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# Health-related and legal interventions: A comparison of allegedly delinquent and convicted opioid addicts in Austria

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## Abstract

In Austria, judges can offer quasi-compulsory treatment options (in- and outpatient settings) as an alternative to imprisonment for drug-related delinquencies. A standard assessment of medical, psychological and legal data on the implementation of health-related and legal interventions in Austria was applied in 96 opioid-dependent individuals (10.4% female) undergoing quasi-compulsory treatment, receiving health-related measures. Additional data from the official prison registry were collected (data of 228 imprisoned individuals sentenced for drug-related crimes; 14.5% female) to gain comparable information to in- and outpatient health-related measure groups. Health-related measures were offered significantly more often to individuals charged with solely narcotics possession and/or trade, whereas imprisonment was filed significantly more often when concomitant property or violent crimes were committed in addition to drug possession/dealing ( $p < 0.001$ ). Both cohorts had high prevalences of previous convictions (health-related measure 84.4%, prison 93.9%). The majority of patients in health-related measures suffered at the time of investigation from severe depression (62.5%), anxiety disorders (58.3%) and had a high loading of suicidal ideation (45.8%). Women showed a higher prevalence of affective disorders ( $p = 0.042$ ), with higher administration rates of psychopharmacological medication ( $p = 0.045$ ), whereas male offenders scored significantly higher in violent behaviour ( $p = 0.004$ ). Inpatients showed a significantly higher burden of comorbid disorders compared to outpatients and reported a higher need for psychiatric treatment and legal counselling (all  $p < 0.001$ ). The inpatient sample had a longer duration of opioid use ( $p = 0.024$ ), a higher lifetime prevalence of intravenous drug use ( $p < 0.001$ ) and a higher rate of hepatitis C infections ( $p = 0.012$ ). Results confirm that imprisonment is sentenced to a vast extent for severe crimes, and health-related measure is well accepted among judges. However, based on patients' high loading of previous convictions and alarmingly high burden of comorbidities, quality improvement and assurance in health-related measure are required when patients have their first contact with the criminal justice system. Continuous focus on applying diversion procedures is also required to reduce societal costs.

## Keywords

costs, crime, opioid addiction, prison, quasi-compulsory treatment

## Introduction

Opioid addiction is a significant public health, policy and law problem (Nutt et al., 2010), with >4% (12-month prevalence) of the general population in the EU suffering from alcohol and drug dependence (Wittchen et al., 2011). Substance-related addiction alone is the fifth most frequent and, with €65.7 billion/year, also the fifth most expensive psychiatric disorder in the EU (following mood disorders, dementia, psychotic and anxiety disorders). Yearly costs of

addiction in the EU are composed of €27.7 billion direct health care, €13.6 billion direct non-medical (expenses associated with the delivery of health care

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and health services, e.g. transportation) and €24.4 billion indirect costs of all resources used or lost due to illness (e.g. absenteeism from work), irrespective of paying source (Olesen et al., 2012).

Drug users are significantly over-represented in prison, with up to 50% of all prisoners (not only individuals being sentenced to imprisonment for drug-related delinquencies) meeting diagnostic criteria for drug abuse or dependence in the United States (Zarkin et al., 2012) as well as in Europe (Hedrich et al., 2012). Notably, the gender distribution of abusing drugs in prison is almost equal with 10%–48% of males and 30%–60% of female prisoners abusing drugs (Fazel et al., 2006). Furthermore, a continued increase of prison sentences related to opioid crimes is observed over the last decades in Europe (Soyka et al., 2012). Thus, high societal costs are not only caused by the severity of addictive disorders but also by their close relation to criminal behaviour (Ruiz et al., 2012; Soyka, 2000). Clark et al. (1999) showed that mean legal costs per person associated with an arrest are almost six times higher than mean costs associated with a non-arrest encounter. Zarkin et al. (2012) estimated for the US prison cohort 2004 (1.14 million subjects) lifetime legal system costs (arrest, court, incarceration) of US\$226,008 per person compared to US\$2,694 total lifetime treatment costs. Metz et al. (2012b) reported costs for treatment of opioid addiction with €3,800 per patient/year, but costs of €34,500 per subject/year in prison (without legal system costs, e.g. for judges, lawyers or police; based on calculations by Moore et al., 2007).

In Austria, under specific circumstances, health-related measures (HRM) can be offered as an alternative for imprisonment for drug-related delinquencies. Similarly, most of the EMCDDA member states (EU 28, Turkey and Norway) offer treatment as an alternative to prosecution or imprisonment, with quasi-compulsory or compulsory modalities at different stages in the criminal procedure (EMCDDA, 2013; Israelsson and Gerdner, 2012). Purpose and principles of the Austrian drug policy can be found in the corresponding law (Suchtmittelgesetz; SMG; Engl: Narcotic substances act), which enables judges to offer quasi-compulsory treatment (QCT) instead of imprisonment depending on the severity of the case. The implementations of QCT are HRMs, with an average duration of 2 years (in combination) with a conditional deferral of sentence, often ordered after a recommendation by court-appointed experts. The legal implementation of QCT in Austria can be described as ‘treatment instead of punishment’, conducted in specialized institutions defined as medical, psychological, psychotherapeutical and/or psychosocial treatment in in- and outpatient settings, reported to the juridical system, outside of prison, and ordered by law authorities (Schaub et al.,

2011). In 2011, 12.2% of all convictions ( $n = 4444$ ) were according to the SMG; in 70.6%, exclusively for drug possession (10.2% of the convicted were female); and in 11,667 cases, QCT was applied. Thus, for drug-related crimes, diversions (i.e. QCT) were used 2.8 times more often than convictions (Weigl et al., 2012).

In Austria, the number of individuals with poly-drug use including opioids is estimated between 30,000 and 34,000, with 17,000 subjects (approximately half of all subjects with ‘problematic opioid consumption’) in opioid maintenance therapy (OMT; United Nations Office on Drugs and Crime, 2011). OMT is the state-of-the-art therapy for opioid addiction (Baewert et al., 2012) with unsatisfying coverage in prison within the EU (Hedrich et al., 2012). OMT has been available in Austria since 1989 with methadone and consecutively expanded to buprenorphine and slow-release oral morphine, with full coverage in prisons (regulated by § 23 c Suchtgiftverordnung; SGV; Engl: Narcotic drugs decree). A structured assessment in Austria’s largest prison (up to 1057 prisoners) by Metz et al. (2010) pointed out that the number of prisoners in OMT (without specific methodology or homogeneity) increased from 1996 to 2007 by 444%. Over the years, increased coverage of OMT in prison has been available within the EU. However, the OMT coverage in prison matches the average coverage of OMT in the EU only in eight of the EMCDDA member states (Hedrich and Farrell, 2012).

It is important to note that there is a high rate of psychiatric comorbidity among substance abusers (15%–80%, depending on gender, drug in use and methodology of assessment; Flynn and Brown, 2008). Psychiatric comorbidities are related to increased direct and indirect costs, e.g. due to higher prevalence of infectious diseases through intravenous injection (Torrens et al., 2012) as well as higher indirect costs through unemployment and criminal behaviour (Hawkins, 2009) and thus have to be considered in the evaluation of HRMs and other (treatment) settings.

The aim of the present study was to gather structured medical, psychological and legal data on the implementation of the SMG in Austria regarding health-related and legal interventions, with a focus on QCT in opioid-dependent individuals in comparison to prisoners in OMT who were sentenced according to the SMG.

## Methods

This quantitative investigation was conducted in Vienna, Austria as a non-randomized cross-sectional study of opioid-addicted adults receiving HRMs, including a data analysis of individuals in prison, who receive OMT and were imprisoned for drug-related offenses.

In 2011, 96 opioid-dependent men and women between 18 and 49 years, sanctioned with HRMs, were randomly selected in various specialized out- and inpatient institutions with permission to offer QCT in accordance with § 15 SMG. After giving informed consent, a structured battery of face-to-face interviews (European Addiction Severity Index; Addiction Severity Index-Crime Module; Addiction Severity Index-Supplement) was administered by a clinical research psychologist (Koechl, 2012; Kokkevi and Hartgers, 1995; Oeberg et al., 1998). Participants received €25 vouchers for expenditure of time (on average 1.5 h).

In-prison data were collected through the integrated administration of the penal system (Austrian Federal Computing Centre, 2011). Prison data ( $n=228$ ) consisted of epidemiological point prevalences (reporting date April 1, 2011) of subjects in OMT, imprisoned due to offenses against the SMG and were comparable to the HRM sample. Both populations were independent from each other.

### Data analysis

Statistical analysis was conducted using SPSS 20.0 for Mac OS X. Categorical data were analysed using Pearson's  $\chi^2$  tests. When the expected count of at least one cell was lower than 5, Fisher's exact test was used instead. For gender comparisons, the odds ratio was reported. In case of significance of nominal polytomous variables, the variable was dichotomized, and tests on the resulting  $2 \times 2$  tables were performed. Student's *t*-test for independent samples was used to detect differences in mean values. The homogeneity of variances was tested with Levene's test, and, if significant, Welch's test for independent samples was used instead. Repeated measurement analyses of variance (RM-ANOVA) were used to compare external with self-assessment scales. If the assumption of sphericity was violated, the Greenhouse-Geisser RM-ANOVA was used instead. The external rating scale was linearly transformed to match the self-assessment scales. Post-hoc tests were Bonferroni-corrected. For all tests, an  $\alpha$ -level of  $p < 0.05$  was considered significant.

### Ethics

The institutional review board (IRB) of the Medical University of Vienna approved the study (083/2009) for Gabriele Fischer.

### Results

The analysis of legal data showed that HRMs were offered significantly more often to addicted individuals

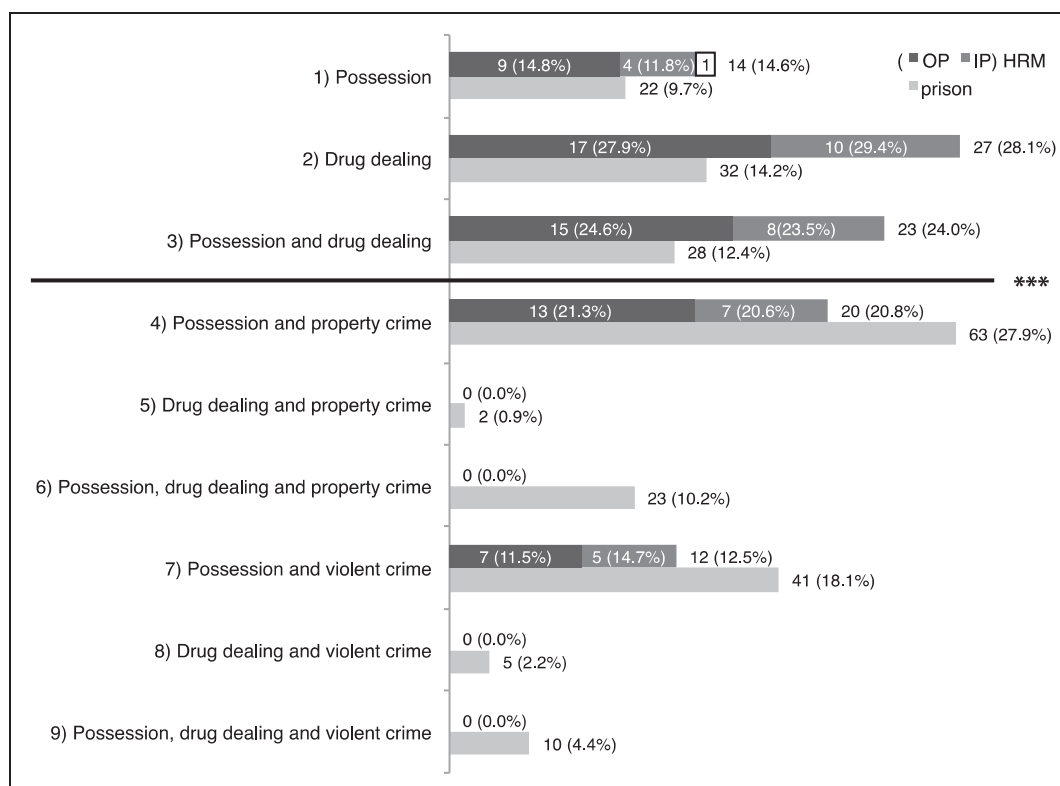
charged with narcotics possession and/or trade ( $p < 0.001$ ), while imprisonment was ordered more frequently when concomitant property or violent crimes were committed (Figure 1).

Sociodemographic information of all groups is displayed in Table 1. Individuals in prison were slightly older, higher educated, less often indebted and less often employed (prior to imprisonment) compared to those in HRM. The duration of the so far served sentence of the prison group was  $630.2 \pm 832.4$  days ranging from 0 to 4746 days. The reported debt of the HRM group was  $\text{€}23,002.17 \pm \text{€}30,956.83$  with a range between  $\text{€}200.00$  and  $\text{€}200,000.00$  (no structured data on debts for the prison population). The majority of both groups had been previously convicted, with significantly higher counts for individuals in prison (HRM: 84.4% vs. prison: 93.9%).

Subjects in HRM showed a high psychiatric burden (91.7% had at least one comorbid disorder) as well as high rates of attempted suicides (24%) and thoughts about suicide (over 45%) at the time of the investigation. Women were significantly higher in anxiety scores and receiving prescriptions for psychopharmacological medication in addition to OMT and scored significantly lower in violent behaviour compared to men (Table 2).

The inpatient HRM population showed significantly higher severity of drug problems, with a longer duration of opioid use (6.8 vs. 4.8 years,  $p=0.024$ ), a higher coverage of OMT (lifetime; 97% vs. 57%,  $p < 0.001$ ), a higher lifetime prevalence of intravenous drug use (76% vs. 40%,  $p < 0.001$ ) and a higher rate of hepatitis C infections (52% vs. 25%,  $p=0.012$ ) compared to the outpatient population (Table 3).

The comparison of subjective self-assessments of burden (SAB) and need for treatment (SANT) with the external severity ratings (ESR) showed that patients underestimated the severity of their drug, psychiatric and social problems in almost all dimensions (Table 3). The external rating was significantly higher than the self-assessments for alcohol ( $F_{2,190} = 7.509$ ,  $p < 0.001$ , ESR vs. SAB:  $p=0.008$ , ESR vs. SANT:  $p=0.002$ ), family/social statuses ( $F_{1,87,177.44} = 16.347$ ,  $p < 0.001$ , ESR vs. SAB:  $p < 0.001$ , ESR vs. SANT:  $p < 0.001$ ) and legal problems ( $F_{2,190} = 3.791$ ,  $p=0.024$ , ESR vs. SAB:  $p=0.041$ , ESR vs. SANT:  $p=1$ ), but significantly lower in the medical scales ( $F_{2,190} = 9.454$ ,  $p < 0.001$ , ESR vs. SAB:  $p < 0.001$ , ESR vs. SANT:  $p < 0.001$ ). The external severity rating for drugs status was in between the self-assessment ratings ( $F_{1,77,166.43} = 54.157$ ,  $p < 0.001$ ), with lower ratings for burden ( $p < 0.001$ ) and higher ratings for treatment need ( $p < 0.001$ ) compared to external rating. Furthermore, there were no significant differences between the rating modalities in the psychological ( $F_{2,190} = 0.382$ ,  $p=0.683$ ) and work ( $F_{2,190} = 0.035$ ,  $p=0.965$ ) dimensions.



**Figure 1.** Criminal offenses committed by individuals receiving health-related measures (HRM) or in prison ( $\chi^2(8) = 33.873$ ,  $p < 0.001$ ). Dichotomization: people in HRM were significantly more often convicted for offenses 1–3 ( $n = 64$ , 66.7%) than those in prison ( $n = 82$ , 36.0%,  $\chi^2(1) = 25.722$ ,  $p < 0.001$ , OR = 3.6). There was no significant difference in the legal categories between the treatment modalities, outpatient (OP) and inpatient (IP) treatment ( $p = 0.959$ ). Missing categorization data (IP, OP) are marked by the white box with black boundaries. \*\*\* $p < 0.001$ . HRM: health-related measures; IP: inpatient; OP: outpatient; OR: odds ratio.

## Discussion

This scientific investigation confirms that imprisonment was sentenced in large part for more severe offences, and HRM options are taken into consideration in the juridical system to a vast extent. The judges' decisions to apply QCT rely on the primacy of narcotics crimes, and the specific treatment modality offered depends on the burden and treatment needs of the patient. Intravenous drug users, a large (about half of the polydrug users including opioids; Weigl et al., 2012) and rather unstable population with high counts of somatic (e.g. Hepatitis C, HIV) and psychiatric comorbidities (Mackesy-Amiti et al., 2012), were more likely to be offered inpatient HRM (Roy et al., 2011). The high rate of previous convictions in both the prison as well as the HRM group highlights the need of an early, standardized, multi-professional and holistic diagnostic process by trained professionals to initiate as early as possible an adequate treatment, preferably at or before the time of first conviction (Metz et al., 2012a). Furthermore, it

might be necessary to increase the quality and precision of recommendations for HRM by court-appointed experts to achieve a more accurate assignment of patients to different HRM options.

Besides the high rate of previous convictions, patients showed an alarmingly high severity of psychiatric symptoms. The comorbidity rates in the HRM groups exceed prevalence figures of the general population by far, taking similar sex differences into account (Wittchen et al., 2011). Comorbidity of substance use disorder with anxiety and affective disorders is in concordance with previous studies (Grant et al., 2004; Kelly et al., 2012). Especially the high rates of suicidal ideation in patients already undergoing treatment hint at an insufficient treatment quality. Increased attention to the whole spectrum of psychiatric disorders and increased quality control in HRM are needed, since poor prognoses are expected if the treatment fails to address both (Flynn and Brown, 2008; Kelly et al., 2012), as efficient treatment of psychiatric comorbidities ensures a higher retention in treatment (Drake et al., 2004).



**Table 1.** Characteristics

	HRM-OP	HRM-IP	Sig.	HRM total	Prison	Sig.
N	61	34		96	228	
Sex			0.683			0.326
Female	7 (11.5%)	3 (8.8%)		10 (10.4%)	33 (14.5%)	
Male	54 (88.5%)	31 (91.2%)		86 (89.6%)	195 (85.5%)	
Age			0.226			0.004**
Mean (SD)	29.74 (7.01)	27.94 (6.65)		29.20 (6.94)	31.86 (9.06)	
Range	20 to 49	18 to 46		18 to 49	19 to 70	
Nationality			0.542			0.356
Austrian	51 (83.6%)	30 (88.2%)		82 (85.4%)	185 (81.1%)	
Non-Austrian	10 (16.4%)	4 (11.8%)		14 (14.6%)	43 (18.9%)	
Civil status			0.590			0.865
Unmarried	47 (78.3%)	27 (79.4%)		74 (77.9%)	173 (76.2%)	
Married	7 (11.7%)	2 (5.9%)		9 (9.5%)	24 (10.6%)	
Divorced	6 (10.0%)	5 (14.7%)		12 (12.6%)	27 (11.9%)	
Widowed	0 (0.0%)	0 (0.0%)		0 (0.0%)	3 (1.3%)	
Highest education			0.012*			<0.001***
None	3 (4.9%)	7 (20.6%)		10 (10.4%)	13 (9.3%)	
Secondary school	43 (70.5%)	16 (47.1%)		59 (61.5%)	50 (35.7%)	***
Trade school	15 (24.6%)	9 (26.5%)		24 (25.0%)	71 (50.7%)	
High school diploma	0 (0.0%)	2 (5.9 %)		3 (3.1%)	6 (4.3%)	
Income source <sup>a</sup>			<0.001***			<0.001***
Non/private support	4 (6.6%)	3 (9.1%)		7 (7.4%)	37 (21.4%)	
Pension	1 (1.6%)	3 (9.1%)		4 (4.3%)	15 (8.7%)	
Welfare	11 (18.0%)	7 (21.2%)		18 (19.1%)	26 (15.0%)	
Unemployment	17 (27.9%)	20 (60.6%)	*	37 (39.4%)	78 (45.1%)	
Employment	28 (45.9%)	0 (0.0%)	***	28 (29.8%)	17 (9.8%)	***
Indebted	44 (72.1%)	28 (82.4%)	0.265	73 (76.0%)	78 (35.8%)	<0.001***
Previously convicted ever	54 (88.5%)	27 (79.4%)	0.451	81 (84.4%)	214 (93.9%)	<0.001***

<sup>a</sup>Prison group: income before imprisonment; HRM group: current income. HRM: health-related measure; IP: inpatient; OP: outpatient; SD: standard deviation. \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001, big stars (\*) denote significant (sig.) results between the whole groups, small stars (\*) sig. post hoc results.

**Table 2.** Lifetime prevalences of psychiatric comorbidities in HRM groups

	Male	Female	Total	p	OR
Serious depression	51 (59.3%)	9 (90.0%)	60 (62.5%)	0.084	0.16
Serious anxiety or tension	47 (54.7%)	9 (90.0%)	56 (58.3%)	<b>0.042*</b>	0.13
Problems understanding, concentrating or remembering	31 (36.1%)	6 (60.0%)	37 (38.5%)	0.177	0.38
Serious thoughts of suicide	38 (44.2%)	6 (60.0%)	44 (45.8%)	0.505	0.53
Attempted suicide	20 (23.3%)	3 (30.0%)	23 (24.0%)	0.699	0.71
Hallucinations	12 (14.0%)	1 (10.0%)	13 (13.5%)	1.000	1.46
Problems controlling violent behaviour	41 (47.7%)	0 (0.0%)	41 (42.7%)	<b>0.004**</b>	—
Prescribed medication for any psychological/emotional problem	40 (46.5%)	8 (80.0%)	48 (50.0%)	<b>0.045*</b>	0.22

HRM: health-related measure, OR: odds ratio, \*p < 0.05, \*\*p < 0.01 of Fischer's exact test between gender and lifetime prevalence.

**Table 3.** Differences between the HRM-population in out- and inpatient treatment

		OP	IP	Total	t(df)	p
<i>Self and external assessments</i>						
Medical	SANT	0.85 (1.49)	1.50 (1.89)	1.11 (1.69)	−1.718 (56.08)	0.091
	SAB	0.90 (1.39)	0.94 (1.43)	0.95 (1.42)	−0.132 (93.00)	0.896
	ESR	0.33 (0.62)	1.51 (1.45)	0.62 (1.06)	−3.148 (39.77)	<b>0.003**</b>
Work	SANT	0.70 (1.35)	1.06 (1.46)	0.82 (1.38)	−1.193 (93.00)	0.236
	SAB	0.87 (1.34)	0.82 (1.27)	0.84 (1.30)	0.162 (93.00)	0.872
	ESR	0.68 (0.80)	1.04 (1.73)	0.81 (0.96)	−1.802 (50.50)	0.077
Alcohol	SANT	0.30 (0.84)	0.00 (0.00)	0.19 (0.69)	2.732 (60.00)	<b>0.008**</b>
	SAB	0.23 (0.78)	0.18 (0.76)	0.21 (0.77)	0.320 (93.00)	0.750
	ESR	0.60 (0.82)	0.33 (0.86)	0.50 (0.84)	1.559 (93.00)	0.122
Drugs	SANT	2.97 (1.39)	3.85 (0.44)	3.28 (1.22)	−4.546 (79.31)	<b>&lt;0.001***</b>
	SAB	1.26 (1.49)	2.76 (1.33)	1.78 (1.61)	−4.887 (93.00)	<b>&lt;0.001***</b>
	ESR	2.10 (0.94)	3.33 (0.74)	2.50 (1.08)	−7.094 (82.47)	<b>&lt;0.001***</b>
Legal	SANT	0.93 (1.55)	2.59 (1.56)	1.54 (1.74)	−4.979 (93.00)	<b>&lt;0.001***</b>
	SAB	0.62 (1.17)	2.44 (1.46)	1.27 (1.54)	−6.228 (56.89)	<b>&lt;0.001***</b>
	ESR	0.94 (0.89)	2.50 (1.09)	1.52 (1.23)	−7.119 (57.72)	<b>&lt;0.001***</b>
Social	SANT	0.62 (1.23)	0.74 (1.31)	0.57 (0.91)	−0.418 (93.00)	0.677
	SAB	0.85 (1.42)	0.74 (1.40)	0.70 (1.03)	0.387 (93.00)	0.700
	ESR	1.21 (0.94)	1.53 (1.13)	1.32 (1.01)	−1.480 (93.00)	0.142
Psychological	SANT	1.43 (1.69)	1.88 (1.61)	1.57 (1.67)	−1.283 (93.00)	0.677
	SAB	1.57 (1.55)	1.62 (1.39)	1.57 (1.49)	−0.137 (93.00)	0.892
	ESR	1.54 (1.03)	1.97 (1.09)	1.68 (1.07)	−1.942 (93.00)	0.055
<i>Other parameters</i>						
Dur. opioid use (years)		4.82 (4.21)	6.79(3.65)	5.58 (4.12)	−2.297 (93)	<b>0.024*</b>
						$\chi^2$ (df)
IV consumption ever		24 (40.0%)	26 (76.4%)	51 (52.7%)	11.594(1)	<b>&lt;0.001***</b>
Chronic med. prob.		18 (29.5%)	13 (38.1%)	32 (33.3%)	0.756(1)	0.384
OMT (ever)		35 (57.4%)	33 (97.1%)	68 (70.8%)	16.898(1)	<b>&lt;0.001***</b>
Hepatitis C		15 (25.0%)	15 (51.7%)	31 (32.3%)	6.248(1)	<b>0.012*</b>
HIV		0 (0.0%)	2 (5.8%)	2 (2.1%)	—	—
Thoughts of suicides <sup>a</sup>		30 (48.4%)	14 (41.2%)	44 (45.8%)	0.460(1)	0.498
Suicide attempts <sup>a</sup>		15 (24.2%)	8 (23.5%)	23 (24.0%)	0.005(1)	0.942

<sup>a</sup>Lifetime prevalences: ESR: external severity rating by a clinical psychologist; IP: inpatient; OP: outpatient; SAB: self-assessment of burden; SANT: self-assessment of need for treatment/counseling; SANT, SAB and ESR scales are from 0 to 4; the higher the value the higher SANT, SAB and ESR; df: degrees of freedom; dur.: duration; IV: intravenous; med. prob.: medical problems; OMT: opioid maintenance treatment; prev.: previously; \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001.

The severe burden in the HRM population in most other important areas of life (psychological, medical, social, financial and work issues), besides their drug and legal problems, highlights the need not only for psychiatric care but also for specific counselling (e.g. for debts; Maremmanni et al., 2012). The discrepancy between self-assessments and professional external severity ratings might be at least partly caused by patients' low self-esteem, low education and stigmatization from

society (Bruckmüller et al., 2011; Otiashvili et al., 2013). Legal and medical professionals have to be trained in addiction knowledge to understand that this target group, to a broad extent, lacks insight into their disease or tend to disregard its severity (Bruckmüller et al., 2011). More specialized and interdisciplinary trainings for all parties involved are needed to ensure a high standard of care and translational communication. An improved treatment system could not only increase

patients' quality of life but also substantially lower societal costs and ensure a better return of investment.

Within the EU, a broad range of different interventions is applied. Many European countries offer different compulsory and quasi-compulsory treatment options depending on type of offense and offender. Some countries (e.g. Croatia) specify that the treatment is obligatory in case of first offense, and others (e.g. Bulgaria) only order compulsory treatment (EMCDDA, 2013).

Imprisonment might be an option if the criminal energy outweighs the burden of the disorder (Hofinger, 2010). However, the availability of drugs in prison should not be underestimated, with 2%–56% of all imprisoned illicit drug-dependent individuals continuing to use and inject and one third starting to use an additional drug (mainly heroin) in prison (Carpentier et al., 2012; EMCDDA, 2012). Furthermore, 33% of drug-dependent prisoners relapse in the first 2 months post release (Pelissier et al., 2007). An approach in using an ankle monitor showed promising results in obtaining abstinence in alcohol-dependent driving under the influence offenders (Caulkins and DuPont, 2010) and might be considered in combination with QCT as an alternative to imprisonment.

In comparison to prison costs of €100 on average per day and person (without legal system costs, e.g. for judges, lawyers or police; Metz et al., 2012b; Zarkin et al., 2012), opioid medication costs are low (€10, on average per day and person; Metz et al., 2012b). With Austria as an example for a European country with high-treatment coverage and diversification of OMT, also available in prison, the focus should be on closing the treatment gap between community settings and prison within the EU (Hedrich and Farrell, 2012; Metz et al., 2010). This is in line with the EU Drugs Strategy 2013–2020, stating as one of its key priorities to 'scale up the development, availability and coverage of drug demand reduction measures in prison settings, as appropriate and based on a proper assessment of the health situation and the needs of prisoners' (Council of the European Union, 2012) and could also contribute to a decrease in HIV prevalence, which is several times higher in prison compared to surrounding communities (Jürgens et al., 2011). Due to the early introduction of treatment options (Methadone since 1989) and harm reduction units (e.g. needle exchange), there is a low prevalence of HIV in the Austrian intravenous drug using population, which declined from 20% in the nineties to 4% in 2011 ( $n = 36$  new infections in 2011; Weigl et al., 2012).

Portugal decriminalized (not legalized) all drugs in 2001, with violations of prohibitions (drug possession for personal use and drug consumption) being exclusively administrative violations and removed

completely from the criminal law. Drug trafficking however continues to be prosecuted as a criminal offense. About 7592 charges for drug consumption in 2000 compared to 6026 referrals to CDTs (Comissões para a Dissuasão da Toxicodependência; multiprofessional teams consisting of social workers, legal advisors and medical professionals, recommending treatment options or educational programs instead of sanctions to dependent drug users) in the year after decriminalization (Hughes and Stevens, 2007). This resulted in decreased drug-related pathologies (infectious diseases; e.g. 17% reduction in new, drug-related HIV cases; Tavares et al., 2005) and fewer deaths due to drug use (318 in 2000 vs. 216 in 2006; Institute on Drugs and Drug Addiction of Portugal, 2006), which might be related to the commitment of increased treatment programs (e.g. 147% increase of patients in OMT from 1999 to 2003; Hughes and Stevens, 2007). These policies can be seen as a good example of perceiving addiction mainly as a health and not a legal problem (Greenwald, 2009).

Finally, a recent study with the aim of systematically assessing long-term estimates of international illegal drug supply concluded that illegal drug prices for cannabis, cocaine and opioids decreased in the past two decades, while purity increased. Attempts to control the international illegal drug market through law-enforcement-based supply reduction efforts are failing (Werb et al., 2013). Thus, it might be necessary to re-examine the effectiveness of current drug strategies.

## Limitations

The Austrian Federal Ministry of Justice did not agree to conducting structured personal interviews in jail, despite a positive IRB decision. Therefore, it was not possible to control results for substance-use disorder severity and psychiatric burden.

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## Conflicts of interest

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

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