Reducing injecting-related injury and diseases in people who inject drugs: Results from a clinician-led brief intervention

Mihaela Ivan, Craig Rodgers, Lisa Maher, Ingrid van Beek

Background

The burden of disease associated with injecting-related injury and diseases (IRIDs) is significant among people who inject drugs (PWID).

Objective

The aim of this study was to evaluate a clinician-led brief intervention involving safer injecting messages and demonstration of safer injecting techniques at the time of venepuncture for serological testing.

Method

We conducted a before and after evaluation study. History of IRIDs and injecting-related risk behaviours were assessed and compared at baseline and follow-up.

Results

Fifty-eight participants completed the pre-intervention and post-intervention evaluation surveys. Compared to baseline, at follow-up fewer participants reported not cleaning their hands prior to injecting (16% cf 31%; $P = 0.039$); more reported applying a tourniquet correctly (38% cf 24%; $P = 0.008$), never missing a vein (56% cf 31%; $P = 0.007$), and applying pressure for at least one to two minutes after injecting (33% cf 13%; $P = 0.035$).

Discussion

The intervention was found to be feasible, justifying its inclusion into routine clinical care. We recommend that other health services targeting PWID implement similar interventions.

People who inject drugs (PWID) are at risk of a series of conditions related to this mode of drug administration. These conditions are grouped under the term 'injecting-related injury and diseases' (IRIDs). There is, however, significant variation in the definition and classification of these conditions in the scientific literature. Most often, cutaneous conditions, such as abscesses and cellulitis, are included as IRIDs, together with other injecting-related sequelae, such as septic arthritis, osteomyelitis, septicaemia, thrombosis and endocarditis. Other clinical signs associated with injecting, such as bruising, redness and skin hyperpigmentation ('track marks'), are also sometimes classified as IRIDs[1] or in a separate category of injecting-related problems.[2,3] Various factors, such as repeated injection in the same area, not cleaning the injection site, use of non-sterile injecting equipment, ubiquitous skin flora (eg *Streptococci*, *Staphylococci*), as well as physical and chemical proprieties of the substances being injected, can all contribute to skin damage and the development of cutaneous and vascular IRIDs.[4–7]

Barriers to accessing medical assessment and care are well documented among PWID. In relation to IRIDs, delayed treatment and access to hospital emergency departments for care have been reported and are associated with large healthcare costs.[8–11] Australian studies have consistently reported that a considerable proportion of PWID experience IRIDs during their lifetime.[1–3] While the risk factors associated with IRIDs are targeted by broader harm reduction/bloodborne virus prevention messages, few, if any, specific interventions have been developed or reported in the literature to date.

The Kirketon Road Centre (KRC) is a targeted primary healthcare facility of the South Eastern Sydney Local Health District (SESLHD), located in Sydney's Kings Cross. KRC is focused on the prevention and treatment of human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) and other transmissible infections

among 'at risk' young people, sex workers and PWID. KRC is among the most integrated services of its kind,[12] offering free, anonymous and confidential medical and nursing care, counselling, social welfare assistance, a needle syringe program, outreach services and a methadone access program. Thus, KRC was well placed to assess and treat IRIDs and implement preventive interventions among PWID.

Serological testing for exposure to transmissible infections (including HIV, hepatitis B and C, and syphilis) is routinely offered by experienced nurses and medical practitioners to all KRC clients who report a history of injecting and/or sexual risk behaviour. Clinicians are required to have considerable knowledge and manual skills in order to perform venepuncture associated with such testing, particularly among PWID with poor venous access as a result of previous cutaneous IRIDs. Communicating this expertise to PWID through demonstration during such procedures seemed to be an avenue worthy of further exploration. Moreover, the efficacy of safer injecting education for PWID,[13] as well as the unmet need for non-judgemental venous access information and advice, had been documented.[14]

This study aimed to assess the impact of a clinician-led brief intervention involving the communication of specific, safer injecting messages and demonstration of injecting techniques delivered at the time of venepuncture for serological testing among PWID attending KRC.

Method

A before and after study design was used to evaluate the intervention. All KRC patients who self-identified as PWID and underwent serological testing between June 2011 and March 2012 were invited to participate in the study. The study was approved by SESLHD's Human Research Ethics Committee (reference number 11/01).

At baseline, clinicians administered a brief survey exploring lifetime and recent history of a wide range of IRIDs, including:

- cutaneous conditions (cellulitis, abscess, skin ulcer)
- vascular conditions (thrombosis, phlebitis, distal limb amputation)
- osteo-articular and systemic infections (osteomyelitis, septic arthritis, septicaemia, endocarditis)
- any other drug-related conditions (drug-induced psychosis, convulsions, cardiac arrhythmia).

These IRIDs were described in lay language (eg 'skin is red, hot, swollen and tender' for cellulitis) to facilitate identification.

Injecting risk behaviours in the last month were also documented, including:

- frequency of injecting
- drugs used
- injecting alone
- being injected by other persons
- injecting in public places (street, park, beach, public toilet or squat)
- ability to locate a vein
- injecting sites used
- use of a tourniquet
- re-using injecting equipment
- injecting site
- hand hygiene.

To ensure consistency, KRC clinicians received training in venepuncture and safer injecting technique prior to implementing the intervention. Written reminders containing the key health messages were placed in the clinical consultation rooms.

Informed by the scientific literature on venepuncture technique, KRC clinicians delivered the following harm reduction messages:

- Preparing to inject: participants were advised to wash their hands with soap and water for a minimum of 15 seconds, or to rub their hands with alcohol-based hand rubs or swabs.[15] They were shown how to assume a comfortable sitting position with the arm extended downward to 'fix' the veins, making them easier to puncture.[16]
- The correct application of a tourniquet: the advantages of using a tourniquet to dilate veins were discussed. This included a detailed explanation and demonstration showing that a tourniquet needs to be applied such that its pressure does not exceed arterial pressure and arterial blood flow from the heart into the limb is not obstructed, yet exceeds venous pressure such that venous blood flow from the distal limb back to the heart is restricted, thereby dilating the veins. Participants were also shown how the tourniquet should be released prior to the slow injection of drugs to prevent damage to the vein wall and regurgitation of the drug solution into the surrounding tissues.[16,17]
- Correct injecting technique: a diagram of the veins in the upper limb was used to illustrate the location of the median cubital vein. Participants were then shown this vein and informed that it is usually larger, closer to the surface and more stationary,

Table 1. Injecting behaviours at baseline (n = 45)

Injecting behaviours in the last month	n (%)
Frequency of injecting	
Less than daily	22 (49)
Daily or more	20 (44)
Missing	3 (7)
Difficulty finding a vein	
At least some of the time	23 (51)
None of the time	21 (47)
Missing	1 (2)
Missed a vein	
At least some of the time	30 (67)
None of the time	14 (31)
Missing	1 (2)

**Public place = street, park, beach, public toilet or squat*

making it the easiest to puncture and least likely to bruise. Other options and the need to rotate injecting sites were also discussed.[16]

Participants were advised that the injection site should be cleaned with a circular motion for 4–6 cm for approximately 30 seconds, and that the area should be left to dry for a further 30–60 seconds.[18,19]

As the clinician performed venepuncture, the upward position of the needle's bevel and its insertion into the skin at a 15–30 degree angle was demonstrated, also showing how after some initial resistance, the needle will be felt to enter the vein.[14] The clinicians demonstrated how pressure with gauze or a cottonwool ball was to be applied for up to two minutes to the injection site once the needle had been fully removed with the arm extended.

Participants were followed up on their return for serological test results or opportunistically at subsequent visits to KRC. A clinician-administered survey was used to document changes in injecting-related behaviours following the intervention or in the last month (whichever was shorter).

Data analysis was completed using Stata12 software (Stata Corporation, College Station, Texas). A McNemar test for paired proportions was used to assess significant changes in self-reported behaviours at follow-up, compared with baseline.

Results

Fifty-eight participants completed the baseline and follow-up surveys. The majority were male (58.5%) and the mean age was 35 years (range 19–53 years). Mean duration of follow-up was 42 days (range 2–303 days). Thirteen participants did not inject between intervention and follow-up, and were excluded from further analysis.

At baseline, almost half (44%) of the participants reported injecting daily or more in the previous month (Tables 1, 2). Just over half (51%) reported having had difficulties finding a vein at least some of the time, and the majority (67%) had missed a vein at least some of the time. At the last injecting episode, a large majority of participants used a new needle and syringe

Table 2. Injecting behaviours at baseline (n = 45)

Injecting behaviours at last injection	n (%)
Location when injecting	
Own home	20 (44)
Friends' home	8 (18)
Public place*	4 (9)
Medically supervised injecting centre	9 (20)
Other	3 (7)
Missing	1 (2)
Used a new needle and syringe	
Yes	40 (89)
No	3 (7)
Missing	2 (4)
Injected by	
Self	41 (91)
Others	1 (2)
Missing	3 (7)
Cleaned hands with	
Alcohol swabs	6 (13)
Soap and water	19 (42)
Other	3 (7)
Did not clean hands	14 (31)
Don't know/missing	3 (7)
Applied a tourniquet	
Yes	21 (47)
No	22 (49)
Missing	2 (4)
Tourniquet applied correctly	
Yes	11 (24)
No	11 (24)
N/A (Did not apply tourniquet)	23 (51)
Person who injected cleaned the injection site with	
Alcohol swab	36 (80)
N/A (did not clean injection site)	8 (18)
Missing	1 (2)
Stopped the bleeding with	
Cotton wool	25 (56)
Tissue	7 (16)
Alcohol swab	3 (7)
Finger	4 (9)
Other	3 (7)
N/A (did not stop the bleeding)	1 (2)
Missing	2 (4)
Time pressure applied to stop the bleeding	
<1 minute	31 (69)
1–2 minutes	6 (13)
Other	2 (4)
N/A (did not apply pressure)	3 (7)
Missing	3 (7)

**Public place = street, park, beach, public toilet or squat*

Table 3. IRIDs reported at baseline (n = 45)

IRIDs	Total n (%)	Most recent IRIDs episode: In the last month n (%)	In the last year n (%)	>1 year ago n (%)	Attended hospital n (%)
Cutaneous conditions					
Cellulitis	11 (24)	2 (4)	2 (4)	7 (16)	1 (2)
Abscess	12 (27)	4 (9)	1 (2)	7 (16)	4 (9)
Skin ulcer	6 (13)	2 (4)	1 (2)	3 (7)	2 (4)
Systemic conditions					
Septicaemia	3 (7)	1 (2)	1 (2)	1 (2)	3 (7)
Vascular conditions					
Phlebitis	11 (24)	4 (9)	2 (4)	5 (11)	1 (2)
Thrombosis	4 (9)	1 (2)	1 (2)	2 (4)	2 (4)
Limb amputation	1 (2)	0	0	1 (2)	1 (2)
Other conditions					
Drug-induced psychosis	15 (33)	4 (9)	2 (4)	9 (20)	5 (11)
Convulsions/fits	6 (13)	2 (4)	1 (2)	3 (7)	4 (9)
Cardiac complications	1 (2)	0	0	1 (2)	0

Table 4. Comparison of key behaviours at baseline and follow-up (n = 45)

Behaviours	Baseline n (%)	Follow-up n (%)	*P* value*
Never missed a vein	14 (31.1)	25 (55.5)	0.007
Did not clean hands	14 (31)	7 (16)	0.039
Applied tourniquet firmly	11 (24.4)	17 (37.8)	0.008
Applied pressure for at least 1–2 min	6 (13.3)	15 (33.3)	0.035

**McNemar test for paired proportions*

(90%). More than half (56%) used either soap and water or alcohol swabs to clean their hands prior to injecting. Less than half (47%) used a tourniquet. Of those who did use a tourniquet, less than half applied it correctly (43%). More than half (56%) of the participants used cottonwool to stop the bleeding after injecting; however, only a small minority (16%) applied pressure for one to two minutes.

Twelve participants (27%) reported lifetime history of abscesses (Table 3). Phlebitis was reported by 11 (24%) of participants.

At follow-up, significantly fewer participants reported not cleaning their hands (16% cf 31%; $P = 0.039$), and significantly more reported applying a tourniquet correctly (38% cf 24%; $P = 0.008$), never missing a vein (56% cf 31%; $P = 0.007$) and applying pressure for at least one to two minutes after injecting (33% cf 13%; $P = 0.035$) compared with baseline (Table 4).

Discussion

Previous studies have reported a high burden of disease from IRIDs in PWID.[1–3] A recent study conducted at KRC found that the lifetime prevalence of cutaneous IRIDs was 23% among PWID.[20] Our study results are consistent with those previous studies, with 27% of participants reporting a lifetime history of abscesses, and 24% with a history of cellulitis and phlebitis. Despite this considerable disease burden, interventions seeking to reduce IRIDs have not been reported in the literature. To our knowledge, this is the first study reporting the results of a clinician-led intervention specifically targeting IRIDs.

The baseline assessment of injecting-related behaviours revealed a significant proportion of participants could benefit from safer injecting advice. The intervention provided an opportunity for clinicians to initiate discussion with clients about IRIDs and the importance of prevention and early presentation to avoid more serious complications. Importantly, there were significant changes in self-reported behaviours at follow-up. However, it should be noted that for a considerable proportion of participants, risk behaviours remained unchanged, highlighting the need for ongoing safer injecting education.

Our study provides initial evidence of the feasibility of incorporating a clinician-led safer injecting intervention into serological testing procedures offered to PWID. The results of the study were encouraging and justified inclusion of the intervention into routine care at KRC. Clinicians did not report any difficulty

in incorporating the intervention into their routine practice, and the costs associated with its implementation were negligible.

The study is part of a broader initiative at KRC into monitoring the burden of IRIDs in PWID, and designing and evaluating prevention interventions within a harm reduction framework. As part of this, KRC has developed a surveillance system for IRIDs that incorporates a comprehensive list of IRIDs-related diagnostic codes within its client database. This allows clinicians to report all IRIDs-related presentations, as well as associated treatment, referral and outcomes. This system will enable evaluation of the longer term impact of the current intervention on the prevalence of IRIDs among KRC clients.

Our study has several limitations. The study's small sample size may have limited our ability to determine other significant changes in injecting-related behaviours. We relied on self-reported data, which may be subject to social desirability and recall bias, and thus some risk behaviours may have been under-reported. However, the literature suggests that behaviours self-reported by PWID are reliable and valid.[21,22] Furthermore, our study focused on injecting behaviours in the last month only, thus minimising recall bias.

Our study participants were similar in demographic characteristics and risk behaviours to the broader base of KRC's PWID clients.[20] However, KRC is accessed by a very socially marginalised population of PWID who are at high risk of IRIDs. Thus, our results may not be generalisable to the broader population of PWID, including those who do not access health services. The burden of IRIDs may be higher in PWID not attending health services, warranting further exploration of the feasibility of integrating the current intervention in non–health service settings. Our study did not include a comparison group, and the same clinicians administered the intervention and collected the survey data at baseline and follow-up. The surveys administered at baseline and follow-up contained only structured questions and recorded self-reported behaviours. Thus, any impact associated with a lack of blinding would have been minimal. Moreover, data analysis was completed by a researcher who did not participate in data collection.

Our study demonstrated that a clinician-led brief intervention targeting IRIDs was acceptable to both clients and clinicians, and could be easily implemented in KRC's primary care setting. We recommend that clinicians experienced in working with this client group consider incorporating similar interventions into their routine practice to reduce the burden of IRIDs and related healthcare costs, including those associated with hospital presentations.

Authors

Mihaela Ivan MD, MSc, FAFPHM, Lecturer, The Kirby Institute, University of New South Wales, NSW; Research Coordinator, Kirketon Road Centre, SESLHD, NSW

Craig Rodgers BMed, FRACGP, FAChAM, Medical Unit Manager, Kirketon Road Centre, SESLHD, NSW

Lisa Maher PhD, Professor and Program Head, The Kirby Institute, University of New South Wales, NSW

Ingrid van Beek MBBS, MBA, FAFPHM, FAChAM, MD, Director, Kirketon Road Centre, SESLHD, NSW; School of Public Health and Community Medicine, University of New South Wales, NSW. ingrid.vanbeek@sesiahs.health.nsw.gov.au

Competing interests: Outside this work, Ingrid van Beek has received a National Health and Medical Research Council (NHMRC) grant; and Lisa Maher has received an NHMRC and National Institute of Health (NIH) grant.

Provenance and peer review: Not commissioned, externally peer reviewed.

Acknowledgements

We would like to acknowledge the contribution of KRC clients and clinicians.

References

1. Dwyer R, Topp L, Maher L, et al. Prevalences and correlates of non-viral injecting-related injuries and diseases in a convenience sample of Australian injecting drug users. Drug Alcohol Depend 2009;100:9–16.
2. Salmon AM, Dwyer R, Jauncey M, van Beek I, Topp L, Maher L. Injecting-related injury and disease among clients of a supervised injecting facility. Drug Alcohol Depend 2009;101:132–36.
3. Topp L, Iversen J, Conroy A, Salmon AM, Maher L. Prevalence and predictors of injecting-related injury and disease among clients of Australia's needle and syringe programs. Aus N Z J Public Health 2008;32:34–37.
4. Del Giudice P. Cutaneous complications of intravenous drug abuse. Br J Dermatol 2004;150:1–10.
5. Lamagni TL, Neal S, Keshishian C, et al. Epidemic of severe *Streptococcus pyogenes* infections in injecting drug users in the UK, 2003–2004. Clin Microbil Infect 2008;14:1002–09.
6. McGuigan CC, Penrice GM, Gruer L, et al. Lethal outbreak of infection with *Clostridium novyi* type A and other spore-forming organisms in Scottish injecting drug users. J Med Microbiol 2002;51:971–77.
7. Murray-Lillibridge K, Barry J, Reagan S, et al. Epidemiological findings and medical, legal, and public health challenges of an investigation of severe soft tissue infections and deaths among injecting drug users – Ireland, 2000. Epidemiol Infect 2006;134:894–901.
8. Fairbairn N, Milloy MJ, Zhang R, et al. Emergency department utilization among a cohort of HIV-positive injecting drug users in a Canadian setting. J Emerg Med 2012;43:236–43.
9. Milloy MJ, Wood E, Lloyd-Smith E, et al. Recent incarceration linked to cutaneous injection-related infections among active injecting drug users in a Canadian setting. J Community Health 2010;35:660–66.
10. Morrison A, Elliott L, Gruer L. Injecting-related harm and treatment-seeking behaviour among injecting drug users. Addiction 1997;92:1349–52.
11. Sweeney R, Conroy AB, Dwyer R, Aitken CK. The economic burden to the public health system of treating non-viral injecting-related injury and disease in Australia (a cost of illness analysis). Aust N Z J Public Health 2009;33:352–57.
12. Islam MM, Topp L, Day CA, Dawson A, Conigrave KM. The accessibility, acceptability, health impact and cost implications of primary healthcare outlets that target injecting drug users. A narrative synthesis of literature. Int J Drug Policy 2012;23:94–102.
13. Bertrand K, Roy E, Vaillancourt E, Vandermeerschen J, Berbiche D, Boivin JF. Randomized controlled trial of motivational interviewing for reducing injection risk behaviours among people who inject drugs. Addiction 2015;110:832–41.
14. Harris M, Rhodes T. Venous access and care: Harnessing pragmatics in harm reduction for people who inject drugs. Addiction 2012;107:1090–96.
15. National Health and Medical Research Council. Australian guidelines for the prevention and control of infection in healthcare. Canberra: NHMRC, 2010. Available at www.nhmrc.gov.au/guidelines/publications/cd33 [Accessed 29 June 2015].
16. McCall RE, Tankersley CM. Phlebotomy essentials. 5th edn. Philadelphia: Lippincott Williams & Wilkins, 2011.
17. Lavery I, Ingram P. Venepucture: Best practice. Nurs Stand 2005;19(49):55–65.
18. Scales K. A practical guide to venipuncture and blood sampling. Nurs Stand 2008;22:29–36.
19. Stonecypher K. Going around in circles: Is this the best practice for preparing the skin? Crit Care Nurs Q 2009;32:94–98.
20. Ivan M, Maher L, Wand H, van Beek I. Surveillance of injecting-related injury and diseases in people who inject drugs attending a targeted primary health care facility in Sydney's Kings Cross. Aus N Z J Public Health 2015;39:182–87.
21. De Irala J, Bigelow C, McCusker J, Hindin R, Zheng L. Reliability of self-reported human immunodeficiency virus risk behaviors in a residential drug treatment population. Am J Epidemiol 1996;143:725–32.
22. Latkin CA, Vlahov D, Anthony JC. Socially desirable responding and self-reported HIV infection risk behaviors among intravenous drug users. Addiction 1993;88:517–26.