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Research Paper

Pharmacists' attitudes and practices about selling syringes to people who inject drugs in Tajikistan: Results of a syringe purchase audit and a survey

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ABSTRACT

Background: In Tajikistan, governmental policies leave the decision whether or not to sell syringes to people who inject drugs (PWID) to pharmacists' discretion. This exploratory study tests a theory-driven model explaining Tajikistani pharmacists' actual syringe sale practices to inform future HIV advocacy activities.

Methods: Data were collected via attempts to purchase syringes without prescription and a subsequent survey among a sample of 232 pharmacists in two cities (Dushanbe and Kulob) in Tajikistan in 2015. The survey collected data on attitudes and beliefs related to selling syringes to PWID, stigma against PWID and background contextual factors such as social conservatism, HIV and drug use knowledge. Structural equation modelling was used to assess the relationships between syringe sale practice and pharmacists' attitudinal and background factors.

Results: The majority (87.9%, n = 204) of sampled pharmacists agreed to sell syringes to the study research assistants without a prescription. According to the final model, agreeing to sell syringes was moderately associated with the reported intent to provide syringes without prescription ($\beta = 0.36$, $p < 0.001$), lower stigma against PWID ($\beta = -0.43$, $p = 0.01$), and stronger social conservatism ($\beta = 0.35$, $p = 0.02$). Intent to provide syringes correlated with positive attitudes towards provision of syringes ($\beta = 0.35$, $p = 0.008$), which in turn were negatively associated with stigma ($\beta = -0.54$, $p < 0.001$) and positively with age ($\beta = 0.20$, $p = 0.03$). Stigma against PWID was directly associated with social conservatism ($\beta = 0.47$, $p < 0.001$) and inversely with university-level education ($\beta = -0.28$, $p < 0.001$).

Conclusion: We demonstrated the accessibility of over-the-counter syringes in urban pharmacies of Tajikistan and emphasized the role of stigma in shaping pharmacists' syringe sale practices. Advocacy interventions should target pharmacists to reduce stigmatization of PWID and ensure access to clean syringes.

Introduction

Tajikistan, the poorest post-Soviet republic in Central Asia, is experiencing twin epidemics of HIV and hepatitis C virus (HCV) among people who inject drugs (PWID). In 2014 (the latest available data) national prevalence estimates of these infections among PWID were 13.5% and 22.7%, respectively (Government of Tajikistan, 2015; Ministry of Health of Tajikistan, 2014). In urban areas prevalence may be higher – a 2015 study found that 26.5% of surveyed PWID in Khujand and Kulob tested positive for HIV (Zule, Otiashvili, Latypov, Bangel, & Wechsberg, 2017). Sharing non-sterile injecting equipment remains one of the main factors fuelling these epidemics (Government of Tajikistan, 2015).

Providing access to sterile needles and syringes has been shown to reduce the prevalence of risky injection practices, and thus to contribute to curbing HIV and HCV epidemics among PWID (Abdul-Quader et al., 2013; Dutta, Wirtz, Baral, Beyrer, & Cleghorn, 2012; Palmateer et al., 2010). Nevertheless, existing community-based needle and

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syringe programs (NSPs) operating in Tajikistan as part of the national AIDS response cannot meet all the needs of PWID (Government of Tajikistan, 2015; Ministry of Health of Tajikistan, 2014; Otiashvili, Latypov, Kirtadze, Ibragimov, & Zule, 2016). In Tajikistan, as in many other countries, PWID may buy syringes from pharmacies if NSP services are unavailable in the area or if injecting equipment is needed when NSPs are closed (Otiashvili et al., 2016). However, existing regulations neither directly prohibit nor explicitly allow sales of syringes without a prescription, thus effectively leaving this decision at each pharmacist's discretion (Beardsley & Latypov, 2012; Boymatov, 2015). Recent qualitative studies conducted in Tajikistan showed that pharmacists who stigmatize PWID may refuse to sell them syringes, mistreat, or report them to the police, limiting PWID's access to sterile injecting equipment (Ibragimov et al., 2017; Otiashvili et al., 2016).

Understanding the impact of stigma over pharmacists' decisions related to selling or distributing syringes to PWID may help in promoting accessibility of injecting equipment for PWID. Global literature shows that stigma affects pharmacists' willingness to sell syringes to PWID (Coffin, Linas, Factor, & Vlahov, 2000; Eades, Ferguson, & O'Carroll, 2011; Matheson, Bond, & Mollison, 1999; Rich et al., 2002; Taussig, Junge, Burris, Jones, & Sterk, 2002; Watson & Hughes, 2012). At the same time, stigma does not exist and develop in a vacuum, but is closely tied to the sociocultural context of the society, being part of social relationships, as indicated by Goffman (1963). Thus, literature on Tajikistan and other countries suggest that stigma against PWID and other marginalized groups may be a manifestation of social and religious conservatism (Altemeyer & Hunsberger, 1992; Brener & Von Hippel, 2008; Ibragimov et al., 2017; Kamarulzaman & Saifuddeen, 2010; Laythe, Finkel, & Kirkpatrick, 2001; Narayanan, Vicknasingam, & Robson, 2011). In particular, a 2014 qualitative study found that pharmacists in Tajikistan may refuse to sell syringes to PWID due to Islamic prohibition of substance use (Ibragimov et al., 2017). Studies among pharmacists and other health care providers in western countries demonstrate that factors related to sigma include knowledge of HIV and drug use related issues (Ding et al., 2005; Scott & Mackridge, 2009) and personal and professional encounters with PWID (Brener, von Hippel, & Kippax, 2007; Palamar, Kiang, & Halkitis, 2011; Taussig et al., 2002). In addition to stigma, pharmacists' beliefs about public health and community-related outcomes associated with providing sterile syringes to PWID (e.g. reducing HIV transmission or littering communities with used syringes) may also play a role in their decision-making (Amesty, Blaney, Crawford, Rivera, & Fuller, 2012; Pollini et al., 2014; Rich et al., 2002).

Promoting access to clean needles and syringes and other pharmacy-based HIV prevention services would require developing comprehensive models explaining pharmacists' willingness to provide services to PWID. Literature suggests a host of factors that may influence pharmacists' attitudes and practices. However, to our best knowledge, no theory-driven models explaining actual syringe sale practices by a constellation of socio-cultural and attitudinal factors have been published for Tajikistan or other countries. Further, data on accessibility of syringes for PWID in Tajikistan is limited. Our study starts to fill these gaps by conducting syringe purchase audit and exploring individual-level factors explaining Tajikistani pharmacists' syringe-sale practices using a model guided by Theory of Planned Behaviour (TPB).

Theoretical framework

TPB developed by Ajzen and Fishbein (Montano & Kasprzyk, 2008) posits that attitudes and beliefs are key constructs explaining intent to perform a behaviour – a major determinant of the actual behaviour. Based on TPB, our study framework (Fig. 1) states that actually providing syringes to PWID can be explained by the *intent* to sell syringes, which, in turn, is influenced by *attitudes*, *perceived norms*, and *self-efficacy* related to this behaviour. *Stigma against PWID* and its predecessors – *social conservatism, perceived drug use controllability*, *HIV and drug related knowledge* and *personal exposure to PWID* are key background constructs in the model, as suggested by the literature on drug and HIV-related stigma.

Methods

Overview and setting

The study had two forms of data collection: (1) an audit of pharmacies to determine if they would sell syringes without a prescription, and (2) a survey of pharmacists who worked at the audited pharmacies. The syringe purchase audit assessed actual syringe sale practices, while the survey collected data on pharmacists' attitudes and beliefs related to selling syringes to PWID, stigma against PWID and background contextual factors.

The study was conducted in two cities in Tajikistan, Dushanbe and Kulob, in May–June 2015. Dushanbe, the capital city with a population of 776,000 [the largest in the country (Tajikistan Statistics Agency, 2014)], was selected as a study site because it contains the largest estimated PWID population (3000) in the country (Ministry of Health of Tajikistan, 2014). Kulob [total population: 100,000 (Tajikistan Statistics Agency, 2014), estimated PWID population: 1500 PWID (Ministry of Health of Tajikistan, 2014)] was chosen because it is the largest city in the Khatlon province that borders Afghanistan. Both cities have a wide range of free HIV-related services targeting PWID including NSP, pilot opioid substitution treatment (OST) programs, and HIV testing and treatment (Government of Tajikistan, 2015).

Data collection

Syringe purchase audit

A syringe purchase audit (or test), the primary outcome of the model, is a proxy method to assess pharmacists' actual practices related to over-the-counter (OTC) sales of syringes (Compton et al., 2004; Fedorova et al., 2013; Pollini et al., 2010). It involved a "mock client," here a research assistant (RA), who attempted to buy syringes without a prescription in the sampled pharmacies. We modified the syringe purchase audit protocol described by Compton et al. (2004) in accordance with the local drug-use practices. In particular, the test involved the attempt to purchase a 2-ml syringe and a vial of injectable Diphenhydramine (Dimedrol), an antihistamine medicine often mixed with heroin by PWID in Tajikistan (Zule et al., 2015).

We selected pharmacies via systematic random sampling from the list of registered pharmacies provided by the National Pharmaceutical Monitoring Service (NPMS) for Dushanbe and Kulob. The number of pharmacies sampled in each city was approximately proportionate to the total number of pharmacies in each city at the time of data collection. The sampling frame consisted of 461 pharmacies in Dushanbe and 122 in Kulob. Given the exploratory nature of the study, the sample size was based on the rule of thumb that structural equation modelling should not be conducted with fewer than 200 observations (Kline, 2014). Anticipating a 25% potential refusal rate (or some pharmacies being closed), we sampled 250 pharmacies (180 in Dushanbe and 70 in Kulob).

We hired and trained eight RAs and instructed them to work in pairs (three in Dushanbe and one in Kulob). The syringe purchase audit protocol has been informed both by literature (Compton et al., 2004) and by a formative qualitative study conducted among pharmacists in Dushanbe and Kulob (Ibragimov et al., 2017). RAs that were involved into syringe purchase attempt were of the same demographic (young males) as a stereotypical PWID, as informed by the formative study. For general safety reasons, RAs visited sampled pharmacies during the daytime only. No replacement sampling for the pharmacies closed by the time of RA team's arrival was made.

In accordance with the standardized study protocol and script, one of RAs (a young male) approached the pharmacy worker (any person

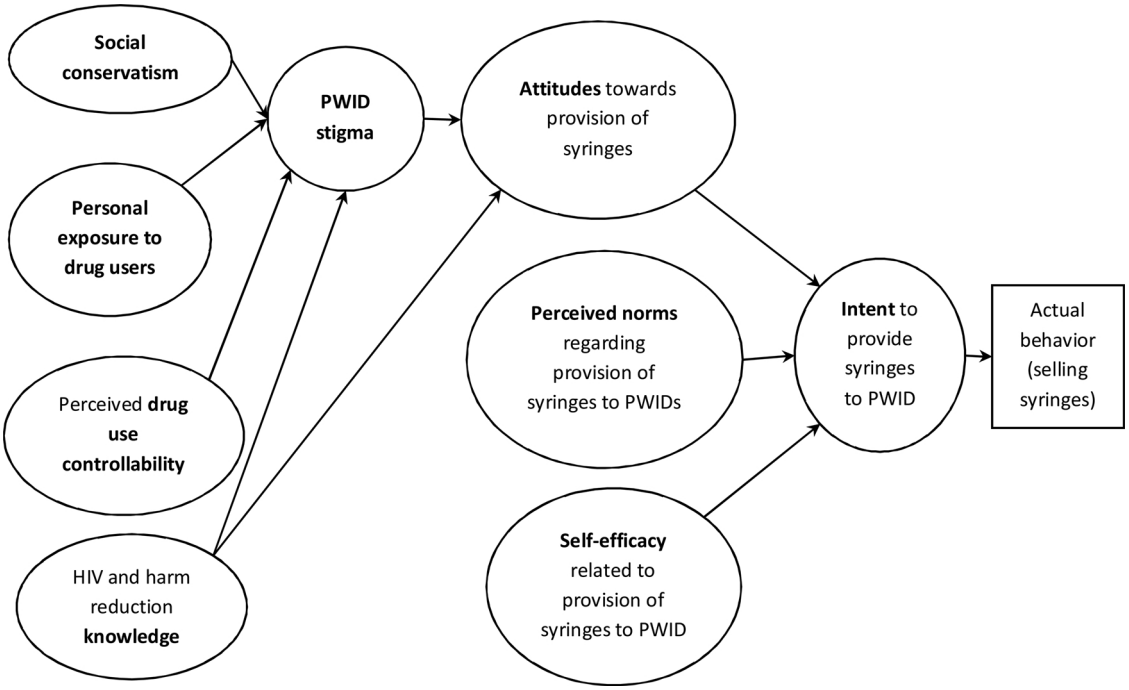

Fig. 1. Hypothesized model of Tajikistani pharmacists' practices related to providing syringes to PWID.

present at the counter) at the sampled pharmacies and asked for a 2-ml syringe and an ampule of antihistamine (Diphenhydramine, commonly referred to by its brand name Dimedrol) without providing a prescription. PWID in Tajikistan often use Dimedrol to prepare drug solution because it potentiates the effect of heroin and mitigates possible allergic reactions from drug mixture impurities (Ibragimov et al., 2017; Otiashvili et al., 2016). If more than one pharmacist was present at the sampled pharmacy (most pharmacies in Tajikistan have only one employee, who must be a pharmacist), the RA chose the pharmacist on the spot using convenience sampling method. If the pharmacist agreed to sell, the RA requested to see the syringe and Dimedrol for a visual inspection (a common practice of Tajikistan pharmacy customers). If the pharmacist produced the syringe and Dimedrol, the RA would refuse the purchase under a pretext and the attempt was recorded as positive. If the pharmacist refused to sell a syringe or said that the pharmacy had no syringes, the RA would leave without confrontation and the purchase audit result was recorded as negative. Another RA waited outside the pharmacy to ensure there is no security risk for the first RA. The syringe purchase audit did not involve deception – RAs were instructed not to look or act like a stereotypical PWID (e.g. by wearing shabby clothing, showing anxiety or using specific slang), since, as reported by pharmacists in the formative study, there are no typical signs indicating that a customer may inject drugs aside from buying one syringe and Dimedrol. After the purchase audit was finished, the RA exited the pharmacy without debriefing the pharmacist to avoid priming the subsequent survey results.

Survey

10 min after the purchase audit another RA approached the same pharmacist and informed them about the study and the opportunity to take part in the survey. If the sampled pharmacist expressed interest, the RA screened her or him for eligibility, and obtained oral informed consent. Inclusion criteria were (a) 18 years old and above, (b) being a pharmacist employed at or owning the pharmacy, and (c) willingness to provide informed consent. Data were collected anonymously via a computer-assisted self-interview (CASI) questionnaire in Tajik or Russian languages. We offered USD $8 in local currency to pharmacists as a compensation for their time and efforts. The study was approved by the Medical Ethics Committee of the Ministry of Health of Tajikistan and the Emory University Institutional Review Board.

Measures

Syringe purchase audit

The results of each syringe purchase audit were recorded as 'agreed to sell a syringe' ('1') or 'refused' ('0').

Survey

All survey measures were based on instruments published in the literature. We adjusted several of them as specified below based on the results of the qualitative study conducted among pharmacists and pharmacy students in Dushanbe and Kulob in November–December 2014 (Ibragimov et al., 2017).

The *behavioral intent scale* included three items measuring willingness to provide syringes to PWID with a 5-point 'strongly disagree' (1) – 'strongly agree' (5) Likert type response scale. We translated one item ('*I am willing to sell syringes to known or suspect PWID without prescription*') used elsewhere (Mashburn, 2003) from English to Tajik and Russian and added two more items reflecting the willingness to distribute syringes to PWID for free and to sell syringes without prescription to anyone. Higher scores correspond to higher willingness to provide syringes.

The scale measuring *attitudes towards providing syringes to PWID* consisted of 13 items. Two of them were direct measures of attitudes (e.g. "*In general, is selling syringes to PWID without prescription good or bad?")* with response options ranging from '*very bad*' (1) to '*very good*' (5). The rest of the items measured the likelihood of positive (e.g. "*Reduces HIV transmission*") and negative (e.g. *"Encourages drug use"*) outcomes of providing syringes to PWID measured on a 5-point '*strongly disagree*' (1) – *'strongly agree'* (5) Likert type response scale. We used 6 items from a scale by Mashburn (2003) and added 5 items (e.g. "*Will lead to problems with the state inspecting agencies*") derived from our formative qualitative study among pharmacists and pharmacy students published elsewhere (Ibragimov et al., 2017). The higher scores indicate more positive attitudes towards providing syringes to PWID.

Perceived norms were assessed by asking participants about whether

individuals who they consider important (referent persons) approve providing syringes to PWID (*normative beliefs*) and if participants would follow a referent persons' advice on this matter (*motivation to comply*). The list of referent persons (pharmacy owner or staff, other pharmacists, NPMS inspector, police officers, religious leaders, family members and friends) was identified during our formative qualitative study (Ibragimov et al., 2017). Both normative beliefs and motivation to comply sub-constructs were measured on a 5-point '*strongly disagree*' (−2) – '*strongly agree*' (2) Likert scale. To derive the composite perceived norms value, we multiplied every normative belief value by the relevant motivation to comply value as recommended by TPB authors (Montano & Kasprzyk, 2008). The higher scores relate to more positive perceived norms about providing syringes to PWID.

The *self-efficacy* scale for providing syringes to PWID consists of two sub-scales – *perceived barriers* and *facilitating factors* related to providing syringes and relevant *control beliefs* (perceived ability to control these factors). *Perceived barriers* included six items (i.e. NPMS, police, policies regulating syringe sale, owner or staff, salary supplement and workload) elicited during the qualitative stage (Ibragimov et al., 2017). *'[An external factor] will make it easy or difficult to provide syringes to PWID'*. The five-point response scale ranged from *'very difficult'* (−2) to *'very easy'* (+2). Accordingly, *control beliefs* items were formulated as follows: *"If [a barrier] interferes with provision of syringes to PWID, I can deal with it on my own.'* We did not ask pharmacists about their control beliefs over salary supplement or syringe sale policies, because we assumed that these factors were not within their control. This sub-scale was measured using a 5-point '*strongly disagree*' (−2) – *'strongly agree'* (+2) Likert scale. In addition, we included four items directly measuring self-efficacy (e.g. *'Selling syringes to PWID is completely under my control'* or *'Distributing syringes to PWID for free would be easy for me')* on a 5-point '*strongly disagree*' (-2) – *'strongly agree'* (2) Likert scale. Then we multiplied the value for *potential barrier/facilitator* by the value of *control belief* for each external factor (items related to salary and policies were multiplied by two to ensure the similar range) as recommended by TPB. Higher composite scores correspond to higher self-efficacy.

The stigma towards PWID scale is based on the scale proposed by Palamar et al. (2011). The original scale consisted of 7 items (for example, "*Heroin users are weak minded*") measured on a 5-point Likert scale ranging from '*strongly disagree*' (1) to '*strongly agree'* (5). We modified the scale by adding 6 more items based on themes (e.g. drug use being sin, PWID harming families and society) that emerged from the formative qualitative study (Ibragimov et al., 2017). An example of an item is "*Heroin users harm their families*". Higher scores equate stronger stigmatization of PWID.

We revised a 13-item *Social conservatism* scale by Henningham (1996) measuring agreement with liberal or conservative values by removing 6 items not relevant to the context of Tajikistan (e.g. '*Asian immigration' or 'Bible truth'*) and replacing them with more relevant items such as '*Hijab for all wome*n' or '*Condom education for high schoolers'*. We also added two items measuring religiosity (e.g. *'Religion is very important for me'*) and changed the response options from *'yes/no'* to a 5-point '*strongly disagree*' (1) – *'strongly agree'* (5) Likert scale to increase variance in data. Higher score indicates more conservative values.

The *drug use controllability* scale proposed by Brener and Von Hippel (2008) consists of four items (e.g. *'PWID can stop using drugs whenever they want to'*) with a 5-point '*strongly disagree*' (1) – *'strongly agree'* (5) Likert scale. Higher scores relate to stronger belief in controllability of drug use.

The *exposure to drug users index* (Palamar et al., 2011) assessed participants' encounters with heroin users in various settings and situations (e.g. school, family, work). An example of an item is '*I have lived with a person who uses heroin*' with response options 'yes' (1), 'no' (0) and 'not sure' (0). We also added two questions measuring pharmacists' perceptions of pervasiveness of injecting drug use in the city (e.g. '*There are a lot of PWID in my city'*) measured on a 5-point '*strongly disagree*' (1) – *'strongly agree'* (5) Likert scale (values of these two items were divided by five to maintain the original range). Higher index scores indicate higher perceived exposure to PWID.

The *HIV and drug related knowledge index* was derived from the HIV-KQ-18 measure (Carey & Schroder, 2002) assessing knowledge of basic facts related to HIV transmission (a typical item: '*A person can get HIV by sharing a glass of water with someone who has HIV'*) with 'yes', 'no' or 'don't know' response options with each correct answer resulting in one score summed into the total index score. We excluded three items that were perceived either as too explicit (e.g. a question about oral sex) or irrelevant to Tajikistan's context (a question about natural skin condom) during the pre-test. We added two questions about the possibility of HIV transmission via used syringes (e.g. '*Washing syringes in bleach can reduce the risk of HIV infection'*) and an item about the possibility of transmitting HIV via saliva, a common misconception. We also included two items about drugs used for medication assisted treatment (Methadone) and reversal of opiate overdose (Naloxone) to assess *knowledge about drug-related* issues, where participants were asked to select the right answer out of five. Higher index scores reflect higher knowledge level.

We also measured basic demographic characteristics (age, gender, city, marital status) as well as the level of education (five-year university vs. two-year college) and work experience in years.

Analysis

We conducted descriptive analyses of survey and syringe purchase data. Analyses of missing data indicated that missingness for socio-demographic covariates ranged from 0% (city) to 10.3% (years lived in the city). In the final model 10.3% (n = 24) data patterns were missing. We used maximum likelihood (ML) and robust weighted least squares with mean and variance adjustment (WLSMV) estimation algorithms able to produce consistent estimates with missing data assuming missing at random mechanism (Asparouhov & Muthén, 2010; Baraldi & Enders, 2010).

For every composite measure, we recoded negatively worded items, calculated the mean scores by dividing the sum of scores by the number of items in the scale, so the mean score lies within the individual item score interval, e.g. from 1 to 5 for stigma scale. We recalculated mean scores for scales after excluding items based on exploratory factor analysis (see below). We treated mean scores as continuous variables for bivariate analysis. Univariate analyses produced descriptive statistics characterizing measures of central tendency (mean) and spread (standard deviation) for continuous variables and frequency and count for dichotomous ones. We compared mean scores for each scale across two cities using independent t-test.

Inter-item reliability was assessed by calculating Cronbach's alpha. Scales with an alpha statistic < 0.70 were considered for modification, where possible. All statistical analyses used 5% significance level; effect sizes and confidence intervals were reported for all statistical tests.

Validity analysis

Construct validity of the scales was explored by identifying their factor loadings of the scales in the independent sample (240 students of Pharmacy Department of Tajik State Medical University recruited for a parallel study) using *exploratory factor analysis* (EFA). For the scales with composition of items different from that of students (modified stigma scale with drug controllability items, perceived norms and self-efficacy) we conducted EFA using data from the pharmacists' sample. We used maximum likelihood (ML) method to extract latent factors (Bandalos & Finney, 2010). The final decision on the number of factors to retain was made by comparing the results of different methods such as Velicer's Minimum Average Partial procedure (Velicer, 1976), eigenvalues greater than 1, scree-plot and weighing in theoretical considerations. Taking into account the high possibility of correlation

Table 1
Sociodemographic characteristics of pharmacists surveyed in Dushanbe and Kulob cities of Tajikistan (n = 232).

Variable	Mean	SD	Missing, n (%)
Age, years	33.2	9.3	18 (7.8)
Experience as pharmacist, years	7.2	6.0	11 (4.7)
Years lived in the city	17.8	6.0	24 (10.3)
	Frequency, %	Count, n	
Female	36.2	84	1 (0.4)
Dushanbe (vs. Kulob)	71.6	166	0
Owner (vs. employee)	21.1	49	2 (0.9)
University (vs. technical college)	28.9	67	11 (4.7)
Marital status			4 (1.7)
Single	21.6	50	
Married	64.2	149	
Widowed, divorced, separated	12.5	29	

between the factors, we used oblique rotation (*promax*). Given the exploratory character of the study, we retained several competing models (factor solutions and related items) for the scales to compare them during the CFA stage. We excluded items with low item loadings (below 0.4) and tested convergent and discriminant properties of the modified scales using Pearson's correlation test. We also assessed the association between the modified scales and dichotomous variables (main outcome and demographics) as well as between dichotomous variables using simple logistic regression.

The identified latent factor structure was confirmed using *confirmatory factor analysis* (CFA) of data in our sample following the steps recommended by Kline (2014) as described below. A priori sub-models related to each scale were specified based on factors and items belonging to each factor identified during the EFA stage. Models were re-estimated each time a change had been made. Model fit was assessed using the following indicators: (a) chi-square, where a non-significant chi-square at alpha = 0.05 indicates good fit; (b) root mean square error of approximation (RMSEA) index with the value above 0.08 indicating poor fit; (c) comparative fit index (CFI) with values of 0.95 and more suggesting good fit (Bandalos & Finney, 2010). We re-specified the models based on modification indices and theoretical framework in a iterative manner to achieve good fit.

Structural model

In the final step, we tested the structural model of the relationships among the latent factors, the outcome (syringe purchase audit results) and control variables. Since the outcome was dichotomous, we used WLSMV estimation to account for the non-normal data and produce consistent estimates for data sets with missing data (Asparouhov & Muthén, 2010). To address the problems with convergence of the initial model we assessed the output to detect potential reasons such as improper values (negative error variances, factor correlations greater than one, very large coefficient values) and excluded variables causing these problems from the model. Re-specification also involved merging scales to address multicollinearity that prevented model convergence. Specifically, because of the high correlation between drug controllability and stigma scale items, we loaded items of both scales together onto a single factor. This approach can be justified by the fact that drug controllability address stereotypes related to PWID – an integral component of stigma (Link & Phelan, 2001).

When model convergence was achieved, we tested the model's goodness of fit. We tested alternative models with different number of factors (e.g. with two factor loadings for stigma scale and two and three factor loadings for self-efficacy scale) as suggested by the EFA results. To ensure adequate goodness of fit we iteratively re-specified the models by adding covariances between the indicators of the same factors based on the modification indices. Further, we excluded indicators with low factor loadings and removed latent factors that had low reliability or factor-item correlation.

For the model with adequate fit, we report unstandardized and fully standardized path coefficients, standard errors for unstandardized path coefficients and significance test results (p-values). Standardized coefficients for unidimensional variables were squared to derive variance (R^2) of this variable explained by the factor it pertains. Factor quality was assessed based on the magnitude of factor-item correlation expecting that majority of items would have R^2 greater than 0.5.

All statistical analyses prior for assessing the structural model were performed in STATA 14.0 software (StataCorp LP, College Station, TX). Structural model assessment was performed on Mplus 7.4 (Muthen & Muthen).

Results

Data were successfully collected from 232 pharmacists (166 or 92.2% in Dushanbe and 66 or 94.3% in Kulob) with the overall response rate of 92.8%, while 18 of sampled pharmacists (7.2%) did not consent to participate in the survey and were excluded from the study). Sociodemographic characteristics of the participants and syringe purchase audit results are presented in Table 1. Overall, most participants were male (63.8%) and the sample was relatively young (mean age = 33.2, SD = 9.3). Pharmacy owners or those with a university diploma comprised a minority (21.1% and 28.9% respectively) of participants. Out of 232 pharmacists who participated in the survey 204 (87.9%) agreed to sell syringes without prescription during the syringe purchase audit. Out of those who refused, 6 participants (2.6% of all participants) said that they had no syringes for sale, while the remaining 22 (9.5%) requested a prescription. On average, according to summated and rescaled scores for original measures (with no items dropped), the participants were more likely to agree with the items related to intent to sell or provide syringes without prescription (on a scale from 1 to 5: mean = 3.38; SD = 0.88); report stigmatizing attitudes towards PWID (on a scale from 1 to 5: mean = 3.70; SD = 0.62); have more negative attitudes towards providing syringes to PWID (on a scale from 1 to 5: mean = 2.28; SD = 0.72); and be more socially conservative (on a scale from 1 to 5: mean = 3.73; SD = 0.50). Participants also tended to have virtually neutral perceived norms (on a scale from −4 to +4: mean = −0.23, SD = 1.26) and self-efficacy (on a scale from −4 to +4: mean = 0.12, SD = 0.64) related to provision of syringes to PWID. The mean percentage of correctly answered HIV and drug-related knowledge items was 68.0% (SD = 19.0%). Descriptive statistics for each individual item are given in Supplemental Table 1.

Descriptive statistics of scales and indices (from the original and final models) are presented by cities in Table 2. Most scales included into the final model had good or adequate inter-item reliability (i.e., > 0.70). However, the final behavioural intent measure had a Cronbach's alpha of 0.65; the low inter-item reliability of this measure can be partially due to the fact that there were only two items in the final scale.

Comparison of mean scores for measures comprising the final model demonstrated that participants from Dushanbe had reported lower stigma against PWID than participants from Kulob (mean scores on the scale from 1 to 5: 4.13 vs. 4.41; $p < .001$); had stronger intent to provide syringes to PWID (mean scores on the scale from 1 to 5: 3.80 vs. 3.48; $p = 0.018$); and were more likely to agree to sell syringes (OR 2.92; 95%CI 1.30, 6.54; Table 2). As for the measures omitted from the final model, Dushanbegi participants, as compared to Kulobi counterparts, demonstrated better knowledge of HIV and drug related issues (71.0% of correct answers vs. 60.0% for Kulob; $p < .001$), reported less exposure to people who use heroin (mean scores on the scale from 0 to 1: 0.30 vs. 0.53, $p < 0.001$), higher perceived norms favouring provision of syringes to PWID (mean scores on −4 to + 4 scale: −0.07 vs. −0.48; $p = .036$) and higher self-efficacy to provide syringes to PWID (mean scores on −4 to + 4 scale: 0.23 vs. −0.11; $p = .001$;

Table 2
Descriptive statistics of composite attitudinal and behavioural measures for Tajikistani pharmacists by cities (n = 232).

Scale/Index	Dushanbe				Kulob				p-value	Reliability (both cities, Cronbach's alpha or Kuder-Richardson's 20)
	N = 166	Missing (%)	Mean**	Std. Dev.**	N = 66	Missing (%)	Mean**	Std. Dev.**		
Stigma (17 items, response options: *Str. disagree* '0' to *Str. agree* '5', higher – stronger stigma)	144	13.3%	3.55	0.62	64	3.0%	4.02	0.48	< **0.001**	0.88
Stigma (6 final model items)*	159	4.2%	4.13	0.86	65	1.5%	4.41	0.56	**0.005**	0.88
Social conservatism (14 items, response options: *Str. disagree* '1' to *Str. agree* '5', higher – more conservative)	113	31.9%	3.74	1.79	58	12.1%	3.69	0.50	0.532	0.70
Social conservatism (7 fin.al model items)*	126	24.1%	3.91	0.67	60	9.1%	4.00	0.65	0.391	0.73
Attitudes towards providing syringes (13 items response options: *Str. disagree* '1' to *Str. agree* '5', higher – more positive)	144	13.3%	2.27	0.73	64	3.0%	2.30	0.70	0.754	0.88
Attitudes towards providing syringes (4 fin.al model items)*	154	7.2%	2.05	0.81	66	0.0%	2.03	0.81	0.903	0.73
Behavioural intent (3 items, response options: *Str. disagree* '1' to *Str. agree* '5', higher – more willing)	155	6.6%	3.48	0.83	65	1.5%	3.12	0.95	**0.005**	0.74
Behavioural intent (2 final model items)*	158	4.8%	3.80	0.87	65	1.5%	3.48	1.04	**0.018**	0.63
Percentage of correct answers to HIV and drug related knowledge index (15 items, response options: *True*, *False*, *Don't Know*)	150	9.6%	71.0%	17.4%	65	1.5%	60.0%	21.9%	< **0.001**	0.74
Personal exposure to heroin users index (9 items: *Yes* '1', *No* or *Not Sure* '0', higher – more exposure)	148	10.8%	0.30	0.16	66	0.0%	0.53	0.24	< **0.001**	0.73
Perceived norms (7 items, normative beliefs x motivation to comply; response options: *Str. disagree* '-2' to *Str. agree* '+2', higher – more positive perceived norms)	109	34.3%	−0.07	1.20	66	0.0%	−0.48	1.31	**0.036**	0.76
Self-efficacy (10 items): direct measure (4 items, *Str. disagree* '-2' to *Str. agree* '+2') + indirect measure (6 items, perceived barriers [*'very difficult'* '-2' to *'very easy'* '+2'] x [control belief, *Str. disagree* '-2' to *Str. agree* '+2'], higher – more self-efficacious)	120	27.7%	0.23	0.58	57	13.6%	−0.11	0.71	**0.001**	0.65

Note: *scales from the final model are in bold font.
** means and standard deviations are rescaled according to the individual item response scale (e.g. 1 to 5 for stigma scale).

Table 2).

Bivariate analysis demonstrated significant association between most of the scales with correlation coefficients being medium to small (r = 0.15 to 0.48), suggesting that these scales reflect similar, though different concepts. At the same time, high correlation between the drug controllability and stigma scales (r = 0.78, p < 0.001) indicated high convergence between these measures. Taking into account this finding and multicollinearity of some items from these two scales found at SEM stage we decided to merge these two scales into one in the final model.

We found statistically significant associations among several key constructs (i.e. drug controllability beliefs, HIV and drug knowledge, stigma, attitudes towards providing syringes and behavioural intent to provide syringes) and the results of syringe purchase audit as well as some sociodemographic characteristics. Those who agreed to sell syringes were more likely to have lower drug controllability beliefs (OR 0.71; 95%CI 0.56; 0.90), higher HIV and drug dependency knowledge (OR 1.18; 95%CI 1.04, 1.35), lower level of stigma (OR 0.84; 95%CI 0.74, 0.93), more positive attitudes towards provision of syringes (OR 1.09; 95%CI 1.04, 1.15) and stronger willingness to provide syringes to PWID (OR 1.26; 95%CI 1.08, 1.48).

The diagram of the final SEM results is presented in Figs. 2 (structural model) and 3 (measurement model). The model demonstrated adequate fit with $\chi^2 = 221.7$ (df = 191, p = 0.06), RMSEA = 0.03 and CFI = 0.96. According to the model testing results (Table 3), the positive outcome of the syringe purchase audit was significantly and positively associated with the behavioural intent to provide syringes (β = 0.36, p < 0.001) and social conservatism (β = 0.35, p = 0.02), and inversely with stigma (β = −0.43, p = 0.01). Intent to provide syringes significantly and positively correlated with attitudes (or, more specifically, its behavioural beliefs component) towards provision of syringes to PWID (β = 0.35, p = 0.008), while attitudes were negatively associated with stigma (β = −0.54, p < 0.001) and positively with age (β = 0.20. p = 0.03). The model also demonstrated statistically significant and positive correlation between stigma and social conservatism (β = 0.47, p < 0.001) and negative association with university education (β = −0.28, p < 0.001). The model explained about a third of stigma factor variance (R^2 = 0.35), although for other dependent latent factors this estimate was lower. Factor-item correlation was adequate for the stigma latent variable only, where most of items showed R^2 greater than 0.5, while factor validity for other latent variables was limited.

Discussion

This study tested the theory-based structural model explaining pharmacists' practices related to providing syringes to PWID in Tajikistan using a syringe purchase audit as the main outcome. The high percentage of sampled pharmacists who agreed to sell syringes shows that the absence of clear policies regulating syringe sales does not prevent pharmacists from selling syringes over-the-counter. Our findings are in line with the qualitative accounts of PWID reporting frequent purchases of syringes without prescription in pharmacies in Tajikistan (Otiashvili et al., 2016). No similar studies involving syringe purchase audit were published for Tajikistan or other post-Soviet Central Asian countries to compare our results. In a 2013 study in St. Petersburg, Russia (where over-the-counter sale of syringes is legal), the research team was able to purchase syringes without prescription in 65% of 108 audited pharmacies (Fedorova et al., 2013). These results are somewhat lower than those of our syringe purchase audit (88%), which is possibly due to stronger stigmatization of PWID in Russian society and negative attitudes towards harm reduction prevalent among Russian officials (Lunze, Lunze, Raj, & Samet, 2015). At the same time, our findings do not suggest that all PWID can freely access syringes. Other factors, such as lack money to buy syringes or police surveillance, may reduce accessibility of syringes to PWID in pharmacies (Ibragimov, Latypov, Jamolov, & Khasanova, 2011; Otiashvili et al., 2016).

The study identified several factors associated with selling syringes over-the-counter. Specifically, the linkages found among practice, behavioural intent and attitudes toward providing syringes support the key theoretical postulates of TPB (Montano & Kasprzyk, 2008). Furthermore, the model demonstrates that attitudinal factors, such as stigma and behavioural beliefs about outcomes of syringe sale, are important correlates of actual syringe sale practices. While previous studies assessed factors explaining pharmacists' self-reported syringe sale practices or willingness to provide syringes (Matheson, Bond, & Tinelli, 2007; Rich et al., 2002; Scott & Mackridge, 2009; Taussig et al., 2002); our study is among the first to demonstrate the link between pharmacists' attitudinal and background factors and their actual syringe sale practices.

The model highlighted the central role of stigma against PWID. Thus, stigma may influence pharmacists' behaviour indirectly by triggering negative attitudes towards the idea of providing syringes to PWID (or, given the item composition of the attitude scale, negative

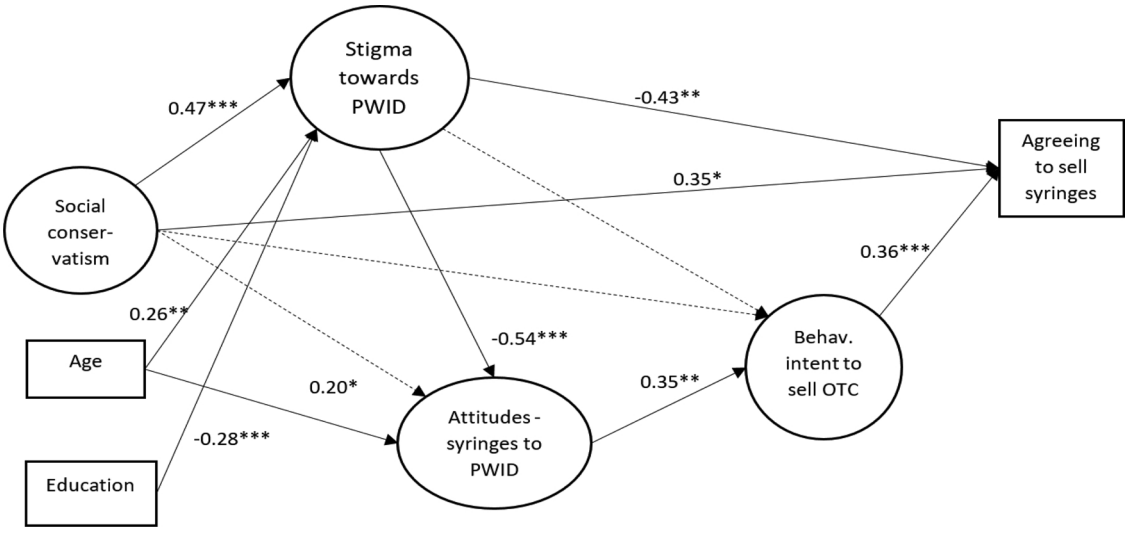

Fig. 2. Final structural model of Tajikistani pharmacists' syringe sale practices.
* p < 0.05, ** p < 0.01, *** p < 0.001.
Note: Only standardized estimates are shown. Solid arrows denote associations between the constructs significant at α = 0.05; dotted arrows show associations non-significant at α = 0.05. Circles refer to the latent constructs, boxes – to directly measured items.

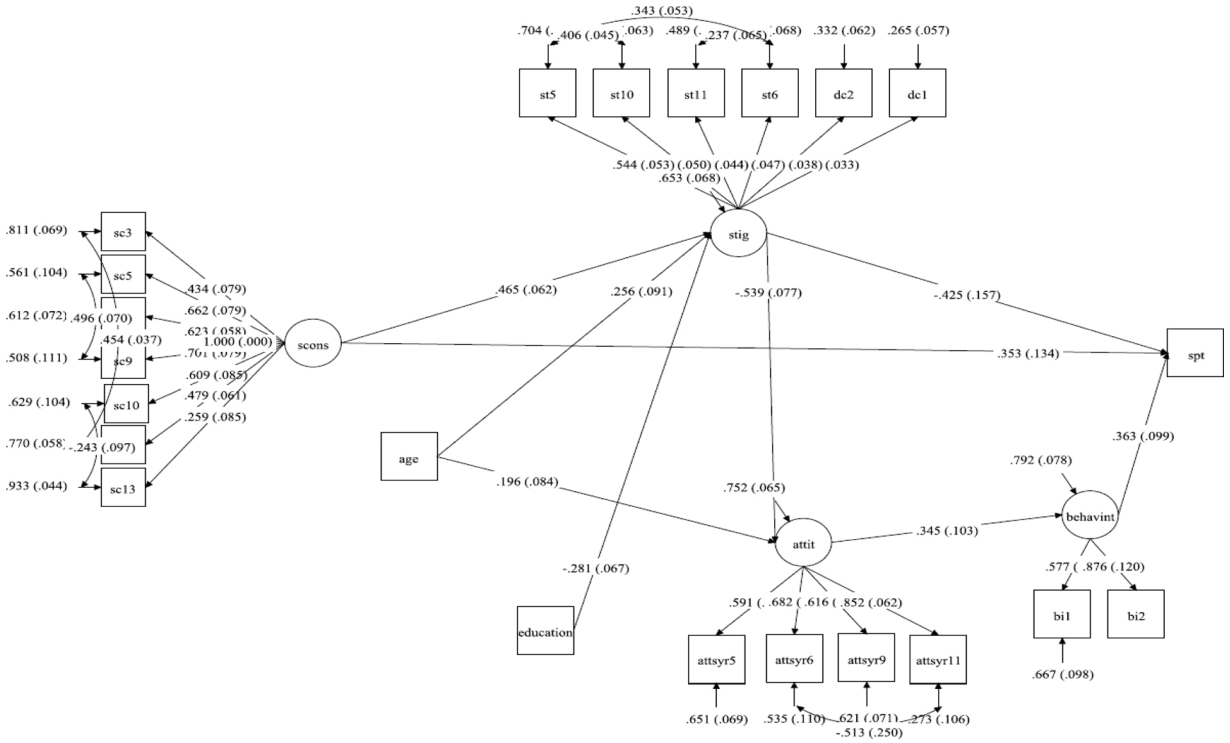

Fig. 3. Final measurement model of Tajikistani pharmacists' syringe sale practices.
Note: Significant (at $\alpha = 0.05$) standardized estimates and standard errors (in parenthesis) are shown. Circles refer to the latent constructs, boxes to directly measured items. Construct names: 'scons' – social conservatism; 'stig' – stigma against PWID; 'attit' – attitudes related to provision of syringes to PWID; 'behavint' – intent to sell syringes without prescription; 'spt' – agreeing to sell syringes in syringe purchase audit. For the names of individual items see Table 3.

beliefs about the outcomes of such behaviour), which in turn reduces their intent to provide syringes. The direct inverse link between stigma and syringe selling practice remained significant while controlling for the association between these two variables mediated by the attitudes and behavioural intent. This finding suggests that stigma toward PWID may lead pharmacists to refuse to sell syringes even if they have no negative beliefs regarding the outcomes of selling syringes to PWID. However, this finding should be interpreted cautiously because previous studies of pharmacists' attitudes either did not assess the role of stigma in addition to attitudes towards providing syringes (see, e.g. Rich et al., 2002) or measured both concepts with one instrument (Matheson et al., 1999).

The positive correlation between stigma and social conservatism found in our study corresponds with the literature on stigmatization of PWID. In particular, a study among Australian health care providers showed that social conservatism may predict stigmatization of PWID and this link has been mediated by perceived drug use controllability (Brener, Hippel, Kippax, & Preacher, 2010), a component of the stigma scale used in our study. The results of our qualitative exploration of pharmacists' attitudes towards PWID in Tajikistan also showed that socially conservative values may be an important contextual antecedent of stigma. For example, collectivistic norms that prioritize well-being of groups over individual choices may facilitate stigmatization of PWID based on perceived damage they inflict on the image of the society (Ibragimov et al., 2017).

The direct positive link between social conservatism and agreeing to sell syringes (while controlling the pathway between both variables mediated by stigma) is puzzling. Notably, the non-significant bivariate association between social conservatism and syringe sale practices suggest that there may be little or no relationship between these variables. An alternative explanation for this relationship might be that socially conservative pharmacists who hold little or no stigma against PWID may choose to sell syringes based on pragmatic reasons (e.g. selling syringe as business). Although we did not address pragmatism as a construct of our model, previous qualitative findings indicate that this proposition is plausible (Ibragimov et al., 2017).

Attitude-related factors may depend on sociodemographic factors, as shown by the model. Older pharmacists tend to be more stigmatizing towards PWID and at the same time demonstrate more positive beliefs in the outcomes of providing syringes. A potential explanation might be that older pharmacists may have a more realistic understanding of the positive outcomes of syringe provision due to higher professional or personal exposure to PWID (Matheson et al., 2007; Scott & Mackridge, 2009). Lower levels of stigma among pharmacists with a university education as compared to those with vocational school diploma might be due to their better understanding of drug dependency and HIV-related issues, as shown in studies conducted outside of Tajikistan (Ding et al., 2005; Scott & Mackridge, 2009); however, we could not test this hypothesis since the model with the knowledge index had poor measurement properties.

We found that pharmacists in Dushanbe were more likely to agree to sell syringes than their Kulobi colleagues, and this difference may be explained, as our bivariate findings suggest, by lower stigma and better knowledge of HIV and drug-related factors among Dushanbe participants. We also assume that larger population size and geographical area, and more cosmopolitan context of the capital city may instil higher sense of anonymity into pharmacy transactions and, therefore, higher likelihood of agreeing to sell syringes without prescription in Dushanbe.

Practical implications

Although the results of our syringe purchase audit were positive in the majority of pharmacies, PWID may still face obstacles while accessing syringes in the pharmacies, as reported for Tajikistan cities by Otiashvili et al. (2016). Access to syringes and other pharmacy-based harm reduction services may be improved via combination of policy reforms, awareness raising, stigma reduction and on-the-job practical

Table 3
Results of testing the final model of Tajikistani pharmacists' syringe sale practices.

Latent factors and indicators	Standardized coeff. (STDYX)	Unstandardized coeff.	Standard error (SE) for unstandardized coeff.	Unstandardized coeff./SE	p-value
Behavioural intent					
Willing to sell syringes over-the-counter (OTC) to PWID (bi2)	0.58	1.00	0.00	n/a	n/a
Willing to sell syringes OTC to any person (bi1)	0.88	1.78	0.51	3.49	< **0.001**
Attitudes (behavioural beliefs) towards providing syringes					
Will cause problems with state controllers (attsyr5)	0.59	1.00	0.00	n/a	n/a
Will encourage drug use (attsyr6)	0.68	1.35	0.28	4.84	< **0.001**
Will impact safety of staff (attsyr9)	0.62	0.92	0.15	6.14	< **0.001**
Will result in theft in the pharmacy (attsyr11)	0.85	1.63	0.30	5.45	< **0.001**
Stigma towards PWID					
People who inject drugs are to blame for their addiction (dc1)	0.86	1.00	0.00	n/a	n/a
People use drugs because of character weakness (dc2)	0.82	0.92	0.10	9.39	< **0.001**
Heroin users (HU) have no future (st6)	0.73	0.99	0.13	7.95	< **0.001**
HU are bad parents (st11)	0.72	0.86	0.11	8.12	< **0.001**
HU harm society (s10)	0.63	0.66	0.10	7.01	< **0.001**
HU harm families (st5)	0.54	0.50	0.07	6.84	< **0.001**
Social conservatism scale					
I am very religious (sc3)	0.43	1.00	0.00	n/a	n/a
Penalty for same-sex sex (sc5)	0.66	2.40	0.66	3.61	< **0.001**
Youth to obey seniors (sc7)	0.62	1.50	0.32	4.66	< **0.001**
Penalty for sex work (sc9)	0.70	2.35	0.68	3.48	< **0.001**
Arranged marriage (sc10)	0.61	2.57	0.71	3.62	< **0.001**
Religion is important for me (sc11)	0.48	1.11	0.20	5.72	< **0.001**
Hijab for all women (sc13)	0.26	0.97	0.40	2.43	**0.015**
Association between the latent factors					
Stigma on age	0.26	0.02	0.01	2.65	**0.008**
Stigma on university education	−0.28	−0.54	0.14	−3.88	< **0.001**
Stigma on social conservatism	0.47	1.23	0.30	4.14	< **0.001**
Attitudes on age	0.20	0.01	0.01	2.17	**0.030**

support of pharmacists. Policy reforms should be led by the Ministry of Health mandating sales of syringes at pharmacies without prescription followed by proper informing pharmacists about this policy change. Piloting and scaling-up of pharmacy-based provision of free syringes and other services (e.g. information, referrals) to PWID would be substantially expedited if Ministry of Health issues a decree acknowledging and authorizing pharmacy-based harm reduction services.

The role of stigma against PWID and attitudes (behavioural beliefs) in influencing syringe sale practices highlights the need for theory-driven stigma-reduction activities directed toward pharmacists. However, TPB may not be suitable to guide intervention development, since it does not provide instructions on how to influence contextual and attitudinal factors such as social conservatism and stigma. Intervention developers may instead rely on Allport's inter-group contact theory, which states that under certain conditions contacts between groups lead to reduced prejudice. Based on this theory, guided interactions of pharmacists and pharmacy students with people who have history of injecting drugs may help to sensitize pharmacists to the needs of this group and reduce stigma towards PWID. Empirical evidence supports application of Allport's theory to addressing stigma among pharmacists – interventions targeting pharmacy students in Canada and Australia showed that both direct (personal) and indirect (video demonstration) contacts reduced stigma towards people with mental health problems (Nguyen, Chen, & O'Reilly, 2012; Patten et al., 2012).

While we were unable to test in our model to what extent knowledge of HIV and drug-related issues may influence pharmacists' decisions, global literature demonstrates a positive influence of awareness raising on improving service providers' attitudes towards PWID and other marginalized populations (Andrewin & Chien, 2008; Balfour et al., 2010; Ding et al., 2005; Feyissa, Abebe, Girma, & Woldie, 2012; Waluyo, Culbert, Levy, & Norr, 2014). Stigma-reduction and awareness-raising interventions should also be accompanied by support from supervisors and colleagues, as demonstrated by the study among nurses in Australia (Ford, Bammer, & Becker, 2009). Conservative social values affecting willingness to provide syringes can be potentially counterweighted by the emphasis on the practical advantages of harm reduction. Future studies should involve developing and testing the efficacy of educational and stigma-reducing interventions targeting pharmacists in Tajikistan as knowledge in this area is limited. Efficacy of educational activities may involve measurement of behavioural intent as a proxy for actual behaviour in the situations when assessment of actual syringe selling behaviour is not feasible or practical (e.g. educational activities among pharmacy students). Evaluation of syringe promotion interventions may require studies assessing the link between geospatial distribution of HIV risk among PWID, their access to sterile syringes and pharmacists' attitudes and practices related to selling syringes.

Strengths and limitations

Our study featured several strengths, including the use of a syringe purchase audit to assess actual syringe sale practices; probability-based sampling of pharmacies; and administering the survey via CASI to reduce social desirability bias. Use of measures that were not previously validated in Central Asia and limited sample size might have impacted measurement and estimation of the model, resulting in exclusion of important theoretical constructs (e.g. HIV and drug-related knowledge, self-efficacy). Due to the cross-sectional nature of the study, we cannot establish temporality of the associations or identify cause-effect relationships within the model. The validity of the syringe purchase audit may also be limited because it was not conducted by actual PWID. The

study results may also have limited generalizability to rural areas of Tajikistan.

Conclusion

This is the first quantitative study of factors predicting pharmacists' attitudes and practices towards providing syringes to PWID in Tajikistan. We demonstrated the availability of syringes over-the-counter in urban pharmacies and emphasized the role of stigma in shaping pharmacists' attitudes and willingness to provide syringes to PWID. Education and advocacy activities targeting pharmacists are needed to reduce stigmatization of PWID and ensure their wide access to clean needles and syringes as part of the national HIV and HCV response.

Declaration of interests

None.

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Ethics approval and consent to participate

Ethics approval for the study has been granted by the Emory University IRB (ref ID IRB00079989) and Medical Ethics Committee of the Ministry of Health and Social Protection of Tajikistan. All participants provided oral consent.

Consent for publication

Not applicable.

Availability of data and material

No dataset from this study is publicly available to ensure participants' confidentiality.

CRediT authorship contribution statement

Umedjon Ibragimov: Conceptualization, Data curation, Formal analysis, Investigation, Project administration, Writing - original draft. **Regine Haardörfer:** Conceptualization, Methodology, Writing - review & editing. **Hannah L.F. Cooper:** Conceptualization, Methodology, Writing - review & editing. **Kristin L. Dunkle:** Conceptualization, Methodology, Writing - review & editing. **William A. Zule:** Conceptualization, Funding acquisition, Writing - review & editing. **Frank Y. Wong:** Conceptualization, Methodology, Supervision, Writing - review & editing.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.drugpo.2019.06.009.

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