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Uptake of paraphernalia from injecting equipment provision services and its association with sharing of paraphernalia among injecting drug users in Scotland

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ABSTRACT

Background: There has been a significant increase in the provision of injecting paraphernalia from Scottish injecting equipment provision (IEP) services. However, there is currently a lack of evidence on whether uptake of paraphernalia has any impact on paraphernalia sharing among injecting drug users (IDU). The aim of this study was to examine the factors associated with paraphernalia sharing; in particular, whether uptake of filters, spoons and sterile water from IEPs is associated with a reduction in the sharing of these items.

Methods: A cross-sectional voluntary anonymous survey of 2037 IDUs was administered during 2008–2009. Participants were asked whether they had shared filters, spoons or water (paraphernalia) in the previous 6 months, and their uptake of these items from an IEP during an average week in the previous 6 months.

Results: Self-reported uptake of paraphernalia in an average week during the previous 6 months was associated with reduced odds of sharing paraphernalia: (i) uptake of >30 filters was associated with a reduced odds of sharing filters (adjusted odds ratio (AOR) 0.50, 95% confidence interval 0.32–0.79); (ii) uptake of >30 spoons was associated with a reduced odds of sharing spoons (AOR 0.46, 95% confidence interval 0.28–0.74); and (iii) uptake of sterile water was associated with a reduced odds of sharing water (AOR 0.36, 95% confidence interval 0.22–0.61) compared to no uptake of each of these items.

Conclusions: Uptake of paraphernalia appears to be associated with safer injecting practice. Further research is needed to establish the impact of paraphernalia provision on HCV transmission.

1. Introduction

Since 2003, Injecting Equipment Provision (IEP) services in the UK have been permitted by law to provide clients with sterile items of drug injecting equipment other than needles and syringes (UK Home Office, 2003). This includes spoons (or stericups) for cooking drugs, sterile water ampoules for mixing drugs and cleaning works, and filters for preventing larger insoluble particles from entering the syringe after drug preparation (collectively hereafter referred to as 'paraphernalia'). In Scotland, there has been significant development and expansion of IEP services as part of the Scottish Government's Hepatitis C Action Plan, which invested £43 million between May 2008 and March 2011 in hepatitis C virus (HCV) prevention and treatment (Scottish Government, 2008). Government guidelines published in May 2010 recommended that filters, spoons, sterile water, acidifiers, and sterile wipes should be provided for each injection, and should be free of charge to service users (Scottish Government, 2010). This has coincided with a significant increase in the provision of paraphernalia from Scottish IEP services: 350,000 filters and 500,000 spoons were provided between April 2008 and March 2009, increasing to 2.2 million filters and 2.1 million spoons between April 2009 and March 2010 (Information Services Division, 2011; Health Protection Agency, 2011).

In Scotland, injecting equipment provision is mainly through pharmacies, although fixed site, mobile and outreach needle exchange account for up to a third of IEP services in some areas. IEP outlets usually provide a range of services, including opiate substitution therapy (OST), and other harm reduction services (Information Services Division, 2010). The majority of pharmacy sites provide paraphernalia in packs containing spoons, filters and needles/syringes in a one-to-one ratio to encourage single use, or in 'One Hit Kits' (that contain a filter incorporated into the cap of the syringe). Sterile water is supplied in 2 ml glass ampoules,

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although current provision is restricted due to prescription requirements.

The One Hit Kits, but not multi-packs, provide an instruction leaflet showing how all equipment should be disposed of after use. There are no limits on the amount of injecting equipment distributed at a single visit, and provision is not dependent on the return of used needles. Current recommendations are that clients attending IEP services for the first time undergo a short interview so that staff can assess clients' injecting and related needs (Scottish Government, 2010).

The association between HCV transmission and needle/syringe sharing in injecting drug users (IDU) has been well documented, with a higher risk in more frequent injectors, and those who are new to or require assistance with injecting (Wand et al., 2009; Pouget et al., 2012; Hahn et al., 2002). HCV transmission has also been associated with the sharing of drug containers/spoons and filters (Hagan et al., 2001; Thorpe et al., 2002), and with the sharing of drug preparation equipment more generally (De et al., 2008; Pouget et al., 2012). In a large cohort study by Hagan et al., sharing drug preparation equipment, but not syringes, was significantly associated with HCV seroconversion, and the authors estimated that 37% of the observed seroconversions could be attributed to the sharing of drug preparation equipment (Hagan et al., 2010).

Ethnographic studies have identified numerous opportunities for contamination of paraphernalia during the injecting process (Colon et al., 2001; Koester et al., 2005; Needle et al., 1998; Taylor et al., 2004). In addition, laboratory studies have isolated HCV RNA from used paraphernalia (Crofts et al., 2000; Thibault et al., 2011), as well as demonstrated the stability of HCV on drug cookers/spoons after preparation and cooking of drugs (Doerrbecker et al., 2011). Doerrbeker and colleagues also demonstrated that HCV contamination of drug cookers was only inactivated after heating for 80–95 s, and the addition of water or serum to the cooker did not alter HCV viability (Doerrbecker et al., 2011).

The distribution of paraphernalia at IEP services has cost implications, and in some cases, may restrict the ability to expand or deliver core services to IDU (Information Services Division, 2010). However, it has yet to be established whether provision of paraphernalia has any impact on paraphernalia sharing (Gillies et al., 2010; Hutchinson et al., 2000; Palmateer et al., 2010). A recent systematic review found that most published studies on the association between uptake and sharing of paraphernalia used attendance at needle exchange services as a proxy measure for uptake of this equipment (Bluthenthal et al., 1998; Gillies et al., 2010; Hagan and Thiede, 2000; Huo and Ouellet, 2007; Longshore et al., 2001; Sears et al., 2001a,b; Stoltz et al., 2007; Vlahov et al., 1997). In general, these studies suggested that attendance at IEP services reduced the odds of sharing paraphernalia, but the confidence intervals were wide and often included unity (Gillies et al., 2010).

The aim of this study was, therefore, to assess factors that might be associated with sharing of paraphernalia: in particular, whether the uptake of filters, spoons and sterile water from an IEP service was associated with a reduction in the sharing of these items. These data will help to inform future guidance for IEP services in Scotland and elsewhere.

2. Methods

2.1. Study population

A cross-sectional voluntary anonymous survey approach was used to recruit and interview IDUs. IEP services were selected on the basis of willingness to take part, and availability of a private room in which to conduct interviews. Nearly 80% of known IEPs are pharmacy based, with the remainder accounted for by fixed site or mobile specialist services. In total, 81 out of 169 (48%) of pharmacy IEPs, and 22 out of 39 (56%) specialist IEPs participated as recruitment sites.

Clients attending the participating IEP services, for injecting equipment and/or other harm reduction services (e.g., methadone prescription), were invited to take part if they had ever injected drugs, and, after providing informed consent, completed a short interviewer-administered questionnaire. The interview lasted approximately 10–15 min, and all participants received a £5 ($8) voucher to compensate them for their time. All individuals attending the service were approached; the exception being if the person was obviously intoxicated, or if the interviewer was busy interviewing someone else at the time. Approximately 63% of potentially eligible clients that were approached agreed to participate. Interviewers noted down the gender and approximate age of those who did not participate: those not participating were slightly younger than participants (mean age was 29 years compared to 33 years, respectively), but similar in terms of gender (72% of both groups were male). The main reason given for not participating was lack of time. Between June 2008 and June 2009, trained interviewers recruited 2563 participants, of whom 2037 had injected in the previous 6 months and were included in this analysis. Ethical approval was obtained from the West Glasgow Ethics Committee, as well as Research and Development committees at each participating Health Board.

2.2. Outcome measures

The three outcome measures were: whether in the previous 6 months a participant reported using (i) filters, (ii) spoons, or (iii) water that had already been used by someone else (hereafter referred to as 'sharing' of each paraphernalia item).

2.3. Explanatory variables

Injecting frequency in the preceding 6 months was assessed by asking participants how often, on average, they injected drugs during the months that they injected. The uptake of paraphernalia was assessed by asking participants how many filters, spoons, and sterile water ampoules they had collected from any service (pharmacy, fixed site specialist needle exchange, or mobile/outreach exchange) in an average week during the preceding 6 months. Because of the small number of participants who reported collecting sterile water, uptake and shortfall of sterile water were categorised as binary variables.

'Shortfall' of paraphernalia was calculated by subtracting the number of filters, spoons or sterile water ampoules collected in an average week from the number of injections reported in an average week (in the months that injecting was reported). The shortfall of each item (filters, spoons, water) was calculated separately.

Participants were asked whether they had been homeless (defined as living in a hostel for the homeless, no fixed abode, or living on the streets) whether they had received a script for methadone, which drug they had injected most often (exclusive heroin, stimulants (amphetamine, cocaine or crack) ± other drugs, or body building drugs ± other drugs) in the preceding 6 months. Participants were also asked their age, sex, region, length of injecting history, and whether they had injected in the last 4 weeks.

2.4. Analysis

Data were analysed using SPSS. Logistic regression was used to calculate the odds of self-reported sharing of (i) filters, (ii) spoons, and (iii) sterile water associated with uptake of these respective paraphernalia items, as well as age, sex, region, history of homelessness, methadone treatment, time since onset of injecting, time since last injection, main drug of injection, and frequency of injecting. Those variables significant at the 5% level in the univariate analysis were included in multivariate logistic regression models. Two separate multivariate logistic regression models were fitted: the first (referred to as Model 1) examined the number of items of paraphernalia collected from IEP services, while the second (referred to as Model 2) examined the shortfall of paraphernalia.

Participants for whom no outcome measure (i.e., sharing of (i) filters, (ii) spoons, or (iii) sterile water) was recorded were excluded from the logistic regression examining that particular outcome. Regarding explanatory variables, if there were a small number of individuals (<5%) with missing data, these were excluded from the logistic regression. To ensure that as many participants as possible were retained in the multivariate logistic regression models (for completeness and to maintain statistical power), a separate 'not known' category was included for explanatory variables with ≥5% missing data.

3. Results

3.1. Sample characteristics (Table 1)

Among 2037 participants, 73% were male, 60% were aged over 30 years, and 49% were resident in the West of Scotland. Thirty percent of participants reported an episode of homelessness in the

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Table 1
Logistic risk scores for having used a filter already used by someone else in the previous 6 months among 2037 current IDUs recruited from IEP services across Scotland, 2008–2009. Model 1 examines number of filters obtained but not shortfall of filters, in an average week, while Model 2 examines shortfall of filters but not number of filters obtained, in an average week.

Determinant	*N* (%)	Used filter already used by someone else in previous 6 months, odds ratio (95% confidence interval)			
		n (% of *N*)	Univariate	Multivariate	
				Model 1	Model 2
Study group	2037 (100%)	669 (33%)			
Gender					
Male	1495 (73%)	463 (31%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Female	530 (26%)	199 (38%)	**1.34 (1.09–1.65)**	**1.26 (1.01–1.57)**	**1.26 (1.01–1.57)**
Not known	12 (1%)	7 (58%)	–		
Age					
16–25 years	318 (16%)	128 (40%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
26–30 years	495 (24%)	171 (35%)	0.78 (0.59–1.05)	0.80 (0.59–1.09)	0.80 (0.59–1.09)
>30 years	1224 (60%)	370 (30%)	**0.64 (0.50–0.83)**	**0.70 (0.52–0.92)**	**0.69 (0.53–0.92)**
Region					
East of Scotland	583 (29%)	174 (30%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
West of Scotland	1003 (49%)	318 (32%)	1.09 (0.87–1.36)	0.99 (0.77–1.28)	1.01 (0.79–1.28)
North of Scotland	451 (22%)	177 (39%)	**1.52 (1.17–1.97)**	1.25 (0.92–1.69)	1.26 (0.95–1.69)
Homeless in previous 6 months					
No	1433 (70%)	427 (30%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Yes	602 (30%)	241 (40%)	**1.57 (1.29–1.92)**	**1.42 (1.16–1.76)**	**1.43 (1.16–1.76)**
Not known	2 (0%)	1 (50%)	–		
Methadone treatment for all of previous 6 months					
No	966 (48%)	359 (37%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Yes	1068 (52%)	310 (29%)	**0.69 (0.57–0.83)**	0.85 (0.69–1.04)	0.84 (0.68–1.03)
Not known	3 (0%)	0 (0%)			
Time since last injection					
In last 4 weeks	1753 (86%)	606 (35%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
In last 6 months but not in last 4 weeks	284 (14%)	63 (22%)	**0.54 (0.40–0.73)**	**0.61 (0.44–0.83)**	**0.61 (0.44–0.83)**
Time since onset of injecting					
<6 years	686 (34%)	233 (34%)	1.00 (Baseline)	NI	NI
6–15 years	1011 (50%)	323 (32%)	0.91 (0.74–1.12)		
>15 years	338 (17%)	112 (33%)	0.96 (0.73–1.27)		
Not known	2 (0%)	1 (50%)	–		
Drugs injected in previous 6 months					
Stimulants ± other drugs	453 (22%)	187 (41%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Heroin only	1542 (76%)	480 (31%)	**0.64 (0.52–0.80)**	**0.66 (0.53–0.83)**	**0.67 (0.53–0.85)**
Body building ± other drugs	42 (2%)	2 (5%)	**0.07 (0.02–0.30)**	**0.09 (0.02–0.39)**	**0.09 (0.02–0.40)**
Frequency of injecting in the months injected, previous 6 months					
Once a week or less	470 (23%)	107 (23%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
2–7 times a week	547 (27%)	156 (29%)	**1.35 (1.02–1.80)**	**1.37 (1.01–1.86)**	**1.36 (1.00–1.85)**
>once a day	1020 (50%)	406 (40%)	**2.24 (1.75–2.88)**	**2.06 (1.54–2.75)**	**1.66 (1.18–2.32)**
Number of filters obtained from IEP service in average week in previous 6 months					
None	1176 (58%)	402 (34%)	1.00 (Baseline)	1.00 (Baseline)	
1–15	341 (17%)	89 (26%)	**0.68 (0.52–0.89)**	0.80 (0.59–1.08)	
16–30	236 (12%)	85 (36%)	1.08 (0.81–1.45)	0.88 (0.64–1.23)	*
More than 30	120 (6%)	31 (26%)	0.67 (0.44–1.03)	**0.50 (0.32–0.79)**	
Not known	164 (8%)	62 (38%)	1.17 (0.84–1.64)	**1.60 (1.10–2.33)**	
Shortfall of filters in average week in previous 6 months					
No shortfall	427 (21%)	112 (26%)	1.00 (Baseline)		1.00 (Baseline)
Shortfall of 1–10 filters	795 (39%)	217 (27%)	1.06 (0.81–1.38)	*	1.20 (0.90–1.61)
Shortfall of more than 10 filters	651 (32%)	278 (43%)	**2.10 (1.61–2.73)**		**1.55 (1.12–2.14)**
Not known	164 (8%)	62 (38%)	**1.71 (1.17–2.51)**		**2.08 (1.37–3.16)**

NI, not included. Values in bold type are statistically significant at the 5% level.
* Variables not significant at the 5% level in univariate analysis were not included in multivariate models.

previous 6 months, and 52% had received methadone treatment for all of the previous 6 months. Fifty percent of participants reported that they injected drugs more than once daily, and 67% had been injecting for more than 5 years.

3.2. Uptake of injecting paraphernalia

Filters and spoons were obtained more often from IEP services than sterile water (35%, 32% and 6% of respondents reported obtaining these respective items in the previous 6 months). Of those who reported that they did not collect a particular paraphernalia item, 60% said that filters were not available, 61% said that spoons were not available, and 74% said that sterile water was not available at the IEP services they used.

3.3. Factors associated with sharing of filters, spoons, or water in univariate analysis

Thirty-three percent of participants reported sharing filters, 42% of participants reported sharing spoons, and 31% reported sharing water in the previous 6 months. In the univariate analysis, factors that were significantly associated with sharing filters, spoons and water were: sex, age, homelessness in the previous 6 months, methadone use in all of the previous 6 months, time since last injection, drug of injection, frequency of injection, and uptake or shortfall of that particular item of paraphernalia. In addition, sharing filters and spoons was associated with region of recruitment and sharing of spoons and water was associated with time since onset of injecting. These factors were all adjusted for in subsequent multivariate models.

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Table 2
Logistic risk scores for having used a spoon already used by someone else in the previous 6 months among 2036 current IDUs recruited from IEP services across Scotland, 2008–2009. Model 1 examines number of spoons obtained but not shortfall of spoons, in an average week, while Model 2 examines shortfall of spoons but not number of spoons obtained, in an average week.

Determinant	*N* (%)	Used spoon already used by someone else in previous 6 months, odds ratio (95% confidence interval)			
		n (% of *N*)	Univariate	Multivariate	
				Model 1	Model 2
Study group	2036 (100%)	864 (42%)			
Gender					
Male	1495 (73%)	604 (40%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Female	529 (26%)	254 (48%)	**1.36 (1.12–1.66)**	1.19 (0.96–1.47)	1.21 (0.98–1.50)
Not known	12 (1%)	6 (50%)			
Age					
16–25 years	317 (16%)	166 (52%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
26–30 years	495 (24%)	226 (46%)	0.76 (0.58–1.01)	0.79 (0.58–1.07)	0.80 (0.60–1.08)
>30 years	1224 (60%)	472 (39%)	**0.57 (0.45–0.73)**	**0.64 (0.48–0.86)**	**0.66 (0.49–0.88)**
Region					
East of Scotland	583 (29%)	226 (39%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
West of Scotland	1002 (49%)	415 (41%)	1.12 (0.91–1.38)	0.88 (0.69–1.14)	0.99 (0.78–1.26)
North of Scotland	451 (22%)	223 (49%)	**1.55 (1.21–1.98)**	1.10 (0.82–1.48)	1.26 (0.95–1.67)
Homeless in previous 6 months					
No	1432 (70%)	567 (40%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Yes	602 (30%)	296 (49%)	**1.48 (1.22–1.79)**	**1.31 (1.07–1.60)**	**1.31 (1.07–1.60)**
Not known	2 (0%)	1 (50%)	–	–	-
Methadone treatment for all of previous 6 months					
No	966 (47%)	449 (47%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Yes	1067 (52%)	414 (39%)	**0.73 (0.61–0.87)**	0.90 (0.74–1.11)	0.91 (0.74–1.11)
Not known	3 (0%)	1 (33%)	–	–	–
Time since last injection					
In last 4 weeks	1752 (86%)	777 (44%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
In last 6 months but not in last 4 weeks	284 (14%)	87 (31%)	**0.55 (0.42–0.73)**	**0.62 (0.47–0.83)**	**0.63 (0.47–0.84)**
Time since onset of injecting					
<6 years	686 (34%)	324 (47%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
6–15 years	1010 (50%)	415 (41%)	**0.78 (0.64–0.95)**	0.85 (0.68–1.06)	0.86 (0.69–1.07)
>15 years	338 (17%)	124 (37%)	**0.65 (0.50–0.85)**	0.74 (0.54–1.01)	0.75 (0.55–1.02)
No known	2 (0%)	1 (50%)	**–**		
Drugs injected in previous 6 months					
Stimulants ± other drugs	453 (22%)	230 (51%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Heroin only	1541 (76%)	631 (41%)	**0.67 (0.55–0.83)**	**0.67 (0.54–0.84)**	**0.67 (0.54–0.84)**
Body building ± other drugs	42 (2%)	3 (7%)	**0.08 (0.02–0.25)**	**0.08 (0.02–0.26)**	**0.09 (0.03–0.29)**
Frequency of injecting in the months injected, previous 6 months					
Once a week or less	470 (23%)	145 (31%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
2–7 times a week	547 (27%)	212 (39%)	**1.42 (1.09–1.84)**	**1.38 (1.04–1.83)**	**1.34 (1.01–1.78)**
>once a day	1019 (50%)	507 (50%)	**2.22 (1.76–2.80)**	**2.05 (1.57–2.68)**	**1.51 (1.09–2.10)**
Number of spoons obtained from IEP service in average week in previous 6 months					
None	1247 (61%)	567 (46%)	1.00 (Baseline)	1.00 (Baseline)	
1–15	338 (17%)	113 (33%)	**0.60 (047–0.78)**	**0.61 (0.45–0.82)**	
16–30	197 (10%)	79 (40%)	0.80 (0.59–1.09)	**0.56 (0.39–0.79)**	*
More than 30	91 (5%)	33 (36%)	0.68 (0.44–1.06)	**0.46 (0.28–0.74)**	
Not known	163 (8%)	72 (44%)	0.95 (0.68–1.32)	1.24 (0.87–1.78)	
Shortfall of spoons in average week in previous 6 months					
No shortfall	362 (18%)	119 (33%)	1.00 (Baseline)		1.00 (Baseline)
Shortfall of 1–10 spoons	804 (40%)	300 (37%)	1.22 (0.94–1.58)	*	**1.37 (1.02–1.83)**
Shortfall of >10 spoons	707 (35%)	373 (53%)	**2.28 (1.75–2.97)**		**1.85 (1.31–2.60)**
Not known	163	72 (44%)	**1.62 (1.11–2.36)**		**1.93 (1.28–2.92)**

NI, not included. Values in bold type are statistically significant at the 5% level.
* Variables not significant at the 5% level in univariate analysis were not included in multivariate models.

3.4. Factors associated with sharing of filters in multivariate analysis

In the first multivariate model (Model 1 in Table 1), respondents who had obtained more than 30 filters in an average week during the previous 6 months had significantly reduced odds of sharing filters during that time (adjusted odds ratio (AOR) 0.50, 95% confidence interval (CI) 0.32–0.79), compared to those who had obtained none. While, in a second multivariate model (Model 2 in Table 1), respondents who had a shortfall of more than 10 filters in an average week during the previous 6 months had significantly increased odds of sharing filters during that time (AOR: 1.55, 95% CI 1.12–2.14), compared to those who had no shortfall. Other odds ratios were similar across the two multivariate models. In multivariate Model 1, sharing of filters was significantly associated with female sex (AOR 1.26, 95% CI 1.01–1.57) age >30 years (AOR 0.70, 95% CI 0.52–0.92), homelessness in last 6 months (AOR 1.42, 95% CI 1.16–1.76), not injecting in the previous 4 weeks (AOR 0.61, 95% CI 0.44–0.83), exclusive heroin injecting (AOR 0.66, 95% CI 0.53–0.83), and injecting more than once a day in the previous 6 months (AOR 2.06, 95% CI 1.54–2.75 in Model 1, and AOR 1.66, 95% CI 1.18–2.32 in Model 2).

3.5. Factors associated with sharing of spoons in multivariate analysis

In the first multivariate model (Model 1 in Table 2), respondents who reported uptake of at least one spoon in an average

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Table 3
Logistic risk scores for having used a sterile water ampoule already used by someone else in the previous 6 months among 2033 current IDUs recruited from IEP services across Scotland, 2008–2009. Model 1 examines uptake of sterile water but not shortfall of sterile water, in an average week; while, Model 2 examines shortfall of sterile water but not uptake of sterile water, in an average week.

Determinant	*N* (%)	Used water ampoules already used in previous 6 months, odds ratio (95% confidence interval)			
		n (% of *N*)	Univariate	Multivariate	
				Model 1	Model 2
Study group	2033 (100%)	627 (31%)			
Gender					
Male	1492 (73%)	428 (29%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Female	529 (26%)	194 (37%)	**1.44 (1.17–1.78)**	**1.33 (1.07–1.66)**	**1.34 (1.07–1.67)**
Not known	12 (1%)	1 (8%)	–	–	
Age					
16–25 years	316 (16%)	114 (36%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
26–30 years	495 (24%)	167 (34%)	0.90 (0.67–1.21)	0.96 (0.72–1.35)	0.97 (0.71–1.33)
>30 years	1222 (60%)	346 (28%)	**0.70 (0.54–0.91)**	0.80 (0.59–1.09)	0.79 (0.59–1.08)
Region					
East of Scotland	583 (29%)	173 (30%)	1.00 (Baseline)	NI	NI
West of Scotland	999 (49%)	332 (33%)	1.18 (0.95–1.47)		
North of Scotland	451 (22%)	122 (27%)	0.88 (0.67–1.16)		
Homeless in previous 6 months					
No	1431 (70%)	401 (28%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Yes	600 (30%)	225 (38%)	**1.54 (1.26–1.89)**	**1.36 (1.10–1.67)**	**1.36 (1.10–1.67)**
Not known	2 (0%)	1 (50%)	–		
Methadone treatment for all of previous 6 months					
No	962 (47%)	325 (34%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Yes	1068 (53%)	301 (28%)	**0.77 (0.64–0.93)**	0.92 (0.75–1.14)	0.92 (0.75–1.14)
Not known	3 (0%)	1 (33%)	–		
Time since last injection					
In last 4 weeks	1750 (86%)	564 (32%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
In last 6 months but not in last 4 weeks	283 (14%)	63 (22%)	**0.60 (0.45–0.81)**	**0.68 (0.50–0.94)**	**0.69 (0.50–0.95)**
Time since onset of injecting					
<6 years	684 (34%)	236 (35%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
6–15 years	1009 (50%)	293 (29%)	**0.78 (0.63–0.96)**	0.87 (0.69–1.10)	0.87 (0.69–1.10)
>15 years	338 (17%)	97 (29%)	0.76 (0.58–1.02)	0.93 (0.67–1.30)	0.92 (0.66–1.29)
Not known	2 (0%)	1 (50%)	–	–	–
Drugs injected in last 6 months					
Stimulants ± other drugs	453 (22%)	167 (37%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
Heroin only	1538 (76%)	459 (30%)	**0.73 (0.59–0.91)**	**0.73 (0.58–0.92)**	**0.72 (0.57–0.91)**
Body building ± other drugs	42 (2%)	1 (2%)	**0.04 (0.01–0.31)**	**0.05 (0.01–0.40)**	**0.05 (0.01–0.40)**
Frequency of injecting in the months injected, previous 6 months					
Once a week or less	469 (23%)	98 (21%)	1.00 (Baseline)	1.00 (Baseline)	1.00 (Baseline)
2–7 times a week	546 (27%)	152 (28%)	**1.46 (1.09–1.95)**	**1.52 (1.11–2.08)**	**1.50 (1.09–2.05)**
>once a day	1018 (50%)	377 (37%)	**2.23 (1.72–2.88)**	**2.12 (1.59–2.83)**	**2.01 (1.53–2.73)**
Collected sterile water from IEP service in previous 6 months					
No	1751 (86%)	549 (31%)	1.00 (Baseline)	1.00 (Baseline)	
Yes	119 (6%)	19 (16%)	**0.42 (0.25–0.69)**	**0.36 (0.22–0.61)**	*
Not known	163 (8%)	59 (36%)	1.24 (0.89–1.74)	**1.72 (1.19–2.49)**	
Shortfall of sterile water ampoules in average week in previous 6 months					
No	70 (3%)	5 (7%)	1.00 (Baseline)		1.00 (Baseline)
Yes	1800 (89%)	563 (31%)	**5.92 (2.37–14.8)**	*	**5.84 (2.32–14.71)**
Not known	163 (8%)	59 (36%)	**7.38 (2.81–19.3)**		**10.00 (3.75–26.68)**

NI, not included. Values in bold type are statistically significant at the 5% level.
* Variables not significant at the 5% level in univariate analysis were not included in multivariate models.

week during the previous 6 months had significantly reduced odds of sharing spoons during that time (for those who obtained 1–15 spoons; AOR 0.61, 95% CI 0.45–0.82; obtained 16–30 spoons: AOR 0.56, 95% CI 0.39–0.79; and obtained >30 spoons: AOR 0.46, 95% CI 0.28–0.74, compared to those who had obtained none). While in a second multivariate model (Model 2 in Table 2), respondents who had a shortfall of spoons in an average week during the previous 6 months had significantly increased odds of sharing spoons during that time (for those with a shortfall of 1–10 spoons: AOR 1.37, 95% CI 1.02–1.83; and a shortfall of more than 10 spoons: AOR 1.85, 95% CI 1.31–2.60), compared to those who had no shortfall. In multivariate Model 1, sharing of spoons was significantly associated with age >30 years (AOR 0.64, 95% CI 0.48–0.86), homelessness in last 6 months (AOR 1.31, 95% CI 1.07–1.60), not injecting in the previous 4 weeks (AOR 0.62, 95% 0.47–0.83), exclusive heroin injecting (AOR 0.67, 95% CI 0.54–0.84), and injecting more than once a day in the previous 6 months (AOR 2.05, 95% CI 1.57–2.68 in Model 1, and AOR 1.51, 95% CI 1.09–2.10 in Model 2).

3.6. Factors associated with sharing of water in multivariate analysis

In the first multivariate model (Model 1 in Table 3), respondents who had obtained any sterile water ampoules in an average week during the previous 6 months had significantly reduced odds of sharing water during that time (AOR 0.36, 95% CI 0.22–0.61), compared to those who had obtained none. While, in a second multivariate model (Model 2 in Table 3), respondents who had a shortfall of sterile water ampoules in an average week during the previous 6 months had significantly increased odds of sharing water during that time (AOR 5.84, 95% CI 2.32–14.71), compared to those who had no shortfall. In multivariate Model 1, sharing water was significantly associated with female sex (AOR 1.34, 95% CI 1.07–1.66), homelessness in the last 6 months (AOR 1.36, 95% CI 1.10–1.67), not injecting in the previous 4 weeks (AOR 0.68, 95% CI 0.50–0.94), exclusive heroin injection (AOR 0.73, 95% CI 0.58–0.92), and injecting more than once a day in the previous 6 months (AOR

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2.12, 95% CI 1.59–2.83 in Model 1, and 2.01, 95% CI 1.53–2.73 in Model 2).

4. Discussion

This study found that a shortfall of filters, spoons, or sterile water was associated with significantly increased odds of sharing each item of paraphernalia in the previous 6 months, and, correspondingly, that uptake of these items from an IEP service was associated with a significantly decreased odds of sharing. We also demonstrate a dose–response relationship between the number of filters and spoons collected and the risk of sharing of these items, strengthening the evidence for a causal relationship between paraphernalia uptake and prevention of sharing.

Previous studies have been unable to examine the direct relationship between uptake of specific items of paraphernalia and paraphernalia sharing (Gillies et al., 2010). The results of our study provide some evidence to support current Scottish IEP guidelines (Scottish Government, 2010) on providing items of paraphernalia to service users.

Our study sample was demographically representative of Scotland's IDUs when compared by gender and age group with Bayesian estimates for Scotland's current IDUs (King et al., 2009). However, our questionnaire was interviewer-administered, and may therefore have prompted socially desirable responses regarding the use of IEP services and injecting behaviour. In addition, our survey question about paraphernalia uptake did not specify whether paraphernalia was collected for other people, and therefore our measure of shortfall may under-estimate the true amount. However, questions that came earlier in the questionnaire were phrased such that participants would respond in relation to their own needs and use, rather than that of others. Further, the effect of underestimating our measure of shortfall would be likely to dilute, rather than overestimate, the observed association between shortfall and paraphernalia sharing. It is important that future surveys of IEP users are able to distinguish between the collection of injecting equipment for personal use or for others, given the importance of secondary needle/syringe distribution in some settings (Huo et al., 2005; Griesbach et al., 2006). Shortfall may also be underestimated due to damage to or loss of injecting paraphernalia after collection, and because our measure of shortfall was estimated from average uptake and average injecting over different time periods. However, similar methods have previously been used to measure needle/syringe coverage (Turner et al., 2011), and our own analysis using a measure of paraphernalia uptake shows comparable results.

Our study took place in the context of a significant increase in paraphernalia distribution at Scottish IEP services, with a 4–6 fold increase in spoon and filter distribution reported between April 2008/March 2009 and April 2009/March 2010 (Information Services Division, 2011; Health Protection Agency, 2011). The observed increase appears to precede the May 2010 release of guidelines recommending that paraphernalia should be made available. However, these guidelines were made available to Scottish Health Boards from 2009, and our data, which covers the period June 2008/June 2009, therefore represent the start of these changes.

A national IEP survey found that with regards to paraphernalia, service providers thought they should offer clients 'what they need, and only what they need' as a means of opening discussions about clients' drug use and injecting practices (Griesbach et al., 2006). However, our study found that uptake of more items of paraphernalia was associated with a reduced odds of sharing paraphernalia, even after adjusting for injecting frequency, suggesting that clients who collect more paraphernalia may stock-pile unused items for use at a later date, and thus avoid sharing. Alternatively, clients may be collecting extra items of paraphernalia for other people, and if these individuals are injecting partners, this will also reduce the likelihood of sharing. This emphasises the importance of assessing both injecting behaviour, and frequency of attendance at IEP services, particularly for clients who report frequent injecting, or injection of stimulants, both of which were associated with a significantly increased odds of paraphernalia sharing in our study.

In our univariate analysis of current IDUs (involving only those individuals who had injected in the previous 6 months), those who reported using methadone for all of the previous 6 months were significantly less likely to share paraphernalia than those who did not, but this was non-significant in the multivariate analyses. A recent pooled analysis of UK data (involving mainly current IDUs, but also non-current IDUs), found that receiving oral substitution therapy, including methadone, was associated with a reduction in new HCV infections, and by implication, a reduction in injecting risk behaviour (Turner et al., 2011). A recent review also found that there was good evidence of an association between OST and a reduction in injecting frequency and injecting equipment sharing (Kimber et al., 2010). However, the mechanism by which methadone is effective is through a reduction in injection frequency, or cessation of injecting. Our study excluded individuals who no longer inject, and our multivariate model adjusted for frequency of injecting; we therefore potentially underestimate the effect of methadone on the sharing of injecting paraphernalia.

A number of other factors, including female sex, younger age, homelessness, injection of stimulants, and more frequent injecting, were significantly associated with the sharing of paraphernalia. This corresponds with previous studies that have reported a higher risk of HCV seroconversion in more frequent cocaine injectors, and those who have recently commenced injecting (Wand et al., 2009; Miller et al., 2002). The association between homelessness and paraphernalia sharing may be related to, among other factors, a lack of knowledge of local IEP services, and more frequent adoption of unhygienic injecting practices (such as injecting in public places; Wright et al., 2005), both of which we were unable to asses in this analysis.

The majority of participants who reported that they did not collect paraphernalia from IEP services thought that these items were unavailable, despite a national survey of injecting equipment provision reporting that approximately two thirds of services were offering filters and spoons between April 2008 and March 2009 (Information Services Division, 2010). However, the finding that participants were more likely to report sharing spoons compared to filters, despite similar availability of these items, suggests that other factors, including the perceived risks of sharing, are also important in determining whether sharing takes place. The implication for IEP services is that clients need to be kept informed not only of new services, but also that there remains considerable scope for offering advice on reducing injecting risk behaviour.

Although our study suggests that uptake of paraphernalia is associated with a reduction in paraphernalia sharing, the impact of the uptake of paraphernalia on HCV transmission remains uncertain. Given that the ultimate aim of IEP services is to reduce the transmission of BBV, including HCV, there is a need for further studies that examine how the provision of paraphernalia impacts on HCV transmission among IDUs.

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Contributors

EA undertook the statistical analysis and contributed to the manuscript; SH contributed to designing the survey, supervised the statistical analysis and contributed to the manuscript; AT, NP, EA and DG contributed to designing the survey, and critical revisions of the manuscript; MH contributed to critical revisions of the manuscript. All authors gave final approval for submission of the manuscript.

Conflict of interest

No conflict declared.

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