

Editors' Choice

The effectiveness of compulsory drug treatment: A systematic review



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ABSTRACT

Background: Despite widespread implementation of compulsory treatment modalities for drug dependence, there has been no systematic evaluation of the scientific evidence on the effectiveness of compulsory drug treatment.

Methods: We conducted a systematic review of studies assessing the outcomes of compulsory treatment. We conducted a search in duplicate of all relevant peer-reviewed scientific literature evaluating compulsory treatment modalities. The following academic databases were searched: PubMed, PAIS International, Proquest, PsycINFO, Web of Science, Soc Abstracts, JSTOR, EBSCO/Academic Search Complete, REDALYC, SciELO Brazil. We also searched the Internet, and article reference lists, from database inception to July 15th, 2015. Eligibility criteria are as follows: peer-reviewed scientific studies presenting original data. Primary outcome of interest was post-treatment drug use. Secondary outcome of interest was post-treatment criminal recidivism.

Results: Of an initial 430 potential studies identified, nine quantitative studies met the inclusion criteria. Studies evaluated compulsory treatment options including drug detention facilities, short (i.e., 21-day) and long-term (i.e., 6 months) inpatient treatment, community-based treatment, group-based outpatient treatment, and prison-based treatment. Three studies (33%) reported no significant impacts of compulsory treatment compared with control interventions. Two studies (22%) found equivocal results but did not compare against a control condition. Two studies (22%) observed negative impacts of compulsory treatment on criminal recidivism. Two studies (22%) observed positive impacts of compulsory inpatient treatment on criminal recidivism and drug use.

Conclusion: There is limited scientific literature evaluating compulsory drug treatment. Evidence does not, on the whole, suggest improved outcomes related to compulsory treatment approaches, with some studies suggesting potential harms. Given the potential for human rights abuses within compulsory treatment settings, non-compulsory treatment modalities should be prioritized by policymakers seeking to reduce drug-related harms.

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Background

Globally, dependence to illicit and off-label drugs remains a key source of morbidity and mortality, and is implicated in criminal recidivism. For instance, 1.7 million of the world's estimated 13 million people who inject drugs (PWID) are believed to be

HIV-positive while more than 60% of PWID globally are estimated to be hepatitis C (HCV) positive (UNODC, 2015). Illicit drug dependence is also estimated to have contribute to 20.0 million disability-adjusted life years in 2010 (Degenhardt, Whiteford, & Ferrari, 2013) while, the United Nations Office on Drugs and Crime (UNODC) estimated that there were as many as 231,400 drug-related deaths in 2013, the majority of which were the result of drug overdoses (UNODC, 2015). Additionally, a UNODC review found that between 56% and 90% of PWID reported imprisonment since initiating injection drug use (Jurgens, 2007).

An increasing range of evidence-based treatment modalities have been found to be effective in improving outcomes from

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substance use disorder and attendant harms. For example, among individuals addicted to opioids, opioid substitution therapies (OST) including methadone and buprenorphine maintenance have been shown to reduce negative drug-related outcomes and to stabilize individuals suffering from opioid dependence (Amato, Davoli, Ferri, & Ali, 2002; Gowing, Ali, & White, 2004; Mattick, Breen, Kimber, & Davoli, 2009). In a recent review, use of Suboxone (a combination of buprenorphine and naloxone) was demonstrated to be effective for opioid withdrawal (As, Young, & Vieira, 2014; Ferri, Davoli, & Perucci, 2011; Krupitsky et al., 2011; Wolfe et al., 2011). Evidence of effectiveness for pharmacotherapies for stimulant use disorder remains mixed (Castells et al., 2010; Fischer, Blanken, & Da Silveira, 2015). However, a large set of psychosocial tools have shown promise for a range of substance use disorders (Dutra et al., 2008; Grabowski, Rhoades, & Schmitz, 2001; Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012; Mooney et al., 2009; Prendergast, Podus, Finney, Greenwell, & Roll, 2006; Shearer, Wodak, Van Beek, Mattick, & Lewis, 2003).

In many settings, compulsory treatment modalities have been in place or are being implemented. For instance, a recent international review found that as of 2009, 69% of a sample of countries ($n = 104$) had criminal laws allowing for compulsory drug treatment (Israelsson & Gerdner, 2011). Compulsory drug treatment can be defined as the mandatory enrolment of individuals, who are often but not necessarily drug-dependent, in a drug treatment program (Wild, 1999). While most often consisting of forced inpatient treatment (i.e., individuals are placed under the care and supervision of treatment institutions), compulsory treatment can nevertheless be designed as outpatient treatment as well, either using an individualized treatment or group-based model that can include psychological assessment, medical consultation, and behavioral therapy to reduce substance use disorder (Hiller, Knight, Broome, & Simpson, 1996). Compulsory drug treatment (particularly in inpatient settings) is often abstinence-based, and it is generally nested within a broader criminal justice-oriented response to drug-related harms (WHO, 2009). Compulsory treatment is distinct from coerced treatment, wherein individuals are provided with a choice, however narrow, to avoid treatment (Bright & Martire, 2012). Perhaps the most widely known example of coerced treatment is the drug treatment court model, which provides individuals charged with a drug-related crime with therapeutic measures in addition to criminal justice interventions under the auspices of the criminal justice system (Werb et al., 2007). While no systematic evaluation of the effectiveness of compulsory treatment approaches has been undertaken, observers have cited concerns regarding human rights violations within compulsory drug treatment centers (Hall, Babor, & Edwards, 2012; Jurgens & Csete, 2012). Further, while overviews as well as reviews on related topics (i.e., quasi-compulsory treatment) exist (Stevens, Berto, & Heckmann, 2005; Wild, Roberts, & Cooper, 2002), no recent systematic assessments of the efficacy or effectiveness of compulsory or forced addiction treatment have been undertaken. This represents a critical gap in the literature given the implementation and scale up of compulsory treatment in a range of settings, including Southeast Asia, Latin America, and Australia.

Observers have also noted that while the overall number of countries that employ compulsory drug treatment approaches is declining, the mean duration of care is increasing, as is the number of cases of individuals sentenced to compulsory drug treatment (Israelsson & Gerdner, 2011). Relatedly, observers have expressed concern with evidence that compulsory treatment centers incorporate therapeutic approaches generally unsupported by scientific evidence, and employ punishment for individuals who relapse into drug use (Amon, Pearshouse, Cohen, & Schleifer, 2013; Hall & Carter, 2013; Pearshouse, 2009a). Given the need for

scientific evidence to inform effective approaches to drug treatment, we therefore undertook a systematic review of the effectiveness of compulsory drug treatment.

Methods

We employed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for the development of systematic reviews (Moher, Liberati, Tetzlaff, & Altman, 2009). A full review protocol is available by request to the corresponding author.

Eligibility criteria

Studies were eligible if they were peer-reviewed, and if they evaluated the impact of compulsory drug treatment on illicit drug-related outcomes. The primary outcome of interest was defined as the frequency of post-treatment drug use. The secondary outcome of interest was defined as any post-treatment drug-related criminal recidivism (i.e., post-treatment arrest or incarceration). Randomized control trials (RCTs) and observational studies were both eligible for inclusion. To be eligible, treatment interventions reported had to be compulsory; however, the type of intervention (e.g., inpatient abstinence-based therapy, outpatient group therapy, OST, etc.) could vary. Reviews as well as multi-component studies that did not disaggregate findings between components were not eligible if they did not provide specific data regarding the impact of compulsory treatment. Studies that assessed mandated treatment for legal or licit substances (i.e., alcohol, tobacco) were also not eligible. Further, studies that only evaluated outcomes such as attitudinal or psychosocial change, or psychological functioning related to substance use were excluded. Finally, studies that evaluated coerced or quasi-compulsory treatment (i.e., wherein individuals are provided with a choice between treatment and a punitive outcome such as incarceration such as a drug treatment court model) were excluded.

Information sources

We searched the following 10 electronic databases: Pubmed, EBSCOhost/Academic Search Complete, Cochrane Central, PAIS International/Proquest, JSTOR, PsycINFO, Soc Abstracts, Web of Science, REDALYC (Spanish language) and Scielo Brazil (Portuguese language). We also searched the internet (Google, Google Scholar), relevant academic conference abstract lists, and scanned the references of potentially eligible studies.

Search

We searched all English-, Spanish- and Portuguese-language studies and abstracts and set no date limits. The following search terms were used: “forced treatment,” “compulsory treatment,” “substance abuse,” “substance use,” “mandated treatment,” “mandatory treatment,” “addiction,” “addiction treatment,” “involuntary treatment,” “involuntary addiction treatment.” The terms were searched as keywords and mapped to database specific subject headings/controlled vocabulary terms when available, including MeSH terms for PubMed searches. Each database was searched from its inception to its most recent update as of June 15th, 2015.

Study selection

Two investigators (MM, CR) conducted the search independently and in duplicate using a predefined protocol. The investigators scanned all abstracts and obtained full texts of articles that potentially met the eligibility criteria. Validity was

assessed in duplicate based on eligibility criteria. After all potentially eligible studies were collected, three investigators met to achieve consensus by comparing the two review datasets (MM, CR, DW). Differences were reviewed by three investigators (MM, CR, DW) and a final decision to include or exclude was then made.

Data extraction process

Between September 10th, 2014 and June 15th, 2015, data were extracted using a standardized form soliciting data on study design, setting, sample size, participant characteristics, type of compulsory intervention, measures of effectiveness, and study quality. Given the variance in study methodologies and treatment interventions, we extracted a range of summary measures, including difference in means, risk ratio, and odds ratio. The data were then entered into an electronic database.

Risk of publication bias

Compulsory drug treatment centers have been implemented or brought to scale in a number of settings, including Vietnam, China, and Brazil. However, these settings produce disproportionately less academic scholarship than other settings such as established market economies. For this reason, there is a potential risk of publication bias that may result in a smaller number of peer-reviewed evaluations of compulsory treatment in settings in which these interventions are more widely implemented. This may, in turn, affect the publication of studies relevant to the present systematic review.

Additional analyses

Study quality was assessed using the Downs & Black criteria by two authors independently (MM, CR) (Downs & Black, 1998). This scale evaluates five domains: reporting, external validity, risk of bias, confounding, and statistical power.

Given the wide variance in intervention design and reported outcomes, it was not feasible to perform a meta-analysis of findings.

Role of the funding source and ethics approval

This study was supported by the Canadian Institutes of Health Research, Open Society Foundations, and the U.S. National Institute on Drug Abuse. At no point did any external funder play a role in the collection, analyses, or interpretation of data, writing of the manuscript or decision to publish. All authors had complete access to all data, and all had final responsibility to submit the manuscript for publication. No ethics approval was required for this review.

Results

Study selection and characteristics

Overall, as seen in Fig. 1, 430 studies were initially identified, of which 378 were excluded because they did not present primary and/or specific data on compulsory treatment. Of the remaining 52 studies, 17 were excluded because they constituted reviews or editorials, 18 were excluded because they did not focus on illicit drug use (i.e., they focused on alcohol treatment), and 8 studies were excluded because they evaluated quasi-compulsory treatment rather than compulsory treatment interventions. Nine studies met the inclusion criteria (combined $n = 10,699$). Three studies employed longitudinal observational approaches, four studies employed prospective case control designs, one study employed a cross-sectional design, and one study employed a

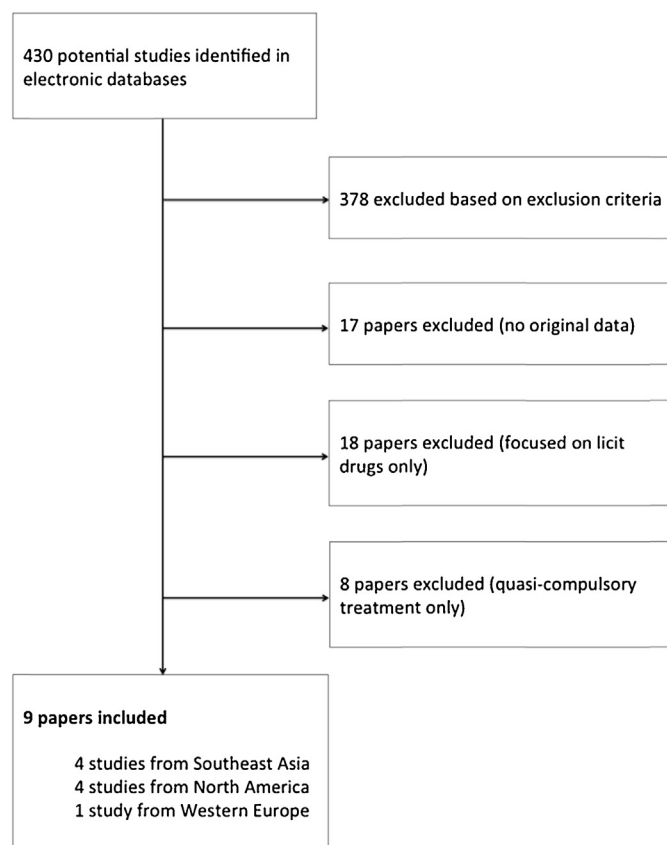


Fig. 1. Screening and study selection process.

quasi-experimental design. Six studies evaluated compulsory inpatient treatment or drug detention, one study evaluated prison/detention-based treatment, and two studies evaluated compulsory community-based treatment.

Methodological quality assessment

The Downs & Black scale has a possible score of 0 to 18, with 18 being a perfect score (highest quality). The median score for eligible studies was 12 (interquartile range: 9.5–15). All studies failed to undertake adequate steps to mitigate all risk of bias; eight studies (89%) did not optimally address risk of confounding, and five studies (56%) did not report all relevant study characteristics, methods, or findings. (Sun, Ye, & Qin, 2001) (11%) was only available as an abstract.

Results of individual studies

Three studies reported no significant impacts of compulsory treatment on substance use compared with control interventions (Fairbairn, Hayashi, & Ti, 2014; Kelly, Finney, & Moos, 2005; Sun et al., 2001). Two studies found equivocal results but did not compare against a control condition (e.g., voluntary drug treatment) (Jansson, Hesse, & Fridell, 2008; Strauss & Falkin, 2001). Two studies observed negative impacts of compulsory treatment on criminal recidivism (Huang, Zhang, & Liu, 2011; Vaughn, Deng, & Lee, 2003). Two studies found positive outcomes: one study observed a small significant impact of compulsory inpatient treatment on criminal recidivism (Hiller, Knight, & Simpson, 2006), and a retrospective study found improved drug use outcomes within the first week of release after treatment (Strauss & Falkin, 2001).

Six studies evaluated compulsory inpatient treatment or drug detention (Fairbairn et al., 2014; Huang et al., 2011; Hiller et al., 2006; Jansson et al., 2008; Kelly et al., 2005; Sun et al., 2001). Huang et al. (2011) examined the impact of mandatory inpatient drug treatment on post-treatment drug use patterns over the period of a year among participants in Chongqing, China ($n_Y = 177$). As the authors note, Chinese police are given authority over mandatory drug treatment facilities, and have the power to detain individuals within these facilities for a period of weeks to several months (Huang et al., 2011). While the allocation of treatment varies by facility, treatment modalities commonly offered include “physical exercise, moral and legal education, drug and health education, and skill training (e.g., computer skills)” (Huang et al., 2011). The authors do not, however, provide specific data on the content of any of these activities. The authors did not specify what type of treatment participants received, referring only to treatment and counseling. However, 46% of respondents reported using illicit drugs within a month to six months after release from mandatory treatment; a further 10% relapsed within one year (Table 1).

Sun et al. (2001) compared relapse into drug use among a sample of heroin users in China ($n_Y = 615$) enrolled in mandatory detoxification, volunteer detoxification, and detoxification with ‘re-education through labor’ (i.e., compulsory drug detention). Overall relapse within a year among the sample was 98%; 22% relapsed within three days, and 52% relapsed within one month. There was no significant difference between rates of relapse between sample participants enrolled in mandatory detoxification, volunteer detoxification, or detoxification in a compulsory drug detention center (Sun et al., 2001).

Hiller et al. (2006) investigated the impact of a mandated six-month residential addiction treatment intervention on post-treatment criminal recidivism. Participants in Dallas, Texas ($n_Y = 506$) were mandated to participate in a modified therapeutic community (TC), defined as addiction treatment provided within a controlled environment within which supervision is maximized (Hiller et al., 2006). All participants were probationers or individuals arrested for drug-related crimes in Dallas county. Three groups were compared: a graduate group ($n_Y = 290$; participants who successfully completed six months of the TC treatment process), a dropout group ($n_Y = 116$; participants who failed to complete six months within the TC), and a comparison group ($n_Y = 100$) comprised of a random sample of probationers from the Dallas county probationers list. The authors then compared the 1-year and 2-year incarceration rates across the three comparison groups, and found no significant differences after 1-year across all three groups (20% of the dropout group, 17% of the graduate group, and 13% of the comparison group were re-arrested and incarcerated; $p_Y > 0.05$). The proportion of participants incarcerated within 2 years did not differ significantly between the graduate and comparison groups (21% vs. 23%, $p_Y > 0.05$), though the dropout group had a significantly higher proportion of participants incarcerated compared with the other two groups (30%, $p_Y < 0.05$) (Hiller et al., 2006).

Jansson et al. (2008) investigated the long-term impact of compulsory residential care among drug-using individuals in Sweden ($n_Y = 132$). This included supervision and care from psychologists, a psychiatrist, nurses, social workers, and treatment attendants. Across 642 observation years after compulsory residential care, 232 observation years (37%) included a criminal justice record, despite the fact that all participants were assigned to treatment (Jansson et al., 2008). Further, in a longitudinal multivariate analysis, use of opiates was significantly associated with subsequent criminal recidivism.

A five-year longitudinal study compared treatment outcomes among American veterans across 15 Veterans Affairs Medical

Centers in the United States ($n_Y = 2095$) who either had justice system involvement and were voluntarily enrolled in treatment (JSI); were mandated by the justice system to receive treatment (JSI-M); or had no involvement in the justice system and were enrolled in treatment (No-JSI) (Kelly et al., 2005). The treatment provided was an abstinence-based, 12-step program (Ouimette, Finney, & Moos, 1997). Kelly et al. (2005) compared one- and five-year substance use and criminal recidivism outcomes among participants in each group and adjusted for a range of socio-demographic and dependence-related variables. The authors noted that the JSI-M (mandated) group had a significantly lower-risk clinical profile compared with the comparison groups at baseline, which necessitated adjustment via the multivariate analyses. After one year, participants in the JSI-M group had the highest reported level of abstinence from illicit drugs (61.0%), significantly higher than the JSI or No-JSI groups (48.1% vs. 43.8%, respectively) (Kelly et al., 2005). However, after five years no significant differences in the proportion of those in remission from drug use were detected across groups (JSI-M = 45.4%; JSI = 49.8%; No-JSI = 46.4%) (Kelly et al., 2005). With respect to criminal recidivism, the JSI group reported a significantly higher proportion of individuals rearrested (32.3%) compared with the JSI-M or No-JSI groups (20.6% vs. 18.3%, respectively, $p_Y > 0.05$). There were no significant differences in the proportion of participants rearrested after five years (JSI-M = 23.6%; JSI = 32.3%; No-JSI = 18.3%). The authors concluded that, while JSI-M participants had a more favourable clinical profile at baseline, they did not have significantly improved therapeutic gains compared with the other groups after five years (Kelly et al., 2005).

Fairbairn et al. (2014) sought to determine whether detainment in a compulsory drug detention was associated with subsequent cessation of injection drug use among a sample of PWID in Bangkok ($n_Y = 422$). Thailand has a large system of compulsory drug detention centers that seeks to promote drug abstinence through punishment, physical labor, and training among individuals charged with drug possession and other minor drug crimes (Fairbairn et al., 2014). Generally, detainees undergo a 45 day assessment period, followed by four months of detention and two months of vocational training (Pearshouse, 2009b). The authors found that 50% of participants reported a period of injection cessation of at least one year (i.e., ‘long term cessation’). In multivariate logistic regression analysis, incarceration and voluntary drug treatment were both associated with long-term cessation, though compulsory drug detention was only associated with short-term cessation (i.e., ceasing injection drug use for less than a year) and subsequent relapse into injecting (Fairbairn et al., 2014). The authors concluded that strategies to promote long-term cessation are required to address ongoing relapse among Thai PWID (Fairbairn et al., 2014).

One study evaluated mandatory prison-based addiction treatment. Vaughn et al. (2003) evaluated Taiwan’s compulsory prison-based addiction treatment program. This program, implemented in 1997, required individuals arrested for illicit drug use to undergo a one-month detoxification regime upon incarceration. At that point, a medical doctor determined whether offenders were drug dependent; such individuals were then sentenced to 12 months in prison and enrolment in a three-month drug use treatment program. The treatment was abstinence-based and included physical labor, psychological counseling, career planning, religious meditation, and civil education (no further details regarding the content of the psychological counseling, career planning, and civil education was provided by study authors). If offenders did not satisfactorily complete the program, they were forced to repeat it until successful completion (Vaughn et al., 2003). Once released, individuals were required to pay the cost of treatment. The authors employed a quasi-experimental design wherein individuals who

Table 1
Results of systematic review of studies evaluating compulsory drug treatment approaches.

Author/ year	Location	n	Study period	Study design	Participant characteristics				Intervention	Changes in substance use	Changes in recidivism	Summary of outcomes	Quality score
					Mean age (range)	Female	Ethnicity	Drug use					
Sun et al. (2001)	China	615	NR	Cross-sectional	NR	NR	NR	NR	Mandatory detoxification vs. volunteer detoxification vs. Detoxification and compulsory drug detention	98% relapsed within one year	NR	Almost all participants relapsed within a year. No significant difference between participants enrolled in different interventions	8
Huang et al. (2011)	Chongqing, China	177	2009	Longitudinal observational	16% 18–25; 43.4% 26–35; 31.4% 36–45; 9.1% 46+	21.6%	Asian (Chinese)	87.5% alcohol; 69.4% heroin; 62.8% meth; 40.7% Manguo	Mandatory inpatient treatment	10.3% relapsed in less than a month; 35.5% 1–6 months; 10.3% 7–12 months; 43.9% ≥13 months	N/A	65% placed in mandatory treatment by police in past 12 months; 46% used drugs within 6 months of their release and 10% relapsed in 7–12 months	8
Rengifo and Stemen (2010)	Kansas	1494; 4359 in control group	2001–2005	Prospective case control	SB 123 group: 14–25 = 38.9% 26–35 = 28.2% >35 = 32.9% Control groups: >35 = 33.0–45.0%	SB 123: 29% Control groups: 19.3–26.5%	SB 123 group: 81.6% white Control groups: 75.5–78.2% white	NR	18 months of mandatory community based drug treatment	NA	No difference in recidivism	No significant impact on recidivism compared to community corrections; increase compared to court services	15
Fairbairn et al. (2014)	Bangkok, Thailand	422	N/A	Cross-sectional observational	38 (34–48)	18%	100% Thai	Heroin, methamphetamine, midazolam; proportions not reported	Compulsory drug detention vs. voluntary addiction treatment vs. MMT	Voluntary addiction treatment associated with sustained cessation; compulsory drug detention associated with short-term cessation	N/A	Compulsory drug detention not associated with long-term cessation	16
Jansson et al. (2008)	Sweden	132	Treated between 1997 and 2000; 5 year follow up	Longitudinal observational	Youth: 18.7 (16–20), Adults: 26.7 (18–43)	100%	NR	NR	Compulsory residential care	NA	Of 642 observation years, 232 (37%) contained a criminal justice record.	Recidivism was associated with use of opiates	12
Hiller et al. (2006)	Dallas, TX	506	1997–1999	Longitudinal observational	32.2 (SD: 9.2)	30%	10% Hispanic	NR	Mandated residential 6-month treatment	N/A	No significant differences in 1-year arrest rates. Significantly fewer graduates arrested in 2 nd year than dropouts.	Treatment graduates slightly less likely to be arrested within 2 years of leaving the program	13

Table 1 (Continued)

Author/ Year	Location	n	Study period	Study design	Participant characteristics			Intervention	Changes in substance use	Changes in recidivism	Summary of outcomes	Quality score	
					Mean age (range)	Female	Ethnicity						
Kelly et al. (2005)	US	2095	5 year follow up (dates not reported)	Prospective case control	Mean age = 42 (9.4) JSI = 40.7 (8.0) None = 42.9 (9.2) (<i>p</i> < 0.01)	None	49% African American; 45% White; 6% other (<i>p</i> = 0.01)	JSI-M: 44.7%; JSI: 58.3%; None: 57.5% (<i>p</i> = 0.01)	21- or 28-day SUD residential treatment programs from Veterans Affairs	1-year remission: JSI-M 61.0%; JSI 48.1%; None 43.8%; (<i>p</i> < 0.01) 5-year remission: JSI-M 45.4%; JSI 49.8%; None 46.4%; (<i>p</i> = 0.32)	1-year rearest: JSI-M 20.6%; JSI 32.3%; Other 18.3%; (<i>p</i> < 0.05) 5-year rearest: JSI-M 23.6%; JSI 27.7%; None 19.0%; (<i>p</i> = 0.24)	Mandated patients had less severe clinical profile at treatment intake; no differences in therapeutic gains during treatment. Treatment group had worse outcomes than non- treatment group	15
Vaughn et al. (2003)	Taiwan	700	1999–2000	Quasi- experimental	NR	25% of 700 pre-release interviews	Asian	NR	Compulsory prison based treatment for drug using offenders	Treatment sample: 44% amphetamine, 26.6% heroin; Non-treatment sample: 9.1% amphetamine, 7.1% heroin	33% of treatment sample reincarcerated, 5% of non-treatment reincarcerated	Treatment group had worse outcomes than non- treatment group	11
Strauss and Falkin (2001)	Oregon	165	1995–1999	Prospective case control	ASAP: 30.9 VOA: 34.0	100%	African American: ASAP = 25–29.7% VOA = 13.8–20.5%	NR	Community based treatment programs	45 used drugs in first week after treatment (27%), 120 did not	NA	Those not using drugs in first week after mandated treatment more likely to have been in treatment longer and had individual and group support	11

Note: NA, not applicable; NR, not reported; SD, standard deviation; Meth, methamphetamine; MMT, methadone maintenance therapy; SB 123, Kansas' mandatory drug treatment policy; QCT, quasi-compulsory treatment; JSI, justice system involved individuals; JSI-M, justice system involved and mandated individuals; SUD, substance use disorder; ASAP, ASAP treatment services, Inc; VOA, volunteers of America residential program.

undertook the three-month drug treatment program ($n_Y = 109$) were compared with individuals who were not enrolled in the program as a result of being incarcerated prior to the program's implementation ($n_Y = 99$). Individuals were interviewed during pre-release and after 12 months of release from prison. Multivariate logistic regression analyses were used to identify any significant differences in post-treatment drug use and criminal recidivism. The authors found that offenders enrolled in the mandatory prison-based drug treatment program were significantly more likely to engage in post-release drug use and criminal recidivism. As such, they concluded that Taiwan's mandatory drug treatment system requires reform (Vaughn et al., 2003).

Two studies evaluated mandatory outpatient or community-based treatment. Strauss and Falkin (2001) sought to determine the short-term impact of a compulsory community-based treatment intervention on substance use among a sample of drug-using female offenders in Portland, Oregon ($n_Y = 165$). Participants were mandated to receive either treatment from 'ASAP' (Alcohol and Substance Abuse Prevention Program) or VOA (Volunteers of America). Both programs are community-based treatment interventions that include both mandated and voluntary clients, and are intended to last six months. ASAP is an outpatient program that employs an abstinence-based approach with individual counseling sessions and therapeutic group sessions (Strauss & Falkin, 2001) while VOA provides a residential program focused on the therapeutic community model, with an emphasis on structured activities, individual counseling, and building skills to reduce domestic violence and abuse risk (Strauss & Falkin, 2001). In a retrospective analysis focused on the first week after release from treatment, the authors found that women offenders who were in treatment longer were less likely to use drugs within the first week (Strauss & Falkin, 2001).

In 2003, the American state of Kansas implemented SB 123, a state senate bill legislating mandatory community-based treatment of up to 18 months for nonviolent offenders convicted of a first or second offense of drug possession (Rengifo & Stemen, 2010). Rengifo and colleagues compared criminal recidivism among individuals convicted of drug possession who were mandated to treatment ($n_Y = 1494$) vs. those on regular probation, sent to court services, or sent to prison ($n_Y = 4359$), though they do not describe the community-based treatment that individuals received. Data were collected between 2001 and 2005. Findings suggested that there was no significant impact on criminal recidivism among participants mandated to treatment compared to those mandated to regular probation. Of concern, participants mandated to treatment had a significantly increased risk of criminal recidivism compared to participants mandated to court services. The authors concluded that offenders mandated to treatment were not recidivating at a lower rate compared with offenders in alternative programs (Rengifo & Stemen, 2010).

Conclusion

Summary of evidence

While a limited literature exists, the majority of studies (78%) evaluating compulsory treatment failed to detect any significant positive impacts on drug use or criminal recidivism over other approaches, with two studies (22%) detecting negative impacts of compulsory treatment on criminal recidivism compared with control arms. Further, only two studies (22%) observed a significant impact of long-term compulsory inpatient treatment on criminal recidivism: one reported a small effect size on recidivism after two years, and one found a lower risk of drug use within one week of release from compulsory treatment (Strauss & Falkin, 2001). As such, and in light of evidence regarding the potential for human

rights violations within compulsory treatment settings, the results of this systematic review do not, on the whole, suggest improved outcomes in reducing drug use and criminal recidivism among drug-dependent individuals enrolled in compulsory treatment approaches, with some studies suggesting potential harms.

These results are of high relevance given the reliance on compulsory drug detention among policymakers in a range of settings. Indeed, compulsory drug treatment approaches have been implemented in southeast Asia (Amon et al., 2013; Pearshouse, 2009b), the Russian Federation (Utyasheva, 2007), North America (Rengifo & Stemen, 2010), Latin America (CNN, 2010; Malta & Beyrer, 2013; Mendelevich, 2011; Utyasheva, 2007), Europe (Jansson et al., 2008), Australia (Birgden & Grant, 2010), and elsewhere (Israëlsson & Gerdner, 2011). However, experts have noted that little evidence exists to support compulsory treatment modalities, and that the onus is therefore on advocates of such approaches to provide scientific evidence that compulsory treatment is effective, safe, and ethical (Hall & Carter, 2013). The results of the present systematic review, which fails to find sufficient evidence that compulsory drug treatment approaches are effective, appears to further confirm these statements (Hall et al., 2012). Human rights violations reported at compulsory drug detention centers include forced labour, physical and sexual abuse, and being held for up to five years without a clinical determination of drug dependence (Amon et al., 2013; Hall et al., 2012; Pearshouse, 2009a, 2009b). Governments should therefore seek alternative, evidence-based policies to address drug dependence.

The evidence presented herein also supports the joint statement on drug detention centers released by a range of United Nations-affiliated institutions declaring that, "[t]here is no evidence that these centres represent a favorable or effective environment for the treatment of drug dependence", and that "United Nations entities call on States to close compulsory drug detention and rehabilitation centres and implement voluntary, evidence-informed and rights-based health and social services in the community" (ILO, 2012). It is noteworthy in this regard that, while compulsory approaches appear ineffective, evidence suggests that a large body of scientific evidence supports the effectiveness of voluntary biomedical approaches such as OST in reducing drug-related harms (Amato et al., 2002; Mattick et al., 2009). China, Vietnam and Malaysia, for example, all previously scaled up compulsory drug detention centers, but are increasingly moving towards voluntary methadone maintenance and needle and syringe distribution systems to reduce the risk of blood-borne disease transmission from PWID sharing injecting equipment (Baharom, Hassan, Ali, & Shah, 2012; Hammett, Wu, & Duc, 2008; Nguyen, Nguyen, Pham, Vu, & Mulvey, 2012; Qian, Hao, & Ruan, 2008; Reid, Kamarulzaman, & Sran, 2007; Sullivan & Wu, 2007; Wu, Sullivan, Wang, Rotheram-Borus, & Detels, 2007). Emerging evidence suggests that expanded OST dispensation in these settings has been effective in reducing drug use (Baharom et al., 2012; Hammett et al., 2008; Nguyen et al., 2012; Yin, Hao, & Sun, 2010). This scale up of evidence-based biomedical and harm reduction interventions is occurring despite China's previous investment in a compulsory treatment infrastructure; as such, tensions remain between voluntary, public health-oriented approaches and compulsory detention (Larney & Dolan, 2010), as they do in settings that include both compulsory and voluntary approaches, such as Mexico (Garcia, 2015; Lozano-Verduzco, Marín-Navarrete, Romero-Mendoza, & Tena-Suck, 2015). This may result in suboptimal treatment outcomes given that ongoing interactions with law enforcement and the threat of detainment within compulsory drug detention centers may cause drug-dependent individuals to avoid harm reduction services or engage in risky drug-using behaviors out of a fear of being targeted by police (Larney & Dolan, 2010), as has been observed in a range of settings (Bluthenthal, Kral, Lorvick, & Watters, 1997; Beletsky, Lozada, &

Gaines, 2013; Beletsky et al., 2014; Cooper, Moore, Gruskin, & Krieger, 2005; Werb, Wood, & Small, 2008). We also note that this is likely the case in settings seeking to control the harms of non-opioid substance use disorders such as cocaine use disorder, given that available interventions that have been shown to be effective have been undertaken using voluntary treatment approaches (Castells et al., 2010; Fischer et al., 2015; Hofmann et al., 2012). Governments seeking to implement or bring to scale harm reduction interventions that include OST and needle and syringe distribution will therefore likely be required to reduce their reliance on compulsory and law enforcement-based approaches in order to ensure treatment effectiveness.

Limitations

This systematic review has limitations. Primarily, risk of publication bias is present given political support for law enforcement-oriented strategies to controlling drug-related harms, particularly in Southeast Asia, where compulsory drug detention centers have been implemented by many national governments (Amon et al., 2013; Pearshouse, 2009b). In certain settings, such as Thailand, the scale up of drug detention centers has been accompanied by high-profile 'war on drugs' campaigns promoting enforcement- and military-based responses to drug harms (Fairbairn et al., 2014). Within such political climates, undertaking or publishing peer-reviewed research critical of compulsory drug treatment may be disincentivized. Further, while drug detention centers are more numerous in southeast Asia, this region has a limited infrastructure for scientific research on drug use, which may also increase the risk of publication bias.

Conclusions

Based on the available peer-reviewed scientific literature, there is little evidence that compulsory drug treatment is effective in promoting abstinence from drug use or in reducing criminal recidivism. It is noteworthy that this systematic review includes evaluations of not only drug detention centers, but of a range of compulsory inpatient and outpatient treatment approaches. Additionally, the reductions in drug use and criminal recidivism as a result of compulsory drug treatment interventions were generally short-term or of low clinical significance. In light of the lack of evidence suggesting that compulsory drug treatment is effective, policymakers should seek to implement evidence-based, voluntary treatment modalities in order to reduce the harms of drug use.

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