



## Going into the groin: Injection into the femoral vein among people who inject drugs in three urban areas of England



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### ARTICLE INFO

#### Article history:

Received 19 October 2014

Received in revised form 27 March 2015

Accepted 28 March 2015

Available online 9 April 2015

#### Keywords:

People who inject drugs

Femoral vein

Risk behaviours

Bacterial infections

Viral infections

### ABSTRACT

**Background:** There have been increasing concerns about injection into the femoral vein – groin injecting – among people who inject drugs in a number of countries, though most studies have been small. The extent, reasons and harms associated with groin injecting are examined.

**Method:** Participants were recruited using respondent driven sampling (2006–2009). Weighted data was examined using bivariate analyses and logistic regression.

**Results:** The mean age was 32 years; 25% were women ( $N=855$ ). During the preceding 28 days, 94% had injected heroin and 13% shared needles/syringes. Overall, 53% reported ever groin injecting, with 9.8% first doing so at the same age as starting to inject. Common reasons given for groin injecting included: “Can’t get a vein elsewhere” (68%); “It is discreet” (18%); and “It is quicker” (14%). During the preceding 28 days, 41% had groin injected, for 77% this was the only body area used (for these “It is discreet” was more frequently given as a reason). In the multivariable analysis, groin injection was associated with: swabbing injection sites; saving filters for reuse; and receiving opiate substitution therapy. It was less common among those injecting into two body areas, and when other people (rather than services) were the main source of needles. Groin injection was more common among those with hepatitis C and reporting ever having deep vein thrombosis or septicaemia.

**Conclusions:** Groin injection was common, often due to poor vascular access, but for some it was out of choice. Interventions are required to reduce injecting risk and this practice.

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### 1. Introduction

People who inject drugs (PWID) can have difficulty maintaining access to their peripheral veins (Harris and Rhodes, 2012). Problems with accessing peripheral veins may result in people making several injection attempts or using multiple areas of the body for injection (Darke et al., 2001; Harris and Rhodes, 2012; Maliphant and Scott, 2005). Injecting into central veins, such as the femoral vein (“groin injecting”), was generally regarded as the “last resort” for those who had no other options left, as a consequence of the vascular damage that can result after injecting over a long period of time (Darke et al., 2001; Maliphant and Scott, 2005; Rhodes, 1995).

In the United Kingdom (UK), groin injecting has gone from being an uncommon practice among PWID in the 1990s (Rhodes, 1995), to one which was reported by up to half of those surveyed in the mid-2000s (Maliphant and Scott, 2005; Rhodes et al., 2006). In part, this change may reflect an ageing cohort of PWID in the UK. However, for a few, injecting into the groin was reported to be occurring relatively soon after they had first started to inject, and for some, such as those injecting heroin and crack combinations, it may have become an “acceptable risk” (Rhodes et al., 2006, 2007). Increases in injecting into the femoral vein have been documented among PWID elsewhere. Recent reports indicate that 20% of those sampled in Seattle, USA, 31.5% of those sampled in Iran, and 34% of those sampled in Bangkok, Thailand, reported current injection into the groin or femoral vein (Coffin et al., 2012; Karimi et al., 2014; Ti et al., 2014).

Injecting into the groin may occur for reasons other than difficulties with vascular access elsewhere on the body. Injecting into the groin can be viewed as discreet – as the groin is a part of the

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body rarely seen by others – without clearly visible signs of injection such as ‘track marks’ (Coffin et al., 2012; Rhodes et al., 2007). In addition, groin injection can also be seen by PWID as being an ‘easy hit’ or as possibly giving a superior ‘rush’ (Coffin et al., 2012; Maliphant and Scott, 2005; Rhodes et al., 2007). This is because injecting into the femoral vein, due to the large size of this vein (which also allows the development of a sinus tract), is relatively simple and less likely to result in a missed ‘hit’ or having to repeatedly try to inject. Thus groin injection can be seen as both a discreet and a quick option.

Injecting into the femoral vein has been associated with a number of health problems (Coffin et al., 2012; Senbanjo and Strang, 2011); including damage to the vein and to the femoral artery, infections and circulatory problems. Health problems including deep vein thrombosis (DVT; McColl et al., 2001), abscesses (Mackenzie et al., 2000), chronic venous disease (Pieper et al., 2009), and necrosis of the femoral artery (Mullan et al., 2008) have been reported among those injecting into their groin. PWID are often unaware of the risks of developing these problems (Williams and Abbey, 2006) and often delay accessing services in response to injecting related problems (Hope et al., 2014b).

The few previous studies that have examined the extent of groin injection have had small sample sizes or had recruited using simple convenience sampling approaches, usually through health-care settings. This study recruited a comparatively large sample of PWID from the community using respondent driven sampling (RDS), a form of structured chain referral sampling which aims to adjust for selection biases that may arise from convenience surveys (Heckathorn, 1997; Salganik and Heckathorn, 2004). This quantitative study purposively collected detailed data on current injecting practices, including groin injection, to examine the associations between injecting practice and the reasons for injecting into the groin. It also examined the medical complications associated with this practice. This paper describes (a) the extent of groin injection; (b) the reasons given for injecting into the groin; (c) the factors associated with current groin injection; and (d) the health harms associated with groin injecting.

## 2. Methods

This quantitative study recruited PWID from community settings, with participants undergoing an interview and providing a dried blood spot (DBS) sample.

### 2.1. Recruitment

Participants were recruited into a voluntary unlinked-anonymous cross-sectional survey conducted between 2006 and 2009 in three major urban areas across England – Bristol, Leeds and Birmingham – using RDS (Hope et al., 2014b). RDS is an established recruitment process which is explained fully elsewhere (Heckathorn, 1997, 2002; Salganik and Heckathorn, 2004). Briefly, RDS recruits subjects through the participants’ social networks and starts with the selection of the initial recruits, or ‘seeds’. In each of the urban areas the ‘seeds’ were selected in relation to location within the area and gender through key informants and street outreach. To be eligible, participants had to be aged over 15-years, have injected during the preceding four weeks, and live within one of the three cities.

The participants first provided a DBS sample (tested for antibodies to HIV [anti-HIV], the hepatitis B core antigen [anti-HBc], and the hepatitis C virus [anti-HCV]), before undergoing a computer-assisted interview; once this was completed they were then offered an acknowledgement. The participants were asked to act as recruiters and those who agreed were given three uniquely numbered date-limited coupons. They were instructed to give these coupons only to eligible individuals whom they knew. A single fieldwork co-ordinator screened all participants for eligibility and also for attempted repeat participations. The study had ethical approval (London REC, MREC/98/2/51).

### 2.2. Questionnaire

The questionnaire was developed from ones used in previous studies (Judd et al., 2005; Hickman et al., 2007) with the core questions consistent with those used in national bio-behavioural surveillance (Hope et al., 2005, 2014a). The questions on groin injecting were developed from existing questions on injecting practice and the findings of two exploratory studies (Maliphant and Scott, 2005; Rhodes et al.,

2007). The questionnaire was reviewed by members of the study team, including the fieldworkers, and by people working with PWID in the study areas. The two main foci were: (1) injecting drug use (drugs used, injection practices, paraphernalia used, and injection sites including a section on groin injection); and (2) health harms (particularly infections) and associated health service use and intervention uptake. In addition, the questionnaire covered demographics, contact with criminal justice system, sexual behaviours, and the uptake of other health services. Questions on injecting practice used a 28 day recall period, so as to be consistent with other UK studies; this period has previously been found to be appropriate and reliable (Stimson et al., 1998).

### 2.3. Analysis

In surveys using chain referral approaches, such as RDS, there is a tendency for participants to recruit people like themselves, and a higher probability that people with large networks will be recruited. Therefore, information on network size and characteristics were used to test for evidence of selection bias and to generate sample weights using RDSAT (Version 5.4.0. Ithaca, New York).

Weighted data from those who had fully completed the questionnaire were included in the analyses (undertaken in SPSS 19). Descriptive analyses initially explored the extent of ever having injected into the groin and the reasons given for having done this. Factors associated with groin injecting were explored among those who reported injecting during the preceding 28 days. First, bivariate associations between reporting recent injection into the groin and demographic characteristics, environmental factors, the drugs used, injecting practices, and recruitment site were examined using the  $\chi^2$  test. The variables selected for inclusion in the analyses related to factors that had previously been shown to be related to injecting risk. Then those characteristics found to be associated in the bivariate analysis were entered using the forward stepwise procedure in SPSS into a logistic regression model with inclusion assessed using the likelihood ratio (with the stepwise probability for inclusion of 0.05 and exclusion of 0.1).

## 3. Results

### 3.1. Demographic and drug use characteristics

Across the three areas 855 individuals were recruited (291 in both Birmingham and Leeds; and 273 in Bristol). The mean age of the weighted sample was 32 years (median 31, IQR 27–37 years); with 13% (113) of the participants aged under 25-years and 34% (293) aged over 34-years. One-quarter (25%, 217) of the participants were women, and 4.4% (38) had been born outside the UK. For 31% (267) their main source of income was illicit (i.e. not from employment or benefits). During the preceding year, two-thirds (67%, 574) had been arrested, half (50%, 430) had been homeless and a third (33%, 284) had been imprisoned. The mean time since first injection was 10.6 years (median 10, IQR 5–15 years), with 21% (181) of the participants having first injected less than five-years ago and 25% (217) over 14-years ago.

During the preceding 28 days, 94% (807) had injected heroin, 50% (430) crack-cocaine, 11% (93) amphetamines, and 6.9% (59) cocaine powder. During that time, 37% (313) of the participants had injected daily. On the last complete day that they injected, 70% had injected more than once (271 twice, 163 thrice and 161 four or more times). For two-fifths (40%, 339) injecting usually took place in their own home, for a third it was someone else’s home (33%, 280), and for 15% (131) it was a hostel; for the rest (12%, 105) it was a public place. During the preceding 28 days, two-fifths (43%, 364) had always washed their hands prior to injecting, and half (52%, 448) had always swabbed their injection sites. A third (35%, 298) had re-used a filter, a third (32%, 276) had saved filters for reuse, and 13% (115) had shared needles or syringes in the preceding 28 days.

### 3.2. Ever injected into the groin

Overall, 53% (450) reported that they had ever injected into their groin (femoral vein). This did not differ by age (for those groin injecting the mean age was 32.5 years, median 31, vs. mean of 31.6, median 30, for those not; Mann–Whitney  $U p = 0.063$ ) or by gender (54%, 345/638, of men and 48%, 105/217, of women had;  $p = 0.153$ ).

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