10 años de uso (OR=2.58, IC 95%: 1.21,5.48). Conclusión: En el área rural Puerto Rico, la prevalencia de estar sin vivienda dentro de los usuarios de drogas inyectables fue de 21.7%. Dentro de la muestra, el 6% tuvo resultados positivos para VIH y el 78.4% era positivo para el VHC. Nuestros resultados señalan la necesidad de aumentar la accesibilidad a tratamientos para el abuso de sustancias y la necesidad de establecer más programas de intercambio de jeringuillas (debido a que solo existe 1) en la zona rural de Puerto Rico.

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