Full length article

Dynamics in the costs of criminality among opioid dependent individuals

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ABSTRACT

Background: Research into the avoided crime-related costs associated with methadone maintenance treatment (MMT) is sparse. Our objective was to characterize the dynamics in crime-related costs associated with MMT effectiveness among opioid dependent individuals in Vancouver, Canada.
Methods: We considered individuals enrolled in a prospective study between December, 2011 and May, 2013. Monthly crime-related costs (2013 CAD) were derived from self-reported criminal activity. On the basis of MMT receipt and illicit opioid use, individuals were classified in mutually exclusive health states: (i) MMT high effectiveness; (ii) MMT low effectiveness; (iii) opioid abstinence; or (iv) relapse. We classified individuals as daily, non-daily or non-stimulant users and controlled for demographic and socioeconomic characteristics. A two-part multiple regression model was constructed; the first part modeled non-zero cost probability, the second estimated the level of costs. Avoided costs were estimated for each health state and stratified by stimulant use intensity.
Results: Our study included 982 individuals (median age 47, 38% female) for 2232 observations. Individuals on MMT with high effectiveness incurred lower monthly costs of criminality (avoided costs of $6298; 95% C.I. ($1578, $11,017)), as did opioid abstinent individuals ($6563 ($1564, $11,561)). Avoided costs for daily stimulant users were greater than for non-daily users, both for individuals on MMT with high effectiveness ($12,975 vs. $4125) and opioid abstinent ($12,640 vs. $4814).
Conclusion: Using longitudinal data on individuals with a history of MMT, we found substantially lower costs of criminality associated with high effect to MMT. Avoided costs were highest among daily stimulant users that were on MMT with high effectiveness or those opioid abstinent.

1. Introduction

Illicit drugs have been estimated to impose a $10.2 billion annual societal cost in Canada ($291 per capita), with law-enforcement costs representing the largest share ($2.9 billion; $83 per capita) of the direct burden (Rehm et al., 2007). In the US, the annual societal costs are estimated to be $223 billion ($707 per capita), with criminal justice costs representing the largest share ($71.0 billion; $225 per capita) of the direct societal costs of illicit drug use (National Drug Intelligence Center, 2011). In 2012, the US Federal government enacted drug control spending of $26.3 billion with more than 51% ($13.5 billion) for domestic law enforcement and interdiction of illegal drug use (ONDCP, 2013).

Substance abuse treatment (SAT) has been identified as a direct method of reducing crime-related costs of substance use disorders (SUD; Prendergast et al., 2002). Opioid substitution treatment (OST) with methadone is the most common treatment modality for opioid dependence and methadone maintenance treatment (MMT) has a long history of associated decline in criminal activity (Marsch, 1998; Prendergast et al., 2002). Comprehensive literature reviews of cost-benefit and cost-effectiveness analyses for opioid dependence treatment by Schwartz et al. (2014) as well as Doran (2008) find that studies which include criminal activity consistently find benefits outweighing the costs. Estimates of the economic benefits of avoided crime, i.e., costs that would have otherwise been incurred if the crimes had taken place, are essential to inform optimal use of scarce resources.

Nevertheless, research into the crime-related cost dynamics associated with MMT effectiveness and illicit opioid abstinence

is sparse (Chisholm et al., 2006; Doran, 2008). Using a cost-of-illness methodology with 114 illicit opioid users not in treatment, Wall et al. (2000) estimated an average annual law enforcement and victimization societal burden of $53,054 for untreated opioid dependence. Crime-related costs have also been accounted for in cost-effectiveness analyses of different forms of OST. Dijkgraaf et al. (2005) found a 12-month cost of criminality reduction of $51,303 per individual receiving medical co-prescription of heroin compared to MMT, and Nosyk et al. (2012) found a 12-month cost of criminality reduction of $29,902 per individual receiving diacetyl-morphine versus methadone, with both studies being conducted in a limited duration randomized control trial setting. All costs presented in 2013 CAD.

Perhaps more importantly, however, none of the reviewed studies provided estimates of crime-related costs associated with the cyclical longitudinal patterns of chronic continued drug use, treatment, relapse and full abstention (Bell et al., 2006; Bovasso and Cacciola, 2003; Dobler-Mikola et al., 2005; Galai et al., 2003; Hser et al., 2007; Nosyk et al., 2013, 2009; Termorshuizen et al., 2005). Furthermore, while self-reported crime is common, opioid dependent individuals are infrequently arrested (French et al., 2000; Nurco, 1998; Schwartz et al., 2006, 2007); therefore estimates of the costs of criminality must be based on criminal acts perpetrated rather than only on those recorded by police services. While deriving costs from every incident committed will accurately capture the societal benefit of avoided crime, these immediate benefits will not be realized as reductions in law enforcement expenditures in the short-term. However, these cost reductions could result in a medium to long-term decrease of the proportion of public funding allocated to law enforcement due to illicit drugs.

Therefore, our objective was to characterize from a societal perspective the avoided crime-related costs associated with opioid abstinence and MMT effectiveness among opioid dependent individuals with varying degrees of concurrent use of other illicit substances (e.g., crack, powder cocaine).

2. Methods

2.1. Study design and subjects

Data for this analysis were derived from a series of ongoing open prospective cohort studies involving illicit drug users, including the At-Risk Youth Study (ARYS), the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), and the Vancouver Injection Drug Users Study (VIDUS). The VIDUS study began enrollment in May 1996 and recruits individuals through word of mouth, street out-reach, and referrals. The original VIDUS cohort was divided into two separate studies in 2005: VIDUS now follows HIV-negative individuals and its sister study ACCESS follows HIV-positive drug users (Strathdee et al., 1997; Wood et al., 2009). ARYS began in late 2005 and is made up of street-involved youth who report use of drugs other than or in addition to cannabis and are aged 14–26 (Wood et al., 2006a,b).

Sampling and follow-up methodologies have been described in detail previously and were identical to allow for merged analyses (Strathdee et al., 1997; Tyndall et al., 2003; Wood et al., 2006a,b). At baseline, individuals complete an interviewer-administered questionnaire and individuals received $20 CAD for each visit. All studies have been approved by the University of British Columbia/Providence Health Care Research Ethics Board.

Items assessing self-reported criminal activity, arrests and charges in the past month were first added to the follow-up study instrument for the cohort studies in November, 2011. We considered baseline data captured between March 2005 and December, 2012, with a maximum of three assessments conducted at six

month intervals between December, 2011 and May, 2013. All individuals who completed at least one follow-up interview during this period and had ever accessed MMT at baseline or during follow-up assessments were eligible for inclusion. Individuals were excluded if their baseline assessment was missing.

2.2. The costs of criminal activity

The primary dependent variable considered in this analysis is composed of direct and indirect costs of criminal activity incurred during the previous 30 days. Costs were calculated from a societal perspective, which include costs for the criminal justice system as well as for victimization but did not include crime career opportunity costs or intangible costs. We adhered to best practice guidelines for the conduct of economic analysis (Garrison et al., 2010) and included costs regardless of who incurred them or whether they corresponded to budgetary expenditures. We used a comprehensive methodology motivated by McCollister et al. (2010), which uses most current costs to build on Rajkumar and French (1997). A set of eight categories of self-reported criminal activity was multiplied by unit costs and all costs are adjusted for inflation and presented in 2013 CAD (see Supplementary material for details).

Justice system costs: Justice costs are composed of resources dedicated to policing, court proceedings as well as the correctional system. Total policing expenditures include arrest as well as incident-based unit costs. Only the cost of arrest is included for drug dealing and sex work involvement, consistent with the methodology used by Dijkgraaf et al. (2005). Crime category specific costs for arrest cases and court cases were used. Corrections costs are composed of a per-case processing cost as well as daily costs for days spent incarcerated. We updated unit costs of arrests, court proceedings and incarceration presented by Wall et al. (2000).

Victimization costs: Unit costs of victimization from McCollister et al. (2010) were used and take into account medical expenses, cash losses, property theft and victimization-related consequences. Our data does not allow us details as to the specific nature of the capital offense being self-reported and we therefore assumed victimization costs for those reports as if they were assaults. It is argued that drug dealing and sex work can be viewed as a transfer with no direct victimization costs (Rajkumar and French, 1997; Zarkin et al., 2012), therefore, most of the criminal incidents in our study with victimization costs are income-related property crimes (99.2%). Our survey does not allow us to distinguish between incidents within this category; consequently we assign victimization costs probabilistically combining Vancouver Police Department (VPD) and Statistics Canada's General Social Survey (GSS) on victimization data.

To ensure representativeness of our results, and to correct for potentially incorrect responses, we choose an appropriately conservative approach excluding the top 2% of non-zero derived cost observations from our analysis.

2.3. Independent variables

We were primarily interested in assessing the benefits associated with MMT effectiveness on the costs of criminal activity. An effective maintenance dose will block the euphoric effects of opioids so we defined health states according to the intended benefit of reduction or cessation of opioids use (College of Physicians and Surgeons of British Columbia, 2014). Consequently, on the basis of both self-reported MMT receipt at assessment and illicit opioid use in the past six months, participants were classified as being in one of four mutually exclusive health states: (i) on MMT with high effectiveness (defined as current MMT receipt and no illicit opioid use in the last six months); (ii) on MMT with low effectiveness