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A cross-sectional study of correlates of imprisonment in opioid dependent men and women in New South Wales, Australia

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Abstract

Introduction and Aims—Involvement in the criminal justice system is common among opioid dependent people. This study aimed to determine prevalence and adolescent-onset correlates of adult imprisonment among opioid dependent men and women in New South Wales, Australia.

Design and Methods—Participants were recruited from opioid substitution therapy clinics and completed a face-to-face, structured interview. Data were collected on demographic characteristics, family history, substance dependence and psychiatric disorders. Adolescent-onset correlates of adult incarceration (including interactions with gender) were examined using logistic regression.

Results—Opioid dependent men were significantly more likely than opioid dependent women to report adult imprisonment (66% vs 40%; $P < 0.001$). In a multivariable logistic regression model, older age, male gender, having completed high school education only, having dependent children or living independently prior to age 18 years, a history of juvenile detention, and adolescent-onset opioid dependence were all significantly associated with increased odds of adult imprisonment. Adolescent-onset depression was associated with a halving of odds of adult imprisonment. The only variable for which we observed an interaction with gender was juvenile detention, which had a significantly greater impact on the odds of imprisonment for men than women.

Discussion and Conclusions—More than half of this sample of opioid dependent adults had a history of imprisonment. Variables that are associated with imprisonment in the general

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Declaration of interests

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population, such as childhood maltreatment, were not important in predicting imprisonment in this sample. Further study is required to understand the interaction between sex and juvenile detention in predicting adult imprisonment.

Keywords

prisons; opioid dependence; sex differences; juvenile detention; substance use disorders

Introduction

Not with standing variation due to differing legal and policy environments, a substantial proportion of people with opioid use disorders experiences imprisonment. In the United States, with the world's highest incarceration rate [1], it has been conservatively estimated that one-quarter to one-third of heroin dependent persons are detained in a correctional facility annually [2]. In a state-wide data linkage study in an Australian jurisdiction, approximately one in five people with a history of opioid dependence was imprisoned annually, and 37% of the cohort was imprisoned at least once over a 12-year follow-up period [3].

The health and social consequences of imprisonment can be profound. A history of imprisonment is associated with an ongoing elevated risk of stress-related illness, even accounting for socio-economic factors, health behaviours and pre-existing illness [4]. For people with opioid use disorders, imprisonment is associated with specific risks, including suicide shortly after reception to prison [5] and exposure to infectious diseases through shared use of needles and syringes to inject drugs [6, 7]. Additionally, the weeks following release from prison are well-known as high risk for overdose fatalities. During the first two weeks post-release, the risk of fatal overdose is 3–8 times greater than that during other time at liberty [8]; an estimated 1 in 200 people with a history of opioid injecting released from prison will die within four weeks of release [9]. Recent release from prison has also been associated with increased needle and syringe sharing [10], reduced likelihood of injecting cessation [11], and resumption of injecting after a period of abstinence prior to incarceration [12].

In the general population, adverse childhood experiences – including parental substance use and violence, and physical and sexual abuse – have been associated with increased risk of criminal justice involvement and imprisonment as an adult [13]. Substance use disorders, but not mental illness, have also been associated with increased risk of imprisonment [14]. Despite the known risks and poor outcomes of imprisonment for opioid dependent people, and the identification of factors that increase imprisonment risk in the general population, the correlates of imprisonment of opioid dependent people are largely unstudied. Population studies have shown that imprisonment is not inevitable for opioid dependent people [3], and understanding factors that increase risk of imprisonment may assist in understanding trajectories of offending in opioid dependence. The aim of this study was to determine prevalence of adult imprisonment in an opioid dependent sample, and associations with socio-demographic characteristics, adverse childhood experiences and adolescent-onset substance use and psychiatric disorders. Given disparities between opioid dependent men

and women in the prevalence of imprisonment [3], adverse childhood events and mental disorders [15, 16], we also aimed to determine if the correlates of imprisonment varied by gender.

Methods

Setting

This study was undertaken in New South Wales (NSW), Australia. NSW is the most populous state in Australia and has the largest opioid dependent population in the country. In 2002 (the most recent year for which population size estimates are available), the number of regular heroin users in Australia was estimated to be 4 per 1000 population aged 15–54 years, or 5.3 per 1000 population in NSW [17]. In 2014, over 48,000 Australians received methadone or buprenorphine for the treatment of opioid dependence on a given day; approximately 19,000 (~40%) of these were in NSW [18].

Participants and Procedure

Participants in this study were recruited as part of the Comorbidity and Trauma Study (CATS), a large retrospective case-control study examining genetic and environmental influences in the development of opioid dependence. Participants were recruited from 34 of the 35 public and private opioid substitution treatment (OST) clinics in the greater Sydney region, as well as via word-of-mouth. Recruitment took place between November 2005 and March 2008. Participants were eligible for the CATS study if they were over 18 years of age, had an adequate understanding of English, and were current or previously OST patients; this latter criterion served as a proxy for lifetime opioid dependence, as opioid dependence is a prerequisite for OST in this setting. Given the sensitive content of the interview and the need to provide informed consent, current suicidal ideation/intent and psychosis were exclusion criteria.

Potential participants were screened via telephone interview. Participants completed a face-to-face interview with a project research assistant. Interviewers held a minimum undergraduate degree in psychology or social science, and were trained in administering the interview and responding to participants who expressed distress or suicidality during or after the interview. Interviews were between 1.5 and 2.5 hours in duration, and participants received AU\$50 reimbursement for their time. The following ethics boards reviewed and approved the study: University of New South Wales Human Research Ethics Committee, the Washington School of Medicine Human Subjects Committee, the Queensland Institute of Molecular Research Ethics Committee, and local area health district ethics boards governing participating OST clinic sites.

Measures

Interviews collected data on demographic characteristics, substance use, mental health and family history [see 16]. Psychiatric diagnoses and substance dependence were based on the Semi-Structured Assessment of the Genetics of Alcoholism-Australia (SSAGA-Australia) [19, 20]. Although the SSAGA was originally designed to provide broad phenotyping of alcoholism in genetic studies, it is a reliable and valid tool developed for use in studies of a

range of psychiatric disorders. The modified interview used in CATS was designed to be computer-assisted, with programmed skips based on screeners, to minimise the burden of administration [19, 20]. The following substance dependencies were assessed using DSM-IV criteria: alcohol, nicotine, cannabis, cocaine, opioid, sedative and stimulant. Psychiatric diagnoses were also assessed using DSM-IV criteria, including conduct disorder, depression, post-traumatic stress disorder (PTSD) and panic disorder. In assessing the age of onset for psychiatric disorders, the SSAGA focuses on the self-reported features of the *syndrome* with a specified timeframe (e.g. the co-occurrence of three or more DSM-IV symptoms of substance dependence in the same 12-month period), and how old participants were the first time this occurred. We used age of onset data for substance dependence and psychiatric disorders to determine whether these disorders occurred prior to the age of 18 (i.e. prior to adult imprisonment).

Borderline personality disorder was assessed using a screener adapted from the International Personality Disorder Examination [21]. Questions on childhood sexual and physical abuse were taken from the Christchurch Health and Development Study interview [22]. Five items from the study interview were identified as indicating childhood neglect (physical, emotional, or supervisory neglect [23]). Childhood emotional abuse was measured with one item assessing verbal insult. A single childhood maltreatment variable was derived by summing across types of childhood maltreatment experienced (emotional abuse, physical abuse, sexual abuse, or neglect); that is, participants could experience zero to four types of childhood maltreatment.

Problematic parental (biological only) substance use was assessed using items from the Family History Assessment Module [24]. Finally, 12 items were included to examine whether participants had witnessed parental violence during childhood (father-to-mother and mother-to-father). Participants were asked whether they had ever seen one parent exhibit a range of violent behaviours towards the other, including threatening, pushing, hitting, punching or choking.

Analysis

Chi square analyses were used to compare binary outcomes for men and women. Odds ratios (OR) with 95% confidence intervals (CI) are reported. Mann-Whitney U was used to compare median age for men and women. Correlates of adult imprisonment were examined using logistic regression. In addition to age and gender, the following adolescent-onset variables were considered as correlates of imprisonment in univariate analyses: education (no post-high school), dependent children prior to age 18, living independently prior to age 18, juvenile detention, parental substance use, witnessing parental violence, childhood maltreatment (none, one type, two types, three types or four types), substance dependence prior to age 18 (alcohol dependence, nicotine dependence, opioid dependence and 'other' drug dependence, the latter of which included cannabis, cocaine, sedative and stimulant dependence), and psychiatric disorders with onset prior to age 18 (borderline personality disorder, conduct disorder, depression, PTSD and panic disorder). Variables with univariate Wald $P < 0.25$ were included in an initial multivariable model [25]. Variables in the initial multivariable model with $P > 0.05$ were removed to give the main effects multivariable

model. Interactions between each variable in the main effects model and gender were examined by separately adding interaction terms to the multivariable model. Interactions with Wald $P < 0.05$ were included in the final multivariable model.

Results

The sample comprised 1482 opioid dependent adults. The median age was 36 years (range 18–61 years) and 61% were male. Men were significantly more likely than women to report a history of both juvenile detention (27% vs 17%; $P < 0.001$) and adult imprisonment (66% vs 40%; $P < 0.001$) (Table 1). Half of the men with a history of imprisonment, and 39% of women with a history of imprisonment, reported injecting drugs while in prison.

Compared to women in this sample, men were more likely to meet criteria for conduct disorder. Women, compared to men, were more likely to report having dependent children prior to age 18 and living independently prior to age 18; exposure to parental substance use and violence; emotional abuse, sexual abuse and neglect in childhood; and early (<18 years of age) onset of opioid dependence. Women were more likely than men to screen positive for borderline personality disorder, and meet criteria for depression, PTSD, and panic disorder.

Correlates of adult imprisonment

In univariate analyses, the following variables were associated with increased risk of adult imprisonment: older age; male gender; having no more than a high school education; having dependent children or living independently prior to the age of 18; having been in juvenile detention; childhood maltreatment; alcohol, nicotine, opioid and other drug dependence with age of onset prior to 18 years; and conduct disorder with age of onset prior to 18 years (Table 2).

In the final multivariable model, all of the above variables remained significantly positively associated with imprisonment, except for childhood maltreatment, alcohol dependence, nicotine dependence, other drug dependence and conduct disorder. The odds of imprisonment for men was double that for women (adjusted OR 2.65; 95% CI 2.04, 3.45). Juvenile onset depression was associated with a halving of odds of imprisonment (adjusted OR 0.51; 95% CI 0.34, 0.77).

Tests of interactions between each variable in the multivariable model and gender identified that juvenile detention had a significantly greater impact on odds of adult imprisonment for men compared to women (juvenile detention x adult imprisonment interaction $P = 0.007$). For women, juvenile detention doubled the odds of adult imprisonment (adjusted OR 2.02; 95% CI 1.26, 3.25); among men, juvenile detention was associated with a near five-fold increase in the odds of adult imprisonment (adjusted OR 4.93; 95% CI 1.60, 15.23). No other significant interactions with gender were observed.

Discussion

This sample of opioid-dependent adults had a high prevalence of adverse childhood events and adolescent-onset substance use disorders and psychiatric disorders. Around half of the

participants reported physical abuse in childhood, compared to an estimated Australian population prevalence of 9%; one-third of men, and 70% of women, reported childhood sexual abuse, compared to 5% of men, and 12% of women, in the Australian population [26]. Similarly, two-thirds of participants reported adolescent-onset conduct disorder, compared to a population prevalence of 2.4% among Australian adolescents [27]. Opioid dependent women showed particularly severe clinical profiles, being more likely than men to have experienced adverse childhood events (including parental substance use and violence, emotional and sexual abuse, and neglect) and to meet criteria for adolescent-onset opioid dependence and psychiatric disorders (except conduct disorder).

One-quarter of the sample had a history of juvenile detention, and over half had been in prison as an adult. Imprisonment has important implications for the health and wellbeing of this population. Imprisonment may also interrupt treatment for opioid dependence, as access to opioid pharmacotherapies is often limited in correctional settings [28]. This is despite evidence of decreased injecting drug use [29, 30] and mortality [5] while in opioid substitution therapy in prison. Around half of the sample reported injecting drug use while in prison, a high-risk behaviour associated with hepatitis C infection [31]. Imprisonment has impacts on trajectories of injecting drug use post-release; recent imprisonment may prolong injecting [11] or prompt the resumption of injecting among former injectors [12]. Release from prison is also associated with elevated drug-related mortality rates [8].

After controlling for potential confounders, male gender, having no more than a high school education, having dependent children or living independently prior to the age of 18, juvenile detention and early onset (prior to the age of 18) opioid-dependence, significantly increased the odds of adult imprisonment. Some of these behaviours and outcomes may themselves be responses to or outcomes of adverse childhood experiences [13]. In general population samples, adverse childhood experiences (e.g. problematic parental substance use, parental violence and childhood maltreatment) have been associated with greater risk of imprisonment [13]. We did not observe this association in our opioid-dependent sample, perhaps because adverse childhood experiences were so common (three-quarters of the sample reported some form of childhood maltreatment).

As in the general population [14], there was no association between most of the assessed psychiatric disorders (borderline personality disorder; post-traumatic stress disorder; panic disorder) and imprisonment. Conduct disorder was positively associated with imprisonment in unadjusted analyses, but was not statistically significant in multivariable analyses. This may be attributable to the significant correlation between conduct disorder and juvenile detention (Pearson correlation coefficient 0.275, $P < 0.0001$). Adolescent-onset depression was protective against adult imprisonment. This association has also been observed in the general population [14], and further suggests a possible influence of externalising vs internalising behaviours and disorders in likelihood of imprisonment.

A history of juvenile detention was among the strongest predictors for adult incarceration. This association between juvenile detention and adult incarceration is well established across multiple offence types [32, 33]. Labelling theory posits that juvenile detention increases risk of offending and incarceration through marginalisation of already

disadvantaged young people [32]. Detention interrupts education, which subsequently interferes with employment prospects [32, 33], and facilitates the development of criminal social networks while detained [34]. Juvenile detention was the only variable predicting imprisonment for which we observed a statistically significant interaction with gender. The impact of juvenile detention on adult imprisonment was significantly stronger for men (associated with a five-fold increase in odds of imprisonment) compared to women (associated with a doubling of odds of imprisonment). The reasons for this interaction are unclear, but it may be pertinent that girls typically have far shorter stays in juvenile detention than do boys [35], which may mean less opportunity to form criminal social networks while detained.

Limitations

This was a cross-sectional, retrospective study, limiting the extent to which we can make causal inferences. We did, however, limit our predictor variables to those occurring prior to age 18, or with first onset prior to age 18, thus ruling out the possibility that imprisonment caused, for example, psychiatric illness.

Imprisonment data were based on participant self-reports. Lifetime prevalence of imprisonment was similar to that seen in other self-report surveys of people who use illicit drugs in NSW [36], although somewhat higher than that in a data linkage study of officially recorded imprisonment of opioid dependent people [3]. The likely reason for the disparity between prevalence in this study and the data linkage cohort is the restriction of the latter to imprisonment occurring after first entry to opioid substitution therapy, vs lifetime prevalence in the current study.

We were unable to take into account the impact of offending on imprisonment risk. Previous work on criminal offending by opioid dependent people in NSW has demonstrated that offending of any type is very common, with 80% of men and 68% of women charged with at least one criminal offence over a 13-year period [37]. True offending prevalence would be even higher. The ubiquity of offending in this population may limit the utility of a dichotomous offending variable (yes/no) in predicting prison risk; however, severity of offending may be an important moderating variable.

Conclusions

In contrast to the general population, adverse childhood events were not associated with imprisonment in this cohort of opioid dependent adults. Rather, limited education, living independently and having dependent children prior to age 18, adolescent onset of opioid dependence, and juvenile detention, were important in predicting adult imprisonment.

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Table 1

Demographic characteristics, imprisonment history, and juvenile-onset disorders of opioid-dependent people, by sex

	All persons (N=1482) n (%)	Men (N= 896) n (%)	Women (N= 586) n (%)	OR (95% CI) Men/ Women
Socio-demographic characteristics				
Median age in years (range)	36 (18–61)	37 (18–61)	35 (18–61)	$Z = 4.40^{***}$
Unemployed	1226 (83)	732 (82)	494 (84)	0.83 (0.63–1.10)
No post-high school education	1053 (71)	634 (71)	419 (72)	0.96 (0.77–1.21)
Dependent children ¹	103 (7)	34 (4)	69 (12)	0.30 (0.19–0.45) ^{***}
Living independently ¹	1015 (69)	589 (66)	427 (73)	0.72 (0.57–0.91) ^{**}
Custodial history				
Juvenile detention	346 (23)	244 (27)	102 (17)	1.78 (1.37–2.30) ^{***}
Adult imprisonment	823 (56)	589 (66)	234 (40)	2.89 (2.33–3.58) ^{***}
Of ever incarcerated, injected in prison or juvenile detention	406 (46)	301 (50)	105 (39)	1.58 (1.18–2.11) ^{**}
Family history				
Parental substance use	710 (48)	397 (44)	313 (53)	0.69 (0.56–0.86) ^{**}
Parental violence	995 (67)	577 (67)	418 (73)	0.74 (0.59–0.93) [*]
Childhood maltreatment				
Sexual abuse	700 (48)	301 (34)	399 (70)	0.23 (0.18–0.28) ^{***}
Physical abuse	713 (49)	422 (48)	291 (50)	0.90 (0.73–1.10)
Emotional abuse	724 (53)	391 (47)	333 (61)	0.55 (0.44–0.69) ^{***}
Neglect	422 (49)	220 (45)	202 (54)	0.69 (0.53–0.91) ^{**}
No. types of childhood maltreatment				
None	361 (24)	279 (31)	82 (14)	2.78 (2.12–3.65) ^{***}
One type	339 (23)	206 (23)	133 (23)	1.02 (0.79–1.30)
Two types	309 (21)	185 (21)	124 (21)	0.97 (0.75–1.25)
Three types	282 (19)	142 (16)	140 (24)	0.60 (0.46–0.78) ^{***}
Four types	189 (13)	83 (9)	106 (18)	0.46 (0.34–0.63) ^{***}
Substance use disorders¹				
Alcohol dependence	253 (17)	159 (18)	94 (16)	1.13 (0.85–1.49)
Nicotine dependence	335 (23)	194 (22)	141 (24)	0.87 (0.68–1.12)
Opioid dependence	283 (19)	154 (18)	129 (23)	0.73 (0.56–0.95) [*]
Other drug dependence ²	510 (34)	308 (23)	202 (35)	1.00 (0.80–1.24)
Psychiatric diagnoses/personality traits¹				
Borderline personality disorder	610 (41)	323 (36)	285 (49)	0.60 (0.48–0.74) ^{***}

	All persons (N=1482) n (%)	Men (N= 896) n (%)	Women (N= 586) n (%)	OR (95% CI) Men/ Women
Conduct disorder	689 (67)	456 (51)	233 (40)	1.57 (1.27–1.94) ***
Depression	136 (9)	58 (7)	78 (13)	0.46 (0.32–0.65) ***
Post-traumatic stress disorder	370 (25)	173 (20)	197 (34)	0.47 (0.37–0.60) ***
Panic disorder	92 (6)	36 (4)	56 (10)	0.40 (0.26–0.62) ***

 $P < 0.001$

**
 $P < 0.01$

*
 $P < 0.05$

¹ Onset prior to the age of 18.

² Includes cannabis, cocaine, sedative and stimulant dependence.

CI, confidence interval; OR, odds ratio.

Table 2

Demographic and adolescent-onset correlates of adult imprisonment in opioid dependent people

	Incarcerated (N = 823) n (%)	Never incarcerated (N = 659) n (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Demographic characteristics				
Age				
< 30	165 (20)	199 (30)	Reference	Reference
30–39	336 (41)	240 (36)	1.69 (1.30–2.20) ***	1.18 (1.33–2.48) ***
40–49	262 (32)	179 (27)	1.77 (1.33–2.34) ***	2.06 (1.47–2.87) ***
> 50	60 (7)	41 (6)	1.77 (1.13–2.76) *	1.91 (1.14–3.21) *
Male gender	589 (72)	307 (47)	2.89 (2.33–3.58) ***	2.65 (2.04–3.45) ***
No post-high school education	643 (78)	410 (62)	2.17 (1.73–2.73) ***	1.78 (1.38–2.31) ***
Dependent children ¹	71 (9)	32 (5)	1.85 (1.20–2.84) **	2.10 (1.29–3.42) **
Living independently ¹	606 (74)	409 (62)	1.70 (1.36–2.12) ***	1.50 (1.16–1.94) **
Juvenile detention	281 (34)	65 (10)	4.74 (3.53–6.36) ***	2.02 (1.26–3.25) **
<i>Gender x juvenile detention</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>2.44 (1.27–4.68) **</i>
Family history				
Parental substance use	412 (50)	298 (45)	1.21 (0.99–1.49)	–
Parental violence	568 (71)	427 (67)	1.24 (0.99–1.56)	–
Childhood maltreatment ²				
None	209 (25)	152 (23)	Reference	
One type	159 (19)	180 (27)	0.64 (0.48–0.87) **	–
Two types	179 (21)	133 (20)	0.96 (0.71–1.31)	–
Three types	167 (20)	115 (18)	1.06 (0.77–1.45)	–
Four types	111 (14)	78 (12)	1.04 (0.72–1.48)	–
Substance use disorders¹				
Alcohol dependence	160 (19)	93 (14)	1.47 (1.11–1.94) **	–
Nicotine dependence	207 (25)	125 (20)	1.40 (1.09–1.79) **	–
Opioid dependence	190 (23)	93 (15)	1.79 (1.36–2.36) ***	1.78 (1.26–2.52) **
Other drug dependence ³	312 (38)	198 (30)	1.42 (1.15–1.77) **	
Psychiatric diagnoses/personality traits				
Borderline personality disorder ¹	330 (40)	280 (43)	0.91 (0.74–1.12)	
Conduct disorder ¹	440 (54)	249 (38)	1.90 (1.54–2.34) ***	–
Depression ¹	53 (7)	83 (13)	0.48 (0.33–0.69) ***	0.51 (0.34–0.77) **
Post-traumatic stress disorder ¹	217 (27)	153 (23)	1.19 (0.93–1.51)	–

	Incarcerated (N = 823) n (%)	Never incarcerated (N = 659) n (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Panic disorder ¹	47 (6)	45 (7)	0.84 (0.55–1.28)	–
Impulsivity	333 (54)	265 (52)	1.09 (0.86–1.38)	–

 $P < 0.001$

**
 $P < 0.01$

*
 $P < 0.05$

¹ Onset prior to the age of 18 years.

² Includes frequent emotional abuse, physical abuse resulting in injury, any sexual abuse, and neglect by parents or caregivers.

³ Includes cannabis, cocaine, sedative and stimulant dependence.

CI, confidence interval; OR, odds ratio.