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Božičević, Ivana; Sharifi, Hamid; Haghdoost, AliAkbar; Sabry, Ahmed; Hermez, Joumana

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Review

Availability of HIV surveillance data in key populations in the countries of the World Health Organization Eastern Mediterranean Region

Ivana Bozicevic[a,*], Hamid Sharifi[b], AliAkbar Haghdoost[b], Ahmed Sabry[c], Joumana Hermez[c]

[a] World Health Organization Collaborating Centre for HIV Strategic Information, University of Zagreb School of Medicine, Zagreb, Croatia
[b] HIV/STI Surveillance Research Center and WHO Collaborating Center for HIV Surveillance, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran
[c] World Health Organization Regional Office for the Eastern Mediterranean, Cairo, Egypt

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ABSTRACT

Objectives: To present an assessment of key components and results of HIV surveillance activities relevant for understanding HIV epidemics in the countries of the World Health Organization (WHO) Eastern Mediterranean Region among key populations (KPs), which include men who have sex with men (MSM), sex workers, people who inject drugs and transgender people.

Methods: We examined HIV surveillance data submitted by the National AIDS Programmes of all 22 countries of the WHO Eastern Mediterranean Region via an online database hosted by the WHO since 2011. We also examined journal articles available on PubMed and technical reports on surveillance activities.

Results: Recent (i.e., since 2017) estimates of HIV indicators from integrated bio-behavioral surveys (IBBS) were available from only four countries (Lebanon, Morocco, Somalia, and Tunisia) and population size estimates from two (Afghanistan and Morocco). IBBS indicated an increase in HIV prevalence among KPs in Pakistan, among people who inject drugs and female sex workers in Tunisia, and among MSM in Lebanon.

Information on size estimations of KPs was available from 11 countries, and population size estimation data since 2017 had been collected in only Afghanistan and Morocco.

Conclusion: Although some countries have been able to progressively expand HIV strategic information systems, there were still few or no HIV data on KPs in almost a third of the countries.

Introduction

According to the Joint United Nations Programme on HIV/AIDS (UNAIDS), an estimated 420,000 (309,000–565,700) people of all ages were living with HIV in the World Health Organization (WHO) Eastern Mediterranean Region (EMR) in 2019 (Global HIV/AIDS Statistics – Fact Sheet. Geneva: UNAIDS, 2020). UNAIDS estimates that there were 44,000 (33,000–67,000) new HIV infections in 2019, and that 15,000 (11,000–23,000) people died of HIV in 2019, which represents a 47% increase in new HIV infections and a 57% increase in HIV-related deaths compared with that observed in 2010 (Global HIV/AIDS Statistics – Fact Sheet. Geneva: UNAIDS, 2020).

Most people living with HIV (PLHIV) in the region are unaware of their HIV infection, and health systems still fail to engage many people who test positive for HIV in life-saving treatment. Indicators of HIV testing and treatment continuum are the poorest globally. By the end of 2019, of the estimated number of PLHIV, 37% knew their HIV status, 24% were receiving antiretroviral treatment, and 21% had a suppressed viral load (Global HIV/AIDS Statistics – Fact Sheet. Geneva: UNAIDS, 2020).

Key populations (KPs), which include men who have sex with men (MSM), sex workers (SWs), people who inject drugs (PWID), transgender people, and prisoners together disproportionately account for 97% of new HIV infections in the region (Global HIV/AIDS Statistics – Fact Sheet. Geneva: UNAIDS, 2020). HIV control efforts directed at KPs can therefore achieve a substantial impact on HIV epidemics in the countries of the WHO EMR. HIV policies and programs for KPs have to be informed by robust evidence on HIV prevalence and incidence and their trends, levels of HIV-related

* Corresponding author: Phone : +385 99 450 51 55.
E-mail address: Ivana.Bozicevic23@gmail.com (I. Bozicevic).

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risk behaviors, and the extent to which KPs access prevention and treatment services. This information is collected via integrated HIV bio-behavioral surveys (IBBS), which makes them critical tools for monitoring the HIV epidemic and evaluating national and local HIV control efforts. Without evidence generated via IBBS and estimation of the size of KPs, differentiated programming for these populations is often left under-resourced and uncoordinated.

According to WHO recommendations, in concentrated HIV epidemic settings, IBBS should be done every 2 years in high-priority areas and every 3–5 years in lower-priority areas, and size estimation of KPs should be done every 2–3 years (WHO, 2013).

As KPs are often stigmatized and socially marginalized, there are no conventional sampling frames for IBBS, which implies a need for the implementation of complex quasi-probabilistic sampling designs, such as respondent-driven sampling (RDS) and time-location sampling, or non-probability sampling methods, such as snowball and convenience sampling.

This paper provides an overview of key components of HIV surveillance systems and the results of HIV surveillance activities in KPs in 22 countries of the WHO EMR: Afghanistan, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates (UAE), Palestine, and Yemen. The first assessment of availability of HIV surveillance data and results of HIV surveillance systems in these countries was published in 2013 (Bozicevic et al., 2013). It found that HIV prevalence trend data in any KP were available in one country only and that four countries conducted IBBS in all three KPs. Population size estimation (PSE) data were found to be available in only one country. The review highlighted the need to invest resources into the development of robust HIV strategic information systems for KPs.

Methods

As part of annual collection of HIV surveillance data, the WHO Regional Office for the Eastern Mediterranean (WHO EMRO) requests National AIDS Programmes of the region's countries to submit the following data via an online database: the number of reported cases of HIV and AIDS, reported cases of sexually transmitted infections (diagnosed etiologically or syndromically), availability and results of IBBS in KPs, estimates of the size of KPs, and data on testing for HIV, hepatitis B and hepatitis C in selected population groups. This process is followed by individual interviews with staff of National AIDS Programmes to validate provided information and clarify data, if needed. Through this system, the WHO EMRO has collected HIV surveillance data and reports from all the countries since 2007. In this paper, we present the most recent IBBS and PSE data, which are relevant for understanding HIV epidemics in KPs (PWID, MSM, female SWs [FSWs], and transgender people), submitted from 2007–2020. In addition, we examined journal articles available on PubMed and technical reports on HIV surveillance activities from the assessed countries.

We also analyzed whether HIV surveillance systems in the countries of the WHO EMR include components relevant for understanding HIV epidemiology, such as IBBS, PSEs, HIV case reporting, sexually transmitted infection (STI) case reporting, annual reporting of data from services for prevention of mother-to-child transmission of HIV and antenatal care sentinel surveillance for HIV and syphilis, as recommended in the WHO guidelines for HIV surveillance (WHO, 2013).

To characterize PSE of KPs, we used the classification proposed by UNAIDS and used by other global public health agencies such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, and the WHO (Sabin et al., 2016). The classification categorizes KP size estimates into (1) nationally adequate, (2) nationally inadequate but locally adequate in selected sites, (3) documented estimates but inadequate methods, (4) undocumented or untimely, and (5) no data.

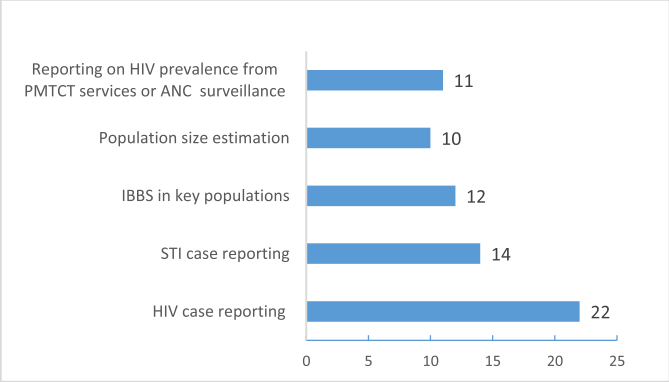

Fig. 1. Number of countries of the WHO Eastern Mediterranean Region where specific components of HIV surveillance systems as recommended by WHO were available
ANC, antenatal care; IBBS, integrated bio-behavioural surveys; PMTCT, prevention of mother-to-child transmission; STI, sexually transmitted infections; WHO, World Health Organization.

The following characteristics are used for categorization:

- Nationally adequate: estimates that are empirically derived using one of the following methods: multipliers, capture-recapture, mapping/enumeration, network scale-up method, population-based survey, and RDS–successive sampling (RDS-SS). Estimates had to be national or based on multiple data collection sites with a clear description of extrapolation to a national estimate, and available for at least two major KP groups of national interest.
- Nationally inadequate but locally adequate in selected sites: estimates that are empirically derived using multipliers, capture-recapture, mapping, network scale-up method or population-based survey, and RDS-SS. Estimates had to be only from areas where KP programs are available but are insufficient for national program use. In addition, estimates had to be available for at least two major KP groups of national interest.
- Documented estimates but inadequate methods: estimates derived from expert opinions, Delphi surveys, wisdom-of-the-crowd methods, programmatic results/registry, or regional benchmarks. Estimates did not have to be national.
- Undocumented or untimely: estimates reported but not documented or derived before 2017.

Results

The surveillance component that existed in all the countries was HIV case reporting (Fig. 1). STI case reporting was implemented in 14 countries but etiological STI case reporting was implemented in only eight countries. Nine countries (Bahrain, Djibouti, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, Syria, and UAE) lacked both IBBS and PSE of KPs. Three countries—Afghanistan, Iran, and Morocco—had all five HIV surveillance components recommended for countries with concentrated HIV epidemics. However, only in Morocco IBBS in KPs were done in the past five years, that is, since 2017 (Table 1).

HIV-integrated bio-behavioral surveys in key populations

Table 1 shows HIV prevalence for MSM, PWID, and FSW from the most recent IBBS along with the sample size, number of cities where IBBS were done, sampling method, and the year when surveys were done. Of the 22 countries assessed, seven reported HIV prevalence data for all three KPs, whereas only in Pakistan HIV

Table 1
Latest available HIV prevalence data from integrated bio-behavioural surveys in key populations in the countries of the WHO Eastern Mediterranean Region.

	PWID; HIV prevalence—range (%), city, sample size, sampling method, year	FSW: HIV prevalence—range (%), city, sample size, sampling method, year	MSM: HIV prevalence—range (%), city, sample size, sampling method, year
Afghanistan	0.3-13.3 (Kabul, Herat, Mazar, Jalal-Abad, Charikar), n=117-369 per city, RDS, 2012	0-0.9 (Herat, Kabul, Mazar), n=333-355 per city, RDS, 2012	0.4 in Kabul, n=207, RDS, 2012
Egypt	6.7 and 7.7 (Alexandria and Cairo), n=275-285 per city, RDS, 2010	0 in Cairo, n=431, convenience sample, 2010	0-6.9 (Luxor, Cairo, Alexandria), n=260-269 per city, RDS, 2010
Iran	9.3 in 13 cities, n=2305, convenience sample, 2014	2.0 in 13 cities, n=1337, convenience sample, 2015	NA
Jordan	NA	0-0.6 (Irbid, Zarqa, Amman), n=102-358 per city, convenience sample, 2013	0-0.2 (Irbid, Zarqa, Amman), n=133-313 per city, convenience sample, 2013
Lebanon	0.3 in Beirut, n=390, RDS, 2015	0.8 in Beirut, TLS, 2018	12.0 in Beirut, n=376, RDS, 2018
Libya	87.0 in Tripoli, n=328, RDS, 2011	15.7 in Tripoli, n=69, RDS, 2011	3.1 in Tripoli, n=227; RDS, 2011
Morocco	1.3 in Tangier, 6.0 in Tetouan, 14.0 in Nador, n=150-151 per city, RDS, 2017	0.4-2.4 insix cities, n=246-276, RDS, 2016	3.2-9.6 in four cities; n=250-301, RDS, 2017
Pakistan	38.4 (3.4-50.8 across 14 cities), n=146-302 per city, cluster sampling, 2016	2.3 (0-8.8 across 18 cities), n=72-364 per city, cluster sampling, 2016	5.4 (0-9.7 across 22 cities), n=99-350 per city, cluster sampling, 2016
Palestine	0 (Ramallah, Hebron, and Bethlehem), n=288, TLS, 2013	NA	NA
Somalia	NA	2.9-4.5 (Mogadishu, Hargeisa, Bosaso), n=286-287 per city, RDS, 2017	NA
Sudan	NA	1.3 (aggregate) in multiple cities, n=4134, RDS, 2015	1.4 (aggregate) in multiple cities, n=4142, RDS, 2015
Tunisia	0.7 in Bizerte and 7.4 in Tunis, n=300 and 505, respectively; RDS, 2017	0.9-1.7 (Sfax, Tunis, Sousse), n=348-352 per city, TLS, 2017	2.9-12.9 in six cities, n=140-300 per city, TLS, 2014
Yemen	NA	1.3 in Aden, n=244, RDS, 2008	5.9 in Aden, n=261, TLS, 2011

FSW, female sex worker; MSM, men who have sex with men; NA, not available; PWID, people who inject drugs; RDS, respondent-driven sampling; TLS, time-location sampling; WHO, World Health Organization.

surveillance data on transgender people were available (Table 1). More recent data (since 2017) were available only in Lebanon, Morocco, Somalia, and Tunisia.

IBBS data indicate the highest HIV prevalence in PWID. According to the latest survey data, the highest HIV burden in PWID was found in Libya (87.0% in Mirzoyan et al., 2013), followed by Pakistan (3.4–50.8% across cities, 2016), and Morocco (1.3–14.0% across cities, 2017) (Mirzoyan et al., 2013; Pakistani National AIDS Control Programme, 2017; Moroccan National AIDS Control Programme, 2017).

More than three rounds of IBBS of PWID were carried out in Iran, Morocco, Pakistan, and Tunisia. The most pronounced rise in HIV prevalence among PWID was in Pakistan, where it increased from 10.8% (aggregate data for multiple cities) in 2005 to 38.4% in 2016 (Pakistani National AIDS Control Programme, 2017). In Iran, HIV prevalence among PWID recruited in 10 provinces was 13.4% in 2010, increased to 15.0% in 2011, and declined to 9.3% in 2014. In Morocco, HIV prevalence among PWID might have increased slightly from 2011–2017 in Tangier, whereas it declined in Nador from 25.0% in 2011 to 14.0% in 2017 (Moroccan National AIDS Control Programme, 2017). In Tunisia, the prevalence increased in Tunis (from 2.9% in 2011 to 7.4% in 2017) and somewhat in Bizerte (from 0% in 2011 to 0.7% in 2017) (Tunisian National AIDS and STI Programme, 2017).

The most recent IBBS data indicated the highest HIV prevalence among MSM in Tunisia (0–12.9% across cities, 2014), followed by Lebanon (12.0%, 2018), Pakistan (0–9.7% across cities, 2016), and Morocco (3.2–9.6% across cities, 2017) (Tunisian National AIDS and STI Programme, 2017; Heimer et al., 2017; Pakistani National AIDS Control Programme, 2017; Moroccan National AIDS Control Programme, 2017). IBBS of MSM in Tunisia found an HIV prevalence higher than 5.0% in five of the six cities surveyed; this was also found in several cities in Egypt and Sudan.

In terms of temporal patterns, HIV prevalence increased among MSM in Lebanon from 1.2% in 2008, 1.5% in 2012 to 12.6% in 2015, and then decreased to 12.0% in 2018 (Heimer et al., 2017). Programmatic data collected from MSM who attended one sexual health clinic in Lebanon between 2015 and 2018 (n=2238) revealed an HIV prevalence of 5.6% (Assi et al., 2019). In Pakistan, more than three data points are available for male SWs, indicating an increase in HIV prevalence from 1.5% in 2007, 3.1% in 2011 to 5.2% in 2016 (Pakistani National AIDS Control Programme, 2017). In Agadir and Marrakesh in Morocco, where three rounds of IBBS were carried out, HIV prevalence measured in 2011, 2015 and 2017 fluctuated (Moroccan National AIDS Programme, 2017).

An HIV prevalence of 5.0% or higher was found among FSWs in urban areas in several countries, including Libya (although the survey included only 69 women), Pakistan, Sudan, and Yemen (Valadez et al., 2013). A large-scale implementation of IBBS using RDS among FSWs occurred in 2016 in Morocco (six cities), and an HIV prevalence lower than 3.0% was found (Moroccan National AIDS Control Programme, 2017).

More than three rounds of IBBS of FSWs were done in cities in Iran, Pakistan, Somalia, and Tunisia. In Iran, HIV prevalence among FSWs in 13 cities was 3.8% (n=876) in 2010, 4.0% in 2010 (n=1005), and 2.1% in 2015 (n=1337) (Mirzazadeh et al., 2020). In Pakistan, HIV prevalence increased from 2007–2016 from 0.02–2.3% (aggregate data), respectively, whereas in Tunisia it increased from 0.4% (aggregate data) in 2009 to 1.2% in 2017 (Emmanuel et al., 2021). Three rounds of IBBS of FSWs were carried out in Hargeisa in Somaliland, and HIV prevalence showed a declining pattern: 5.2% in

Table 2
Latest available size estimations of key populations in the countries of the WHO Eastern Mediterranean Region.

Country	People who inject drugs	Female sex workers	Men who have sex with men
Afghanistan, 2019 Multiple methods	25,736 (95% CI 19,364-32,877) in 31 major cities; 0.69% (95% CI 0.52%-0.88%) of the population aged 15-64 years	11,237 (95% CI 9481-13,191) in 31 major cities; 0.61% (95% CI 0.51%-0.72%) of the female population aged 15-64 years	10,108 (95% CI 7916-12,618) in 31 major cities; 0.53% (95% CI 0.42%- 0.66%) of male population aged 15-64 years
Djibouti, 2012 Method unknown	NA	2218 in Djibouti City	873 in Djibouti City
Egypt, 2014 Mapping	93,314 (uncertainty range: 86,142-119,412); 0.37% (range: 0.35-0.48%) of male population aged 18-59 living in all urban and rural areas	22,986 (uncertainty range: 6460-26,792); 0.24% (range: 0.07-0.28%) of female population aged 15-49 years living in all urban areas	64,318 (uncertainty range: 15,946-90,914); 0.62% (range: 0.15-0.87%) of male population aged 18-59 years living in all urban areas
Iran PWID: network scale-up FSW: wisdom-of-the crowd and multiplier methods, network scale-up	208,000 (183,000-238,000); 0.21% of the total male and female population in 31 provinces (2013)	228,700 (95% uncertainty interval: 153,500-294,300) in all urban areas (2015)	359,000 (2012)
Lebanon, 2015 RDS-SS	3114 (±2302) in greater Beirut	NA	4220 (±2192) in greater Beirut
Morocco, 2019 RDS-SS for city-level estimates	Tetouan, 184-500; Tangier, 200-387; Nador, 360-535	Agadir, 5300; Casablanca, 6300; Fes, 4400; Marrakesh, 3350; Safi, 3000; Tangier, 2700; in 2019	NA
Pakistan, 2016 Mapping	37,137 (range 31,138-41,752) in 14 cities	64,829 (range 70,428-57,734) in 18 cities	46,264 (range 39,273-53,257) in 23 cities
Somalia, 2016 Capture-recapture, mapping	NA	Mogadishu, 963; Hargeisa, 1126; Bosaso, 911	NA
Sudan, 2012 Capture-recapture, mapping	986, national-level	212,500, national-level	132,000, national-level
Tunisia, 2012 Mapping	9000, national-level	25,500, national-level	29,000, national-level
Yemen, 2013 Method unknown	NA	54,000, national-level	44,000, national-level

CI, credibility interval; FSW, female sex worker; NA, not available; PWID, people who inject drugs; RDS-SS, respondent-driven sampling–successive sampling; WHO, World Health Organization.

2018, 4.8% in 2014, and 3.6% in 2017 (International Organization for Migration, 2017).

Surveillance data from a transgender population were available from Pakistan. In IBBS from 2016, HIV prevalence ranged from 0–18.2% across cities. In four of 23 cities where IBBS of transgender women were done, HIV prevalence was higher than 10.0%.

In most countries, with the exception of Iran and Jordan, IBBS data were collected using probabilistic or quasi-probabilistic methods, most commonly RDS. For example, in Morocco, RDS has been used consistently across IBBS rounds of FSWs, MSM and PWID.

Of note is that IBBS data were outdated in several countries (Afghanistan, Egypt, and Yemen). For example, the latest IBBS of MSM in Yemen was done in 2011 and found a well-established HIV epidemic in the port city of Aden (Mirzazadeh et al., 2014). Similarly, the last IBBS of FSWs in Yemen was done in 2008. The last IBBS in Egypt was carried out in 2010 and found substantial HIV prevalence among MSM and PWID in Cairo (5.7% and 6.8%, respectively) and Alexandria (5.9% and 6.5%, respectively); however, no IBBS data have been available since (Kabbash et al., 2012; Family Health International and Ministry of Health of Egypt, 2010). Nine countries do not have any survey data on KPs.

Key population size estimation

Information on the size of KPs was available from a total of 11 countries, whereas more recent PSE data (since 2017) were collected in Afghanistan and Morocco (Table 2). The most common method to estimate the size of KPs was mapping, used in Afghanistan, Egypt, Pakistan, Sudan, Somalia, and Tunisia (Afghani Ministry of Public Health, 2019; Jacobson et al., 2015; Pakistani National AIDS Control Programme, 2016; Nasirian et al., 2020; International Organization for Migration, 2016). Network scale-up was used only in Iran (Nikfarjam et al., 2016; Sharifi et al., 2017).

In some settings, multiple methods to estimate the population size were used. For example, in Afghanistan in 2019, several methods were applied, including mapping and enumeration, unique object and service multipliers, capture-recapture, wisdom-of-the-crowd methods, and a synthesis of the estimates using the anchored multiplier Bayesian approach (Jacobson et al., 2015). In Morocco, KP size estimation was done in conjunction with IBBS (multiplier, capture-recapture, and RDS-SS) in several cities. National-level size estimates of KPs were also available in Morocco, but they were based on the synthesis of literature (Kouyoumjian et al., 2018; Moroccan National AIDS Control Programme, 2010). It was estimated that there were 55,319 MSM (0.6% of adult males) and 85,000 FSWs (0.9% of adult females). Estimates of the transgender population were available only in Pakistan, where it was estimated using mapping that there were 31,790 (range: 26,804–36,776) transgender women in 23 cities in 2016 (Pakistani National AIDS Control Programme, 2016).

Using categorization of PSE proposed by UNAIDS, most of the countries with some PSE data had locally adequate but nation-

ally inadequate estimates (Iran, Lebanon, Morocco, Pakistan, and Somalia). PSE in Afghanistan was based on rigorous and multiple methods, but extrapolation was done to 31 major urban areas of the country and not to the national level. In several countries, estimates were untimely (Djibouti, Sudan, Tunisia, and Yemen). A number of countries (Bahrain, Iraq, Jordan, Libya, Oman, Qatar, Syria, and UAE) did not have KP size estimations.

Discussion

Over the past decade, HIV surveillance systems in the region have evolved from focusing primarily on HIV case reporting and HIV testing data to inclusion of a broader array of data collection activities. Despite evidence of the importance of prioritizing KPs in national HIV responses, more than a third of the countries still do not have any IBBS or PSE data. This inaction is to the largest extent attributed to lack of political will, denial, social stigma and discriminatory policies—including criminalization of KPs (Ballouz et al., 2020). Long-term socio-economic problems and failing social protection systems additionally challenge the HIV response and the ability to reach the KPs. Countries in conflict that have faced institutional degradation and loss of human capital (Afghanistan, Iraq, Syria, Libya, and Yemen) also have the weakest HIV surveillance and experience the most severe disruptions in HIV service delivery.

In general, pre and extramarital sex are sensitive issues because of cultural and religious principles; therefore, working with KPs and instituting a sustainable system of surveillance of related behaviors is challenging.

Conversely, in some parts of the region (Iran, Lebanon, Morocco, Pakistan, and Somalia), HIV surveillance activities with the focus on KPs have been conducted continuously over the past 10–15 years.

Surveillance data have shown a probable decline in incidence and prevalence of HIV among PWID and FSWs in Iran, which could be at least partly attributed to the development of extensive harm reduction programmes in the country (Rahimi et al., 2020; Sharifi et al., 2018). In the other countries with trend data on some KPs (Lebanon, Morocco, and Pakistan), there are no signs of decline in HIV transmission. Of particular concern is the progression of the HIV epidemic in Pakistan via sexual transmission from a large population of PWID to FSW—a country which has the highest estimated number of PLHIV among the WHO EMR countries—190,000 (160,000–210,000) in 2019.

The greatest gap in HIV data availability is among MSM. Multiple rounds of IBBS were conducted among MSM in Lebanon and male SWs in Pakistan, showing an increase in HIV prevalence. In several countries (Egypt, Tunisia, and Yemen), there is a lack of recent data on MSM despite the evidence of a substantial burden of HIV identified in IBBS approximately a decade ago. Larger amounts of data on MSM can be found in countries with a longer and stronger presence of community-based organizations that provide HIV services to MSM, such as Morocco, Tunisia, and Lebanon. The existence of community-based HIV service delivery, coupled with a growing number of studies in KPs, are strong indicators of the willingness of governments in these countries to acknowledge the key role of civil society in addressing the HIV epidemic among MSM.

Severe lack of HIV data on transgender people can be attributed to lack of social and legal recognition of gender-diverse persons and social marginalization. An exception to this is Pakistan, where the HIV strategic information system includes transgender people (Hijras). Hijras in Pakistan have a long-recorded history and were legally recognized as the third gender in 2009.

We categorized five of 11 countries that reported KP size estimates as having untimely estimates, that is, estimates derived before 2017. Local-level PSEs, mainly for urban areas, were the most readily available, and these are needed for geographic prioritization and monitoring programme coverage (World Health Organization Regional Office for the Eastern Mediterranean, 2016).

Mapping has been the method most commonly applied to estimate the size of KPs in the countries of the region. Although it has many advantages for program planning, it often fails to capture non-venue-based subgroups, such as home-based SWs and MSM and SWs who meet partners/clients via the internet or mobile phones.

An interesting finding is that in several countries, the estimated number of FSWs outnumbered that of MSM (Afghanistan, Morocco, Yemen, Sudan, and Pakistan), which raises concerns about approaches used in PSE and the quality of generated data. KP proportions among adults aged 15–49 years suggested by UNAIDS for the WHO EMR are also higher for FSWs (1.2%) than MSM (0.9%) but were based on studies done in three countries only (Global HIV/AIDS Statistics – Fact Sheet. Geneva: UNAIDS, 2020).

The differences among the countries in the estimates themselves are also noteworthy. For example, the estimated proportion of FSWs among adult women in urban areas is three times lower in Egypt than in Afghanistan. This is more likely to be attributable to the methods used and quality of implementation than to real differences in the number of FSWs.

Given that almost all new HIV infections in the region are associated with KPs and their partners, data availability and quality gaps must be addressed so that more effective and focused HIV programs can be implemented.

Continued investments in HIV strategic information systems in the WHO EMR based on sound epidemiologic science and appropriate technology are needed for effective, ethical, and evidence-informed prevention and treatment strategies. Consideration should be given to the implementation of HIV incidence-based surveillance in settings and population groups with higher levels of HIV prevalence using rapid HIV recency assays and similar novel testing approaches (Des Jarlais et al., 2020).

Given the high costs of IBBS and its rather irregular implementation in many countries, future efforts to strengthen HIV surveillance should consider suitability of programmatic data for surveillance purposes and identify minimum requirements for using HIV testing and other data on prevention services for surveillance purposes in KPs.

More efforts are needed to implement national-level size estimations by applying appropriate extrapolation techniques on estimates obtained empirically, using studies conducted in defined local areas. Such estimates are needed for advocacy, resource mobilization, and importantly, HIV estimation and projections. Well-documented and well-conducted studies are needed in particular to estimate the proportions of MSM using various methods including 'virtual mapping' of internet sites and social apps. As recommended by the WHO and UNAIDS, multiple size estimation methods should be used in estimating the size of a KP. It is therefore important that size estimation is done along with IBBS, which is a source of data for the multiplier method, capture-recapture, and successive sampling PSE generated from RDS-based surveys.

Conclusions

IBBS and PSE of KPs were conducted in 13 and 11 WHO EMR countries, respectively, but only few countries have more recent data available. Where there were more than three data points, IBBS clearly indicated an increase in HIV prevalence among KPs in Pakistan, among PWID and FSWs in Tunisia and among MSM in Lebanon.

Many countries of the WHO EMR have yet to engage key stakeholders and identify suitable approaches to start or re-establish

HIV surveillance activities in KPs. This lack of data and the limited timeliness of IBBS implementation create a critical barrier to implementation of an evidence-based response to HIV, evaluation of the progress towards epidemic control, and appropriate resource allocation.

HIV surveillance in KPs should be a core activity in national HIV strategies in the countries of the region.

Declaration of competing interest

The authors have no competing interests to declare.

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Ethical approval

Ethical approval was not sought because this manuscript is based on already collected and published data.

Author contributions

I.B., A.S., H.S., J.H., and A.A.H. participated in the planning and conception of the manuscript. I.B., A.S., H.S., J.H., and A.A.H. reviewed the literature and acquired the data.

I.B. drafted the article, and all authors participated in interpreting the data and critically revising the manuscript. All authors read and approved the manuscript.

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