

# Violence among illicit drug users recruited in drug treatment facilities

## *Violencia en consumidores de drogas ilícitas reclutados en centros específicos de tratamiento*

ELISABET ARRIBAS-IBAR\*, JOSEP MARIA SUELVES\*\*, ALBERT SÁNCHEZ-NIUBÒ\*\*\*, JUDIT TIRADO-MUÑOZ\*\*\*\*, ANTÒNIA DOMINGO-SALVANY\*, M<sup>a</sup> TERESA BRUGAL\*\*\*\*\*.

\*Drug Abuse Epidemiology Research Group. Institut Hospital del Mar d'Investigacions Mèdiques de Barcelona (IMIM). \*\*Public Health Agency of Catalonia. \*\*\*Research and Development Unit, Parc Sanitari Sant Joan de Déu, Fundació Sant Joan de Déu. CIBER en Epidemiología y Salud Pública, CIBERESP, España. \*\*\*\* Institut Hospital del Mar (IMIM) de Barcelona. \*\*\*\*\* Agencia de Salud Pública de Barcelona.

### Abstract

Illicit drug use is known to be associated with injuries resulting from violence. This study aims to estimate the prevalence of violence, for the last 12 months, in illicit drug users and study the victim-offender overlap, separately by sex. Persons using illicit drugs (502) were recruited in drug treatment facilities. Violence was assessed using four questions for victim and one for perpetrator in the last 12 months. Associations between violence and socio-demographic, substance use, crime and illegal drug market aspects were examined with Poisson regression models. Victimization was reported by 49.6% men and 54.7% women; offending by 36.5% and 27.6%, respectively. Higher prevalence ratios of both victim and offender were observed among participants with marginal income generation activities and alcohol risk use. Victimization was more likely in women using parenteral route and among men with early illegal drug use, illegal polydrug use or history of imprisonment. Offending was more likely among men reporting psychological treatment, early illegal drug use, illegal polydrug use or past imprisonment, and women reporting early illegal drug use or trafficking. Thus, a high prevalence of violence (both victimization and perpetration) was found in illicit drug users, especially among those involved in market activities and crime. Drug treatment facilities should consider assessing for history and signs of violence and promote community health strategies.

*Keywords:* Illegal drug use; Violence; Crime; Gender; Victim-offender overlap.

### Resumen

El uso ilícito de drogas se ha asociado a lesiones producidas por violencia. Nuestro objetivo es estimar en usuarios de drogas ilícitas, la prevalencia de violencia en los últimos 12 meses y estudiar la superposición víctima-agresor. Se reclutaron personas consumidoras de drogas ilícitas (502) en centros de tratamiento de drogas. La violencia se evaluó mediante cuatro preguntas sobre victimización y una sobre agresión referidas a los últimos 12 meses. Las asociaciones entre violencia y aspectos sociodemográficos, consumo de sustancias, delincuencia y mercado de drogas ilegales se analizaron con modelos de regresión de Poisson. El 49,6% de los hombres y el 54,7% de las mujeres reportaron victimización; la agresión un 36,5% y 27,6%, respectivamente. Se observaron prevalencias elevadas de víctima y de ofensor entre los participantes con actividades marginales de generación de ingresos y con uso de riesgo de alcohol. La victimización fue más probable en las mujeres que usaban vía parenteral y entre los hombres con consumo precoz de drogas ilegales, policonsumo de drogas ilegales y antecedentes penitenciarios. La agresión fue más probable entre los hombres receptores de tratamiento psicológico, consumo precoz de drogas ilegales, policonsumo de drogas ilegales y antecedentes penitenciarios, y entre las mujeres, aquellas que reportaron consumo precoz de drogas ilegales y que habían traficado. Se encontró una alta prevalencia de violencia en los usuarios de drogas ilícitas, especialmente entre aquellos involucrados en actividades de mercado y delincuencia. Los centros de tratamiento de drogas deberían considerar evaluar los antecedentes y los signos de violencia, y promover estrategias de salud comunitaria.

*Palabras clave:* Drogas ilegales; Violencia; Crimen; Género; Víctima-agresor.

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**Send correspondence to:** Antònia Domingo-Salvany. IMIM. Doctor Aiguader 88 · E-08003 Barcelona, España. (+34) 933160757, Fax: (+34) 933160797. E-mail: adomingo.im2@gmail.com.

**D**rug abuse is associated not only with high levels of physical and psychiatric comorbidity and mortality, (Fridell & Nilson, 2004; Single, Robson, Rehm, & Xi, 1999; Torrens, Gilchrist, & Domingo-Salvany, 2011), but also with a progressive degradation of social factors such as interpersonal relationships and environment, including violence (Boles & Miotto, 2003; Cunningham et al., 2003; MacDonald, Wells, Giesbrecht, & Cherpitel, 1999), as a consequence of drug addiction (UNODC, 1995; Wahler, 2012). These contextual factors may result from consumption itself or conversely may increase the risks of drug use, meaning they can have a circular effect (Rutter, 2002).

Previous investigators have examined the complex interpersonal and social context related to crime and violence among illicit drug users (Bennett, Holloway, & Farrington, 2008; Goldstein, 1985; White & Norman, 2000) and many studies have highlighted the importance of context for understanding the connections between drugs and violence (Arribas-Ibar, Suelves, Sanchez-Niubò, Domingo-Salvany, & Brugal, 2017; Caldentey et al., 2017; Rutter, 2009; Werb et al., 2011). Goldstein proposed a conceptual framework involving three models to explain this relationship: i) The Psychopharmacological Model resulting in changes or cognitive impairment that precipitates criminal behavior, ii) The Economically Compulsive Model as a means of getting money to support drug use, and iii) The Systemic Model occurring as part of the system of drug distribution. Moreover, the three models can overlap (Goldstein, 1985).

Several studies have explored Goldstein's psychopharmacological model and reported that the chemical properties of illegal drugs may induce violent behaviors (Cunningham et al., 2003; Pierce et al., 2015). For example, Darke et al. found that regular methamphetamine users were more likely to have been offenders in the last 12 months than regular heroin users and proposed that the pharmacological properties of methamphetamine may have been related to the relative increase in crime (Darke, Torok, Kaye, Ross, & McKetin, 2010). Other studies have focused on Goldstein's second model, whereby drug use may contribute to a disproportionate number of violent events and crimes committed for financial gain (Bennett et al., 2008; Klee & Morris, 1994; Topalli, Wright, & Fornango, 2002). In relation to Goldstein's third model, several studies have demonstrated the influence of illegal drug activities (supply and distribution) in provoking violence (Reuter, 2009; Ritter, 2006; Seddon, 2000). There is growing consensus that the majority of drug-related violence is systemic in nature (Erickson, 2001); however effects of drug market involvement and other illegal activities on violence have remained relatively under-examined, especially in drug users requesting treatment at health care centers.

In studying violent behaviors it is important to be aware of the existing correlation between victim and offender status, the so called "victim-offender overlap" (Jennings, Piquero, & Reingle, 2012). Cunningham et al. found that in an emergency department many injured patients (57.5%) reported being both victim and offender (Cunningham et al., 2003). Similarly, other studies found that offenders and victims share a similar demographic profile and victimization and perpetration appear to have related etiology (Daday, Broidy, Crandall, & Sklar, 2005).

Posick and Zimmerman posit that to better understand victim and offender profiles and their overlap, gender differences need to be considered (Posick & Zimmerman, 2015). Accordingly, the present study aims to estimate the prevalence of violence among illicit drug users seeking care in drug treatment facilities in Catalonia (Spain), to describe victims and offenders' characteristics, to assess the association of illegal market activities with violence, and to study the victim-offender overlap, separately for men and women.

We hypothesized that drug users ever involved in illegal drug trafficking or other illegal activities would be more likely to report both victimization and offending in the last year and that this trend would be more notable in men than in women. Similarly, we hypothesized that subjects reporting having been in prison would also be more likely to report both past-year victimization and offending; with the same gender trend. Finally, we hypothesized that no gender differences would be observed in the victim-offender overlap.

## Method

### *Study setting and population*

This is a cross-sectional study among illicit drug users recruited from drug treatment and prevention centers in Catalonia (Spain) between April and June 2012. From the list of current public treatment facilities (2010), centers were selected to cover the whole territory and were stratified by type of center. To this aim, Catalonia was divided in five geographical areas; and sampling strategies adapted to contemplate each type of facility in a given area. As Outpatient Treatment Centers (OTC) are the main entrance door to treatment in Catalonia, they were prioritized. Finally, 48 centers participated: 26 OTC, 12 professional residential Therapeutic Communities (ThC), and 10 Harm Reduction Facilities (HRF). All HRF centers were involved in the study. The number of participants to be recruited was determined based on the center's activity and size, over-sampling the smallest selected centers, especially HRF. In HRF quotas were applied for sex and country of birth. Participants answered a questionnaire covering socio-demographic aspects, substance use patterns, health services evaluation, crime, market activities and violence. This

study was approved by the IMIM (*Hospital del Mar Medical Research Institute*) ethics committee. Informed consent was obtained from participants prior their involvement in the research. Participants from HRF were compensated with 10 euros. A total of 558 individuals with illegal drug use were approached, 42 rejected participation and two didn't complete the questionnaire, leading to 514 valid cases. Valid cases were distributed as follows: 310 in OTC, 98 in HRF and 94 in ThC.

### **Dependent variables: victim and offender**

Violence was assessed based on five questions referring to the last 12 months, taken from a WHO guide about conducting community surveys on injuries and violence (World Health Organization, 2004). The first four questions provided information about violence suffered: 1) *How many times have you been attacked, kicked, burned or injured by firearm, knife, stick, broken bottle?* 2) *How many times have you been a victim of any physical aggression not involving any weapon?* 3) *How many times have you been a victim of any sexual abuse?* and 4) *How many times have you been a victim of any psychological abuse?* Answers were summarized in a variable called "victim" in order to obtain overall victimization assessment of the study sample. It was considered affirmative when a respondent reported being a victim of any type of violence or aggression (physical with or without weapon, sexual, or psychological). One question referred to violence perpetrated: 5) *How many times have you physically attacked others? (with weapon, beating, pushing or other)*. If a violent episode was reported the participant was considered "offender".

### **Independent variables**

Independent variables included in the study encompassed socio-demographic aspects (country of birth, municipality, place of residence, level of education, employment status, marital status); psychological treatment; substance use patterns (age at first illegal drug use, parenteral administration ever, alcohol risk use and recent illegal polydrug use), illegal drug market activities (ever trafficked and income generation activities) and crime (prison ever).

Psychological treatment was assessed for the 12 months prior to survey administration. Alcohol risk use was measured through the Alcohol Use Disorders Identification Test (AUDIT-C), referred to the last 12 months, considering alcohol risk users those men with a score of 4 or more and women with 3 or more (Bradley et al., 2007). Recent polydrug use was defined as the daily use of two or more illicit substances during the last 30 days of active use. The income generating activities (IGA) distinguished between legal activities to obtain money (from family, partner, legal job, and pension or street trade) and illegal and/or marginal ones (sex work, stealing, peddling, begging, borrowing on credit from a dealer); the marginal category was prioritized in the event that responses included both categories.

### **Statistical analysis**

Analyses were performed by sex, separately for violence received (VICTIM) and violence perpetrated (OFFENDER). In descriptive analyses, comparisons were evaluated by chi-square and Student's t test. To assess effect size, the Cramer's V statistic was calculated and the following cut-off values applied: small 0.1, medium 0.3 and large 0.5, corresponding to Cohen's d: 0.2, 0.5 and 0.8, respectively (Cohen, 1988). Prevalence ratios (PR) were calculated to identify factors associated with violence through Poisson regression models, with robust variance. In these models, generalized estimating equations (GEE) were used to take into account correlated observations according to the type of recruitment center (HRF, OTC, or ThC). All variables with a  $p$ -value  $\leq 0.20$  in the descriptive analyses were included in a model and then removed stepwise until the model had only significant variables ( $p < 0.05$ ). For any variable with over 15 missing answers, a new category was created in order to avoid losing these cases from the analysis. Psychoactive substance use variables were not included in the multivariate models because reported drug consumption would refer to different time periods, as subjects recruited in different center types would have had different treatment schedules. A total of four models, two for victim (men and women) and two for offender were fitted, adjusting for age and statistically significant socio-demographic variables (see tables footnotes). Finally, to assess victim-offender overlap, the resulting models for victim were further adjusted by offender status, and the offender model by victim status. All analyses were performed using SPSS version 18.

## **Results**

### **Sample description**

Among the valid participants (N=514), 502 reported violence information; 384 men (76.5%) and 118 women. Their mean age was 37.9 years (SD 8.6). The majority of participants came from OTC (61.8%) while HRF and ThC accounted for approximately 19% each. Most (91.0%) had ever used cocaine or crack, 86.5% cannabis, and 37.6% opiates (heroin and methadone). One third (34.2%) of subjects were illicit polydrug users. Illicit drug use initiation at under 14 years old was 52.1% in men and 37.7% in women ( $p < 0.01$ ). Past year alcohol risk use was higher for men (51.5% vs 39.8% for women,  $p < 0.03$ ). More women reported psychological treatment (38.9% vs 25.8% for men,  $p < 0.01$ ). Other variables referring to drug use patterns didn't differ by sex. More men had been sentenced to prison (44.8% vs 29.7% for women,  $p < 0.01$ ). Men reported more drug trafficking activities (52.9% vs 42.4% among women,  $p < 0.05$ ). Finally, illegal and/or marginal IGA were more frequently reported by men (84.4% vs 74.6% for women,  $p < 0.02$ ).

### Prevalence of different types of violence

The last 12-month prevalence of being a victim was 50.8% (49.6% men vs 54.7% women) and of being an offender 34.4% (36.5% men vs 27.6% women) (Table 1). Although women more often reported being victims and men more frequently reported being offenders, differences were not statistically significant. Experiencing a physical attack (without weapon) or psychological abuse was more common (around 33% each) than experiencing physical attack with a weapon (17.4%) or sexual abuse (3.4%). More men reported victimization involving physical attack (with and without weapon) while a higher proportion of women reported sexual and psychological abuse. Differences by sex were significant for all types of violence, except for physical attack without weapon.

### Victim analyses

The only socio-demographic variables significantly associated with 'victim' were employment status and residence in men (Table 2). All drug use patterns were associated with victim status in men while for women the associated variables were alcohol risk use, parenteral route, and illegal polydrug use. Also, all crime and market variables were statistically significant for men whereas only IGA was significant for women.

Multivariate results for victim are shown in Table 3. Among men, higher PRs of victim were observed for early

illegal drug consumption ( $\leq 14$  years) (PR= 1.3), alcohol risk use (PR= 1.2), recent illegal polydrug use (PR= 1.5), ever sentenced to prison (PR= 1.3) and involved in illegal and/or marginal IGA (PR= 1.3). For women, higher PR of victimization was associated with alcohol risk use (PR= 1.5), parenteral route (PR= 1.5) and illegal and/or marginal IGA (PR= 1.4).

### Offender analyses

Younger adults ( $\leq 35$  years), both men and women, reported more frequently offending (43.1% men and 38.3% women) than older participants. Other socio-demographic variables significantly associated to 'offender' were employment status and residence in men (Table 4). For both sexes offending was significantly more common amongst those who started drug use early ( $\leq 14$  years) (46.7% men and 38.6% women), were alcohol risk users (49.0% for men and 48.9% for women) or illegal polydrug users (56.3% men and 42.9% women); also men using parenteral route and opiates were more likely to report offending. Prevalence of offending was higher in men reporting involvement in crime (45.5% of those sentenced to prison, 44.5% of those involved in drug trafficking and 40.8% in illegal and/or marginal IGA), while women who had been involved in drug trafficking were more likely to report offending (38.8%).

Multivariate results for offender status are shown in Table 5. Men reporting psychological treatment (PR=1.4),

Table 1. Type of violence in illicit drug users in the last 12 months for men and women

	MEN			WOMEN			TOTAL		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
<b>VICTIM<sup>a</sup></b>	381			117			498		
Yes	189	49.6	(44.6-54.6)	64	54.7	(45.7-63.7)	253	50.8	(46.4-55.2)
Physical victim (weapon) <sup>b</sup>	370			112			482		
Yes	73	19.7	(15.7-23.7)	11	9.8	(4.3-15.3)	84	17.4	(14.0-20.8)*
Physical victim (no weapon)	376			114			490		
Yes	128	34.0	(29.3-38.8)	32	28.1	(19.8-36.3)	160	32.6	(29.0-36.8)
Sexual victim	364			113			477		
Yes	6	1.6	(0.0-3.0)	10	8.8	(3.6-14.1)	16	3.4	(1.7-5.0)**
Psychological victim	372			117			489		
Yes	109	29.3	(24.7-33.9)	52	44.4	(35.4-53.4)	161	32.9	(28.8-37.1)**
<b>OFFENDER<sup>c</sup></b> (physical)	378			116			494		
Yes	138	36.5	(31.7-41.4)	32	27.6	(19.4-35.7)	170	34.4	(30.2-38.6)

Note. \*\* $p < 0.01$ , \* $p < 0.05$ , Statistical significance in difference by sex. <sup>a</sup> Including one or more forms of victimization: physical victim (with/without weapon), sexual victim and psychological abuse. <sup>b</sup> Attacked, kicked, burned, injured by firearm, knife, stick, broken bottle, and others. <sup>c</sup> Physical aggression.

Table 2. Sociodemographic, psychoactive substance use patterns and crime and market aspects associated with violence suffered (VICTIM) last 12 months, for men and women

	Men					Women				
	N	n	%	p	V Cramer	N	n	%	p	V Cramer
<b>Total</b>	<b>381</b>	<b>189</b>	<b>49.6</b>			<b>117</b>	<b>64</b>	<b>54.7</b>		
<b>Age</b>										
≤ 35	159	85	53.5	0.22	0.06	47	30	63.8	0.10	0.15
≥ 36	221	104	47.1			70	34	48.6		
<b>Country of birth</b>										
Spain	341	164	48.1	0.09	0.09	108	59	54.6	0.96	0.01
Other countries <sup>a</sup>	40	25	62.5			9	5	55.6		
<b>Municipality</b>										
Less than 100,000 inh; not BMC <sup>b</sup>	102	44	43.1	0.07	0.12	35	22	62.9	0.33	0.14
More than 100,000 inh; not BMC	84	37	44.0			17	7	41.3		
Barcelona and BMC	195	108	55.4			65	35	53.8		
<b>Level of education</b>										
High school/university	112	47	42.0	0.14	0.10	41	18	43.9	0.18	0.17
Secondary education	156	84	53.8			42	24	57.1		
Primary/elementary	113	58	51.3			34	22	64.7		
<b>Employment status</b>										
Working	72	22	30.6	<0.01	0.19	22	9	40.9	0.08	0.21
Unemployment/ had never worked	234	131	56.0			75	40	53.3		
Permanent disability/pensioner	74	36	48.6			20	15	75.0		
<b>Residence</b>										
Alone	58	28	48.3	<0.01	0.34	22	11	50.0	0.78	0.12
Married or single couple	63	29	46.0			29	17	58.6		
Other relatives/friends	136	48	35.3			46	25	54.3		
On the street/squatter	56	49	87.5			8	6	75.0		
Therapeutic community	62	31	50.0			10	5	50.0		
<b>Psychological treatment<sup>c</sup></b>										
No	268	128	47.8	0.84	0.01	69	34	49.3	0.25	0.11
Yes	94	46	48.9			43	26	60.5		
<b>PSYCHOACTIVE SUBSTANCE USE PATTERNS</b>										
<b>Age at first illegal drug use</b>										
≤14 years	198	116	58.6	<0.01	0.18	43	26	60.5	0.34	0.09
≥15 years	181	73	40.3			74	38	51.4		
<b>Alcohol risk use<sup>c,d</sup></b>										
No	186	82	44.1	0.04	0.11	71	33	46.5	0.03	0.21
Yes	195	107	54.9			46	31	67.4		
<b>Parenteral route ever</b>										
No	207	91	44.0	0.01	0.13	73	34	46.6	0.02	0.21
Yes	172	98	57.0			44	30	68.2		
<b>Opiates ever</b>										
No	149	57	38.3	<0.01	0.14	55	26	47.3	0.13	0.01
Yes	232	123	56.9			62	38	61.3		
<b>Cocaine and/or crack ever</b>										
No	32	9	28.1	0.01	0.18	13	4	30.8	0.07	0.21
Yes	346	178	51.4			104	60	57.7		
<b>Recent illegal polydrug use</b>										
No	234	94	40.2	<0.02	0.28	78	36	46.2	0.01	0.26
Yes	126	87	69.0			35	26	74.3		

CRIME AND MARKET										
<b>Sentenced to prison</b>										
Never	209	85	40.7	<0.01	0.19	82	41	50.0	0.12	0.14
Ever	170	102	60.0			35	23	65.7		
<b>Drug trafficking</b>										
Never	180	79	43.9	<0.05	0.11	67	33	49.3	0.17	0.13
Ever	201	110	54.7			50	31	62.0		
<b>Drug supplier</b>										
Family/friends/colleagues	28	8	28.6			13	6	46.2		
Dealer/marginal sources	145	71	49.0	0.05	0.13	44	19	43.2	0.07	0.21
Both	207	110	53.1			60	39	65.0		
<b>Income generation activities</b>										
Legal <sup>e</sup>	59	18	30.5	0.01	0.16	30	11	36.7	0.02	0.21
Illegal or marginal <sup>e</sup>	322	171	53.1			87	53	60.9		

Note. <sup>a</sup> Other countries: Rest of Europe, America, Asia and North Africa. <sup>b</sup> BMC: Barcelona Metropolitan Conurbation. <sup>c</sup> Last 12 months. <sup>d</sup> According to AUDIT C (Bradley et al., 2007). <sup>e</sup> Legal activities: money obtained from family, partner, legal job, pension or street trade; Illegal and/ or marginal activities: money obtained from sex work, stealing, peddling, begging or borrowing on credit from a dealer.

Table 3. Poisson regression models exploring factors associated with victimization in the last 12 months, for men and women

	Men <sup>a</sup>			Women <sup>b</sup>		
	N (376)	PR <sup>c</sup>	95% CI <sup>c</sup>	N (117)	PR	95% CI
<b>Age at first illegal drug use</b>						
≥ 15 years	179	1				
≤ 14 years	197	1.3	(1.1-1.4)*			
<b>Alcohol risk use <sup>d</sup></b>						
No	184	1		71	1	
Yes	192	1.2	(1.1-1.4)*	46	1.5	(1.3-1.7)*
<b>Parenteral route ever</b>						
No				73	1	
Yes				44	1.5	(1.1-1.7)*
<b>Recent illegal polydrug use</b>						
No	232	1				
Yes	124	1.5	(1.1-2.0)*			
Missing <sup>e</sup>	20	1.0	(0.9-1.2)			
<b>Sentenced to prison</b>						
Never	208	1				
Ever	168	1.3	(1.2-1.5)*			
<b>Income generation activities</b>						
Legal <sup>f</sup>	59	1		30	1	
Illegal and/or marginal <sup>f</sup>	317	1.3	(1.1-1.5)*	87	1.4	(1.2-1.6)*

\*Note.  $p < 0.05$ . <sup>a</sup> Poisson regression with robust variance, adjusted by age and country of birth. <sup>b</sup> Poisson regression with robust variance, adjusted by age and level of education. <sup>c</sup> PR: Prevalence Ratio; CI: Confidence Interval. <sup>d</sup> According to AUDIT C (Bradley et al., 2007) at last 12 months. <sup>e</sup> Missing category was created in order to avoid losing these cases from the analysis. <sup>f</sup> Legal activities: money obtained from family, partner, legal job, pension or street trade; Illegal and/ or marginal activities: money obtained from sex work, stealing, peddling, begging or borrowing on credit from a dealer.

started illegal drug use early ( $\leq 14$  years old) (PR= 1.4), were alcohol risk users (PR=1.9), were recent illegal polydrug users (PR= 1.7), those sentenced to prison (PR= 1.4), and involved in illegal and/or marginal IGA (PR= 2.0) were more likely to be offenders. For women, those more

likely to have been offenders were those with early illegal drug use ( $\leq 14$  years) (PR= 1.4), alcohol risk users (PR= 3.2), and those involved in drug trafficking (PR= 1.5) and illegal and/or marginal IGA (PR= 2.1).

Table 4. Socio-demographic, psychoactive substance use patterns and crime and market aspects associated with offenders in the last 12 months, for men and women

	Men					Women				
	N	n	%	p	V Cramer	N	n	%	p	V Cramer
<b>Total</b>	<b>378</b>	<b>138</b>	<b>36.5</b>			<b>116</b>	<b>32</b>	<b>27.6</b>		
<b>Age</b>										
≤ 35	160	69	43.1	0.02	0.12	47	18	38.3	0.03	0.20
≥ 36	217	69	31.8			69	14	20.3		
<b>Country of birth</b>										
Spain	339	127	37.5	0.26	0.06	107	31	29.0	0.25	0.12
Other countries <sup>a</sup>	39	11	28.2			9	1	11.1		
<b>Municipality</b>										
Less than 100,000 inh; not BMC <sup>b</sup>	101	33	32.7	0.19	0.09	35	11	31.4	0.57	0.10
More than 100,000 inh; not BMC	83	25	30.1			17	3	17.6		
Barcelona and BMC	191	77	40.3			63	17	27.0		
<b>Level of education</b>										
High school/university	112	37	33.0	0.30	0.08	40	10	25.0	0.68	0.08
Secondary education	153	63	41.2			43	11	25.6		
Primary/elementary	113	38	33.6			33	11	33.3		
<b>Employment status</b>										
Working	72	17	23.6	0.03	0.19	22	5	22.7	0.82	0.21
Unemployment/ had never worked	232	94	40.5			75	22	29.3		
Permanent disability/pensioner	73	26	35.6			19	5	26.3		
<b>Residence</b>										
Alone	58	17	29.3	<0.01	0.23	22	3	13.6	0.31	0.20
Married or single couple	62	21	33.9			29	7	24.1		
Other relatives/friends	135	37	27.4			45	15	33.3		
On the street/squatter	56	33	58.9			7	2	28.6		
Therapeutic community	61	26	42.6			11	5	45.5		
<b>Psychological treatment<sup>c</sup></b>										
No	268	88	32.8	0.06	0.10	68	15	22.1	0.10	0.16
Yes	91	40	44.0			44	16	36.4		
<b>PSYCHOACTIVE SUBSTANCE USE PATTERNS</b>										
<b>Age at first illegal drug use</b>										
≤ 14 years	195	91	46.7	<0.01	0.22	44	17	38.6	0.04	0.19
≥ 15 years	181	47	26.0			72	15	20.8		
<b>Alcohol risk use<sup>c,d</sup></b>										
No	184	43	23.4	<0.01	0.27	69	9	13.0	<0.01	0.39
Yes	194	95	49.0			47	23	48.9		
<b>Parenteral route ever</b>										
No	208	66	31.7	0.03	0.12	73	17	23.3	0.17	0.13
Yes	168	72	42.9			43	15	34.9		
<b>Opiates ever</b>										
No	150	40	26.7	<0.01	0.12	55	14	25.5	0.63	0.07
Yes	228	98	43.0			61	18	29.5		
<b>Cocaine and/or crack ever</b>										
No	32	8	25.0	0.16	0.13	13	3	23.1	0.70	0.15
Yes	344	129	37.5			103	29	28.2		
<b>Recent illegal polydrug use</b>										
No	231	61	26.4	<0.01	0.30	77	17	22.1	0.03	0.21
Yes	126	71	56.3			35	15	42.9		

Violence among illicit drug users recruited in drug treatment facilities

CRIME AND MARKET										
<b>Sentenced to prison</b>										
Never	209	61	29.2	<0.01	0.17	83	19	22.9	0.07	0.17
Ever	167	76	45.5			33	13	39.4		
<b>Drug trafficking</b>										
Never	178	49	27.5	<0.01	0.18	67	13	19.4	0.02	0.21
Ever	200	89	44.5			49	19	38.8		
<b>Drug supplier</b>										
Family/friends/colleagues	28	6	21.4			13	3	23.1		
Dealer/ marginal sources	145	53	36.6	0.20	0.09	43	9	20.9	0.35	0.13
Both	204	79	38.7			60	20	33.3		
<b>Income generation activities</b>										
Legal <sup>e</sup>	59	8	13.6	<0.01	0.21	29	4	13.8	0.06	0.18
Illegal or marginal <sup>e</sup>	319	130	40.8			87	28	32.2		

Note. <sup>a</sup> Other countries: Rest of Europe, America, Asia and North Africa. <sup>b</sup> BMC: Barcelona Metropolitan Conurbation. <sup>c</sup> Last 12 months. <sup>d</sup> According to AUDIT C (Bradley et al., 2007). <sup>e</sup> Legal activities: money obtained from family, partner, legal job, pension or street trade; Illegal and/ or marginal activities: money obtained from sex work, stealing, peddling, begging or borrowing on credit from a dealer.

Table 5. Poisson regression models exploring factors associated with violence perpetration (OFFENDER) in the last 12 months, for men and women

	Men <sup>a</sup>			Women <sup>a</sup>		
	N (373)	RP <sup>b</sup>	IC 95% <sup>b</sup>	N (116)	RP	IC 95%
<b>Psychological treatment<sup>c</sup></b>						
No	263	1				
Yes	91	1.4	(1.2-1.7)*			
Missing <sup>d</sup>	19	1.3	(1.1-1.5)			
<b>Age at first illegal drug use</b>						
≥ 15 years	179	1		72	1	
≤ 14 years	194	1.4	(1.3-1.6)*	44	1.4	(1.1-1.8)*
<b>Alcohol risk use<sup>c,e</sup></b>						
No	182	1		69	1	
Yes	191	1.9	(1.8-2.1)*	47	3.2	(1.9-5.3)*
<b>Recent illegal polydrug use</b>						
No	229	1				
Yes	124	1.7	(1.5-1.9)*			
Missing <sup>d</sup>	20	1.2	(0.9-1.6)			
<b>Sentenced to prison</b>						
Never	208	1				
Ever	165	1.4	(1.1-1.9)*			
<b>Drug trafficking</b>						
Never				67	1	
Ever				49	1.5	(1.4-1.7)*
<b>Income generation activities</b>						
Legal <sup>f</sup>	59	1		29	1	
Illegal or marginal <sup>f</sup>	314	2.0	(1.3-3.2)*	87	2.1	(1.8-2.3)*

\*Note.  $p < 0.05$ ; <sup>a</sup> Poisson regression with robust variance, adjusted by age; <sup>b</sup> PR: Prevalence Ratio; CI: Confidence Interval; <sup>c</sup> Last 12 months; <sup>d</sup> Missing category was created in order to avoid losing these cases from the analysis; <sup>e</sup> According to AUDIT C (Bradley et al., 2007); <sup>f</sup> Legal activities: money obtained from family, partner, legal job, pension or street trade; Illegal and/ or marginal activities: money obtained from sex work, stealing, peddling, begging or borrowing on credit from a dealer.



### **Victim- Offender overlap**

Of the studied sample, 12 participants answered only the victim or offender questions, but not both, leaving our analyses of victim-offender overlap with 375 men and 115 women. Considering both men and women, 132 of the 245 victims also reported being offenders (53.9%); this relation differed by sex ( $n = 107/183$ , 58.5% men and  $n = 25/62$ , 40.2% women) ( $p < 0.02$ ). Conversely, the great majority of those reporting being offenders ( $n = 166$ ) also reported having been victims ( $n = 132$ , 79.5%) with no differences by sex (men  $n = 107/135$ , 79.3% and women  $n = 25/31$ , 80.6%).

When 'offender' was included in the victim models (for each sex), the PR of being a victim for a male offender (vs non offender) was PR= 2.1 (95%CI: 2.0-2.3) and for a female offender PR= 1.6 (95%CI: 1.4-1.8). Alcohol risk use lost significance for the association with being a victim in both. The rest of variables remained significant except parenteral route for women.

The PR of being an offender for those subjects who reported having been victims was three times higher (PR= 3.0; 95%CI: 2.2-3.9) in men and two times higher (PR=2.3; 95%CI: 2.0-2.7) in women, than those who did not report a history of victimization. Variables that ceased to be significant were having been sentenced to prison for men and early illegal drug use for women.

## **Discussion**

High levels of recent violence were observed in illicit drug users, men and women, attending specific health facilities; half reported being victims (physical, psychological or sexual) and around one third offenders. Although the prevalence of being a victim was higher for women and offender for men, the differences were not significant. For both genders, illegal and/or marginal income generation activities were similarly associated with victim and offender status, and when considering the victim-offender overlap, alcohol risk use was only associated with offender status. Furthermore, specifically by gender, victimization was more likely in men with early illegal drug consumption, illegal polydrug use and prison history, whereas among women in those who had used parenteral route. Regarding offending, it was more common in men who had sought psychological treatment, those who reported early drug consumption, illegal polydrug use and for those sentenced to prison, and for women reporting early drug consumption and drug trafficking.

Gender differences were found in relation to the different types of violence. Psychological and sexual violence were more common among women, and physical assault involving a weapon was more frequently reported by men. In line with these findings, a European study involving 545 drug users entering treatment found 75.8% of women and

66.3% of men reporting having experienced some type of violence. Also, consistent with our findings, a higher proportion of females reported psychological violence in comparison to male drug users (41.7% vs 30.0% for men) (Stevens et al., 2007). As in other studies (Rodriguez & Griffin, 2005), we found males were more frequently involved in criminal behavior and in illegal drug market activities, thus it is not surprising that violence with weapon was more frequent among males.

Some limitations need to be considered. First, as victimization patterns differ by sex, and as a single person can have suffered several forms of violence, all victimization forms were analyzed together enabling a more robust analysis by increasing the sample size; however, it did not allow analysis of specific types of violence. Second, prior victimization or perpetration were not considered, allowing better recall and the analysis with other events (psychological treatment, illegal polydrug and alcohol risk use) occurring in the same period. Third, self-report relies on respondents' memory and can also be influenced by social desirability. However, some drug user studies have shown that cross-sectional results are valid despite being self-reported (Maisto, McKay, & Connors, 1990). If there was an under reporting of violence, prevalence estimates would also be underestimated. Nevertheless, for some specific forms (e.g.: psychological abuse) we cannot rule out possible over reporting due to individual differences in sensitivity to violence (Collyer, Brell, Moster, & Furey, 2011). Fourth, recruitment was done in health centers, thus results may not be generalizable to the non-treatment-seeking population. Finally, the study design does not allow inferences regarding causality of violence and the independent variables.

Reported levels of violence among illicit drug users were high, falling within the range found in previous studies in this population, even though various types of victimization but only physical offending are considered in the present study. Also referring to the last 12 months, Darke et al. found around 41% of methamphetamine and heroin users had committed some violent crime and 46% had been victims of violence (Darke et al., 2010) and another study with illicit drug users (using methamphetamine, cocaine and heroin) found that 48% of them had suffered any kind of physical violence and the 34.5% attacked physically at last 6 months (Martin et al., 2008). An emergency department study found that 40.7% of injured patients with alcohol and illicit substances consumption reported having been victims of sexual abuse, violence with a weapon, pushing, or others, and 35.6% were offenders (Cunningham et al., 2003), figures also approaching those of the present study. The prevalence of reported violence in the general population is much lower, with figures from 1.1% of at least one violent victimization (Lauritsen & Rezey, 2013) to 3.9% in men and 3.0% in women of general violence in the previous 12 months (Tjaden & Thoennes, 2000).

Interestingly, our findings match with Goldstein's models. The fact that first illegal drug use at a young age (under 15) was associated with victimization and offending in men, and offending in women could be considered as related to Goldstein's first model, which considers that drug use results in cognitive impairment (exacerbated over the years of drug use) that may trigger criminal behavior. Furthermore, several studies have shown how the effects of some drugs, including amphetamines, benzodiazepines and crack/cocaine can cause aggressive and violent behavior (Albertson, Walby & Derlet, 1995; Davis, 1996; Kuhns, 2005; Macdonald et al., 2003; Sommers, Baskin, & Baskin-Sommers, 2006). In the present study high alcohol consumption was associated with offending, in both men and women.

In accordance with the second model (economic-compulsive), we found that men who had been in prison were more likely to be both victim and offender, suggesting that they engaged in economic violence and/or crimes in order to support costly drug use. Evidence supporting this hypothesis was found in previous studies, though not recent: heroin users reported committing more violent crimes after having become drug users (Parker & Newcombe, 1987), as also happened with crack cocaine users (Parker & Bottomley, 1996).

Regarding the third model, illegal and/or marginal IGA was associated with being a victim and/or offender for both genders, and specifically, women involved in illegal drug market activities were more likely to be offenders. The evidence shows that the need to obtain money to purchase drugs in unfavorable social contexts induces many users to engage in illegal and/or marginal activities (Carpentier, 2007; Kuhns, 2005; Richardson et al., 2015). Likewise, in a study of female sex workers (the vast majority of whom also reported using drugs), Gilchrist et al. noted that participants reported they had frequently been subject to violent physical assault (47%) and to sexual assault (39%) whilst working (Gilchrist et al., 2001). While involvement in the drug market is greater in men (Anderson, 2001) and is probably related to a higher drug consumption (Office of Applied Studies, 1997), in our study only women involved in drug trafficking were more likely to be offenders, though not victims.

The victim-offender overlap was very high for both men and women, as Darke et al. (Darke et al., 2010) also found. Noticeably, the overlap was higher for offenders, men and women, who also reported being victims; while the proportion of victims reporting physical offending was lower and differed by sex (higher in men). This finding is not unexpected due to the fact that "offender" referred only to physical violence, while victims could be also from sexual or psychological violence and violence reported by women victims was more frequently sexual and psychological. When only physical violence was assessed (data not

shown), there were no gender differences in the probability of a victim becoming offender and vice versa as reported in the general population (Shäffer, 2004). Another important point to note is the confounding role of alcohol risk use in its association with being a victim in the overlap models. In our study risk alcohol use was associated with both offenders and victims; however, when the victim model was adjusted with the variable 'offender', the association with alcohol disappeared. Although certain studies assessing only the relation between alcohol use and being a victim found associations between them (Giancola, 2015; Strunin et al., 2015; Testa & Hoffman, 2012), our results are consistent with other studies mentioning alcohol as the substance most frequently related to aggressive and violent behaviors (Bushman & Cooper, 1990; Crane, Godleski, Przybyla, Schlauch, & Testa, 2016; Testa & Derick, 2014).

An elevated prevalence of violence, both as victims and offenders, was found among illicit drug users, especially in those involved in crime and market activities. Alcohol risk use was also associated with violence, particularly with being an offender. In relation to this high prevalence of violence reported by illicit drug users, drug treatment facilities should assess violence signs and promote development of prevention and treatment programs to tackle violence for both genders similarly. In particular, using screening instruments could be useful to detect any type of violence among illicit drug users and it would be advisable to implement evidence based interventions addressing victimization and perpetration with a gender-sensitive approach. Future research could assess effectiveness of such strategies.

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## Declaration of interest

The authors declare they have no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## References

- Albertson, T. E., Walby, W. F. & Derlet, R. W. (1995). Stimulant-induced pulmonary toxicity. *Chest*, *108*, 1140–1149. doi:10.1378/chest.108.4.1140.
- Anderson, T. L. (2001). Drug Use and Gender. In Faupel, C. E. & Roman, P. M. (Eds.), *Encyclopedia of Criminology and Deviant Behavior, Vol. IV: Self-Destructive Behavior and Devalued Identity* (pp. 286-289). Philadelphia, PA: Taylor & Francis.
- Arribas-Ibar, E., Suelves, J. M., Sanchez-Niubò, A., Domingo-Salvany, A. & Brugal, T. M. (2017). Suicidal behaviours in male and female users of illicit drugs recruited in drug treatment facilities. *Gaceta Sanitaria*, *31*(4), 292-298. doi:10.1016/j.gaceta.2016.11.011.
- Bennett, T., Holloway, K. & Farrington, D. (2008). The statistical association between drug misuse and crime: A meta-analysis. *Aggression and Violent Behavior*, *13*, 107–118. doi:10.1016/j.avb.2008.02.001.
- Boles, S. M. & Miotto, K. (2003). Substance abuse and violence. *Aggression and Violent Behavior*, *8*, 155–174. doi:10.1016/S1359-1789(01)00057-X.
- Bradley, K. A., DeBenedetti, A. F., Volk, R. J., Williams, E. C., Frank, D. & Kivlahan, D. R. (2007). AUDIT-C as a brief screen for alcohol misuse in primary care. *Alcoholism: Clinical and Experimental Research*, *31*, 1208-1217. doi:10.1111/j.1530-0277.2007.00403.x.
- Bushman, B. J. & Cooper, H. M. (1990). Effects of alcohol on human aggression: an integrative research review. *Psychological Bulletin*, *107*, 341–354. doi: 10.1037/0033-2909.107.3.341.
- Caldentey, C., Tirado Muñoz, J., Ferrer, T., Fonseca Casals, F., Rossi, P., Mestre-Pintó, J. I. & Torrens Melich, M. (2017). Intimate partner violence among female drug users admitted to the general hospital: screening and prevalence. *Adicciones*, *29*, 172-179. doi:10.20882/adicciones.738.
- Carpentier, C. (2007). *Drugs in focus: Drugs and crime- a complex relationship towards a definition of drug-related crime*. Lisbon: European Monitoring Centre for Drugs and Drug Addiction.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Collyer, C. E., Brell, A., Moster, A. & Furey, J. (2011). Individual differences in sensitivity to violence. *Perceptual and Motor Skills*, *113*, 703–714. doi:10.2466/07.17.21.PMS.113.6.703-714.
- Crane, C. A., Godleski, S. A., Przybyla, S. M., Schlauch, R. C. & Testa, M. (2016). The Proximal Effects of Acute Alcohol Consumption on Male-to-Female Aggression: A Meta-Analytic Review of the Experimental Literature. *Trauma Violence Abuse*, *17*, 520-531. doi:10.1177/1524838015584374.
- Cunningham, R., Walton, M. A., Maio, R. F., Blow, F. C., Weber, J. E. & Mirel, L. (2003). Violence and substance use among an injured emergency department population. *Academic Emergency Medicine*, *10*, 764-775. doi:10.1197/aemj.10.7.764.
- Daday, J. K., Broidy, L. M., Crandall, C. S. & Sklar, D. P. (2005). Individual, Neighborhood, and Situational Factors Associated with Violent Victimization and Offending. *Criminal Justice Studies*, *18*, 215-235. doi:10.1080/14786010500287347.
- Darke, S., Torok, M., Kaye, S., Ross, J. & McKetin, R. (2010). Comparative rates of violent crime among regular methamphetamine and opioid users: Offending and victimization. *Addiction*, *105*, 916-91. doi:10.1111/j.1360-0443.2009.02872.x.
- Davis, W. M. (1996). Psychopharmacologic violence associated with cocaine abuse: kindling of a limbic dyscontrol syndrome?. *Neuro-Psychopharmacology and Biological Psychiatry*, *20*, 1273-1300. doi:10.1111/j.1360-0443.2009.02872.x.
- Erickson, P. G. (2001). *Drugs, violence, and public health: What does a harm reduction approach have to offer? Sensible solutions to the urban drug problem*. In Basham P. (Ed). Canada, Vanouwer: Fraser Institute Digital Publication.
- Fridell, M. & Nilson, M. (2004). *Co-morbidity-drug use and mental disorders*. Lisbon: European Monitoring Centre for Drugs and Drug Addiction.
- Giancola, P. R. (2015). Development and Evaluation of Theories of Alcohol-Related Violence: Covering a 40-Year Span. *Substance Use Misuse*, *50*, 1182-1187. doi:10.3109/10826084.2015.1010836.
- Gilchrist, G., Taylor, A., Goldberg, D., Mackie, C., Denovan, A. & Green, S. T. (2001). Behavioural and Lifestyle Study of Women Using a Drop-In Centre for Female Street Sex Workers in Glasgow, Scotland: A 10 Year Comparative Study. *Addiction Research & Theory*, *9*, 43-58. doi:10.3109/16066350109141771.
- Goldstein, P. J. (1985). The Drugs/Violence Nexus: A Tripartite Conceptual Framework. *Journal of Drug Issues*, *39*, 143–174. doi:10.1177/002204268501500406.
- Jennings, W. G., Piquero, A. R. & Reingle, J. M. (2012). On the overlap between victimization and offending: A review of the literature. *Aggression and Violent Behavior*, *17*, 16-26. doi:10.1016/j.avb.2011.09.003.
- Klee, H. & Morris, J. (1994). Crime and drug misuse: economic and psychological aspects of the criminal activities of heroin and amphetamine injectors. *Addiction Research*, *1*, 377-386. doi:10.3109/16066359409005204.
- Kuhns, J. B. (2005). The dynamic nature of the drug use/serious violence relationship: a multi-causal approach. *Violence Victim*, *20*, 433-454. doi:10.1891/vivi.2005.20.4.433.
- Lauritsen, J. L. & Rezey, M. L. (2013). *Measuring the prevalence of crime with the national crime victimization survey*. Washington, DC: U.S. Bureau of Justice Statistics.
- MacDonald, S., Anglin-Bodrug, K., Mann, R. E., Erickson, P., Hathaway, A., Chipman, M. & Rylett, M. (2003). Injury risk associated with cannabis and cocaine use. A re-

- view. *Drug and Alcohol Dependence*, 72, 99-115. doi:10.1016/S0376-8716(03)00202-3.
- MacDonald, S., Wells, S., Giesbrecht, N. & Cherpitel, C. J. (1999). Demographic and substance use factors related to violent and accidental injuries: Results from an emergency room study. *Drug and Alcohol Dependence*, 55, 53-61. doi:10.1016/S0376-8716(98)00184-7.
- Maisto, S. A., McKay, J. R. & Connors, G. J. (1990). Self-report issues in substance abuse: State of the art and future directions. *Behavioral Assessment*, 12, 117-134.
- Martin, I., Palepu, A., Wood, E., Li, K., Montaner, J. & Kerr, T. (2008). Violence among street-involved youth: The role of methamphetamine. *European Addiction Research*, 15, 32-8. doi:10.1159/000173007.
- Office of Applied Studies. (1997). *1996 National Household Survey*. Washington, DC: Substance Abuse and Mental Health Services Association.
- Parker, H. & Bottomley, T. (1996). *Crack cocaine and drugs: crime careers*. London: Home Office Publications Unit.
- Parker, H. & Newcombe, R. (1987). Heroin use and acquisitive crime in an English community. *British Journal of Sociology*, 38, 331-350. doi:10.2307/590692.
- Pierce, M., Hayhurst, K., Bird, S. M., Hickman, M., Seddon, T., Dunn, G. & Millar, T. (2015). Quantifying crime associated with drug use among a large cohort of sanctioned offenders in England and Wales. *Drug and Alcohol Dependence*, 155, 52-59. doi:10.1016/j.drugalcdep.2015.08.018.
- Posick, C. & Zimmerman, G. M. (2015). Person-in-context: insights on contextual variation in the victim-offender overlap across schools. *Journal of Interpersonal Violence*, 30, 1432-1455. doi:10.1177/0886260514540327.
- Reuter, P. (2009). Systemic violence in drug markets. *Crime, Law and Social Change*, 52, 275-284. doi:10.1007/s10611-009-9197-x.
- Richardson, L. A., Long, C., DeBeck, K., Nguyen, P., Milloy, M. J., Wood, E. & Kerr, T. H. (2015). Socioeconomic marginalisation in the structural production of vulnerability to violence among people who use illicit drugs. *Journal of Epidemiology Community Health*, 69, 686-692. doi:10.1136/jech-2014-205079.
- Ritter, A. (2006). Studying illicit drug markets: Disciplinary contributions. *International Journal of Drug Policy*, 17, 453-463. doi:10.1016/j.drugpo.2006.09.004.
- Rodriguez, N. & Griffin, M. (2005). *Gender Differences in Drug Market Activities: A Comparative Assessment of Men and Women's Participation in the Drug Market*. Washington, DC: National Institute of Justice.
- Rutter, M. (2002). The interplay of nature, nurture, and developmental influences: the challenge ahead for mental health. *Archives of General Psychiatry*, 59, 996-1000. doi:10.1001/archpsyc.59.11.996.
- Seddon, T. (2000). Explaining the drug-crime link: Theoretical, policy and research issues. *Journal of Social Policy*, 29, 95-107. doi:10.1017/S0047279400005833.
- Shäffer, J. N. (2004). *The Victim-Offender Overlap: Specifying the Role of Peer Groups* (Doctoral thesis, Pennsylvania State University). Retrieved at <https://www.ncjrs.gov/pdffiles1/nij/grants/205126.pdf>.
- Single, E., Robson, L., Rehm, J. & Xi, X. (1999). Morbidity and mortality attributable to alcohol, tobacco, and illicit drug use in Canada. *American Journal of Public Health*, 89, 385-390. doi:10.2105/AJPH.89.3.385.
- Sommers, I., Baskin, D. & Baskin-Sommers, A. (2006). Methamphetamine use among young adults: health and social consequences. *Addictive Behaviors*, 31, 1469-1476. doi:10.1016/j.addbeh.2005.10.004.
- Stevens, A., Berto, D., Frick, U., Kersch, V., McSweeney, T., Schaaf, S., ... Werdenich, W. (2007). The Victimization of Dependent Drug Users. *European Journal of Criminology*, 4, 385-408. doi:10.1177/1477370807080719.
- Strunin, L., Díaz-Martínez, L. R., Díaz-Martínez, A., Heeren, T., Winter, M., Kuranz, S., ... Solís-Torres, C. (2015). Drinking Patterns and Victimization among Male and Female Students in Mexico. *Alcohol and Alcoholism*, 50, 226-235. doi:10.1093/alcalc/agu092.
- Testa, M. & Derrick, J. L. (2014). A daily process examination of the temporal association between alcohol use and verbal and physical aggression in community couples. *Psychology of Addictive Behaviors*, 28, 127-138. doi:10.1037/a0032988.
- Testa, M. & Hoffman, J. H. (2012). Naturally Occurring Changes in Women's Drinking From High School to College and Implications for Sexual Victimization. *Journal of Studies on Alcohol and Drugs*, 73, 26-33. doi:10.15288/jsad.2012.73.26.
- Tjaden, P. & Thoennes, N. (2000). *Full Report of the Prevalence, Incidence, and consequences of violence against women*. Washington, DC: National Institute of Justice.
- Topalli, V., Wright, R. & Fornango, R. (2002). Drug dealers, robbery and retaliation: Vulnerability, Deterrence and the Contagion of Violence. *British Journal of Criminology*, 42, 337-351. doi:10.1093/bjc/42.2.337.
- Torrens, M., Gilchrist, G. & Domingo-Salvany, A. (2011). Psychiatric comorbidity in illicit drug users: Substance-induced versus independent disorders. *Drug and Alcohol Dependence*, 113, 147-156. doi:10.1016/j.drugalcdep.2010.07.013.
- United Nations Office on Drugs and Crime. (1995). *The social impact of drug abuse*. Vienna: Author.
- Wahler, E. A. (2012). *The relationship of social stress, economic hardship, and psychological distress to addiction severity among kentucky substance abuse treatment participants* (Doctoral thesis, University of Kentucky). Retrieved at [https://uknowledge.uky.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1000&context=csw\\_etds](https://uknowledge.uky.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1000&context=csw_etds).
- Werb, D., Rowell, G., Guyatt, G., Kerr, T., Montaner, J. & Wood, E. (2011). Effect of drug law enforcement on drug

market violence: A systematic review. *International Journal of Drug Policy*, 22, 87–94. doi:10.1016/j.drugpo.2011.02.002.

White, H. & Norman, D. (2000). *Dynamics of the Drug–Crime Relationship In Criminal Justice 2000. The nature of crime: continuity and change*. Washington, DC: Bureau of Justice Statistics.

World Health Organization. (2004). *Guidelines for Conducting Community Surveys on Injuries and Violence*. Geneva: Author.