International Journal of Drug Policy 25 (2014) 303–307

Contents lists available at ScienceDirect

International Journal of Drug Policy

journal homepage: www.elsevier.com/locate/drugpo

Short report

Factors associated with recent symptoms of an injection site infection or injury among people who inject drugs in three English cities

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ARTICLE INFO

Article history:
Received 16 August 2013
Received in revised form
20 November 2013
Accepted 22 November 2013

Keywords:
People who inject drugs
Injection site infections and injuries
England

ABSTRACT

Background: People who inject drugs (PWID) are at risk of injection site infections and injuries. The factors associated with recent symptoms of these problems are examined.
Method: PWID recruited using respondent driven sampling, underwent a computer-assisted interview and provided a dried-blood spot sample. Weight data were examined using logistic regression.
Results: The mean age of the 855 participants was 32 years, and 25% were women. During the preceding 28 days, 94% had injected heroin and 50% crack-cocaine; with 41% injecting into their arms and 47% their groin. The passing on of used needles/syringes was reported by 9.7% and receiving by 8.0%. During the preceding 28 days, 21% reported having redness, swelling and tenderness, 6.1% an abscess, and 5.2% a sore/open wound at an injection site; with a quarter (24%) reporting one or more of these. A range of factors were associated with these symptoms; all three symptoms were associated with more frequent injection and the use of multiple injection sites; two of the symptoms were also associated with having recently overdosed and the use of particular injection sites.
Conclusions: Injection site infections and injuries are common among PWID and targeted interventions are needed to reduce risk.

Introduction

Injection site infections and injuries are among the many problems that affect people who inject drugs (PWID) (Del Giudice, 2004; Dwyer et al., 2009; Gordon & Lowy, 2005; Hope, 2010). These can be caused by a number factors that lead either to tissue damage or the introduction of organisms that can cause infection; including poor injection hygiene, poor injection technique, and the reuse of injection equipment (Del Giudice, 2004; Dwyer et al., 2009). Injection site injuries and infections can result in a range of symptoms, including open wounds, abscesses, and areas of redness, swelling and tenderness (cellulitis) (Dwyer et al., 2009; Gordon & Lowy, 2005; Hope, 2010). The morbidity these problems cause places a substantial burden on healthcare systems (Hope, Kimber, Hickman, Vickerman, & Ncube, 2008; Kerr et al., 2005; Marks et al., 2013; Palepu et al., 2001) and can lead to death (Hope, 2010).

The prevalence of the symptoms of recent or current injection site infections and injuries among PWID can be as high as one in three (Hope, 2010). In the UK there has, over the last decade, been concern about the extent of injection site problems among PWID (Hope et al., 2008; Marks et al., 2013). A study in 2004 estimated the annual healthcare costs in the UK for injection site infections among PWID were between £15.5 and £47 million (Hope et al., 2008), but they could be much higher (Marks et al., 2013).

Previous studies of the factors associated with symptoms of injecting site infections and injuries in the UK have recruited PWID using simple opportunistic sampling approaches. Respondent driven sampling (RDS) was used here, as this structured chain referral sampling technique allows adjustment for selection biases and is currently regarded as one of the most appropriate methods for recruiting samples of PWID (Heckathorn, 1997). This study, the first to examine injecting site infections and injuries using RDS at multiple sites, collected information on a wider range of symptoms than previous UK studies which had only examined having an "*abscess or open wound*" in the past year (Hope et al., 2008). This paper examines the factors associated with having had each of three different symptoms of an injection site infection or injury – redness, swelling and tenderness; an abscess; or a sore/open wound – during the preceding 28 days.

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0955-3959/$ – see front matter.
http://dx.doi.org/10.1016/j.drugpo.2013.11.012

Methods

PWID were recruited in three cities, Bristol, Leeds and Birmingham using RDS. RDS methods are explained elsewhere (Heckathorn, 1997) and the methodology used in this study has been described previously (Hope et al., 2011). Briefly, the initial recruits needed to commence RDS in each city were selected (by gender and location within the city) using street outreach and key informant referrals. Eligible participants had to be aged over 15-years, have injected during the preceding four weeks, and live within the survey area. Participants underwent a computer-assisted interview with an experienced fieldworker (who could provide clarification and assistance with categorising symptoms), provided a dried blood spot (DBS) sample (tested for antibodies to the hepatitis B core antigen [anti-HBc] and hepatitis C [anti-HCV]), and were offered an acknowledgement. They were asked to act as recruiters and those who agreed were given three uniquely numbered and date-limited coupons with instructions to give these to eligible individuals whom they knew. A single fieldwork co-ordinator screened all participants for eligibility and attempted repeat participations. Information on the characteristics of whom they recruited and the participants' network size were used to test for evidence of selection bias and to generate sample weights (RDSAT Version 5.4.0. Ithaca, New York: Volz E, Heckathorn DD; 2005). The study had ethical approval.

Participants were asked whether, during the preceding 28 days, they had any of these symptoms at an injection site: redness, swelling and tenderness; an abscess (a swelling containing pus); or a sore/open wound. Weighted data from those who had fully completed the questionnaire were included in the analyses (undertaken in SPSS 19). Bivariate associations between the reporting of symptoms and demographic characteristics, the drugs used, injecting practices and recruitment site were examined using the χ^2 test. Those characteristics found to be associated in the bivariate analyses ($p < 0.1$) were then entered into a logistic regression model using the forward stepwise procedure, with inclusion assessed using the likelihood ratio test (stepwise probability for inclusion 0.05, exclusion 0.1).

Results

In total, 855 individuals were recruited from the three cities (291 in Birmingham, 273 in Bristol, and 291 in Leeds). In the weighted sample, the mean age of the participants was 32 years (median 31 years), and there were 217 women (25%). Mean number of years since the participants reported first injecting was 10.6 years (median 10 years). During the preceding year, 67% (574) had been arrested, 33% (284) had been imprisoned, and 50% (430) had been homeless. For almost one-third (31%, 267) the main source of income was illicit (not employment or benefits). A fifth (19%, 167) had anti-HBc, half (50%, 431) anti-HCV, and just over two-fifths (44%, 375) reported ever having an overdose.

During the preceding 28 days, 807 (94%) had injected heroin, 430 (50%) crack-cocaine, 93 (11%) amphetamines, and 59 (6.9%) cocaine powder. During that time, almost two-fifths (39%, 330) had injected on 14 days or fewer days; with 25% (212) injecting on between 14 and 27 days, and 37% (313) on 28 days. On the last full day that they injected, 260 (30%) had injected just once, 271 (32%) twice, 163 (19%) three times, and 161 (19%) four or more times. The two most common main injection sites on the body during the preceding 28 days were the arms 41% (352) and the groin 37% (314); with 20% (167) reporting use of two body sites and 6.8% (58) three or more sites. During the preceding 28 days, 43% (364) always washed their hands before injecting, 52% (448) always swabbed their injection sites prior to injecting, 71% (607) always cleaned their mixing containers, 35% (298) re-used a filter, and 32% (276) saved filters for reuse. The passing on of used needles/syringes in the preceding 28 days was reported by 83 (9.7%) and the receipt by 69 (8.0%).

During the preceding 28 days, 21% (177) reported having redness, swelling and tenderness, 6.1% (52) an abscess, and 5.2% (44) a sore/open wound at an injection site. Having had either an abscess or a sore/open wound at an injection site in the preceding 28 days was reported by 11% (96); with 24% (208) reporting one or more of the three symptoms.

The associations between injecting practice, the drugs used, demographic factors, and environmental factors and reporting each of the three symptoms are given in Table 1. In the multivariable analysis, reporting redness, swelling and tenderness at an injection site was found to be more common among those who had been arrested in the past year, those who reported an overdose in the past year, those who injected more frequently, and those using multiple injection sites; and was less frequent among those whose main injection site was their groin, and those who always cleaned mixing containers. An abscess at an injection site was more common among those who reported an overdose in the past year, those who injected daily, those using multiple injection sites, and those who injected into their legs; it was less common among those who always swabbed injection sites. Reporting a sore/open wound at an injection site was more frequently reported among women, those who injected daily, those using multiple injection sites, and those who reported their main source of income as being illicit.

Discussion

Recent symptoms of injection site infections and injuries were common among PWID in the three cities. Overall, a quarter reported having had at least one of the three symptoms during the preceding 28 days; with one-fifth reported having had redness, swelling and tenderness, one in 16 an abscess, and one in 20 a sore/open wound.

Firstly, it is important to consider the limitations of this study. Self-reported symptoms were used in this study and, though the accuracy of these can be questioned, studies have shown good concordance with clinical diagnosis (Morrison, Elliott, & Gruer, 1997). The comparative rarity of injecting drug use, its illegality and marginalised nature all impede the recruitment of a representative sample of PWID. This study addressed this problem by using RDS to recruit participants. Sample derived weights were then applied with the aim of correcting for possible sampling biases (Heckathorn, 1997); though it is not possible to test how successful this has been. Finally, this study recruited participants in only three cities, though these were spread across England. The findings thus need to be generalised with caution.

Previous studies in the UK had only looked at the prevalence of an "*abscess or open wound*" in the preceding year and typically found that around one-third of PWID had reported this (Hope et al., 2008). Studies elsewhere that had examined the prevalence of current or recent symptoms reported similar levels to those found here (Hope, 2010).

To varying extents the three symptoms considered here could be caused by an infection due to poor injection hygiene or to an injury due to poor injection technique, the reuse of needles, or injecting an acidic drug solution (Del Giudice, 2004; Dwyer et al., 2009). All three of the symptoms were associated with factors related to the frequency of injection and the body sites used. These factors have also been reported to be associated with injection site infections and injuries in previous studies (Hope et al., 2008; Lloyd-Smith et al., 2005; Salmon et al., 2009). The associations with injection in to multiple body sites and frequent injection could reflect issues with