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Comparative prices of diverted buprenorphine/naloxone and buprenorphine in a UK prison setting: A cross-sectional survey of drug using prisoners

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ABSTRACT

Background: There is evidence regarding the abuse potential of buprenorphine in prison settings. There is also emerging evidence from community settings that buprenorphine/naloxone is less amenable to abuse than the single preparation buprenorphine hydrochloride as evidenced by cost-differentials of diverted medication. This study sought to explore cost-differentials within a prison setting of diverted buprenorphine/naloxone medication relative to either single preparation buprenorphine hydrochloride or methadone.
Methods: Cross-sectional survey in one remand prison.
Results: A total of 85 prisoners participated in the survey. Prisoners estimated buprenorphine to have a significantly ($p < 0.001$) higher cost than buprenorphine/naloxone both inside and outside of prison. This finding was supported when the analysis was restricted to both the prisoners with a longer-term experience of taking opioid substitution drugs during their current prison stay and those with a longer-term experience prior to reception.
Conclusions: Consideration should be given to the recommendation that buprenorphine/naloxone medication is the prescribed buprenorphine preparation of choice for clinicians offering opiate substitution therapy to prisoners, pending developments of buprenorphine preparations that have less abuse potential than sublingual preparations.

1. Introduction

A conservative estimate suggests that over 10.2 million people are held in penal institutions throughout the world, which equates to a world prison population of 144 per 100,000 (Walmsley, 2013). Internationally, drug dependence is common amongst prison populations and many are dependent upon heroin. A systematic review of international prevalence studies of prison populations for drug dependence found prevalence rates for drug dependence to vary from 10% to 48% in male prisoners and 30% to 60% in female prisoners (Fazel et al., 2006). In the UK, heroin users historically receiving opioid substitution treatment in the community had such treatment discontinued upon entry into prison. This resulted in a legal class action against the then UK Home Office which, although no court ruling was made, led to prisoners receiving compensation (Silverman, 2006). In response to this legal action, the UK government invested significantly in prison-based drug treatment services, informed by the UK National Institute for Health and Care Excellence (NICE) recommendations supporting either methadone or buprenorphine as clinically effective substitution treatments for opioid dependence (National Institute for Health and Clinical Excellence, 2007). Similarly, in the USA, the prescribing of methadone substitution therapy is either discontinued within the criminal justice system or under-prescribed (Fu et al., 2013). A survey in 2004 of 245 US prisons demonstrated that only 2% of prisoners used methadone or other opioid treatments for detoxification, resulting in forced methadone withdrawal during imprisonment (Nunn et al., 2009).

Several studies have shown that when prisoners are released without opioid substitution therapy there is a greater risk of overdose and death (Kinlock et al., 2010; Lobmaier et al., 2010). However, there is a significant risk of Buprenorphine diversion in

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prison settings (Ministry of Justice, 2007; Tompkins et al., 2009) and misuse in community settings (Simojoki et al., 2010; Smith et al., 2007). A descriptive survey commissioned by the UK Ministry of Justice after heightened concerns regarding buprenorphine diversion identified that 87 out of 139 prisons in England and Wales surveyed between February and April, 2007 detected buprenorphine in random and/or targeted Mandatory Drug Tests (Ministry of Justice, 2007). Buprenorphine misuse was far more widespread across the country and across prison categories than had been anticipated. It was identified to be the most misused drug in 11 prisons and the third most misused drug overall (Ministry of Justice, 2007).

In response to such risk of diversion, buprenorphine/naloxone sublingual combination preparation (Suboxone) was developed and has been licensed for clinical practice in the UK, USA and parts of Europe. There is evidence from community settings that buprenorphine/naloxone is less amenable to abuse than the single preparation buprenorphine hydrochloride (Alho et al., 2006). However, there is a paucity of evidence regarding the possible reduced abuse potential of buprenorphine/naloxone in prison settings. We are also not aware of any published studies exploring price differentials within the prison setting between different preparations of prescribed medications. In response to this evidence gap we undertook a cross-sectional survey in a large male security category B prison (i.e., remand prison but not maximum security) in the North of England to explore the price differential of prescribed buprenorphine/naloxone tablets relative to buprenorphine and methadone.

2. Methods

2.1. Setting

The study was conducted in a large male remand prison in the UK with a capacity for approximately 1200 prisoners, of which approximately half the population had a current or past history of opioid dependence. For prisoners requiring opioid substitution treatment, clinical practice in the prison was to prescribe methadone in the liquid mixture preparation and buprenorphine/naloxone in the sublingual tablet preparation. Single entity buprenorphine was not prescribed for opioid substitution treatment during the time the study was conducted. The remand status of the prison meant that it received prisoners directly from magistrates and crown courts within the local area. The study received both National Health Service (NHS) Ethics Committee and NHS research governance approval. The survey took place between July 2012 and October 2013.

2.2. Study participants

To fulfil the inclusion criteria, study participants had to be aged ≥18 years, have a history of illicit heroin use and be engaged in prison drug treatment services such that they were either directly receiving buprenorphine/naloxone medication, or had close hand knowledge of peers who had a recent history of taking buprenorphine/naloxone medication. Prisoners with either no history of illicit opioid use, or no history of receiving prescribed opioids for heroin dependence were excluded from the study. Participants were identified from the database of those engaged in the prison drug treatment system and following a sampling process of simple random selection were approached by an NHS employed researcher who introduced the study and discussed their potential participation. Participants were each given a detailed verbal explanation of the study and an information sheet. Their right to withdraw from the study at any time was clearly explained and they were assured that withdrawal or non-participation in the study would not jeopardise future care or treatment from the prison.

2.3. Data collection

Information was collected from all consenting participants through face-to-face completion of a questionnaire. All interviews were conducted in a private room or area on the medical reception wing. To mitigate against any potential literacy problems and to ensure questionnaires were completed as fully as possible, the researcher read each question out loud and asked the prisoner for their answer.

The questionnaire used in the study was devised by the researchers, externally peer reviewed and piloted prior to use in this study. The questionnaire covered the following subject areas: demographic details, prison history, current and previously prescribed pharmacological treatments and price of medications in and out of prison. Completed questionnaires and signed consent forms were kept in a locked, fireproof cabinet, which only the research team had access to. Throughout the study all participant data was kept in strict accordance with the UK Data Protection Act, 1998.

Table 1
Details of study participants.

Variable	Category	*n* (%)
Ethnicity	White	71 (83.53)
	Asian – Pakistani	5 (5.88)
	Other Asian background	3 (3.53)
	Mixed – white and Asian	2 (2.35)
	Other black background	2 (2.35)
	Other mixed background	1 (1.15)
	Other ethnic group	1 (1.18)
Age (years)	20–24	4 (4.71)
	25–29	15 (17.65)
	30–34	25 (29.41)
	35–39	22 (25.88)
	40–44	11 (12.94)
	45–49	6 (7.06)
	50–54	2 (2.35)
Length of time in prison	<6 months	55 (64.71)
	6–12 months	15 (17.65)
	1–4 years	5 (5.88)
	>4 years	6 (7.06)
	Missing	4 (4.71)
Housing status	In accommodation	54 (63.53)
	No fixed abode	29 (34.12)
	Missing	2 (2.35)

2.4. Statistical analysis

The sample size was determined following consideration of the findings of the only published study to date regarding the price differential between the two products. In this community based study, Alho et al. (2006) found a highly statistically significant finding [$t(230) = 21.9$, $p < 0.0001$] with a sample size of 131. Therefore, we anticipated needing a smaller sample size of approximately 85 participants to reach clinical and statistical significance.

Variables were grouped into categories for analysis where appropriate: the duration of time in prison (<6 months, 6–12 months and >12 months), length of time drugs were prescribed in prison (<1 month, 1–3 months and >3 months), length of time prescribed drugs prior to current prison stay (<5 years, 5–9 years and ≥10 years). For analysis of perceived ease of selling drugs, responses were aggregated from the administered four categories ("very easy", "easy", "a little difficult", "really difficult") into two ("very easy" or "easy", "a little difficult" or "really difficult"). Estimated price were rounded to the nearest £ sterling prior to analysis.

For sub-group analysis, we selected two groups of prisoners who were felt, due to their greater exposure to and experience of the diversion of prescribed drugs within the prison setting, to be more likely to accurately estimate costs. Prisoners were defined as having longer-term experience of taking opioid substitution drugs if they reported taking methadone, buprenorphine, or buprenorphine/naloxone during the current prison stay for ≥4 months. Prisoners were defined as having a relatively long-term experience of taking opioid substitution medication before prison based on the median of the maximum length of time they reported having taken methadone, buprenorphine or buprenorphine/naloxone before the current prison admission.

All analysis was carried out using Stata version 11.0 software (StataCorp). A comparison of paired variables was determined using either McNemar's test with exact *p* values (categorical variables) or Wilcoxon signed rank test (continuous variables). Pairwise correlation was assessed using Spearman's rank correlation coefficient. Statistical significance was defined as a *p* value <0.05.

3. Results

3.1. Study participants and drug use

A total of 85 participants were recruited (Table 1). The mean age was 35 years (range 23–53), all participants were male and were taking one or more of methadone, buprenorphine or buprenorphine/naloxone at the time of participation in the study (Table 2). Methadone was the most commonly prescribed opioid (Table 3).