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Research paper

The effect of on-site and outreach-based needle and syringe programs in people who inject drugs in Kermanshah, Iran

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ABSTRACT

Background: Needle and syringe programs (NSPs) are widely used to reduce harms associated with drug injecting. This study assessed the effect of facility-based (on-site services at drop-in centre) and outreach models of NSP on injection risk behaviours.
Methods: Self-reported data from 455 people who injected drugs (PWID) during 2014 in Kermanshah, Iran, were examined to measure demographic characteristics and risk behaviors. Self-reported and program data were also assessed to identify their main source of injection equipment. Participants were divided into three sub-groups: facility-based NSP users, outreach NSP users and non-users (comparison group). Coarsened exact matching was used to make the three groups statistically equivalent based on age, place of residence, education and income, and groups were compared regarding the proportion of borrowing or lending of syringes/cookers, reusing syringes and recent HIV testing.
Results: Overall, 76% of participants reported any NSP service use during the two months prior to interview. Only 23% (95%CI: 17–27) reported outreach NSP as their main source of syringes. Using facility-based NSP significantly decreased recent syringe borrowing (OR: 0.27, 95%CI: 0.10–0.70), recent syringe reuse (OR: 0.38, 95%CI: 0.23–0.68) and increased recent HIV testing (OR: 2.60, 95%CI: 1.48–4.56). Similar effects were observed among outreach NSP users; in addition, the outreach NSP model significantly reduced the chance of lending syringes (OR: 0.31, 95%CI: 0.15–0.60), compared to facility-based NSP (OR: 1.25, 95%CI: 0.74–2.17).
Conclusion: These findings suggest that the outreach NSP model is as effective as facility-based NSP in reducing injection risk behaviours and increasing the rate of HIV testing. Outreach NSP was even more effective than facility-based in reducing the lending of syringes to others. Scaling up outreach NSP is an effective intervention to further reduce transmission of HIV via needle sharing.

Introduction

UNAIDS/WHO has reported that about 270,000 people are living with HIV in the Middle East and North Africa (United Nations Office on Drugs and Crime, 2012). In Iran, HIV prevalence is low in the general population (less than 1%), while concentrated among people who inject drugs (PWID) (Haghdoost et al., 2011; Supreme

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Council of Nationwide Planning of HIV/AIDS Infection Prevention and Control, 2014). There are approximately 170,000–230,000 PWID in Iran, of whom, 15% are infected with HIV (Khajehkazemi et al., 2013; Nasirian, Doroudi, Gooya, Sedaghat, & Haghdoost, 2012). Over two-thirds of all newly identified HIV cases have been attributed to unsafe injection (Haghdoost et al., 2011; Mirahmadizadeh, Majdzadeh, Mohammad, & Forouzanfar, 2009; Zamani et al., 2010). In 2002, in order to reduce the risk and harms associated with injection, needle and syringe programs (NSPs) were implemented in Iran. These services are delivered through drop-in centres (DIC) and by outreach teams to those PWID who may have difficulties accessing DIC (Eshrati et al., 2008; Mirahmadizadeh et al., 2009; Nissaramanesh, Trace, & Roberts, 2005) and are the main sources of needles and syrnges in Iran (Noroozi et al., 2015; Supreme Council of Nationwide Planning of HIV/AIDS Infection Prevention and Control, 2014).

NSP outreach is a community-based intervention, reaching PWID where they live, socialize, buy or inject drugs (Needle et al., 2005). The DICs and outreach NSP provide sterile needle and syringes, deliver training on safe injecting practices and overdose prevention and provide condoms and safe sex education (Mathers et al., 2010; Needle & Coyle, 1997). Safe injection kits distributed at each visit to an NSP, either at a DIC or via outreach, consist of 3–4 syringes, 3–4 extra needles, sterile water vials, and alcohol pads (Vazirian et al., 2005).

The effectiveness of the two models of NSP has yet to be evaluated in Iran. The costs of establishing and maintaining a new NSP site are much higher than adding-on an outreach-based NSP to an existing DIC or health facility. Some NSP sites are focused on on-site service delivery and are much less interested in providing outreach NSP. In part this is because of a lack of knowledge or belief in the effectiveness of outreach activities delivered in the community. The objective of this study was to evaluate and compare the effectiveness of the two NSP models – on-site services at DICs and outreach-based NSP – by examining the injecting risk behaviors of PWID in Kermanshah, an urban setting in southwestern part of Iran. Kermanshah was where the HIV epidemic first emerged in Iran and triggered the national response to HIV.

Methods

A cross-sectional study design was used. Participants were recruited from the community and NSP sites between September and December 2014. PWID from NSP sites were recruited by convenience sampling, and in the community through outreach and peer-referral. The outreach team regularly attended venues where PWID congregated and they also encouraged respondents to refer their peers to the study by distributing referral coupons. Study inclusion criteria were males aged over 18 years of age, who self-reported drug injection within the last month and who were willing to provide written consent to participate in the study.

Data were collected through face-to-face interviews. The questionnaire consisted of five sections, including demographic information, type of drug injected most frequently, duration of drug use and injection, frequency of injection, risk behaviours such as sharing (borrowing or lending) syringes/needles and cookers, reuse of syringes and number of injecting partners they had shared syringes/needles with during the month prior to the interview. Information about HIV testing in the past 12 months was also requested. The content of the questionnaire was discussed with eight experts in the fields of behavioural science, epidemiology and harm reduction.

Our main area of enquiry was whether study participants had used on-site or outreach NSP services as their main source of syringes in the two months prior to interview; defined as the service where they sourced at least 70% of their injecting equipment. This was measured by the self-reported data, and then validated by checking the DICs and outreach services' client monitoring information and log books. Those who reported neither on-site nor outreach NSP as their main (70% or more) source of syringes were assigned to the NSP non-user group. In case of discrepancy, participants' allocation to a sub-group was based on service monitoring information and logbook data.

No identifying information was collected. During the consent procedure, participants were provided with information about the study objectives, the risks and benefits of participating in the study, and their right to withdraw from the study at any time without penalty. The study protocol and procedures were reviewed and approved by the Research Ethics Committee of the Kerman University of Medical Sciences (Ethics Code: k/93/204).

Coarsened Exact Matching (CEM) is a statistical matching technique used to improve causal inferences of observational studies (Stuart, 2010) and is recommended when an experimental design is not feasible (Sidney, Coberley, Pope, & Wells, 2015). Here CEM was applied to match outreach and facility-based NSP users and non-NSP users based on certain covariates in order to ensure statistically equivalent comparison groups to estimate the effect of the NSP models on injection risk behaviour. The CEM created a comparable sub-sample of the three subgroups based on age, place of residence, income and education level. CEM attempts to control for the potential confounding influence of 'pre-exposure' covariates on the outcome of interest, by matching 'exposed' cases with 'non-exposed' cases that are approximately similar with regard to covariates (Wells et al., 2013). This approach allowed us to designate a counterfactual for each participant in the exposed group, i.e. outreach-based NSP, and mimic a randomized clinical design. We chose CEM over other matching techniques, such as propensity score matching, to achieve balanced groups, reduce the need for multiple iterations and re-matching, and maximize the number of possible matches in our sample. Also, the predictors for using outreach or on-site NSP were unknown and such information would have been crucial for applying a propensity matching analysis (Iacus, King, & Porro, 2009; King, Nielsen, Coberley, Pope, & Wells, 2011).

Using CEM, every study participant was allocated into one of the specified set of strata in which all were exactly matched on a set of coarsened or matched variables. Matched members were then assigned a weight specific to their stratum and representative of the proportion of all members present in that stratum (King et al., 2011). Then, a statistical measure called L1 distance was calculated. L1 varies between 0 and 1 and values close to zero indicate that the matching is perfect and ensures the comparability of the two groups (Rou, Sullivan, Liu, & Wu, 2010). The L1 was calculated before and after applying CEM, and decreased from 0.43 to 0.00003 after coarsened exact matching. It was reassuring that the imbalance between the two comparison groups was very small and could be ignored. Given the matched subgroups, the descriptive statistics for the pool sample and matched sub-sample were reported. Logistic regression models were applied to estimate the effect of outreach and facility-based NSP on injection risk behaviours. The effects were reported as odds ratio (OR) and 95% confidence interval (CI). All data analyses were performed using STATA v.11.

Results

Characteristics of study participants

A total of 455 men who injected drugs participated in the study. The characteristics of participants in pooled (unmatched) and matched sub-sample are presented in Table 1. The matched sample ($n = 278$) had a mean age ± standard deviation (SD) of 34.5 ± 8.6