Are Stressful Life Events (SLEs) Associated with the Utilization of Substance Use Treatment–Related Services?

Miguel A. Cruz-Feliciano, PhD*; Aimee Ferraro, PhD, MPH†; Angela Witt Prehn, PhD†

Objective: This study described herein explored the association of stressful life events with the utilization of substance use treatment–related services among substance users living in Puerto Rico.

Methods: A secondary data analysis was conducted using data collected by a research project entitled Puerto Rico Drug Abuse Research Development Program II (PRDARDP II). The study population consisted of 378 individuals from 18 to 35 years of age who were residents of the San Juan metropolitan area and who presented evidence of substance use in the 30 days prior to the interview. The analysis considered demographic data, information on patterns of substance use, substance use treatment history, stressful events, and depression and anxiety symptomatology.

Results: As the number of stressful life events increased, substance users were more likely to report having utilized substance use treatment–related services (OR = 1.11, 95% CI [1.06, 1.17], p < 0.001). Relapsing, the inability to afford drugs, and poor working conditions were statistically significant stressful life events associated with the utilization of substance use treatment–related services.

Conclusion: Despite the structural limitations associated with access to and with the quality of the services in the substance use treatment–related system of Puerto Rico, findings suggest that stressful life events play a significant role in the utilization of those services. Researchers and clinicians should consider screening for stressful life events in outreach and engagement strategies. At the same time, the assessment of stressful life events should be integrated into the treatment planning stage to support the recovery process of people with substance use disorders. [*P R Health Sci J 2017;36:29-36*]

Key words: Stressful Life Events, Substance Abuse Treatment, Puerto Ricans, Latinos, Relapse

Substance use is a public health concern, but among those with substance use disorders, only a few utilize substance use treatment–related services (SUT-RS). Roughly, 12% of the individuals who needed attention in the United States received treatment in a specialty facility (1). Of the remaining individuals (who did not report having undergone treatment), 95.5% felt that they did not need treatment, 2.9% reported that they needed treatment but did not make an effort to get it, and 1.6% reported that they needed treatment and did make an effort to get it (1). Similar distributions were reported for Latinos in the United States, although Latinos reported a higher need for treatment and lower utilization rates than did white non-Latinos (2).

In Puerto Rico, 76% of the individuals with any substance use disorder do not receive SUT-RS (3). Studies in Puerto Rico have pointed out that structural challenges in the behavioral health services are in part major contributors to the low utilization rate. A limited number of treatment services with evidence-based approaches, barriers in access to services, and the criminalization and stigma of substance use are only some of the issues faced by those who would receive SUT-RS (4–6). Nevertheless, the stressors that result from and are associated with substance use may contribute to motivating users to recognize their need for treatment and thereby seek it out, regardless of the challenges (7).

Most of the research investigating the association of stress and substance use position stress as the primary trigger of substance use (8–12). However, limited studies have explored both the kinds of stress generated by specific life events that

*Institute of Research, Education, and Services in Addiction, Universidad Central del Caribe, Bayamón, PR; †Public Health Program, School of Health Sciences, College of Health Sciences, Walden University, Minneapolis, USA

The author/s has/have no conflict/s of interest to disclose.

Address correspondence to: Miguel A. Cruz-Feliciano, PhD, Research Associate, Institute of Research, Education, and Services in Addiction, Universidad Central del Caribe, PO Box 60327, Bayamón, Puerto Rico 00960-6032. Email: miguel.cruz@uccaribe.edu

are experienced by substance users and the manner in which those stressors are associated with SUT-RS utilization (13). For example, the substance-induced anxiety model suggests anxiety is a consequence of prolonged alcohol consumption (14). Under this model, a series of withdrawal episodes can lead to progressive neural adaptation, making drinkers susceptible to anxiety (14). Additional research on other health conditions, such as cancer (15–16) and cardiovascular disease (17), have suggested that disease-associated stressors lead to the utilization of more and different services.

The transactional model of stress and coping (18) presents a framework for guiding the relationship between SLEs and SUT-RS utilization. This framework positions stress as the result of an interaction between the person and his or her environment. When stress occurs, the individual experiences an imbalance between the perceived demand of a given situation and the resources available to deal with it (19). Substance users experience certain types of stressors and these—after appraisal—might motivate such users to seek out help. A user's recognition that he or she has a substance use problem is a critical step towards SUT-RS utilization (20–21).

Among Latino subgroups in the United States, research on stressors focuses on how migration and acculturation factors influence behavioral health and service utilization (22–23). But less explored are specific stressors inherent among Latino subgroups. An exploration of specific stressors in a homogenous Latino subgroup not affected by migratory or acculturation patterns is needed to present a broader understanding of SUT-RS utilization. The purpose of the study described in this manuscript was to address a gap in the knowledge regarding the association between SLEs and SUT-RS as this association pertains to substance users living in Puerto Rico.

Methods

A secondary data analysis was performed using data collected by a cross-sectional research project funded by the National Institute on Drug Abuse entitled *Puerto Rico Drug Abuse Research Development Program II* conducted from 2007 through 2012 (24). The original study aimed to investigate the epidemiology of stress among injecting and noninjecting drug users in Puerto Rico, with emphasis on the behavioral and immunological implications with regard to HIV risk.

For the selection of participants, the research team used ethnographic observations for mapping drug-use sites within the San Juan metropolitan area. These observations identified places where drug users gather (e.g., copping areas and shooting galleries) and selected them as recruitment sites. Trained outreach workers then visited these places each month at random dates and times to randomly select and invite participants. To prevent pre-selection bias, staff members were kept blind to the monthly schedule until the day of the visit. After verbal agreement, consent was obtained from participants and the survey administered at the research facility. Exclusion criteria for participation were being under 18 years of age, having a urine test negative for drugs of abuse, and having attended (according to self-report) a drug treatment program in the 30 days prior to the administration of the survey. The latter criterion was necessary in the original study to ensure internal consistency in terms of reports made by the participants regarding their substance use.

Original research protocols and those regarding the protection of human subjects were approved by the Institutional Review Board (IRB) of the Universidad Central del Caribe. IRB approval for this study was obtained from Walden University prior to the data analysis.

The original investigation recruited 390 individuals, but for this study, 12 individuals were excluded because of inaccurate information gathered during drug testing. The excluded cases did not exhibit statistically significant differences in terms of treatment use or the average number of SLEs experienced. The sample for this study consisted of 378 individuals from 18 to 35 years who exhibited evidence of substance use other than alcohol (identified by a 9-panel urinalysis that screened for opiates, morphine, cocaine, THC, methamphetamines, amphetamines, benzodiazepines, barbiturates, and PCP metabolites).

The survey instrument collected demographic data, information on patterns of substance use, SUT-RS history, depression and anxiety symptomatology, and types of SLEs. The demographic variables included sex, age, place of birth, employment status, and educational attainment. Confounder variables such as the age of onset, the type of substance used, the frequency of use, the route of administration, and lifetime treatment history were assessed by elements of the Addiction Severity Index (ASI) (25). Due to the nature of the secondary data analysis, variables were limited. Assessments of substance use severity and diagnoses for any substance use disorder were not collected in the parent study. To estimate severity of use, the frequency of use, the type of substance used, and the route of administration were considered in the analysis.

The Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI) were used to assess self-reported symptoms for both depression and anxiety, respectively. These 2 instruments were administered by the original research team in Puerto Rico (26–29). For this study, the Spanish versions of the BDI and the the BAI obtained Cronbach's alpha reliability coefficients of 0.912 and 0.948, respectively.

The dependent variable, SUT-RS, was assessed using the question, *In the last 6 months, how many times have you been in a substance abuse treatment program?* This was recoded into a dichotomous variable: 0 (0 times) and 1 (1 or more times). A similar approach was used to assess SUT-RS by modality (i.e., detoxification, residential, and outpatient). Although participants could indicate more than one service modality, multivariate analyses explored SUT-RS separately.

SLEs were assessed as categorical and continuous variables. For the categorical assessment, SLEs were measured in terms

of 2 broad categories: that represented by the original list of the Psychiatric Epidemiology Research Interview (PERI) (30) and that represented by the Specific Stressful Events Related to Substance Use (SSERSU) inventory. The PERI assessed 102 traditional SLEs, and the SSERSU inventory contained 54 SLEs hypothesized to be the most prevalent among substance users. Both instruments collected data related to the presence and absence of specific stressful events; when such events were found to have been present, those having occurred within the 12 months leading up to the survey administration were measured using a 4-item Likert scale (the responses of which ranged from "not stressful" to "extremely stressful"). Each SLE was recoded either as 1 (*experience very/extremely stressful*) or as 0 (*not severely stressful/not stressful*). When a given individual reported not having experienced a specific stressor ("absence"), that specific stressor was assigned a value of 0 (for that individual). For the continuous assessment of PERI and SSERSU, all 102 items of the former and all 54 items of the latter were added together after recodification. This sum of the two provided the number of SLEs experienced (by instrument) for each study participant. PERI and SSERSU inventories showed high reliability coefficients, with Cronbach's alphas of 0.798 and 0.862, respectively.

Univariate analysis was performed to assess frequency distribution and central tendency measures. Bivariate analysis using the chi-square test for nominal variables and a *t*-test for continuous variables allowed for the exploration of the association between SUT-RS and independent variables. After said association was explored, those variables with adequate statistical significance ($p \leq 0.25$) were considered as potential confounders in the logistic regression analysis (by service modality). Assumptions of collinearity, dichotomy, mutually exclusive observations, and necessary number of cases were met before performing regression analysis. A backwards elimination procedure was used to eliminate the least significant predictors until the model reached parsimony. Lastly, since multiple comparisons of independent variables and confounders occurred, the Bonferroni correction was considered in the discussion of results. All statistical analyses were performed with IBM SPSS Statistics 21.

Results

Demographic information for the 378 participants showed that 79.1% were male, that the median age of the sample population was 29.0 years, that 93.1% were not employed at the time of the interview, and that 56.9% had not completed high school. People born in Puerto Rico comprised 88.6% of the sample population, followed by 9.8% who were born on the US mainland and 1.6% who were born in either the Dominican Republic or Peru. In terms of patterns of substance use in the 30 days prior to the survey, alcohol use was reported by 54.5% of the participants, marijuana use by 62.4%, cocaine use by 52.9%, crack use by 42.6%, and heroin use by 51.3%. Just over 20% of the participants reported having used alcohol every day in the 30 days prior to the survey. The usage percentages for the other substances of interest (all such uses equaling a frequency of 26 times or more in the 30 days leading up to the survey) were 25.4% for marijuana, 29.6% for cocaine, 28.3% for crack, and 34.4% for heroin. Polysubstance use in the year prior to the survey was reported by 55.3% of the participants. Injection drug use was reported by 60.3% of the study participants for the same time period. The average age of initiation for any substance was 13.68 years (SD: 2.74 years). The number of lifetime treatments of the participating substance users ranged from 0 to 30; 13.5% reported having used SUT-RS in the 6 months prior to the survey. Detoxification service was the most prevalent SUT-RS, with 8.5%, followed by residential treatment (8.2%) and outpatient treatment (2.4%). Severe symptoms of anxiety were reported by 95.2% of the participants, while moderate/severe symptoms of depression were reported by 34.3% of them.

Table 1 shows the results of bivariate analysis between SUT-RS and independent variables. Participants who reported having used SUT-RS in the 6 months prior to the survey were more likely to be males, to report suffering from moderate/severe depression, and to report cocaine use, heroin use, or injection drug use, than those counterparts not reporting having used SUT-RS. The average age of the respondents, number of SLEs by PERI and SSERSU, and number of lifetime SUT-RS were higher in those reporting having used SUT-RS than they were in those counterparts with no reported SUT-RS use.

Table 2 presents the results of the logistic regression models for any kind of SUT-RS use and by service modality (i.e., detoxification, residential, and outpatient). Males were 5 times more likely to report any kind of SUT-RS utilization than females were (OR = 5.46; 95% CI [1.58, 18.88]; p = 0.007). Participants with previous treatment histories were 9% more likely to report any kind of SUT-RS utilization than were those counterparts without previous treatment histories (OR = 1.09; 95% CI [1.03, 1.15]; p = 0.004). The data indicate that for every increase in the number of SSERSU, participants were 11% more likely to report SUT-RS utilization (OR = 1.11; 95% CI [1.06, 1.17]; p < 0.001). For individuals reporting the use of detoxification services, having a previous treatment history and using or having used injection drugs were significantly associated predictors. The results for individuals reporting residential-treatment use indicate that for every increase in the number of SSERSU, participants were 9% more likely to report the utilization of a residential treatment (OR = 1.09; 95% CI [1.02, 1.17]; p = 0.017). Additionally, individuals reporting having used detoxification services were 24 times more likely to engage in residential treatment than were those counterparts who had not used a detoxification service (OR = 24.07; 95% CI [9.85, 58.82]; p < 0.001). None of the variables assessed in this study were predictors of outpatient treatment utilization.

Table 3 illustrates the bivariate analysis for stressors by SUT-RS. The results for PERI SLEs show that individuals who had experienced a serious family argument (other than with spouse), a change in the frequency of family get-togethers, being arrested, getting involved in a court case, or being convicted of a crime were more likely to report having used SUT-RS than were individuals who did not report having experienced these PERI SLEs. For substance use–associated SLEs, those individuals who reported having experienced being homeless, starvation, attempts to quit drugs, relapse events, an inability to get substance use or alcohol use treatment, an inability to afford drugs, rejection because of their substance use, an inability to find drugs of quality, being sick during withdrawal, being rejected by family, being treated differently because of their substance use, having chronic pain, an inability to afford food, or having poor working conditions were more likely to report SUT-RS utilization than counterparts not experiencing those SLEs. An adjusted analysis found that relapsing events and poor working conditions were the only covariates that remained statistically significant when associated with SUT-RS utilization.

Table 1. Bivariate analysis by the utilization of substance use treatment–related services (in the 6 months prior to taking part in the survey)

	The utilization of substance use treatment–related services							
(dichotomous variables)	Yes (n = 51, 13.5%) Frequency	Percent	No (n = 327, 86.5%) Frequency	Percent	OR	95% CI (LL, UL)	p	Φ
Demographics								
Male†	48	94.1	251	76.8	4.845	(1.468, 15.993)	0.003	0.146
High school or more	23	45.1	140	42.8	1.097	(0.606, 1.986)	0.759	0.016
Employed†	3	5.9	23	7.0	0.826	(0.239, 2.858)	1.00	0.016
Mental health								
Moderate/severe depression	26	51.0	104	31.8	2.230	(1.228, 4.048)	0.007	0.138
Severe anxiety	45	88.2	315	96.3	0.286	(0.102, 0.799)	0.012	0.130
Substance use, last 30 days								
Alcohol	27	52.9	179	54.7	0.930	(0.515, 1.680)	0.810	0.012
Marijuana	31	60.8	205	62.7	0.922	(0.504, 1.689)	0.794	0.013
Cocaine	34	66.7	166	50.8	1.940	(1.042, 3.610)	0.034	0.109
Crack	24	47.1	137	41.9	1.233	(0.682, 2.229)	0.488	0.036
Heroin	33	64.7	161	49.2	1.890	(1.023, 3.492)	0.040	0.106
Use of 3 or more substances in the past year	33	64.7	151	46.2	1.573	(0.851, 2.907)	0.146	0.075
Injection drug use	42	82.4	186	56.9	3.538	(1.667, 7.508)	0.001	0.178
(continuous variables)	**M**	**SD**	**M**	**SD**		**t(df)**	**p**	**Effect size**
Age	30.14	4.005	28.34	4.827		-2.899(74.637)	0.005	0.380
Number of stressors								
PERI	5.20	3.774	3.96	4.226		-1.964(376.0)	0.050	0.309
SSERSU	13.22	4.957	9.11	6.307		-5.281(77.678)	0.000	0.668
Age of onset	13.78	2.641	13.67	2.760		-0.285(376.0)	0.776	0.041
Lifetime treatment history*	5.16	5.353	2.43	4.027		-3.482(59.145)	0.001	0.645

Note: OR: odds ratio; CI: confidence interval; LL: lower limit; UL: upper limit; †Fisher's exact test conducted due to cell<5 cases; Φ: phi coefficient. n: sample size; M: mean; SD: standard deviation; t(df): t-test value; df: degrees of freedom; p: p value; PERI: Psychiatric Epidemiology Research Interview; SSERSU: specific stressful events related to substance use. *Equal variances not assumed (nonparametric analysis and Hedges' g effect size were performed).

Table 4 shows the results of logistic regression analysis for SSERSU by SUT-RS modalities. Relapsing, an inability to afford drugs, and poor working conditions were the only stressors associated with any kind of SUT-RS utilization after controlling for sex and lifetime treatment history. The results indicate that substance users reporting having relapsed were almost 4 times more likely to report having used SUT-RS than were those counterparts not reporting having relapsed, even after controlling for other SLEs, sex, and lifetime treatment history (OR = 3.61; 95% CI [1.62, 8.03]; p = 0.031). For residential treatment, substance users reporting having relapsed were 4 times more likely to report treatment than were those counterparts not reporting having relapsed, even after controlling for detoxification services (OR = 4.06; 95% CI [1.51, 10.93]; p = 0.006). However, relapse did not remain significant after Bonferroni correction.

Discussion

This study shows that stressors are factors that are linked to SUT-RS utilization. The results show that with every SLE reported there was an increase of 11% in the probability of using SUT-RS. When analyses were performed by treatment modality, the number of SSERSU was associated only with residential treatment. Neither detoxification nor outpatient treatment services were associated with the number of stressors. Injection drug use and lifetime treatment history were positively associated with detoxification service. Despite the fact that detoxification is not a substance use treatment, the inclusion of this service in this investigation suggests that stressors play a critical role after its provision. In Puerto Rico, the availability of residential treatment services is higher than is the availability of outpatient treatment services, while detoxification is overused, in comparison to

Table 2. Independent logistic regression analysis by the utilization of substance use treatment–related services (in the 6 months prior to taking part in the survey) (N = 378)

Predictors	OR	95% CI (LL, UL)	p	Nagelkerke's R-Squared
Any kind of service				
SSERSU	1.112	(1.056, 1.171)	0.000	0.177
Sex (male)	5.463	(1.580, 18.883)	0.007	
Previous treatment	1.087	(1.027, 1.150)	0.004	
Constant	0.008		0.000	
Detoxification				
SSERSU	1.045	(0.983, 1.110)	0.159	0.133
Injection drug use	4.695	(1.339, 16.464)	0.016	
Previous treatment	1.073	(1.009, 1.140)	0.024	
Constant	0.013		0.000	
Residential				
SSERSU	1.089	(1.015 1.169)	0.017	0.333
Detoxification	24.073	(9.853, 58.817)	0.000	
Constant	0.026		0.000	
Outpatient				
SSERSU	1.056	(0.945, 1.180)	0.337	0.103
Heroin use	2.762	(0.501, 15.217)	0.243	
Age	1.133	(0.926, 1.387)	0.224	
Age of onset	1.145	(0.912, 1.437)	0.243	
Constant	0.000		0.002	

Note: OR: odds ratio; CI: confidence interval; LL: lower limit; UL: upper limit; p: p value; SSERSU: specific stressful events related to substance use; Sex reference = female; Previous treatment = lifetime treatment history; Injection drug use reference = no; Heroin use = heroin use in the last 30 days; reference = no.

other services (31). Certainly, detoxification is a preparation phase before entering formal treatment, and once the individual is stabilized he or she is more likely to recognize life-affecting stressors and decide to continue specialized treatment (32).

In terms of SLEs experienced by substance users, stressors such as family arguments, changes in the frequency of family visits, and criminal justice–related stressors were associated with SUT-RS. The effects of these stressful events were consistent with those reported by other investigations that studied similar stressors (33–35). However, when the number of these stressors was assessed in relation to SUT-RS utilization, these events were not found to be statistically significant. A number of SSERSU, specifically, relapsing, inability to afford drugs, and poor working conditions, were statistically significant after controlling for confounders. Although the variables of inability to afford drugs and having poor working conditions were only statistically significant to SUT-RS in general, it is critical to discuss the implications. Not having money to buy drugs is an indication of economic hardship, and this aspect served as a motivator to engage in treatment (36). The inability to meet basic needs presents a source of high stress (37). Similarly, poor working conditions could be a consequence of substance use. The research pointed out that substance users have a higher prevalence of being in the criminal justice system than non-users do (38), hence the higher possibility of having a criminal record. This kind of background may force these individuals to take any work that is available and endure deplorable working conditions and difficult hours, both of which, alone or together, affect their everyday functioning. In relation to relapse, this variable was the only statistically significant variable, and it was associated with the utilization of SUT-RS in general and for residential treatment, only. The research shows that relapse tends to be very common among substance users and that it is a recurring event both before and after their participating in a substance use treatment program (39); in addition, it is a key factor in terms of recovery (40). Future research considering SUT-RS should include relapse as a trigger for treatment entry or abandonment.

In this investigation, SLEs explained 18% to 33% of the variability for SUT-RS utilization. Besides individual factors, structural challenges, such as the availability of and access to treatment, the quality and satisfaction of services, and stigma, are other elements that play a critical role in the utilization of services. A comparison of treatment capacity in Puerto Rico from 1998 to 2002 showed that there was a 42% decrease in SUT-RS availability. The mean number of 15.4 patients per treatment unit on waiting lists suggests that the capacity for services is also limited (31). In Puerto Rico, the positive perception of SUT-RS received ranged from 24% to 36% (31). In this regard, it has been argued that the bureaucratic process in terms of admission criteria and the lack of evidence-based theories are 2 major contributors affecting the intent of a given user to enter treatment and the subsequent satisfaction (or lack therof) of that user with regard to treatment outcome (5,41–42). Evidence suggests that stigma has perpetuated discrimination toward substance users, as these individuals, though needing treatment, might hesitate to seek services because of said discrimination (6,42). These perspectives affect the perception of service needs and readiness for treatment (43). The combined effect of previously discussed factors might cause individuals to drop out of treatment, thus causing relapse episodes to occur more frequently. Such episodes can be stressful to the substance users who experience them and who are considering taking part in some kind of treatment program, often causing them to resort (sometimes repeatedly) to detoxification services. The frequent use of detoxification also implies that the person seeking such a service has a reduced tolerance, which demands a different level of service, one that is even more specialized; this is another issue that needs to be considered in future studies.

Despite the implications of this investigation, it is not without its limitations. The most critical of these relates to the lack of elements for causality from a cross-sectional research design. Data indicating severity of use and the need for treatment along with substance-use diagnoses were not collected in the parent study. This lack makes it impossible for us to discriminate between those needing and those demanding treatment. Because we limited our population of substance users to those not reporting SUT-RS utilization in the 30 days prior to the survey, we were unable to include medication-assisted treatment

Table 3. Stressful life events associated with the utilization of substance use treatment–related services (in the 6 months prior to taking part in the survey)

Stressful life events	Utilization of substance use treatment–related services							
	Yes (n = 51, 13.5%)		No (n = 327, 86.5%)		Unadjusted OR	95% CI (LL, UL)	Adjusted OR	95% CI (LL, UL)
	Frequency	Percent	Frequency	Percent				
PERI								
A serious family argument (other than with spouse)	20	39.2%	76	23.2%	2.131	(1.149, 3.953)	1.388	(0.625, 3.083)
A change in the frequency of family get-togethers	10	19.6%	28	8.6%	2.605	(1.179, 5.753)	1.356	(0.489, 3.758)
Being arrested	15	29.4%	57	17.4%	1.974	(1.013, 3.844)	0.750	(0.207, 2.722)
Getting involved in a court case	15	29.4%	52	15.9%	2.204	(1.126, 4.312)	1.366	(0.337, 5.543)
Being convicted of a crime	11	21.6%	31	9.5%	2.626	(1.224, 5.632)	1.439	(0.480, 4.314)
SSERSU								
Being homeless	30	58.8%	131	40.1%	2.137	(1.173, 3.894)	1.356	(0.613, 3.002)
Starvation	34	66.7%	147	45.0%	2.449	(1.315, 4.560)	1.128	(0.452, 2.814)
Attempts to quit drugs	41	80.4%	168	51.4%	3.880	(1.880, 8.008)	1.284	(0.505, 3.265)
Relapse events	41	80.4%	127	38.8%	6.457	(3.124, 13.347)	2.835	(1.137, 7.068)
An inability to get substance use or alcohol use treatment	18	35.3%	73	22.3%	1.898	(1.010, 3.565)	0.857	(0.407, 1.805)
An inablity to afford drugs	44	86.3%	185	56.6%	4.825	(2.110, 11.031)	1.749	(0.588, 5.203)
Being rejected because of his or her substance use	41	80.4%	181	55.4%	3.307	(1.602, 6.827)	1.205	(0.482, 3.014)
An inability to find drugs of quality	46	90.2%	215	65.7%	4.793	(1.852, 12.402)	1.459	(0.442, 4.808)
Being sick during withdrawal	44	86.3%	189	57.8%	4.590	(2.007, 10.496)	1.631	(0.532, 5.004)
Being rejected by family	27	52.9%	106	32.4%	2.346	(1.292, 4.259)	1.362	(0.662, 2.803)
Being treated differently because of his or her substance use	18	35.3%	68	20.8%	2.078	(1.103, 3.914)	0.884	(0.396, 1.974)
Having chronic pain	13	25.5%	41	12.5%	2.386	(1.174, 4.853)	1.661	(0.732, 3.770)
An inability to afford food	33	64.7%	155	47.4%	2.034	(1.101, 3.759)	0.699	(0.321, 1.519)
Having poor working conditions†	4	7.8%	4	1.2%	6.872	(1.662, 28.411)	9.588	(1.788, 51.400)

Note: Only significant variables presented. OR: odds ratio; CI: confidence interval; LL: lower limit; UL: upper limit; †Fisher's exact test conducted due to cell<5 cases. PERI: Psychiatric Epidemiology Research Interview; SSERSU: specific stressful events related to substance use.

approaches (e.g., methadone, buprenorphine, naloxone) in the menu of options. Lastly, the inability to identify episodes of treatment mandated by the criminal justice (vs. voluntary entry) made it impossible for this investigation to portray the differences between these groups in terms of the real stressors behind substance use treatment utilization.

Future studies should consider the inclusion of elements indicated previously under case-control and prospective cohort designs to establish some elements of causality. It is also critical to identify adequacy-of-treatment placement criteria and patient preferences vs. treatment received and philosophy to assess treatment outcomes depending on the characteristics of individuals and services received. These findings then would contribute to educating patients about options better suited to their treatment needs.

Based on the findings of this study, it is recommended that SLEs be taken into consideration when assessing SUT-RS use in individuals with substance use disorders. The association between SLEs and SUT-RS furnishes providers with an opportunity to consider, as an option to cope with stressors, these factors in outreach, engagement, treatment planning, and the design of interventions for facilitating treatment.

Resumen

Objetivo: Este estudio exploró la asociación de eventos de vida estresantes y la utilización de servicios relacionados al tratamiento para el uso de sustancias entre personas usuarias de sustancias viviendo en Puerto Rico. Metodología: Se llevó a cabo un análisis de datos secundarios sobre un proyecto de investigación identificado como "Puerto Rico Drug Abuse Research Development Program II" (PRDARDP II). La población de estudio consistió de 378 personas en las edades de 18 a 35 años residentes en el área metropolitana de San Juan y con evidencia de uso de sustancias en los últimos 30 días al momento de la entrevista. Los análisis consideraron datos demográficos, información sobre patrones de uso de sustancias, historial de tratamiento para el uso de sustancias, eventos de vida estresantes y síntomas de depresión y de ansiedad. Resultados: A medida que aumentó el número de eventos de vida estresantes, fue más probable que los usuarios de sustancias informaran la utilización de servicios relacionados para el tratamiento de uso de sustancias (OR = 1.11, IC 95% [1.06, 1.17], p < 0.001). La recaída, la dificultad para comprar drogas y las pobres condiciones en el empleo fueron eventos de vida estresantes estadísticamente

Table 4. Independent logistic regression analysis by the utilization of substance use treatment–related services (by specific stressful events related to substance use) (N = 378)

Predictors	OR	95% CI (LL, UL)	p	Nagelkerke's R-Squared
Any kind of service				
Sex (male)	3.735	(1.028, 13.571)	0.010	0.252
Previous treatment*	1.084	(1.019, 1.154)	0.002	
Relapsing	3.609	(1.623, 8.026)	0.031	
An inability to afford drugs	2.834	(1.098, 7.313)	0.005	
Poor working conditions*	9.973	(2.025, 49.116)	0.000	
Constant	0.007		0.045	
Detoxification				
Previous treatment	1.072	(1.007, 1.141)	0.030	0.191
Injection drug use	4.851	(1.322, 17.794)	0.017	
Relapse	2.706	(1.140, 6.423)	0.024	
Poor working conditions	10.318	(1.825, 58.325)	0.008	
Constant	0.010		0.000	
Residential				
Relapse	4.059	(1.507, 10.933)	0.006	0.348
Detoxification*	20.779	(8.401, 51.391)	0.000	
Constant	0.019		0.000	

Note: OR: odds ratio; CI: confidence interval; LL: lower limit; UL: upper limit; p; p value; Sex reference = female; Previous treatment = lifetime treatment history; Relapse reference = no; Inability to afford drugs reference = no; Poor working conditions reference = no; Injection drug use reference = no. *Significant after Bonferroni correction (p<0.0023; 0.05/22 variables).

asociados a la utilización de servicios relacionados al tratamiento para el uso de sustancias. Conclusión: A pesar de las limitaciones estructurales asociadas al acceso y calidad de los servicios provistos a través del sistema de tratamiento de uso de sustancias en Puerto Rico, los hallazgos sugieren que los eventos de vida estresantes juegan un rol significativo en la utilización de estos servicios. Los investigadores y personal clínico deben considerar el cernimiento de los eventos de vida estresantes en el trabajo de alcance y las estrategias de reclutamiento. Mientras, el avalúo de los eventos de vida estresantes debería integrarse en la planificación del tratamiento para apoyar en el proceso de recuperación a las personas con trastornos de uso de sustancias.

Acknowledgments

The research detailed in this manuscript was made possible thanks to the support of the Puerto Rico Drug Abuse Research Development Program II, which is in turn supported by the National Institute on Drug Abuse of the National Institute of Health (NIDA Grant 5 R24 DA013335). This research was conducted as partial fulfillment of the requirements for the degree of Doctor of Philosophy in Public Health – Epidemiology for the College of Health Sciences, Walden University, Minneapolis, MN. Dr. Aimee Ferraro served as chair and Dr. Angela Witt Prehn as committee member; both contributed their time and effort to the development of this work.

References

1. Substance Abuse and Mental Health Services Administration. Results from the 2013 National Survey on Drug Use and Health: summary of national findings. Rockville, MD; 2014. Available at: Url: http://www.samhsa.gov/data/sites/default/files/NSDUHresultsPDFWHTML2013/Web/NSDUHresults2013.pdf. Accessed Month 10, 2016.
2. Substance Abuse and Mental Health Services Administration. The NSDUH report: need for and receipt of substance use treatment among Hispanics. Rockville, MD; 2012. Available at: Url: http://www.samhsa.gov/data/sites/default/files/NSDUH117/NSDUH117/NSDUHSR117HispanicTreatmentNeeds2012.pdf. Accessed Month 10, 2016.
3. Administración de Servicios de Salud y Contra la Adicción [ASSMCA]. Trastornos de substancias y uso de servicios en Puerto Rico: Encuesta de hogares – 2008. San Juan, PR; 2009.
4. Santiago-Negrón S, Albizu-García CE. Guerra contra las drogas o guerra contra la salud? Los retos para la salud pública de la política de drogas de Puerto Rico. [War against drugs or war against health? The challenges for public health policy on drugs in Puerto Rico.] P R Health Sci J 2003;22:49–59.
5. Upegui-Hernández D, Torruella R. Humillaciones y abusos en centros de "tratamiento" para uso de drogas en Puerto Rico. [Humiliation and abuse in drug use "treatment" centers in Puerto Rico]. 2015 Puerto Rico: Intercambios Puerto Rico.
6. Varas-Díaz N, Santiago-Negrón S, Neilands TB, Bou FC, Rivera SM. Stigmatization of illicit drug use among Puerto Rican health professionals in training. P R Health Sci J 2010;29:109–116.
7. Corless I, Voss J, Guarino A, et al. The impact of stressful life events, symptom status, and adherence concerns on quality of life in people living with HIV. J Assoc Nurses AIDS Care 2013;24:478–490.
8. Breese G, Sinha R, Heilig M. Chronic alcohol neuroadaptation and stress contribute to susceptibility for alcohol craving and relapse. Pharmacol Ther 2011;129:149–171.
9. Fidler J, West R. Self-perceived smoking motives and their correlates in a general population sample. Nicotine Tob Res 2009;11:1182–1188.
10. Hyman S, Sinha R. Stress-related factors in cannabis use and misuse: Implications for prevention and treatment. J Subst Abuse Treat 2009;36:400–413.
11. Mahoney JJ 3rd, Newton T, Omar Y, Ross E, De La Garza R 2nd. The relationship between lifetime stress and addiction severity in cocaine-dependent participants. Eur Neuropsychopharmacol 2013;23:351–357.
12. Zhang X, Shi J, Zhao L, et al. Effects of stress on decision-making deficits in formerly heroin-dependent patients after different durations of abstinence. Am J Psychiatry 2011;168:610–616.
13. Fox H, Talih M, Malison R, Anderson G, Kreek M, Sinha R. Frequency of recent cocaine and alcohol use affects drug craving and associated responses to stress and drug-related cues. Psychoneuroendocrinology 2005;30:880–891.
14. Smith JP, Randall CL. Anxiety and alcohol use disorders: Comorbidity and treatment considerations. Alcohol Res 2012;34:414–431.
15. Sharp L, Carsin AE, Timmons A. Associations between cancer-related financial stress and strain and psychological well-being among individuals living with cancer. Psychooncology 2013;22:745–755.
16. Siegel R, DeSantis C, Virgo K, et al. Cancer treatment and survivorship statistics, 2012. CA Cancer J Clin 2012;62:220–241.
17. Steptoe A, Kivimäki, M. Stress and cardiovascular disease: An update on current knowledge. Annu Rev Public Health 2013;34:337–354.
18. Lazarus RS, Folkman S. Stress, appraisal, and coping. New York, NY: Springer Publishing Company; 1984.
19. Aldwin CM, Werner EE. Stress, coping, and development: An integrative perspective. 2nd Ed. New York, NY: Gilford Press; 2007.
20. Finney J, Moos R. Entering treatment for alcohol abuse: a stress and coping model. Addiction 1995;90:1223–1240.
21. Lee B. Alcohol-induced stress and social support as influences of the adult substance abuser's health and well-being [dissertation]. University of Pittsburgh; 2005.

22. Arbona C, Olvera N, Rodriguez N, Hagan J, Linares A, Wiesner M. Acculturative stress among documented and undocumented Latino immigrants in the United States. Hisp J Behav Sci. 2010;32:362–384.
23. Cervantes R, Padilla A, Salgado de Snyder N. The Hispanic Stress Inventory: a culturally relevant approach to psychosocial assessment. Psychol Assess. 1991;3:438–447.
24. United States Department of Health and Human Services. Project information. NIH research portfolio; 2014. Available at: https://projectreporter.nih.gov/project_info_description.cfm?aid=8061681&icde=32858194&ddparam=&ddvalue=&ddsub=&cr=9&csb=default&cs=ASC&MMOpt=. Accessed Month 10 2016.
25. McLellan A, Cacciola J, Fureman I. The Addiction Severity Index (ASI) and Treatment Services Review (TSR). In: Sederer I, Dickey B, eds. Outcomes assessment in clinical practice. 1st ed. Baltimore, MD: Williams & Wilkins; 2015.
26. Matos TD, Robles RR, Sahai H, et al. HIV risk behaviors and alcohol intoxication among injection drug users in Puerto Rico. Drug Alcohol Depend. 2004;76:229–234.
27. Reyes JC, Robles RR, Colón HM, et al. Severe anxiety symptomatology and HIV risk behavior among Hispanic injection drug users in Puerto Rico. AIDS Behav. 2007;11:145–150.
28. Robles R, Reyes J, Colón H, et al. Effects of combined counseling and case management to reduce HIV risk behaviors among Hispanic drug injectors in Puerto Rico: a randomized controlled study. J Subst Abuse Treat. 2004;27:145–152.
29. Sosa-Zapata I, Colón HM, Robles RR, Cabassa M. Gender differences in drug use and sexual risk behaviors among non-injecting heroin users in Puerto Rico. P R Health Sci J. 2007;26:205–211.
30. Dohrenwend B, Askenasy A, Krasnoff L, Dohrenwend B. Exemplification of a method for scaling life events: the PERI Life Events Scale. J Health Soc Behav. 1978;19:205–229.
31. Mental Health and Anti-Addiction Services Administration. Puerto Rico substance abuse needs assessment program: 2002 provider survey final results. Hato Rey, PR; 2002.
32. Marhe R, Waters A, van de Wetering B, Franken I. Implicit and explicit drug-related cognitions during detoxification treatment are associated with drug relapse: An ecological momentary assessment study. J Consult Clin Psychol. 2013;81:1–12.
33. Hassanbeigi A, Askari J, Hassanbeigi D, Pourmovahed Z. The Relationship between stress and addiction. Procedia Soc Behav Sci. 2013;84:1333–1340.
34. Ferri C, Gossop M, Rabe-Hesketh S, Laranjeira R. Differences in factors associated with first treatment entry and treatment re-entry among cocaine users. Addiction. 2002;97:825–832.
35. Tate S, McQuaid J, Brown S. Characteristics of life stressors predictive of substance treatment outcomes. J Subst Abuse Treat. 2005;29:107–115.
36. Wahler E. The relationship of social stress, economic hardship, and psychological distress to addiction severity among Kentucky substance abuse treatment participants [dissertation]. University of Kentucky; 2012.
37. Cole J, Logan T, Walker R. Social exclusion, personal control, self-regulation, and stress among substance abuse treatment clients. Drug Alcohol Depend. 2011;113:13–20.
38. Fisher W, Clark R, Baxter J, Barton B, O'Connell E, Aweh G. Co-occurring risk factors for arrest among persons with opioid abuse and dependence: Implications for developing interventions to limit criminal justice involvement. J Subst Abuse Treat. 2014;47:197–201.
39. Sinha R. How does stress increase risk of drug abuse and relapse? Psychopharmacology (Berl). 2001;158:343–359.
40. Acri M, Gogel L, Pollock M, Wisdom J. What adolescents need to prevent relapse after treatment for substance abuse: a comparison of youth, parent, and staff perspectives. J Child Adolesc Subst Abuse. 2012;21:117–129.
41. Treloar C, Holt M. Deficit models and divergent philosophies: Service providers' perspectives on barriers and incentives to drug treatment. Drug Educ Prev Policy. 2006;13:367–382.
42. Appel PW, Ellison AA, Jansky HK, Oldak R. Barriers to enrollment in drug abuse treatment and suggestions for reducing them: Opinions of drug injecting street outreach clients and other system stakeholders. Am J Drug Alcohol Abuse. 2004;30:129–153.
43. Albizu-García CE, Caraballo JN, Caraballo-Correa G, Hernández-Viver A, Román-Badenas L. Assessing need for medication-assisted treatment for opiate-dependent prison inmates. Subst Abus. 2012;33:60–69.