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Original Article

Correlates of sharing of needles and syringes among people who inject drugs in Dhaka city, Bangladesh

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Abstract

Introduction: This paper examines the correlates of needle and syringe sharing among People Who Inject Drugs in Dhaka city, Bangladesh, which is currently experiencing a steep increase in HIV prevalence despite the ongoing presence of Needle Exchange Programs.

Methodology: This was a retrospective chart review with cross-sectional design that extracted data from 783 male People Who Inject Drugs enrolled into five Opioid Substitution Treatment clinics in Dhaka city between April 2010 and January 2016. Data were retrieved from the program's electronic database. Needle and syringe sharing constituted the borrowing or lending of needles and syringes from others within the past month preceding data collection.

Results: Buprenorphine was the preferred injection drug and 44.6% shared needles and syringes within the past month. Multivariate analysis indicated that People Who Inject Drugs who were homeless (OR = 8.1, 95% CI = 1.4-44.9, $p < 0.05$), living with friends (OR = 6.8, 95% CI = 2.5-18.2, $p < 0.001$), injecting 2-3 times/day (OR = 4.8, 95% CI = 1.2-19.7, $p < 0.05$), injecting more than three times/day (OR = 4.8, 95% CI = 1.1-20.0, $p < 0.05$), not using condom with non-commercial female sex partners (OR = 3.3, 95% CI = 1.8-6.0, $p < 0.05$), bought sex from female sex workers (OR = 2.9, 95% CI = 1.0-8.3, $p < 0.05$), and did non-suicidal self-injury (OR = 1.8, 95% CI = 1.0-3.0, $p < 0.05$) were more likely to share needles and syringes.

Conclusions: This study demonstrates that operating a standalone harm reduction approach that just provides sterile needles and syringes may not adequately curb needle and syringe sharing among People Who Inject Drugs.

Key words: Needle syringe program; needle sharing; syringe sharing; HIV; people who inject drugs; Bangladesh.

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Introduction

Bangladesh has a generally low HIV prevalence of <0.01%, yet the HIV epidemic is specifically concentrated among people who inject drugs (PWID) in the capital city, Dhaka [1]. This population experienced a steep increase in HIV prevalence from 5.3% in 2011 to 22% in 2016 [2-3]. This upward trend was observed despite the long-term implementation of the Needle-Exchange Programs (NEP), which is considered the highest-coverage program in the South Asian region [4]. Preliminary data from HIV serological and behavioral surveillance surveys (BSS) conducted from 2015-2016 depicted that 53.1% of the PWID respondents in Dhaka shared needles and syringes within the past week preceding data collection, compared to 60.7% during the BSS conducted in 2006-2007 [3,5]. These patterns have depicted the inability of the NEP to effectively curb needle and syringe sharing behaviors.

The trends of needle and syringe sharing varied across different geographic regions around the world. For instance, 27.6% of the PWID in Vancouver and 80% of the PWID in Mexico reported sharing needles and syringes [6,7]. Findings from other studies conducted worldwide revealed a diversity of socio-demographic correlates of needle and syringe sharing such as age [8], being female [8], unemployment [9], income generation through illicit drugs [8], and homelessness [10]. The research highlighted that some behavioral risk factors of needle and syringe sharing include duration of injecting drugs, drug-injecting venues and frequency [11], poly-drug use [6], lack of awareness about their HIV status, and lack of HIV-related knowledge [12]. Sexual risk practices were also found to be associated with needle and syringe sharing [13-15].

However, the current body of evidence demonstrates that the factors associated with needle and syringe sharing do not follow a specific pattern. Rather, these studies showed a diverse array of factors that were specific to the study context, setting and participants. Although this has been a widely researched

phenomenon, the challenge remains within generalizing the findings to other settings. In Dhaka city, the PWID population has experienced a fourfold increase in HIV prevalence over five years, yet there remains a paucity of evidence investigating the underlying contexts of this upward trend.

The current NEP in Dhaka city is administered through community-based service delivery points called Drop-in Centers (DICs), as part of the harm reduction program for PWID [4]. Although the Opioid Substitution Treatment (OST) program has been operating since 2010, it covers merely 1.9% of the total estimated PWID in Bangladesh [16]. Despite the consistent implementation of PWID interventions, the HIV prevalence has been rapidly increasing among this population, thus warranting scientific evidence to facilitate program redesign and refinement. However, there is a paucity of evidence evaluating the factors of needle and syringe sharing among this population.

The objective of this study is to measure the magnitude of needle and syringe sharing, as well as its associated factors, which may facilitate evidence-based policy decisions for addressing the gaps of ongoing harm reduction services.

Methodology

Ethical considerations

Informed written consents were obtained from the participants who were enrolled in the OST clinics. The data used in this study were retrieved from the OST program electronic database maintained by icddr,b, which are used for improving the quality of OST patient care. Data were entered in an anonymized and de-identified manner before the data analysis. This study received the waiver of ethical approval for publication from the Institutional Review Board of icddr,b.

Setting and participants

In the context of the high HIV prevalence among PWID in Dhaka city, five OST clinics were set up within the DIC premises. These DICs consist of outreach services, such as the distribution of needles, syringes, condoms and educational information at the field, as well as facility-based services such as rest and recreational facilities, HIV testing services (HTS), management of sexually transmitted infections, and health education facilities. PWID who were interested in OST services were referred to the OST clinic to facilitate their enrolment into the OST program. In the OST clinic modality, services were rendered by trained physicians and counselors whereas outreach services were delivered by outreach workers. To be eligible to participate in the study, the participants need to be i) aged 18 years and above, ii) reported a history of taking injection drugs at least once in a month before enrolling into the OST program before enrolment into OST, and iii) willing to participate in the program.

Study design and data collection

This study was a retrospective chart review with cross-sectional design conducted in five OST clinics in Dhaka city between April 2010 and January 2016. The study sample constitutes 783 male PWID. Their data were collected at the baseline, while they were enrolled into the OST program, and archived into the OST program electronic database maintained by icddr,b. For the analysis, various forms of data were collected including: socio-demographic profile, HIV knowledge, drug use and injection-related behavior, sexual behavior, psycho-social profile, psychological profile, and other personal risk behaviors such as self-harming ideations and anti-social attitudes. The extracted data were checked for accuracy, consistency, completeness. Incomplete or missing data were excluded from the dataset. The collected data were coded sequentially and entered into SPSS software version 17, IBM for analysis.

Outcome measure

The primary outcome variable was the prevalence of needle and syringe sharing among PWID during their enrolment into the OST program (i.e. whether a sharing episode occurred within the last month before enrolment started). To determine whether or not it was a needle and syringe sharing episode, questions were posed about whether participants borrowed or lent needles and syringes from other PWID within the past month. If the participants indicated whether they borrowed and/or lent needles and syringes, it was considered a needle and syringe sharing episode.

Description of covariates

The covariates of this analysis constituted three major domains: socio-demographic profile, risk behaviors and psychosocial aspects. The socio-demographic profile includes age, marital status, educational status, location of residence, current living companions, relationship with family members, sources of income, total income in last month, and total income generated through illegal activities in the last month. HIV risk behaviors include drug-injecting frequency within the last month, sexual exposure with non-commercial female sex partners within the past three months, safe sex practices (e.g. condom use) in the last

sex act with a non-commercial female sex partner who had sex in the last three months, frequency of using condoms with non-commercial female sex partners in the last three months, history of purchasing sex from female sex workers (FSW) in the last three months, condom use during the last sex act with an FSW, and frequency of condom use with FSW within the last three months. Psychosocial issues include incidents of serious verbal or physical conflicts in the last month, violent behaviors, reported experiences of depression, anxiety in the last three months, suicidal ideation, suicidal attempts and non-suicidal self-harm injury (i.e. cutting oneself, self-injury) during their lifetime.

Statistical Analysis

To describe the characteristics of the study population, univariate statistics (e.g. percentage points) were used for categorical variables whereas mean and median with interquartile range (IQR) were used for numerical variables. To measure the association between the covariates and the outcome measure, univariate logistic regression was adopted in the bivariate analysis. Multivariate analysis was applied to examine the association of the covariates with the outcome measure using backward stepwise multivariate logistic regression [17]. Covariates with over a 10% significance level in the bivariate analysis were included in the multivariate analysis. The results of the bivariate analysis were described using the un-adjusted odds ratio (UOR) whereas the multivariate analysis results were described by adjusted odds ratios (AOR) with 95% confidence intervals and associated significance levels. Before conducting the multivariate analysis, factors that were significant at 10% level in the bivariate analysis were checked for multi-co-linearity using pair-wise correlation [17]. Any two factors that were significantly correlated at $r \geq 0.50$, one factor was excluded from multivariate analysis to mitigate effects of co-linearity. The data were analyzed using SPSS software, Version-17 (SPSS Inc, Illinois, USA) for Windows.

Results

Sociodemographic characteristics and risk behavior of PWID

The median age of the participants was 37 years (IQR = 32-43), 24.8% had never received any schooling, 11.5% were homeless, 32.5% lived with friends, and 21.6% reported that they earned money by collecting garbage, begging or day labor, with a mean income of 184 USD/month. The findings are depicted in Table 1. The mean income generated through illegal activities such as cheating, stealing, drug peddling etc. was 70 USD /month. Among the participants, 59.5% had comprehensive knowledge of HIV and AIDS. More than half of PWID (57.7%) started injecting drugs between the ages of 19-30 years, and 5.9% started injecting before the age of 18 years. Almost half of the PWID (48%) injected drugs for 6-10 years and 26.7% injected drugs for more than ten years. Among the participants, 56.1% claimed that they injected drugs 2-3 times/day followed by 37.5% who injected for more than three times per day, whereas 6.4% reported injecting only once a day or did not inject every day. Among all of the participants, 86% reported sharing needles and syringes during their lifetime, 33.2% claimed that they borrowed needles and syringes and 37.7% lent needles and syringes to others in the last month. Overall, 44.6% of the PWID reported sharing of needles and syringes, i.e. either borrowing or lending their needles and syringes in the last month. Out of all the participants, 57.1% of them had sex within the last three months, including 48.5% who had sex with non-commercial female sex partners. Among the PWID who had sex with non-commercial female sex partners, 70.3% did not use a condom during the last sexual encounter. Only 18.4% of the participants practiced consistent condom use with their non-commercial female sex partners. Among the participants, 9.3% purchased sex within the past three months, among whom 63% used a condom during the last sex act. More than half (52.1%) of the participants practiced consistent condom use while buying sex from the FSW.

Psychological distress was a prevalent phenomenon among PWID, as 64.1% claimed that they felt depressed several times within the last three months and 59.1% had several episodes of anxiety within the last three months. Among the participants, 41.9% mentioned that they struggled to control their violent behavior and 37.5% PWID accepted that they harmed themselves (i.e. non-suicidal self-injury) at least once in their lifetime. Among all participants, 29.8% noted that they had a serious conflict with another person within the past month, predominantly with their spouse or family members (73.4%). Approximately 37.2% of the participants had suicidal thoughts at least once in their lifetime, and 16.7% attempted suicide. Out of all the participants, 77.3% reported that being detained or imprisonment at one point in their life, and 14.7% were awaiting charges, trials or sentences in court.

Table 1. General characteristics, risk behaviour and psychosocial status of the respondents (N = 783).

Variable	Category	Total, N = 783 (100%)
Age (in years)	18-35 Years	359 (45.8)
	35-45 Years	302 (38.6)
	45 Years and more	122 (15.6)
Current marital status	Never been married	186 (23.8)
	Currently married	425 (54.3)
	Separated/ Divorced/Widow/Widower	172 (22.0)
Educational status	Never been to school/can signature only	194 (24.8)
	Class I-V	268 (34.2)
	Class VI-X	220 (28.1)
	XII /higher	101 (12.9)
Residence	Homeless	90 (11.5)
	Fixed Address	693 (88.5)
Current living status	Alone	125 (17.7)
	Spouse/family/relative	353 (49.9)
	With Friends	230 (32.5)
In touch with spouse/relative /family member in the last month		734 (93.7)
If yes, how often	Every day	661 (90.1)
	Not Everyday	73 (9.9)
Current Major sources of income in the last three months (multiple response)	Rickshaw puller/Driver/transport worker	200 (25.5)
	Small trading	200 (25.5)
	Service (outreach/salesman/press/garments)	142 (18.1)
	Tokai/garbage collector/Beggar/Labor	169 (21.6)
	Drug selling/cheating/stealing/snatching/ extortion	96 (12.3)
	From family member/family property	259 (33.1)
Total income in the last month	≤ 40 USD	45 (5.7)
	> 40 USD	738 (94.3)
Total illegal income in the last month	≤ 40 USD	705 (90.0)
	> 40 USD	78 (10.0)
Comprehensive knowledge on HIV and AIDS		466 (59.5)
Injection drug age at onset (years)	Up to 18	46 (5.9)
	19 -30	452 (57.7)
	31 - 40	236 (30.1)
	More than 40	7 (6.3)
Injection drug duration of use (years)	Not more than 5 years	198 (25.3)
	6 -10 Years	375 (48.0)
	More than 10 Years	209 (26.7)
Percentage borrowed/lent needles/ syringes in the last month		349 (44.6)
Had sex in last three months irrespective of partner type		447 (57.1)
Had sex with a non-commercial female sex partners in the last three months		380 (48.5)
Did not use condom during last sex in the last three months with non-commercial female sex partners (among those who had sex with non-commercial female sex partners in the last three months)		267 (70.3)
Frequency of condom use with NCP in the last month (among those who had sex with non-commercial female sex partners in the last three months)	Always	70 (18.4)
	Sometimes	103 (27.1)
	Never	207 (54.5)
Bought sex from FSW in the last three months		73 (9.3)
Did not use condom during last sex with FSW in the last three months (among those who bought sex from FSW in the last three months)		27 (37.0)
Frequency of condom use during last sex with FSW in the last three months (among those who bought sex from FSW in the last three months)	Always	38 (52.1)
	Sometimes	22 (30.1)
	Never	13 (17.8)
Had serious conflict/quarrel with others in the last month		233 (29.8)
Serious conflict/quarrel with whom in the last month (among those who had serious conflict/quarrel with others in the last month)	Spouse/family member	171 (73.4)
	Friends/co-worker	77 (33.0)
Regularly felt depressed in the last three months		502 (64.1)
Regularly felt anxious in the last three months		463 (59.1)

Had problems controlling violent behaviour	328 (41.9)
Non suicidal self injury (i.e. cutting hand, self injury)	294 (37.5)
Ever thought of committing suicide	291 (37.2)
Ever actually attempted suicide	131 (16.7)
Ever been detained by police or in jail	605 (77.3)
Awaiting charges/trials/sentences in court	115 (14.7)

Table 2. Factors associated with sharing of needles and syringes among male PWID (N = 783).

Variable Category	Needles syringes sharing group, n (%)	Needles syringes non-sharing group, n (%)	Univariate logistic regression		Multivariate logistic regression	
			UOR (95% CI)	*p*-value	AOR (95% CI)	*p*-value
Age (in years)						
18-35 Years	177 (49.3)	182 (50.7)	1.5 (1.0-2.3)	< 0.05		
35-45 Years	125 (41.4)	177 (58.6)	1.1 (0.7-1.7)	NS	-	-
45 Years and more (RC)	47 (38.5)	75 (61.5)	1.0	-		
Current marital status						
Never been married (RC)	78 (41.9)	108 (58.1)	1.0	-		
Currently married	182 (42.8)	243 (57.2)	1.0 (0.7-1.4)	NS	-	-
Separated/ Divorced/Widow/Widower	89 (51.7)	83 (48.3)	1.4 (0.9-2.2)	0.064		
Educational status						
Never been to school/can signature only	113 (58.2)	81 (41.8)	6.0 (3.3- 10.7)	< 0.001		
Class I-V	135 (50.4)	133 (49.6)	4.3 (2.5-7.6)	< 0.001	-	-
Class VI-X	82 (37.3)	138 (62.7)	2.5 (1.4-4.5)	< 0.001		
XII /higher (RC)	19 (18.8)	82 (81.2)	1.0	-		
Residence						
Homeless	59 (65.6)	31 (34.4)	2.6 (1.6-4.1)	< 0.001	8.2 (1.5-44.3)	< 0.05
Fixed Address (RC)	290 (41.8)	403 (58.2)	1.0	-	1.0	-
Current living status						
Alone (RC)	49 (39.2)	76 (60.8)	1.0	-	1.0	
Spouse/family/relative	127 (36)	226 (64)	0.8 (0.5-1.3)	NS	1.8 (0.7-4.4)	NS
With Friends	138 (60)	92 (40)	2.3 (1.4-3.6)	< 0.001	6.4 (2.4-16.9)	< 0.001
In touch with your spous e/ relative / family member in the last month	317 (43.2)	417 (56.8)	0.4 (0.2-0.7)	< 0.01	-	-
If yes, how often						
Every day (RC)	278 (42.1)	383 (57.9)	1.0	-	Excluded	-
Not Everyday	39 (53.4)	34 (46.6)	1.5 (0.9-2.5)	0.064		
Current Major sources of income in the last three months						
Tokai/garbage collector/Beggar/Labor	108 (63.9)	61 (36.1)	2.7 (1.9-3.9)	< 0.001	-	-
Total income in the last month						
≤ 40 USD	22 (48.9)	23 (51.1)	1.2 (0.6-2.1)	NS	-	-
> 40 USD (RC)	327 (44.3)	411 (55.7)	1.0	-	-	-
Total illegal income in the last month						
≤ 40 USD (RC)	303 (43)	402 (57)	1.0	-	-	-
> 40 USD	46 (59)	32 (41)	1.9 (1.1-3.0)	< 0.01	-	-
Frequency of injections taken in the last month						
Once in a day or less (RC)	11 (22)	39 (78)	1.0	-	-	-
2-3 times in a day	211 (48.1)	228 (51.9)	3.2 (1.6-6.5)	< 0.01	4.7 (1.2-19.0)	< 0.05
More than 3 times in a day	127 (43.2)	167 (56.8)	2.6 (1.3-5.4)	< 0.01	4.5 (1.1-18.4)	< 0.05
Had sex with non-commercial female sex partners in the last three months	162 (42.6)	218 (57.4)	0.8 (0.6-1.1)	NS	-	-

Did not use condom during last sex in the last three months with non-commercial female sex partners	133 (49.8)	134 (50.2)	2.8 (1.7-4.6)	< 0.001	3.3 (1.8-6.0)	< 0.001
Frequency of condom use with non-commercial female sex partners in the last month						
Always (RC)	17 (24.3)	53 (75.7)	1.0	-	-	-
Sometimes	36 (35)	67 (65)	1.6 (0.8-3.3)	NS	Excluded	-
Never	109 (52.7)	98 (47.3)	3.4 (1.8-6.3)	< 0.001	-	-
Bought sex from FSW in the last three months	47 (64.4)	26 (35.6)	2.4 (1.4-4.0)	< 0.001	3.3 (1.2-9.2)	< 0.05
Did not use condom during last sex in the last three months with FSW	19 (70.4)	8 (29.6)	1.5 (0.5-4.2)	NS	-	-
Frequency of condom use with FSW in the last three months						
Always	21 (55.3)	17 (44.7)	1.0	-	-	-
Sometimes	16 (72.7)	6 (27.3)	2.1 (0.7-6.7)	NS	-	-
Never	10 (76.9)	3 (23.1)	2.7 (0.6-11.3)	NS	-	-
Had serious conflict/quarrel with others in the last month	124 (53.2)	109 (46.8)	1.6 (1.2-2.2)	< 0.01	-	-
Regularly felt depressed in the last three months	245 (48.8)	257 (51.2)	1.6 (1.2-2.2)	< 0.01	-	-
Regularly felt anxious in the last three months	225 (48.6)	238 (51.4)	1.5 (1.1-2.0)	< 0.05	Excluded	-
Non suicidal self injury (i.e. cutting hand, self-injury)	164 (55.8)	130 (44.2)	2.0 (1.5-2.7)	< 0.001	1.9 (1.1-3.1)	< 0.05
Injection drug age at onset						
Upto 18	24 (52.2)	22 (47.8)	1.4 (0.3-7.2)	NS	-	-
19 -30	208 (46)	244 (54)	1.1 (0.2-5.1)	NS	-	-
31 - 40	96 (40.7)	140 (59.3)	0.9 (0.2-4.1)	NS	-	-
More than 40	3 (42.9)	4 (57.1)	1.0	-	-	-
Injection drug duration of use						
Not more than 5 years	100 (50.5)	98 (49.5)	1.3 (0.9-2.0)	NS	-	-
6 -10 Years	159 (42.4)	216 (57.6)	0.9 (0.7-1.3)	NS	-	-
More than 10 Years	90 (43.1)	119 (56.9)	1.0	-	-	-

NS refers to not significant at least at 10% in the bivariate analysis; Excluded refers to co-linearity.

Factors associated with the sharing of needles and syringes

The bivariate analysis aimed to examine the association of needle and syringe sharing with the socio-demographic profile, risk behaviors, and psychological status, (Table 2). Younger PWID (18-35 years) showed a higher odds of sharing of needles and syringes than their older counterparts (45+ years). Participants were more likely to report needle and syringe sharing if they were illiterate or educated up to the equivalent of the tenth grade compared to PWID who have received schooling for more than ten years. PWID who demonstrated higher odds of sharing needles and syringes included those who were homeless, living with friends, generating income through collecting garbage or begging, and those who were earning over USD 40 within the last month through illegal activities. PWID who injected drugs for 2-3 times/day and more than three times/day had higher odds of sharing needles and syringes than PWID who only injected once a day or less. PWID who were not using a condom with non-commercial female sex partners or those who were buying sex also exhibited higher odds of needle and syringe sharing. PWID who felt depressed or anxious, had serious conflict and engaged in non-suicidal self-injury had higher odds of sharing of needles and syringes. Notably, PWID who were in constant communication with spouse and family members demonstrated lower odds of sharing needles and syringes.

The multivariate stepwise logistic regression model indicated that the likelihood of the PWID to share needles and syringes was significantly associated with homelessness (OR= 8.2, 95% CI = 1.5-44.3, $p < 0.05$), living with friends (OR= 6.4, 95% CI = 2.4-16.9, $p < 0.001$), injecting drugs 2-3 times per day (OR = 4.7, 95% CI = 1.2-19.0, $p < 0.05$), injecting drugs more than 3 times per day (OR = 4.5, 95% CI = 1.1-18.4, $p < 0.05$), not using condom with non-commercial female sex partner (OR = 3.3, 95% CI = 1.8-6.0, $p < 0.001$), buying sex from FSW (OR = 3.3, 95% CI = 1.2-9.2, $p < 0.05$) and non-suicidal self-harm injury (OR = 1.9, 95% CI = 1.1-3.1, $p < 0.05$).

Discussion

This retrospective analysis showed that the majority of these PWID (86%) have shared needles and syringes at least once in their lifetime. Findings indicate that PWID who were homeless, living with friends, frequently injected drugs on a daily basis, and did not use a condom with noncommercial female sex partner, bought sex from FSW or have a history of self-harm were more likely to partake in needle and syringe sharing.

Findings showed that PWID who did not use condoms with non-commercial female sex partners and those who purchased sex were more likely to share needles and syringes. This study also found that, even though almost half of the PWID (48.5%) were sexually active with their noncommercial partners, over two-thirds of them (70.3%) did not use a condom during the last sex act. This finding aligns with BSS 2006-07 which shows that along with the persistent sharing of needles and syringes, condom use has not increased among this population over time [5]. Similar relationships were highlighted in previous studies conducted in other countries [9,13-15]. Research indicates that achieving consistent condom use with non-commercial partners is challenging due to partner dynamics, cultural and religious implications [18,19].

It was found that injecting drugs at least 2-3 times a day was associated with a higher likelihood of needle and syringe sharing, which is a corollary to findings from BSS 2006-2007 [5]. This relationship was also corroborated by previous studies conducted elsewhere [20]. In Bangladesh, PWID primarily inject buprenorphine [4], a partial opioid agonist commonly used to treat opioid addiction. Although the half-life is moderately high (24-60 hours), PWID opt for injecting frequently to elicit the physiological and psychological effects of the drug. In earlier studies, most PWID in Dhaka city mentioned that they inject 2-3 times per day [4,5]. According to the literature, there are diverse reasons for the frequency of injection drugs and their association with injection drugs, such as inadequate sterile injecting equipment for frequent drug injections, the unwillingness to waste drugs by using multiple syringes, community-based kinship within the PWID network, the inclination to quickly relieve withdrawal, enhanced pleasure from drug injection, and the fear of police harassment while carrying needles and syringes [21, 22].

Homelessness was not only underpinned as a significant risk factor of needle and syringe sharing, [23] but also other risk behaviors such as multiple sex partners, male-to-male sex and not using condoms [10]. Another study conducted among homeless PWID in Dhaka city showed that two-thirds of homeless PWID shared needles and syringes [24] which was also identified as a sole risk factor for HIV infection in another study [4]. Homeless PWID maintain large networks [25] or remain in clusters [24] which precipitate needle and syringe sharing, regardless of whether they are enrolled in the NEP [26]. Likewise, another study depicted that people living with HIV (PLHIV) who resided in stable housing were significantly less likely to share needles and syringes and partake in high-risk sexual behaviors [27]. These findings suggest that providing stable housing might be an important structural intervention to avert HIV infection among homeless PWID.

The findings revealed that PWID living with friends were more likely to share needles and syringes. The motif of peer influence was also reflected in several other studies, especially in assisted injection episodes [28], friendships where the relationship was considered intimate enough for sharing [29], situations where friends had injection drugs and used contaminated needles [30] and injection episodes at friends' residences [31]. All of these factors were positively associated with needle and syringe sharing. This evidence suggests that social relationships may influence PWID beliefs and perceptions, thus ultimately precipitating needle and syringe sharing behaviors [32]. In group settings, PWID maintain certain community values, which stipulate that needle and syringe sharing symbolizes trust and emotional intimacy [21].

Non-suicidal self-injury (NSSI) refers to deliberately inflicting damage and/or pain to themselves without suicidal intent [33], which might sometimes be attributed to the lack of coping skills. The analysis shows that 37.5% PWID harmed themselves at least once in their lifetime, and NSSI was pinpointed as a risk factor propagating needle and syringe sharing. A previous study in Bangladesh also found NSSI among people who use drugs [34]. Although the literature did not underpin any direct association between NSSI and increased needle and syringe sharing, studies found that some of the precipitants of NSSI, such as depression, were associated with needle and syringe sharing [35-37]. This clearly demonstrates that PWID with a history of NSSI have psychiatric co-morbidities that cannot be managed through the conventional harm reduction approach.

Previous studies on needle and syringe sharing often remained focused on specific contextual and behavioral factors. However, the diverse nature of these

findings shows that correlates of needle and syringe sharing among PWID are invariably influenced by the environmental attributes and the individuals within those environments. Studies based in the US depicted factors such as younger age, homelessness, accompanying friends, sexual partners and psychological distress as possible correlates of sharing [23,30,38,39]. Whereas, studies based in Iran and Montenegro have linked needle and syringe sharing with drug injection in public spaces, such as parks [8,20]. In China and Thailand, the types and combinations of drugs, as well as the presence of co-infections such as hepatitis and tuberculosis, were described to be associated with needle and syringe sharing [40,41]. Another study in India identified law enforcement harassment as a predictor [42].

These findings highlight the importance of constructing a robust body of evidence so that HIV prevention interventions for PWID in Dhaka city can address the unique socio-cultural and individual client characteristics. Complexities such as homelessness, living with friends and psychological issues like NSSI were never considered or intervened in the current harm reduction modalities. The existing programs need to equally prioritize condom use alongside promoting safe injection practices. PWID experiencing additional layers of vulnerability, such as homelessness and estrangement from family need to be identified for tailored interventions, such as living space for homeless PWID and family counseling. Frequent injectors might benefit from flexible needle and syringe distribution schedules, along with behavior change interventions. Moreover, mental health needs to be considered as an integral facet of a comprehensive PWID intervention.

There were some key limitations of this analysis. Firstly, since the analysis included only PWID who were motivated to enroll into the OST program, they may not be representative of the entire PWID population in Dhaka city. Secondly, the data is self-reported therefore reporting biases such as social desirability and recall bias are probable. However, self-reported data are commonly used in observational studies involving PWID and were consistently found to be valid [43]. Finally, this was not a random sample of PWID; rather they were selected by harm reduction program service providers from the field sites and referred to OST clinics. However, routinely collected data (RCD) is becoming an increasingly common practice in biomedical research and can generate valuable evidence if interpreted with caution [44].

Conclusions

This study depicted that almost half of the PWID participants reported unsafe injecting practices. This analysis identified several subgroups with adjustable contextual factors. Substantial efforts have been invested in the HIV prevention strategy for PWID in Bangladesh. However, if critical precipitants of needle and syringe sharing are not properly addressed, it would not be possible to contain the spread of HIV infection.

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Authors' contribution

MMMH contributed to the conceptualization and write up of this manuscript. MR assisted in additional analysis and improved upon the initial analysis by IK and also provided revisions. TKIS and AKMMR all helped to implement the OST program where our information was collected, as well as provided feedback and revisions for the manuscript. SIK supervised the whole activity and provided feedback and revisions for the manuscript. All authors read carefully and approved the final manuscript.

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