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The Ukrainian SORT IT Course

Linking intravenous drug users to treatment through non-governmental organizations in Ukraine: how well is it working?

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Abstract

Introduction: Alliance for Public Health, the International Charitable Foundation, coordinates HIV prevention in Non-Governmental Organizations (NGO) working with people who inject drugs (PWID) in Ukraine. We aimed to describe the performance of the differential model of linking PWID to HIV care and treatment (Community Initiated Treatment Intervention – CITI).

Methodology: A retrospective cohort study using routine program data was conducted among 8,927 PWID who were tested positive for the first time during January 2016 – June 2017. Study outcomes were enrollment into CITI and initiating antiretroviral treatment (ART). Factors associated with outcomes were estimated by logistic regressions with random effects.

Results: Among the study participants, 54% enrolled into CITI and 23% initiated ART. CITI enrolment was associated with being married (adjusted odds ratio (AOR) = 1.17; 95%: 1.02-1.34); less than weekly compared to daily (AOR = 1.31; 95%: 1.13-1.52); less than 5 years of drug use compared to > 14 years (AOR = 1.73; 95%: 1.40-2.13), and having no criminal records (AOR = 1.30; 95%: 1.12-1.50). Factors of non-ART initiation were male gender (AOR = 1.33; 95%: 1.16-1.53); being single (AOR = 1.48; 95%: 1.21-1.82); drug use duration > 14 years compared to < 5 years (AOR = 1.38; 95%: 1.03-1.85), unemployment (AOR = 1.45; 95%: 1.15-1.83) and history of incarceration (AOR = 1.21; 95%: 1.003-1.45).

Conclusion: Mobilizing the NGO community and PWID to engage in outreach HIV testing activity and harm reduction for key populations has succeeded in opening the gateway to prevention, care and ART for thousands of PWID in Ukraine.

Key words: case-management; intravenous drug users; HIV cascade; antiretroviral treatment; SORT IT; SDGs.

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Introduction

The Sustainable Development Goals (SDGs) aims to end the HIV/AIDS epidemic by 2030 [1]. A vital component of this strategy is the 90-90-90 targets [2]:90% of all people living with HIV know their status; 90% of those diagnosed with HIV will receive sustained antiretroviral therapy (ART) and 90% of those on ART have viral suppression [2]. As about 50% of new HIV infections occur in key populations, the first and second targets can only be achieved if there is an improved focus on people who are at increased risk of acquiring and transmitting HIV due to their high-risk behaviors including People Who Inject Drugs (PWID) [3].

Worldwide, 158 countries have reported injecting drug use, of which 78% have reported HIV among PWID [4,5]. The risk of HIV infection in PWID is on average22-50 times higher than in the general population [6]. Injecting drug use contributes to around 10% of HIV infections globally [7]. The overall proportion of HIV positive PWID ranges from 3% in Kazakhstan to 58% in Vietnam [8]. An estimated 20% of new HIV infections occur among PWID and their sexual partners (compared to 0.9% in the general population) in Ukraine [6].

To prevent HIV transmission and improve survival, PWID should know their HIV status and access ART. However, most countries have inadequate coverage and quality of HIV services for PWID [1]. Ways forward in addressing this issue are urgently needed.

The International Charitable Foundation “Alliance for Public Health” (APH), a Non-Governmental Organization (NGO) in Ukraine coordinates the HIV

prevention and care activities of about 100 implementing NGOs working with PWID in Ukraine. A unique aspect of their work is "differentiated service delivery model" which aims at simplifying and adopting HIV services to serve the needs of PWID better. One of the mentioned differentiated care models the Community Initiated Treatment Intervention (CITI), a case-management approach, which engages PWID, their peers and social workers in enhancing health-seeking behavior. CITI assists PWID to navigate the health system to overcome barriers to ART initiation (Figure 1) and is recognized by the World Health Organization (WHO) as a good practice intervention [2]. Although previous studies have shown that involving social workers and peers is effective in linking PWID to HIV care, there are no operational research studies from Ukraine assessing large programs focused on the linkage between HIV testing and ART initiation [9–13]. Accessing this service delivery model would be useful both to evaluate possible performance gaps and its influence on the access to care for PWID.

We aimed to describe the differential model of linking HIV positive PWID to CITI and ART. The specific objectives were to determine a) the total numbers of PWID tested for HIV and found positive b) the socio-demographic characteristics of HIV positive individuals enrolled (and not enrolled) in CITI c) among those in CITI, the numbers initiated on ART within six months of HIV testing and d) risk factors for non-ART initiation within this period.

Methodology

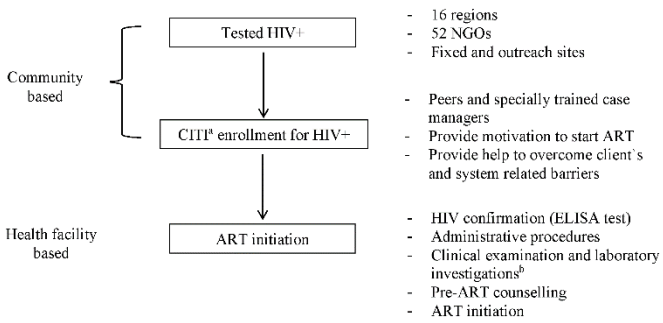
Study Design, General and Specific settings

A retrospective cohort study was conducted using routine program data in Ukraine which is the largest country of Eastern Europe having estimated population of 42 million and national HIV prevalence of 0.9% [14].

The study includes 16 out of 27 regions in Ukraine. In all 16 regions, HIV/AIDS services are provided by NGOs in collaboration with the public health system. There are 52 NGOs working at the selected study sites with key populations including PWID. The activities of NGOs are coordinated, supervised and monitored by the APH

Injectable drugs include psychotropic substances (for example, opioids, methadone, amphetamine-type stimulants, hypno-sedatives, cocaine and hallucinogens) [1]. All NGOs offer a package of harm reduction services according to WHO guidelines [1] including the provision of sterile injecting equipment through needle and syringe programs.

Figure 1. Pathway from HIV testing to antiretroviral treatment initiation among people who inject drugs in 16 regions of Ukraine (2016-2017).



NGO (Non-governmental organization), CITI (Community Initiated Treatment Intervention), ART (antiretroviral therapy), ELISA (enzyme-linked immunosorbent assay).

Differentiated HIV/AIDS care models for linking PWID to ART

A brief description of the models that were reviewed in the study and implemented by the APH in Ukraine is presented below.

Directly assisted HIV self-testing

NGO workers provide services at the places convenient for PWID – both at outreach and community centers. HIV testing is provided using rapid blood tests [1]. From 2007 until 2014, HIV testing was performed at NGO sites by trained medical teams. To improve access to HIV testing, a new approach called directly assisted HIV self-testing (DAST) was introduced in 2015. DAST is performed with the help of trained peer outreach workers. These workers carry rapid HIV tests when they visit clients, or when clients visit community centers for syringe or condom distribution. They provide pre-and post-test counselling and ensure HIV-testing and follow up. HIV testing is provided at any convenient place for the client.

Optimized Case Finding (OCF)

This approach was introduced in 2016 as an additional strategy to DAST and aimed at improving HIV case-finding. This is a two-step chain referral process using an HIV positive index case to recruit peers from the extended risk network (anyone known by the client who might be at risk) for assisted testing by trained case finder [15].

Linkage to treatment services

There are 2 major community intervention models for PWID available in Ukraine - basic nation-wide accepted set of standards of care and its extension, CITI

(Table 1). Essentially, CITI provides case management for HIV positive individuals by peer outreach workers so called case-managers. Case-managers conduct motivational counselling, initiate dialogue with doctors, and manage formal arrangements for clients' initiating their ART. CITI is effectively "peer navigation service" which helps eligible PWID initiate and adhere to HIV treatment. The case-managers are highly trusted by the PWID community. If a PWID enrolls in CITI and the case manager is unable to have the person start ART within 6 months thereafter, the file is closed with a possibility of reopening per clients need.

Antiretroviral treatment

ART is offered according to the WHO [1] and National guidelines and initiated at HIV/AIDS centers, which are public health facilities. Drug refills are provided at the same centers.

Study population and period

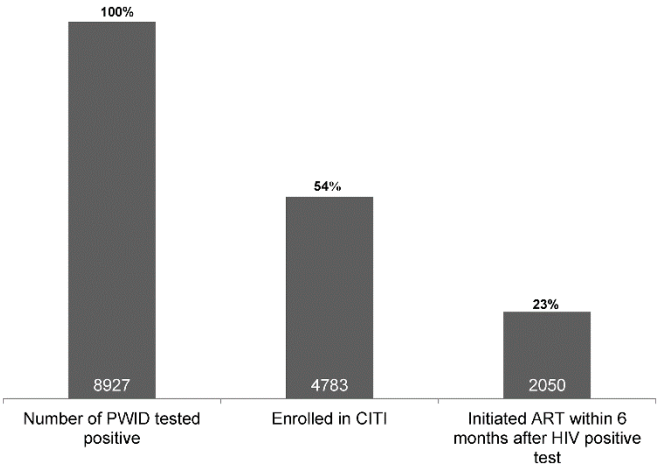
All PWID aged over 14- years who were HIV tested and found positive between January 1st 2016 to June 30th 2017 were included in the study.

Data and statistical analysis

Data on HIV testing and linkage to CITI and ART was collected through the Harm Reduction Program with paper based questionaries' and further entering into a dedicated database for key populations (SyrEx 2+) [16]. All data entry clerks and program staff were trained in data entry and were supervised by a data manager.

Primary outcomes included CITI enrollment and ART initiation. CITI enrollment was defined as enrolled in CITI during the period of 01.01.2016 until 30.06.2017. The first positive HIV test was used as the entry point of any given PWID for the study. ART initiation was assessed up to six months from HIV testing and was censored on 31.12.2017. ART initiation later than 6 months after HIV testing or non-initiation of ART was clumped as an unsuccessful outcome. Independent variables were baseline social and demographic characteristics. We included gender, age in years and categorized by groups, marital status, frequency of drug use, duration of injecting drug use in years and categorized by groups, drug type, employment and history incarceration. In categorical

Figure 2. Cascade of people who inject drugs from being tested HIV positive to antiretroviral therapy initiation, January 2016 – December 2017, 16 regions of Ukraine.



PWID (people who inject drugs), HIV (human immunodeficiency virus), CITI (Community Initiated Treatment Intervention), ART (antiretroviral therapy).

Table 1. Comparison table: Community initiation treatment intervention vs. National Standard of Care.

HIV related service	CITI	National Standard of Care
HIV testing and post-test counseling	Facility based and community-based, available upon request	Facility based and community-based, available upon request
Medical tests and exams to register with AIDS clinic	By referral from HIV physician, facilitated by community-based case-manager	By referral from HIV physician
Lab testing for CD4, VL	At HIV clinics by referral from HIV physician, facilitated by case-manager, CD4 facilitated by community-based case-manager	At HIV clinics by referral from HIV physician
ART initiation	By HIV physician with support of community-based case-manager	By HIV physician
ART prescription	At HIV clinics, facilitated by community-based case-manager	At HIV clinics
ART drug dispensing	At HIV clinics by referral from HIV physician. Also, community based and assisted by case manager	At HIV clinics by referral from HIV physician
ART maintenance and adherence counseling	Community based, delivered by case-manager, peer-counselor, community groups, community based contingency management and DOTs	Facility-based at HIV clinics, available by request
Other medical services	At respective medical facilities, facilitated by community-based case-manager	At respective medical facilities by referral from a physician or self-referral

HIV (human immunodeficiency virus), AIDS (acquired immune deficiency syndrome), VL (viral load), CD4 (cluster of differentiation 4), ART (antiretroviral therapy).

variable, all missing data were included as separate category ("unrecorded").

SyrEx data were imported, validated and analyzed in R, version 3.5.1. Risk measures were estimated using crude and adjusted odds ratios (OR) and their 95% confidence intervals (CI) Logistic regression models with random effects were used for calculating odds ratios.

Ethics

Permission to conduct the study was secured from the Senior Management of the Alliance for Public Health in Ukraine and ethics approval was obtained from the Institutional Review Board of the Ukrainian Institute on Public Health Policy, Kyiv, Ukraine.

Results

HIV testing and the cascade to ART initiation

There was a total of 194,983 PWID tested for HIV, of whom 8,927 (5%) were found HIV positive. Figure 2 shows a progressive drop from being HIV positive to CITI enrollment (54%) and eventual ART initiation (23%).

Table 2. Characteristics of people who inject drugs tested HIV positive for the first time during January.2016 – June 2017 stratified by Community Initiated Treatment Intervention enrollment in 16 regions of Ukraine.

Characteristic	Category	Total n (%)	Enrolled in CITI n (%)		Not enrolled in CITI n (%)		COR, (95% CI)	AOR, (95% CI)
Total		**8927**	**4783**		**4114**			
Gender	Female	2561	1446	56	1115	44	**0.84 (0.76-0.92)**	0.95 (0.86-1.06)
	Male	6366	3337	52	3029	48	1	1
Marital status	Single	2737	1274	47	1463	5	1	1
	Married	1440	715	50	725	50	**1.16 (1.02-1.33)**	**1.17 (1.02-1.34)**
	Divorced	774	379	49	395	51	1.08 (0.92-1.28)	1.14 (0.96-1.35)
	Widow	259	113	44	146	56	0.89 (0.68-1.15)	0.91 (0.69-1.20)
	Unrecorded	3717	2302	62	1415	38	**1.56 (1.39-1.75)**	**1.54 (1.30-1.83)**
Age groups	14-19	27	19	70	8	30	1.73 (0.71-4.19)	-
	20-24	180	122	68	58	32	**1.69 (1.18-2.42)**	-
	25-29	865	531	61	334	39	**1.34 (1.08-1.66)**	-
	30-34	2024	1101	54	923	46	1.02 (0.85-1.23)	-
	35-39	2507	1263	50	1244	50	0.87 (0.73-1.04)	-
	40-49	2663	1394	52%	1269	48	0.94 (0.79-1.12)	-
	50+	661	353	53	308	47	1	1
Age (mean ± SD)		37.9 (± 7.6)	37.6 (± 7.3)		38.2 (± 7.3)		**0.99 (0.99-0.997)**	1.00 (0.99-1.01)
Frequency of drug use	Daily	2639	1604	61	1035	39	1	1
	Weekly	1168	749	64	419	36	**1.22 (1.05-1.42)**	**1.16 (1.00-1.36)**
	Less than once weekly	1396	880	63	516	37	**1.36 (1.18-1.57)**	**1.31 (1.13-1.52)**
	Unrecorded	3724	1550	42	2174	58	**0.54 (0.48-0.60)**	1.13 (0.82-1.57)
Duration of injecting drug use in years	<5	510	299	59	211	41	**1.84 (1.51-2.25)**	**1.73 (1.40-2.13)**
	5-9	821	438	53	383	47	**1.45 (1.23-1.71)**	**1.40 (1.18-1.67)**
	10-14	912	471	52	441	48	**1.49 (1.33-1.67)**	**1.33 (1.12-1.57)**
	> 14	2134	916	43	1218	57	1	1
	Unrecorded	4550	2659	58	1891	42	**1.49 (1.33-1.67)**	0.95 (0.81-1.13)
Duration of injecting drug use in years (median± IQR)		14.0 (± 13.0)	12.0 (± 13.0)		15.0 (± 11.0)		**0.97 (0.97-0.98)**	-
Drug type	Opioids	4535	2898	64	1637	36	1	1
	Stimulants	426	276	65	150	35	1.04 (0.84-1.30)	0.93 (0.75-1.16)
	Other	57	35	61	22	39	0.68 (0.37-1.28)	0.65 (0.35-1.23)
	Unrecorded	3909	1574	40	2335	60	**0.43 (0.39-0.47)**	**0.37 (0.29-0.47)**
Employment	Permanent employment	697	428	61	269	39	1.06 (0.88-1.26)	0.94 (0.78-1.13)
	Temporary employment	1870	1221	65	649	35	**1.21 (1.07-1.38)**	1.13 (0.99-1.29)
	Unemployed	2621	1578	60	1043	40	1	1
	Unrecorded	3739	1556	42	2183	58	**0.52 (0.46-0.57)**	1.40 (0.99-1.98)
History Incarceration	Has been incarcerated	1785	1015	57	770	43	1	1
	Has been on probation	837	505	60	332	40	1.07 (0.90-1.28)	0.98 (0.82-1.17)
	No criminal record	2278	1514	66	764	34	**1.45 (1.27-1.66)**	**1.30 (1.12-1.50)**
	Unrecorded	4027	1749	43	2278	57	**0.58 (0.52-0.66)**	0.97 (0.75-1.24)

HIV (human immunodeficiency virus), COR (crude odds ratio), AOR (adjusted odds ratio), SD (standard deviation), IQR (interquartile range).

Socio-demographic characteristics of individuals enrolled (and not enrolled) in CITI

A total of 4,961 (56%) of the entire cohort of 8,927 HIV positive PWID were on opioids and stimulants, 2,639 (30%) were daily drug injectors and 2,134 (24%) had been injecting drugs for over 14 years.

Table 2 shows the socio-demographic characteristics of 4,783 (54%) individuals enrolled and not enrolled (4,114; 46%) in CITI. The median time between the first positive test and CITI enrollment was one day (Inter Quartile Range, IQR: 2, range: 1-640 days).

After adjustment, CITI enrolment was significantly associated with being married, not using drugs daily, using drugs for periods less than 14 years and having no criminal records. Several variables including duration of drug use, drug type, employment status and history of incarceration had unrecorded data (ranging from 42-51%). Some unrecorded data showed significant statistical associations.

ART initiation and risk factors for non-initiation

The characteristics of 2,050 (23%) HIV positive individuals who initiated ART within six months of HIV testing is shown in Table 3. Median time to ART initiation was 42 days (IQR: 50; range. 1-182 days) from the first HIV positive test. After adjustment, significant risk factors associated with non-ART initiation included being male, single, divorced or widowed, being unemployed and having a history of incarceration. Using drugs other than stimulants and opioids had a protective effect. Unrecorded data was again observed for variables mentioned above (32-56%), some of which were statistically significant.

Discussion

This study is one of the first studies from the EECA region conducted under the operational conditions and assessing the performance of the cascade between HIV-testing and ART among PWID.

The study shows that close to 200,000 PWID were tested for HIV thereby opening the gateway to harm reduction and care services. About half of the HIV positive cohort were enrolled into CITI and about two-in-ten eventually initiated ART. CITI enrolment was associated with a number of factors including drug use frequency and period as well as criminal records. ART initiation showed similar associations.

The study highlights the important role NGOs can play as a health system strategy of "reaching-out" to PWID and other key populations. This is important to the SDG goal of achieving Universal Health Coverage, ending the HIV epidemic by 2030 and "leaving none behind" [17].

Considering that PWID are a difficult-to-reach population, commendable numbers were enrolled in CITI and ART. However, the drop-outs in the journey to ART initiation needs focused attention. This is needed if the test-and-treat moto that maximizes HIV prevention through ART is to be achieved [18].

The strengths of the study were that it involved 16 of 24 regions in Ukraine with over 50 implementing partners and thus likely to be representative of the ground reality. "Cohort analysis" allowing an assessment of performance of the cascade towards ART initiation was useful to identify performance gaps and this is an identified national operational research priority. This is the first study using the cohort approach and assessing the journey from HIV testing to ART. Finally, we followed the STROBE guidelines for reporting of observational research [19].

The main study limitation was missing data on variables related to drug use and drug types, employment status and history of incarceration. This lapse may be linked to practical difficulties in gathering self-reports from people who may have an altered state of mind while on injectable opioids and sedatives. Alternatively, it may reflect the attitude of PWID who are simply hesitant to provide information due to fear or legal consequences. We cannot also exclude shortcomings in actual data recording which needs increased vigilance during supervised visits. In any case, findings ways to build trust of PWID and ensure data confidentiality would be important if the completeness of self-reported data on PWID is to be improved. This is all the more relevant since unrecorded data showed significant associations with CITI and ART initiation.

A number of initiatives to extend a default standard of care for involving PWID are known. Authors [20] assessed whether a strengths-based case management intervention in California, USA had helped smokers of crack cocaine and regular PWID to achieve the viral load suppression. The study claims that strengths-based case management may help highly vulnerable group to achieve undetectable HIV viral load over time. Another USA-based study [21] focused at the local intervention program in Maryland showed that IDUs and those who are not on methadone treatment are less likely to initiate ART. Another study has shown that engagement in methadone promoted ART initiation and fact of incarceration has negative association with ART initiation [22].

The findings from this study have a policy and practice implications. First, although considerable numbers of PWID were enrolled into CITI and on ART, only 23% accessed ART. However, the latter is almost twice what has been reported in the Russian Federation [23,24]. ART enrollment in our study reflects the endpoint of cohort analysis approach which has not been the case with other published studies reported on ART uptake in Ukraine and other parts of the world [25,26]. Studies which do not use the cohort approach will tend to exaggerate ART uptake figures [27].

Table 3. Risk factors non-antiretroviral therapy initiation (> 6 months from HIV testing) for people who inject drugs in 16 regions of Ukraine, January .2016 – December 2017.

Characteristic	Category	Total, n	Initiated ART > 6 month from HIV test or no ART initiation, n (%)		Initiated ART ≤ 6 months from HIV+ test, n (%)		COR (95% CI)	AOR (95% CI)
Total		**4783**	**2733**		**2050**			
Gender	Male	3337	1995	(60)	1342	(40)	**1.46 (1.28-1.66)**	**1.33 (1.16-1.53)**
	Female	1446	738	(51)	708	(49)	1	1
Marital status	Single	1274	909	(71)	365	(29)	**1.58 (1.29-1.92)**	**1.48 (1.21-1.82)**
	Married	715	422	(59)	293	(41)	1	1
	Divorced	379	257	(68)	122	(32)	**1.37 (1.05-1.78)**	**1.38 (1.05-1.81)**
	Widow	113	84	(74)	29	(26)	**1.85 (1.18-2.91)**	**2.16 (1.36-3.43)**
	Unrecorded	2302	1061	(46)	1241	(54)	**0.58 (0.48-0.71)**	**0.47 (0.36-0.62)**
Age groups	14-19	19	13	(68)	6	(32)	2.49 (0.89-6.96)	-
	20-24	122	60	(49)	62	(51)	1.06 (0.69-1.62)	-
	25-29	531	297	(56)	234	(44)	**1.35 (1.02-1.78)**	-
	30-34	1101	664	(60)	437	(40)	**1.55 (1.20-1.98)**	-
	35-39	1263	731	(58)	532	(42)	**1.38 (1.08-1.77)**	-
	40-49	1394	780	(56)	614	(44)	1.21 (0.95-1.54)	-
	50+	353	188	(53)	165	(47)	1	1
Age (mean ± SD)		37.6 (±7.8)	37.8 (± 8.1)		37.5 (± 7.6)		**0.99 (0.98-0.996)**	**0.98 (0.97-0.99)**
Frequency of drug use	Daily	1604	932	(58)	672	(42)	**1.20 (1.003-1.42)**	1.12 (0.93-1.35)
	Weekly	749	378	(50)	371	(50)	0.90 (0.73-1.10)	0.93 (0.75-1.15)
	Less often	880	499	(57)	381	(43)	1	1
	Unrecorded	1550	924	(60)	626	(40)	**1.32 (1.10-1.58)**	1.03 (0.67-1.57)
Duration of injecting drug use in years	<5	299	193	(65)	106	(35)	1	1
	5-9	438	257	(59)	181	(41)	0.81 (0.60-1.10)	0.80 (0.59-1.10)
	10-14	471	314	(67)	157	(33)	1.16 (0.85-1.58)	1.20 (0.88-1.65)
	> 14	916	640	(70)	276	(30)	1.28 (0.97-1.70)	**1.38 (1.03-1.85)**
	Unrecorded	2659	1329	(50)	1330	(50)	**0.62 (0.48-0.81)**	**1.51 (1.08-2.10)**
Duration of injecting drug use in years (median± IQR)		12.0 (±13.0)	10.0 (± 11.0)		12.0 (± 13.0)		**1.02 (1.004-1.03)**	-
Drug type	Opioids	2898	1642	(57)	1256	(43)	1.15 (0.89-1.49)	1.04 (0.80-1.35)
	Stimulants	276	142	(51)	134	(49)	1	1
	Other (cannabis and sedatives)	35	5	(14)	30	(86)	**0.21 (0.07-0.61)**	**0.18 (0.06-0.52)**
	Unrecorded	1574	944	(60)	630	(40)	**1.39 (1.06-1.83)**	1.07 (0.69-1.67)
Employment	Permanent employment	428	204	(48)	224	(52)	1	1
	Temporary employment	1221	661	(54)	560	(46)	1.18 (0.94-1.48)	1.11 (0.88-1.41)
	Unemployed	1578	938	(59)	640	(41)	**1.56 (1.25-1.95)**	**1.45 (1.15-1.83)**
	Unrecorded	1556	930	(60)	626	(40)	**1.63 (1.30-2.05)**	1.47 (0.92-2.36)
History Incarceration	Has been incarcerated	1015	624	(61)	391	(39)	**1.43 (1.21-1.69)**	**1.21 (1.003-1.45)**
	Has been on probation	505	279	(55)	226	(45)	1.15 (0.93-1.42)	1.09 (0.88-1.35)
	No criminal record	1514	809	(53)	705	(47)	1	1
	Unrecorded	1749	1021	(58)	728	(42)	**1.36 (1.17-1.58)**	1.02 (0.77-1.36)

ART (antiretroviral therapy), HIV (human immunodeficiency virus), COR (crude odds ratio), AOR (adjusted odds ratio), IQR (interquartile range), SD (standard deviation).

However, there is no room for complacency and APH teams need to find innovative ways to increase the proportions of initiating ART. We do not know the real reasons why individuals did not enroll in CITI and on ART. It might be related to cumbersome pathways and barriers in the journey to accessing ART. The mean time to ART initiation was a long 42 days which is suggestive. Patient-related factors may also be responsible for not initiating ART.

In any case, this calls for exploring new and innovative ways of further "differentiating" HIV/AIDS care for PWID. Qualitative research would help identify the real reasons why PWID do not enroll in CITI and eventually on ART. This is merited.

Second, on adjustment, CITI enrolment and ART initiation were significantly associated with being married, avoiding frequent and long duration of drug use and having no criminal records. This may be due to married individuals being exposed to a more supportive environment. Frequent and longer durations of injectable drug use particularly (opioids and stimulants) may affect the state of mind of PWID and have negative consequences on CITI and ART uptake. The fact that over half of the entire cohort were on opioids and stimulants and about a third of them were daily drug injectors is a pointer towards practical difficulties in offering counselling and dialoguing with these individuals.

Conclusion

In conclusion, mobilizing the NGO community and PWID to engage in outreach HIV testing activity and harm reduction for key populations has succeeded in opening the gateway to prevention, care and ART for thousands of PWID in Ukraine. Further steps are needed to increase ART initiation and assess if further differentiation of care for PWID subgroups would allow further gains.

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Authors' contributions

JK, OD, PS and NK designed the study. JK, YS and RZ developed the computational framework and analyzed the data. YS, OD, RZ, NK contributed to the interpretation of the results. TM and OD conceived the study and were in charge of overall direction and planning. JK, OD, RZ and JC were involved in drafting the manuscript. All authors discussed the results and contributed to the final manuscript.

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