HIV testing and ART initiation in people who inject drugs and are placed on methadone in Kachin State, Myanmar

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Setting: People who inject drugs (PWID) enrolled for methadone maintenance therapy (MMT) and never previously tested for human immunodeficiency virus (HIV) in Myitkyina Drug Dependency Treatment Hospital, Myitkyina, Kachin State, Myanmar.

Objectives: To compare before (2016) and after (2018) adoption of 'Test and Treat' guidelines for antiretroviral therapy (ART): 1) the demographic profile of PWID, 2) HIV testing uptake and ART initiation in those diagnosed HIV-positive, and 3) time taken for events.

Design: This was a cohort study using secondary programme data.

Results: In 2016 and 2018, there were respectively 141 and 146 PWID: all were male except for one female and age distribution between the 2 years was similar. In 2018, significantly more PWID were HIV-tested than in 2016 (85% vs. 45%; $P < 0.001$). Among those tested, the proportions who were HIV-positive were similar (37% in 2016 and 38% in 2018). In 2018, significantly fewer HIV-positive PWID were started on ART than in 2016 (19% vs. 48%; $P = 0.01$). Median times between enrolment on MMT and HIV testing (2 vs. 1 day) and between being diagnosed HIV-positive and started on ART (31 vs. 17 days) for 2016 and 2018 were not significantly different.

Conclusion: ART uptake decreased in 2018 compared with 2016, and ways to rectify this are urgently needed.

There are an estimated 15.6 million people aged 15–64 years who inject drugs (PWID) worldwide, with the largest populations living in East and South-East Asia.^{1,2} Among the many harms faced by PWID, one of the most important is infection with the human immunodeficiency virus (HIV). There are an estimated 2.8 million PWID (18%) globally living with HIV, with just over 600 000 in East and South-East Asia.¹ HIV prevalence in PWID varies within and between countries, but tends to be lower where comprehensive harm reduction and prevention measures have been implemented.³ Among several available interventions, methadone maintenance therapy (MMT) is effective and recommended as a critical component of a comprehensive package of harm reduction measures.^{4,5} The World Health Organization (WHO) also recommends that all people living with HIV, including PWID, are HIV-tested and initiated on antiretroviral therapy (ART) as soon as possible irrespective of WHO clinical stage or CD4 cell count: the so-called 'Test and Treat' policy.⁶

Myanmar is a large south-east Asian country, in which injecting drug use appears to be increasing. There were an estimated 75,000 PWID in 2010, 83,000 in 2014 and 93,000 in 2017.^{7,8} In Myanmar, MMT is an important component of the harm reduction package for PWID; within MMT programmes, there is a recommendation to test all newly enrolled PWID for HIV and offer care and treatment to those found to be HIV-infected. In a recent study in drug treatment centres in Yangon, the HIV testing rates in PWID who were on MMT were high, at about 90%, 15–17% of whom were diagnosed with HIV infection.⁹

It was not possible to obtain information from Yangon, however, about the referral of HIV-infected PWID to HIV services or how many were initiated on ART. This information is important in terms of linkage to care and the individual and HIV transmission benefits of ART. MMT retention rates were found to decrease over time in PWID in Yangon, Lower Myanmar,⁹ similar to findings reported elsewhere in the Asia Pacific region.^{10,11} Studies published in other countries in the region have found that linking MMT to ART in HIV-infected PWID leads to better programmatic retention in care,¹² and this in turn leads to better HIV prevention, care and treatment.^{13,14}

The number of PWID in Myanmar are highest in Kachin State, Upper Myanmar.¹⁵ To address this growing challenge, 18 government centres in the state were set up to provide MMT and other services: in December 2018, a total of 7235 PWID were recorded as cumulatively receiving MMT in these centres (source: routine monthly MMT reports). HIV testing is recommended practice within these centres, and those found to be HIV-positive can be referred to ART centres (state hospitals or acquired immune-deficiency syndrome/sexually transmitted infections teams) or decentralised sites (township hospitals) for consideration and ART initiation.

Before 2017, national guidelines specified that HIV-infected persons should start ART if they were in WHO clinical Stage 3 or 4 or if the CD4 count < 500 cells/ μ L.¹⁶ In 2017, the guidelines were changed to align with those of the WHO,⁶ specifying that all HIV-infected persons start ART regardless of WHO clinical stage or CD4 cell count.¹⁷ We wanted to assess whether HIV testing and ART uptake in PWID newly enrolled for MMT and never previously tested for HIV had changed and improved in relation to the new HIV guidelines at the largest government centre in Kachin

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State (Myitkyina Drug Dependency Treatment Hospital [DDTH]). Specific objectives were to assess and compare for 2016 (before the new ART guidelines¹⁷) and 2018 (after the new ART guidelines¹⁷): 1) the demographic profile of PWID, 2) HIV testing uptake, HIV test results and initiation of ART in those HIV-positive; and 3) time taken between enrolment to MMT and HIV testing and between being diagnosed HIV-positive and starting ART.

METHODS

Study design

This was a cohort study using secondary programme data.

Setting

General setting

The Republic of the Union of Myanmar is located in mainland South-East Asia. According to the results of the 2014 Census, Myanmar had a total population of about 52 million.¹⁸ The country is divided into seven states and seven regions and the Union Territory, Nay Pyi Taw. The country is administratively sub-divided into districts, townships, wards and villages. Seventy percent of the population lives in rural areas.

In Myanmar, the HIV epidemic is concentrated among key populations; the HIV prevalence in adults was 0.59% in 2016.⁸ In 2017, HIV prevalence among PWID was estimated to be 34.9%, the highest among key affected populations.⁸ According to routine MMT reports, there were 13,911 PWID receiving MMT in December 2018.

Specific setting

Kachin State is located in northern Myanmar with a population of over 1.6 million.¹⁸ The state consists of four districts and 18 townships. The state faces many challenges that include internal conflict, hard-to-reach populations living in mountainous areas and the use of drugs. The estimated HIV prevalence in Kachin State is 2.8%,¹⁹ five times higher than the national prevalence. Critically, the state HIV epidemic is driven by PWID.^{8,15}

Of the 18 MMT centres in the state, Myitkyina DDTH, a 100-bed hospital, is the largest. The DDTH provides MMT as well as HIV testing services in Kachin State, and is the site for this study. At Myitkyina DDTH, PWID can self-present, be referred from general health services or by non-governmental organisations; they are then assessed by medical officers for MMT eligibility here.²⁰ Those enrolled and registered for MMT are hospitalised for 2 weeks to ensure they are stable on methadone, after which they can take MMT under out-patient supervision.

At the time of enrolment, all PWID, except those with known and documented HIV infection are offered testing for HIV using rapid diagnostic tests. These include Determine HIV-1/2 (Abbott Laboratories, Abbott Park, IL, USA) for screening and Uni-Gold™ (Trinity Biotech, Bray, Ireland) and the Chembio HIV-1/2 STAT-PAK™ Assay (Chembio Diagnostic Systems, Medford, NY, USA) for diagnostic confirmation. All tests

are administered according to national guidelines.^{16,17} If PWID are HIV-positive, they are referred to the ART centre which is within the same compound as the MMT centre; here, they are assessed for HIV care and treatment, including ART, according to the national guidelines, as described earlier.^{16,17}

Data on MMT enrolment are kept in the MMT register, which is generally updated by nurses. Data on HIV testing and results are kept in the HIV testing register in the laboratory. Data on ART are kept in the ART register in the ART centre within the hospital compound. PWID can be linked between these registers by name, age, sex and place of residence.

Study population

The study population included all newly enrolled PWID who were hospitalised for MMT at Myitkyina DDTH and who had never previously been tested for HIV in 2016 and 2018.

Data variables, sources of data and data collection

Data variables included name, age, sex, date of hospital admission, HIV testing uptake (yes/no), date of HIV testing, HIV test results (positive/negative/indeterminate), ART initiation and date of ART initiation. Sources of data were the MMT register, the HIV testing register and the ART register at Myitkyina DDTH. Linkage of PWID between registers were by name, age, sex and if necessary, place of residence. Names of PWID who were HIV-positive in 2016 and 2018 were sought in the ART register up to respectively August 2017 and August 2019. Data were collected into a paper-based questionnaire form between February and August 2019.

Analysis and statistics

Data were entered into and analysed using EpiData (v3.1 for entry and v2.2.2.182 for analysis; EpiData Association, Odense, Denmark). Frequencies and proportions were used to summarise categorical variables. Comparisons of demographic characteristics between the 2 years (2016 and 2018) were made using the χ^2 test (with mid-P tests used for cell numbers <5). Associations between age groups and HIV testing and ART uptake were analysed and presented using relative risks and 95% confidence intervals. Times taken for events (continuous variables) were compared between the two different years using the Mann-Whitney *U*-test. Levels of significance were set at 5% ($P < 0.05$).

Ethics approval

Ethics approval was obtained from Ethical Review Committee, Department of Medical Research, Yangon, Myanmar (DMR 087/2019) and the Ethics Advisory Group, International Union Against Tuberculosis and Lung Disease, Paris, France (EAG03/19). Names were used to track PWID from one register to the next, and confidentiality was maintained by keeping paper questionnaires in a lockable cabinet and electronic data files in a password-protected computer. The ethics committees waived the need for informed patient consent because data were obtained from hospital-based records.

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TABLE 1 Demographic characteristics of PWID newly enrolled for MMT and never previously tested for HIV in Myitkyina DDTH, Kachin State, Myanmar, 2016 and 2018

Characteristics	2016		2018		P value*
	n	(%)	n	(%)	
Total	141	(100)	146	(100)	
Age group, years					
15–19	4	(2.8)	3	(2.1)	0.69
20–24	44	(31.2)	39	(26.7)	0.40
25–29	40	(28.4)	43	(29.5)	0.84
30–34	32	(22.7)	29	(19.9)	0.56
≥35	21	(14.9)	32	(21.8)	0.12
Sex					
Male	140	(99.7)	146	(100)	0.67
Female	1	(0.3)	0		—

* Based on the χ^2 test comparing the two proportions for each age group and male sex.

PWID = persons who inject drugs; MMT = methadone maintenance therapy; HIV = human immunodeficiency virus; DDTH = Drug Dependency Treatment Hospital

RESULTS

There were 141 PWID newly enrolled to MMT in 2016 and 146 newly enrolled to MMT in 2018. The mean age of PWID was 28 years (standard deviation [SD] 6.6) for 2016, which was similar to that for 2018 (29 years, SD 7.0). All PWID were male, apart from one female PWID. Demographic characteristics of PWID in the 2 years were similar (Table 1).

The cascade from being HIV tested, to being diagnosed HIV-positive and started on ART is shown in the Figure. In 2018, significantly more PWID were HIV-tested than in 2016 (85% vs. 45%; $P < 0.001$). The same proportion of those tested were diagnosed HIV-positive (37% in 2016 and 38% in 2018). In 2018, significantly fewer HIV-positive PWID were started on ART than in 2016 (19% vs. 48%; $P = 0.01$). Associations between age groups

and HIV testing or ART initiation were analysed separately for 2016 and 2018 but are presented for the 2 years combined in Table 2. There were no significant associations on either separate or combined analysis.

Times taken between enrolment for MMT and HIV testing and between being diagnosed HIV-positive and started on ART for 2016 and 2018 are shown in Table 3. The median times were slightly shorter for 2018 than in 2016, but these did not reach statistical significance.

DISCUSSION

This is the first study in PWID from Kachin State, Myanmar, on HIV testing uptake and linkage to ART before and after the country adopted 'Test and Treat' guidelines in 2017. There were three main findings.

First, HIV testing uptake significantly improved from 2016 to 2018. The time taken between enrolment for MMT and HIV testing also decreased from a median of 2 days to 1 day, although this time difference was not significant. There were no associations between HIV testing and age group; the assessment of associations with sex was not possible as all except one PWID were male. In 2018, HIV testing uptake was at 85%, almost reaching the level (90%) reported in PWID in Yangon by a previous study.⁹ Due to the record review nature of our study, reasons for improved testing uptake could not be explored. However, a recent study from Viet Nam showed that the integration of HIV testing with MMT services encouraged HIV testing uptake among PWID and their partners,²¹ and this may have been an important factor in our study.

Second, ART uptake in HIV-positive PWID decreased from 2016 to 2018. With 'Test and Treat' being a much simpler process for initiating ART in HIV-positive persons, with no need for CD4 cell counts or WHO clinical staging, we had expected to see an increase in ART uptake. Higher ART uptake has been observed at the programme level in high HIV burden countries in Africa when 'Test and Treat' guidelines were adopted.²² Furthermore, in a prospective study among PWID in Viet Nam the uptake of ART and retention on treatment were also higher in the 'Test and Treat' cohort than in the previous cohort where ART eligibility was based on CD4 cell counts.²³

While we could not explore reasons for the decrease in ART uptake in our study, there are several possible explanations. There are anecdotal reports from Kachin State that, despite the benefits of ART, many PWID believe that antiretroviral drugs can induce sleep disorders and mental health illness and interfere with their methadone levels, and they are keen to avoid this. These perceptions are found in other countries where PWID were observed to prioritise drug dependency issues rather than their personal health and HIV treatment.^{24,25} HIV-positive PWID might have been more healthy and asymptomatic through 'Test and Treat' and they might have felt they did not need ART. There may be other barriers such as lack of information about 'Test and Treat', poor motivation and health system barriers. Finally, PWID in Kachin State are a mobile population with many migrant workers, and it is possible that these individuals went to other health facilities to start ART.

Third, and on an encouraging note, in PWID who did start ART, the time taken between a confirmed HIV diagnosis and initiation of therapy decreased from 31 days in 2016 to 17 days in 2018, although this difference was not significant. The WHO has recently recommended ART initiation within 7 days of a con-

FIGURE The cascade from enrolment on MMT to HIV testing to uptake of ART in PWID newly enrolled for MMT and never previously tested for HIV in Myitkyina DDTH, Kachin State, Myanmar, 2016 and 2018. MMT = methadone maintenance therapy; HIV = human immunodeficiency virus; ART = antiretroviral therapy; PWID = people who inject drugs; DDTH = Drug Dependency Treatment Hospital.

TABLE 2 Association of age groups with uptake of HIV testing and ART initiation in PWID newly enrolled for MMT and never previously tested for HIV in Myitkyina DDTH, Kachin State, Myanmar, for 2016 and 2018 combined

A) AGE GROUPS ASSOCIATED WITH HIV TESTING

Characteristics	PWID enrolled in MMT in 2016 and 2018	HIV tested		RR (95%CI)	P value
	n	n	(%)		
Total	287	187	(65.2)		
Age group, years					
15–19	7	5	(71.4)	1.02 (0.63–1.67)	0.97
20–24	83	58	(69.9)	Reference	
25–29	83	54	(65.1)	0.93 (0.75–1.15)	0.51
30–34	61	34	(55.7)	0.80 (0.61–1.04)	0.09
≥35	53	36	(67.9)	0.82 (0.63–1.06)	0.11

B) AGE GROUPS ASSOCIATED WITH ART INITIATION

Characteristics	PWID tested HIV-positive in 2016 and 2018	Initiated on ART		RR (95%CI)	P value
	n	n	(%)		
Total	70	20	(28.6)		
Age group, years					
15–19	2	0		0.80 (0.06–10.50)	0.61
20–24	24	6	(25.0)	Reference	
25–29	17	6	(35.3)	1.41 (0.55–3.64)	0.48
30–34	13	2	(15.4)	0.62 (0.14–2.63)	0.54
≥35	14	6	(42.9)	1.71 (0.68–4.30)	0.25

HIV = human immunodeficiency virus; ART = antiretroviral therapy; PWID = persons who inject drugs; MMT = methadone maintenance therapy; DDTH = Drug Dependency Treatment Hospital; RR = relative risk; CI = confidence interval.

firmed HIV diagnosis and for those who are ready to start, ART initiation can be on the same day.²⁶ In several African countries, this has resulted in the acceleration of rapid ART initiation, although men and young adults perform less well in this regard.²⁷ Whether this new WHO guidance is adopted and leads to improved uptake and more rapid initiation of ART among PWID in Myanmar remains to be seen.

The strengths of this study are the consecutive inclusion of all PWID newly enrolled in MMT during 1-year periods before and after the implementation of new national guidelines in the largest MMT centre in Kachin State, Myanmar. The reporting of the study is also in line with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).²⁸ Limitations relate to the small sample size, register reviews, lack of other socio-demographic or clinical data apart from age and sex in the registers and the absence of a formalised system to track retention on therapy. While we reviewed the ART registers in Myitkyina DDTH for up to 7 months after the closure of 2016 and 2018 to identify HIV-positive PWID presenting late for ART, we are not sure whether some PWID started ART after 7 months or started ART elsewhere.

There are some programmatic implications of this study. Linking MMT to HIV testing and ART using names, age, sex and place of residence was burdensome, and this could be improved by having unique ID numbers for each individual recorded in each register. Given the high HIV prevalence (>35%) in the PWID who were tested, it is important to ensure 100% HIV testing if possible through increased advocacy and counselling support. Finally, the processes of education, advocacy, post-test counselling and peer support for ART should be reviewed and improved so that more

PWID start treatment. Other helpful local measures would include assisted referral to ART through staff members, improved tracking of this service by ensuring that ART status is recorded and checked in the MMT registers, and qualitative research among those initiating and not initiating ART to better understand the reasons for non-uptake of the intervention. ART is highly effective in reducing morbidity and mortality in HIV-infected persons. It significantly reduces HIV transmission through

TABLE 3 Time taken for HIV testing and initiation of ART in PWID newly enrolled for MMT and never previously tested for HIV in Myitkyina DDTH, Kachin State, Myanmar, 2016 and 2018

Characteristics	2016 Time in days		2018 Time in days		P value
	Median	[IQR]	Median	[IQR]	
Between enrollment on MMT and HIV testing	2*	[1–3]	1†	[1–3]	0.69
Between being diagnosed HIV-positive and start of ART	31‡	[20–46]	17§	[16–34]	0.08

*Based on 60 PWID with dates missing for 3.

†Based on 121 PWID with dates missing for 3.

‡Based on 7 PWID with dates missing for 4.

§Based on 8 PWID with dates missing for 1.

HIV = human immunodeficiency virus; ART = antiretroviral therapy; PWID = people who inject drugs; MMT = methadone maintenance therapy; DDTH = Drug Dependency Treatment Hospital; IQR = interquartile range.

sexual contact,²⁹ and in PWID, ART plays an important complementary role with MMT in reducing HIV incidence.³⁰

In conclusion, in Myitkyina DDTH, Kachin State, Myanmar, significantly more PWID were tested for HIV, but significantly fewer HIV-positive PWID were started on ART after the country adopted 'Test and Treat' guidelines. Time to HIV testing and ART initiation was shorter, although differences were not significant. Ways to improve HIV testing and increase ART uptake are discussed.

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Contexte : Les personnes qui s'injectent des drogues (PWID) enrôlées dans un traitement de maintenance par méthadone (MMT) et n'ayant pas encore eu de test de virus de l'immunodéficience humaine (VIH) à l'hôpital Myitkyina Drug Dependency Treatment, état de Kachin, Myanmar.

Objectif : Comparer l'adoption des directives relatives au traitement antirétroviral (TAR), « Testez et traitez » avant (2016) et après (2018) : 1) le profil démographique des PWID, 2) la couverture du test VIH et la mise en œuvre du TAR chez ceux diagnostiqués comme VIH positifs, et 3) le temps entre ces événements.

Schéma : Etude de cohorte utilisant des données de programme secondaires

Résultats : En 2016 et 2018, il y a eu 141 et 146 PWID : tous étaient

des hommes (sauf une patiente) et la distribution de l'âge entre les deux années a été similaire. En 2018, significativement plus de PWID ont été testés pour le VIH par rapport à 2016 (85% contre 45% ; $P < 0,001$). La proportion de ceux testés VIH positifs a été similaire (37% en 2016 et 38% en 2018). En 2018, significativement moins de PWID VIH positifs ont été mis sous TAR par rapport à 2016 (19% contre 48% ; $P = 0,01$). Les délais médians entre l'enrôlement en MMT et le test VIH (2 jours contre 1 jour) et entre le diagnostic de positivité VIH et la mise sous TAR (31 contre 17 jours) en 2016 et 2018 n'ont pas été significativement différents.

Conclusion : La couverture du TAR a diminué en 2018 par rapport à 2016 et des moyens d'y remédier sont requis d'urgence.

Marco de referencia: Las personas que consumen drogas inyectables (PWID) inscritas en el tratamiento de mantenimiento con metadona (MMT), en quienes nunca se había practicado la prueba diagnóstica de infección por el virus de la inmunodeficiencia humana (VIH), en el Hospital Myitkyina de tratamiento de la farmacodependencia en el estado Kachin de Myanmar.

Objetivo: Comparar las siguientes variables antes (2016) y después (2018) de la adopción de las directrices de la estrategia de tratamiento antirretrovírico (TAR) 'Hacer la prueba y tratar': 1) las características demográficas de las PWID; 2) la aceptación de la prueba del VIH y el comienzo del TAR en quienes obtienen un resultado positivo; y 3) el lapso transcurrido hasta cada evento.

Método: Fue este un estudio de cohortes a partir de datos programáticos secundarios.

Resultados: En el 2016 se inscribieron 141 PWID y 146 en el 2018;

todos fueron de sexo masculino, con la excepción de una mujer y la distribución etaria fue equivalente en ambos años. El número de pruebas del VIH practicadas a las PWID fue significativamente mayor en el 2018 que en el 2016 (85% contra 45%; $P < 0,001$). La proporción de resultados positivos obtenidos fue equivalente (37% en el 2016 y 38% en el 2018). En el 2018, un número significativamente menor de PWID positivas frente al VIH inició el TAR en comparación con el 2016 (19% contra 48%; $P = 0,01$). La mediana del lapso transcurrido entre la inscripción al MMT y la prueba del VIH (2 días contra 1 día) y entre el diagnóstico de seropositividad y el comienzo del TAR (31 días contra 17 días) no mostró diferencias significativas entre el 2016 y el 2018.

Conclusión: El índice de aceptación del TAR disminuyó en el 2018 en comparación con el 2016 y es urgente adoptar medidas correctivas.