Full length article

Effectiveness of treatment for opioid use disorder: A national, five-year, prospective, observational study in England

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ABSTRACT

Background: This the first 5-year effectiveness study of publicly funded treatment for opioid use disorder (OUD) in England.
Methods: All adults initiating treatment in 2008/09 in all 149 local treatment systems reporting to the National Drug Treatment Monitoring System (n = 54,347). Admission polydrug use sub-populations were identified by Latent Class Analysis. The treatment outcome measure was 'successful completion and no re-presentation within six months' (SCNR) analysed by multilevel, multivariable logistic regression and funnel plots to contrast outcome by treatment system.
Results: SCNR was achieved by 21.9%. Heroin and crack cocaine users were significantly less likely to achieve this outcome than patients who used heroin only (adjusted odds ratio [AOR] 0.90; 95% confidence interval [CI] 0.85–0.95). Older patients (AOR 1.09; CI 1.07–1.11), those employed (AOR 1.27; CI 1.18–1.37) and those enrolled for longer treatment were more likely to achieve the outcome measure. After risk adjustment, the local treatment systems that achieved substantially better outcome performance (14/149) had a lower rate of opiate prevalence in the local population at time of study initiation (incidence rate difference [IRD] 4.1; CI 4.0–4.2), fewer criminal offences per thousand (IRD 28.5; CI 28.1–28.8) and lower drug-related deaths per million (IRD 5.9; CI 5.9–5.9).
Conclusions: In an English national study, one fifth of patients successful completed treatment for OUD and did not present for further treatment within six months. Longer time in treatment increases the probability of achieving and maintaining clinical benefit from treatment. After risk-adjustment, an important minority of treatment systems achieve substantially better outcome performance.

1. Introduction

Heroin and non-medical opioids are associated with a substantial global burden of disease (Degenhardt et al., 2013). In the United States (US), it is estimated that 2.6 people per 1000 aged 12 and above used heroin in the past year (Jones et al., 2015). In Europe, the estimated annual heroin use prevalence is 4 per 1000 aged 15–64 (EMCDDA, 2015) and 7.3 per 1000 among people aged 16–64 in England (Hay et al., 2014).

Opioid use disorder (OUD), and the conceptually identical 'opioid dependence', is a debilitating and often chronic bio-behavioural disorder (DSM-5; American Psychiatric Association, 2013; ICD-10; WHO, 2016). People with OUD typically use illicit heroin and/or non-medical opioid pharmaceutical products, developing physiologi-

cally dependence and strong motivational urges. Around one quarter of opioid users develop OUD (Gable, 1993; Anthony et al., 1994). Left untreated, OUD typically follows a chronic course causing substantial health, social and economic problems (Hser et al., 2001; Grella and Lovinger, 2011; Hser et al., 2015). In the classic Grella and Lovinger study, half of the sample died and a quarter did not experience any sustained improvement in their drug use (Grella and Lovinger, 2011).

The OUD population is far from homogenous. Several behaviours are associated with increasing severity of the disorder (Marsden et al., 2014) and treatment effectiveness may vary between sub-populations. For example, drop-out is more likely among patients with comorbid psychiatric conditions and more criminal justice involvement in the year before treatment, and less likely among those living with dependent children (Evans et al., 2009). Ethnic minority populations

have been reported to have a lower rate of treatment episode completion (Mennis and Stahler, 2016). An important sub-population are polydrug users, typically involving concurrent use of one or more of the following: alcohol, cocaine powder, smokeable (*crack*) cocaine and benzodiazepines (Darke and Hall, 1995; Monga et al., 2007; Harrell et al., 2012; Kuramoto et al., 2011). Heroin smokers who use crack cocaine are substantially less likely to be infected with Hepatitis C virus than those who inject heroin (Harrell et al., 2012). Opioid-polydrug users have been observed to have greater health and social problems (Leri et al., 2003) and a relatively poorer response to OUD treatment (Williamson et al., 2006; Marsden et al., 2011, 2009).

The majority of countries with a high prevalence of OUD have an array of well-developed treatment services. The opioid medications methadone and buprenorphine are front-line, randomised-controlled trial supported pharmacotherapies (Mattick et al., 2014, 2009). Some OUD patients may receive psychosocial interventions without opioid psychotherapy. Interventions are typically provided by specialist community, primary care and hospital providers. Inpatient withdrawal management and drug-free residential rehabilitation services are also available. In addition to case management, national clinical guidelines recommend psychosocial interventions to address cognitive and behavioural symptoms of OUD (e.g., National Institute for Clinical Excellence, 2007).

Internationally, there have been several longitudinal cohort studies of the effectiveness of these interventions as delivered under routine conditions by public treatment systems (e.g., Simpson and Sells, 1990; Stewart et al., 2002; Darke et al., 2007; Marsden et al., 2009; White et al., 2015). Taken together, these studies conclude that treatment is associated with reduced opioid use, drug injecting, and offending behaviour, and improvements in health (including a substantially reduced risk of fatal overdose), social functioning and employment.

Longitudinal cohort studies are time consuming and expensive. Public accountability means that the commissioners of publicly funded services need information on the effectiveness of treatment as it is delivered. Various proxy measures of outcome have been used in treatment systems research, including unsanctioned discharge (dropout) from treatment and retention (Brorson et al., 2013; Stark, 1992; Faggiano et al., 2003). A commonly used measure is the proportion of patients treated who complete treatment successfully (Alterman et al., 2001). This indicator is associated with reduced drug use (Evans et al., 2009; Kornør and Waal, 2005), increased employment (Lang and Belenko, 2000; Zarkin et al., 2002; Evans et al., 2009; Sung and Chu, 2011; The TOPPS-II Interstate Cooperative Study Group, 2003), lower arrests and incarceration (Campbell et al., 2007; Evans et al., 2009; Gifford et al., 2014; Finnigan, 1996), and a reduced likelihood of readmission to treatment services (Luchansky et al., 2000). In the US, substantial inter-state (Arndt et al., 2013) and regional variation in completion rates have been reported (Hawkins et al., 2014), and this is now monitored at the federal/government level (Stahler et al., 2016).

The 'successful completion' indicator has a key limitation − it does not capture the extent to which treatment benefit is enduring. This is important because relapse is common, affecting 50–60% of people within six months after leaving treatment (McLellan et al., 2005). The process of achieving stable recovery from OUD may involve several cycles of treatment over a decade or more (Dennis et al., 2005; Hser et al., 1997).

To fully assess the effectiveness of treatment systems, national administrative databases need to be able to capture this process, yet the requirements of such systems are difficult to implement. In the US, the absence of a patient consent prevents linkage across consecutive treatment episodes. At the national level, the impact of this is twofold: it is not possible to objectively assess whether an individual has previously engaged in treatment (an indicator of patient-level complexity (Marsden et al., 2012; Siguel and Spillane, 1978). It is also not possible to determine whether a patient's successful completion status is enduring.

England has a well-developed public treatment system for drug use disorders with service delivery involving specialist clinics in the National Health Service (NHS) and non-governmental sector. Services are commissioned by 149 local treatment systems across the country aligned to local government geographical boundaries. All public providers report clinical and effectiveness data to the National Drug Treatment Monitoring System (NDTMS). NDTMS is operated by Public Health England and provides outcome monitoring and performance benchmarking for each local system (see Marsden et al., 2009 for an operational description). The latest national report shows that 28% of people treated for OUD complete treatment successfully (Public Health England, 2016a).

With temporal linkage of episodes, NDTMS can record re-presentation to treatment as a proxy remission indicator. To our knowledge, a 'successful completion and no re-representation' outcome measure has not been used in previous OUD treatment systems research. Accordingly, the aim of this study was to estimate the effectiveness of OUD treatment in England for OUD using this indicator and contrast the effectiveness of local treatment systems.

2. Methods

2.1. Design

This was an English national, five-year, prospective, observational cohort study of publicly-funded, specialist treatment services for OUD reporting to the NDTMS, and reported following the STROBE guideline for observational research (Elm et al., 2007). The population for the study was all adults (≥18 years) diagnosed with OUD who presented for treatment in England between 1 April 2008 and 31 March 2009.

The study included all local treatment systems and all operational specialist community agencies in the NHS and third-sector providing pharmacotherapies, psychosocial interventions and adjunctive support services for OUD in community, inpatient (short-term medically supervised withdrawal), and residential (drug-free rehabilitation) settings.

2.2. NDTMS database

NDTMS captures a core dataset of all clients entering the treatment system, and is designed to record key information at each stage of the treatment process. An initial triage assessment is conducted by clinical staff at each treatment service during the first face-to-face meeting following referral to treatment which can, in the case of self-referrals for example, take place on the same day. Where a treatment need is clinically indicated, the substance(s) and patient demographics are recorded on NDTMS and an appointment for a treatment intervention is arranged. The mean waiting time to initiate this intervention is 2.2 days for OUD patients, and 98% start treatment within three weeks (Public Health England, 2016a). Each treatment intervention received is recorded on NDTMS (Section 2.2.1). Treatment is not time-limited: patients are maintained in treatment for as long as clinically indicated (Section 2.2.2).

2.2.1. OUD treatments

The opioid pharmacotherapies included methadone, buprenorphine and also naltrexone. Psychosocial interventions such as contingency management and motivational interviewing complement pharmacotherapy and target underlying psychological aspects of dependence. In addition to opioid pharmacotherapy and/or psychosocial interventions, a patent's treatment programme could include adjunctive 're-covery support' services, including: facilitated access to mutual aid; complementary therapies; and family, housing, employment, education and training supports.