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Is UNAIDS 90-90-90 target a Dream or a Reality for Middle East and North Africa Region on Ending the AIDS Epidemic? A Review Study

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Abstract

Middle East and North Africa (MENA) region is lagging far behind the global average to reach 90-90-90 targets. This study uses the UNAIDS 90-90-90 program to evaluate the HIV current situation in MENA countries, and understand the challenges that exist in the way of approaching the program goals. All articles and publications were searched based on the 90-90-90 program indexes among national and international data resources such as official national reports and online scientific databases such as PubMed, Medline, and Scopus up to December 2017. The data were categorized into four main stages: (1) estimated number of HIV-positive people (people living with HIV [PLWH]); (2) PLWH who know their status; (3) PLWH receiving antiretroviral therapy (ART); and (4) virally suppressed PLWH. A total of 41 papers were included in the study. 19 out of 24 MENA countries have met the inclusion criteria. The proportion of diagnosed people ranges from 6% in Pakistan to 76% in Algeria. The percentage of diagnosed people receiving ART ranges between 7% in Pakistan and 86% in Algeria. Viral suppression levels vary from 4% to 72% in Pakistan and Kuwait, respectively. Lack of appropriate surveillance systems, low access to HIV-care facilities along with complicated socioeconomic and geopolitical situation of the region have made it challenging for MENA countries to reach 90-90-90 goals by 2020. To achieve these goals, the foremost strategy is global effort to establish peace in this region and rebuild the infrastructure in the countries involved in war and to setup comprehensive surveillance systems in the majority of the MENA countries. **(AIDS Rev. 2018;20:83-93)**

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Key words

HIV/AIDS. Middle East and North Africa Region: 90-90-90 program. AIDS epidemic.

Introduction

HIV/AIDS is still a persistent global health problem, particularly in middle- and low-income countries. Although 19 billion US dollars was dedicated to overcome and control HIV in low- and middle-income countries, 1.1 million people died from HIV infection and 36.7 million people were living with HIV around the world by

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the end of that year[1-3]. Enormous steps have been undertaken to treat and prevent HIV such as "90-90-90 targets" by the Joint United Nations Program on HIV/AIDS (UNAIDS) and "Global Health Sector Strategies for HIV" by the World Health Organization (WHO). However, there is still much to be done to stop the spread and overcome HIV throughout the world[4,5]. The Middle East and North African (MENA) region is not apart from this issue. MENA region is one of the two regions in the world reported to have a dramatic increase in HIV infection between 2001 and 2012[6,7]. There has been an increase in the prevalence and the incidence of HIV in many of MENA countries including Iran and Tunisia[8,9]. Approximately, 65% of the new cases in MENA belongs to Iran, Somalia, and Sudan with Iran having the highest incidence level. This has caused Iran to fail meeting millennium development goals regarding to HIV/AIDS[10,11].

Tackling the issue of HIV/AIDS is crucial since there is always the possibility of a sudden outbreak as some countries have experienced it with the same levels of epidemic before[12]. For instance, HIV epidemic in men who have sex with men (MSMs) has reached a concentrated level in at least a few MENA countries[8]. However, the main routes of transmission are heterogeneous in different countries or even in a single country such as Morocco[7]. In other countries such as Iran where the two major transmission routes are unprotected sex and injecting drug users (IDUs), it is estimated that HIV transmission is shifting from IDUs to female sex workers and MSMs in recent years[8,13]. Even though MENA countries have diverse HIV epidemics, they share some common features such as incompetent leadership, social stigma, discrimination, an increase in the average marriage age, an increase in pre-marital and/or extramarital sex, and risky behaviors. These factors can contribute to the increasing HIV epidemics in these countries[7,8]. Therefore, the countries in the MENA region require a solid strategy and an effective preventive policy to control the disease and to reach the global level by 2020.

The new narrative target published by the UNAIDS and partners consists of three components. First, 90% of all people living with HIV (PLWH) know their HIV status by 2020. Second, 81% of all PLWH receive sustained antiretroviral therapy (ART) by the same year, and finally, 73% of all PLWH exhibit viral suppression[4]. Only 25.5 million people were diagnosed by 2016 which accounts for only 70% of the PLWH. "15 by 15" goal of United Nations Political Declaration on HIV and AIDS set in 2011 (50% on ART) is met by 2015. Since the number of people using ART reached 18.2 million and passed 15 million people by March of 2015. This number has also reached 19.5 million by 2016 with merely 44% viral suppression level by the end of that year[14-16]. This program is achievable since Sweden as the first country followed by Botswana, Cambodia, Denmark, Iceland, Singapore, and the UK have reached all the three goals by the end of 2016, and other countries such as Switzerland are very close to achieve them[11,14,17]. To achieve each of these goals, it is needed to have a complete understanding of HIV[18] estimations and parameters in MENA countries[18]. It is also required to address the issues and the shortages and overcome the barriers to end this epidemic.

This study uses the UNAIDS 90-90-90 targets to evaluate the current HIV situation in MENA countries, compare them with one another, and address the challenges that exist in the way of approaching the goals.

Methods

This study is a narrative review from a combination of analytical and descriptive studies from MENA countries including published literatures, gray literatures, articles, and national reports. All documents were evaluated independently by two reviewers (SSH & MD), related information was gathered, discrepancies between two authors were discussed and solved by the third author (HJ).

Resources

For this study, the data were derived from the national and international data resources such as WHO, UNAIDS, national reports of the Ministry of Health and UN General Assembly Special Session. Data for some countries were not updated or available in English. For these countries, Global AIDS Response Progress Reports (GARPR) from 2010 onward was used. These reports are available in English, Persian, and French. Online scientific databases such as Scopus, PubMed, Medline, Google Scholar, SID, and AIDSinfo UNAIDS were also searched up to December 2017. A total of 1204 records were found by electronic and manual search and 907 of the records remained after duplicate references were removed. We also excluded 526 studies after screening titles/abstracts; therefore, 381 studies were used to be carefully checked by reading their full text. Of the remaining, 340 articles were excluded because of the following reasons: no relevant data on 90-90-90 targets (n = 137), did not perform on MENA region (128), reviews or letter to the editor (n = 23), and modified data (n = 52). Finally, a total of 41 articles were eligible to be addressed in this review.

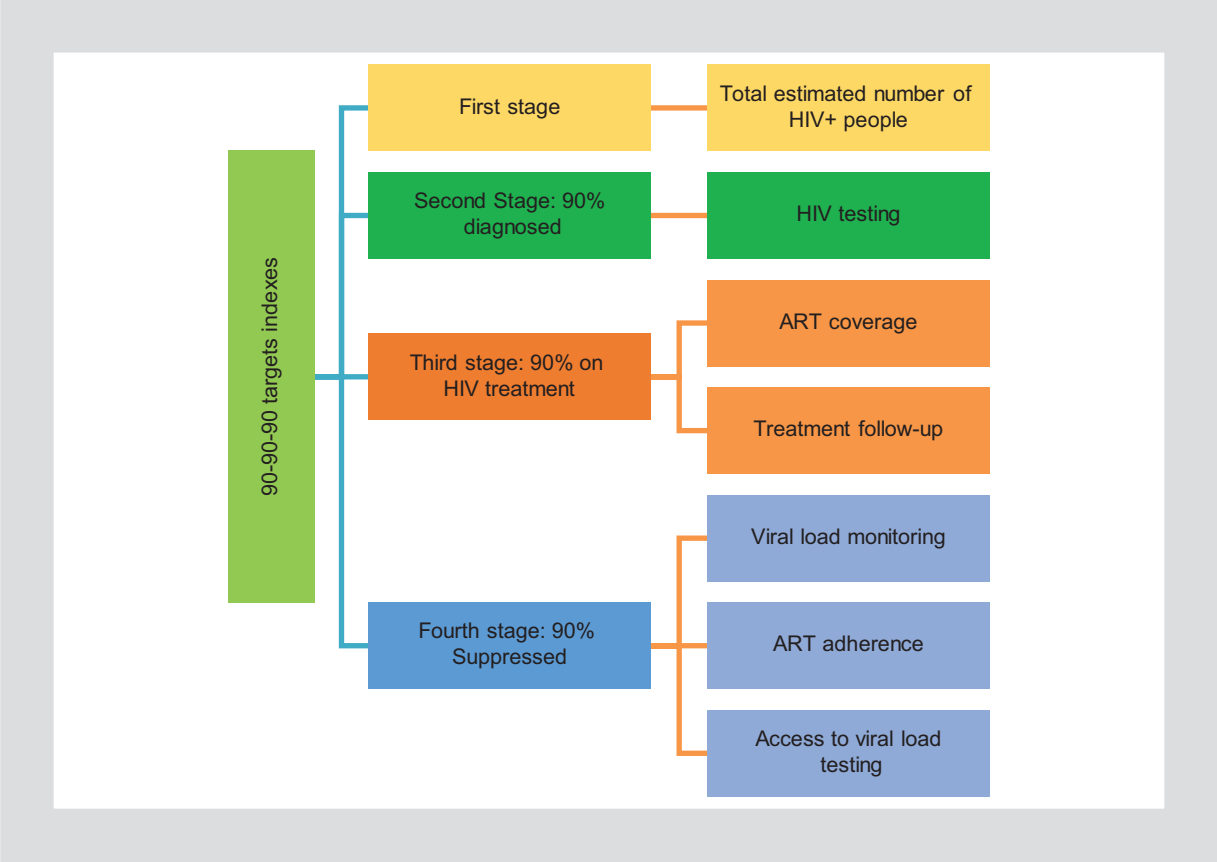


Figure 1. *90-90-90 target's indexes for each stage.*

Inclusion criteria

Search terms were "HIV/AIDS", "90-90-90 target", "treatment cascade" or "continuum of care", "global", and "MENA" plus all indexes set by 90-90-90 goals for each stage (outlined in Figure 1). MENA region accounts for 24 countries selected based on UNAIDS MENA HIV report and searched separately with each term[7]. Since this research is based on the current situation of MENA, time was a criterion and only the articles published after 2010 are included. Only those countries that reported the estimated number of people with HIV are included in this study to make the findings comparable and understandable.

The framework

This study's data is divided into four main stages for better understanding and evaluation: (1) estimated number of PLWH; (2) diagnosed PLWH; (3) number of PLWH on ART or any other treatment; and (4) all the PLWH that exhibited viral suppression[4,14]. The target number for each stage is calculated as following: the total estimated number of PLWH, 90% of PLWH who know their status, 81% of PLWH that are on ART, and 73% of PLWH with viral suppression. The difference between the calculated target numbers for each stage and the real number represents the gap.

The definition for each stage is cited as follows:

PLWH

The estimated number of PLWH infection that are reported in published articles, GARPRs and UNAIDS databases for MENA countries. Furthermore, the most at-risk peoples (MARP) are categorized into six groups for each country: transmission among sex workers (SWs), MSMs, IDUs, inmates/detainees, transgenders, and mother-to-child transmission[19]. There was poor information available about HIV transmission among inmates/detainees and transgender people; therefore, they are not included in this study.

All diagnosed people

The number of cases reported in GARPR and other available articles excluding the number of deaths from HIV. Test for HIV is a main parameter set by 90-90-90

program for this target. Thus, it provides a percentage of people received an HIV test and were diagnosed with HIV in the past 12 months among SWs, MSMs, and IDUs since there was no data available for the total population or other three groups[20,21].

PLWH receiving ART

Providing care to those diagnosed with HIV is a crucial stage in this program. This stage includes both providing ART to HIV+ people and retention of care after receiving the treatment for the first time. ART coverage is defined as percentage of adults and children currently receiving[21] ART among all adults and children living with HIV[21]. The different kinds of ART that were provided are not specified in some of the reports from different countries. Therefore, we use the generic word ART to refer to any HIV therapy that was used in this study. Some countries reported data from both 6-month or 12-month retention of care. Since data for 6-month retention of care was not available for all countries, this study compares the countries with 12-month retention of care defined as the percentage of adults and children with HIV receiving ART until 12 months following the onset of the therapy[20].

Viral suppression among PLWH

This stage is defined as the percentage of adults and children among PLWH that exhibit viral suppression at the end of the reporting period. Therefore, this percentage should be compared to 73% of PLWH which is the last goal in 90-90-90 program. Viral load testing is one parameter of this stage which is the proportion of people who are tested for viral load among those receiving ART. ART adherence is another important indicator and refers to the whole process of a given ART regimen to control HIV viral replication and improve the function of the immune system. ART adherence is not considered in this study due to lack of information in many countries reports[20].

Findings

According to UNAIDS reports, the PLWH in MENA region is 230,000 and only 58% (confidence interval [CI]: 37%–>89%) of PLWH know their status. ART coverage among PLWH is 24% (CI: 15–41%), and viral suppression among the covered population was reported to be 16% (CI: 10–22%). These numbers do not include Afghanistan, Pakistan, and South Sudan in MENA region (Outlined in Map 1)[11].

Stage 1

Estimated PLWH for all of 19 countries who have met the inclusion criteria are shown in Map 1. According to Map 1, Pakistan and South Sudan account for over 50% of HIV+ numbers in the region (23% and 35%, respectively). Iran with 11.5%, North Sudan with 10, and Somalia with 4% are placed after.

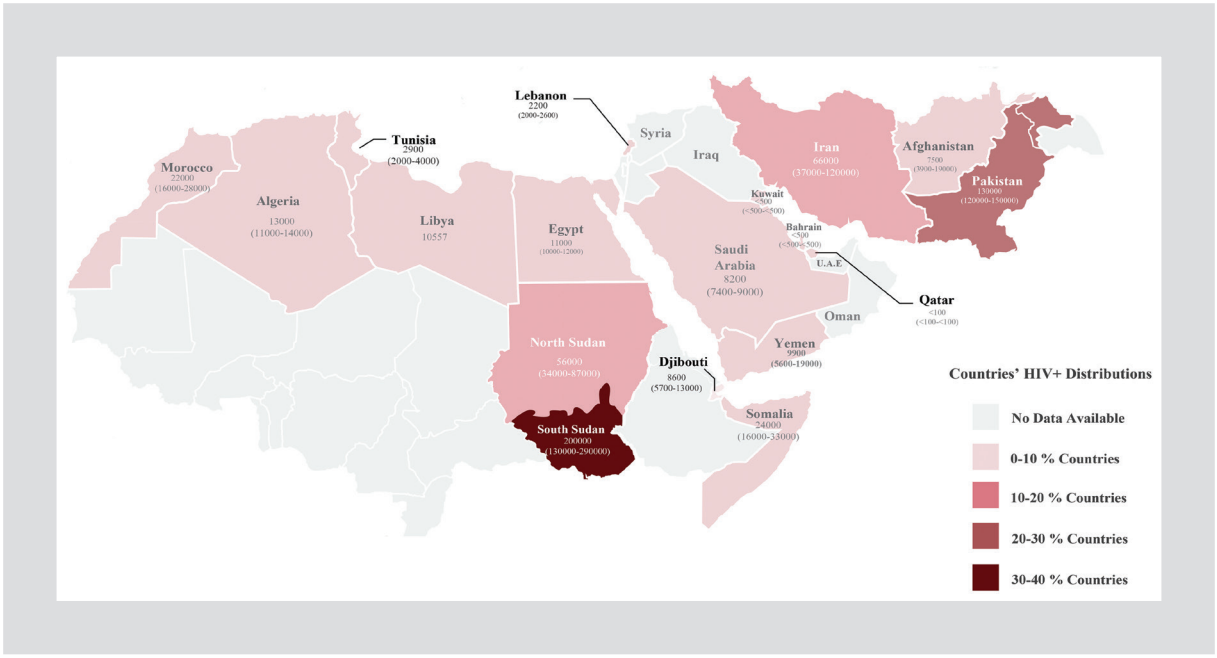
The estimated spread of HIV in MARP groups is shown in Table-1. Most of the countries had no published information on SWs and MSMs. Afghanistan, Egypt, Iran, Morocco, and Pakistan were the only countries to have all their estimated numbers available. However, the sum of all the estimated numbers from the subgroups did not match the total estimated HIV+ in some countries such as Iran and Pakistan.

Stage 2

Figure 2 shows the first target of 90-90-90 program. In some countries, there were some discrepancies between their national reports and UNAIDS data. For instance, there is a noticeable gap between the data from the national report (153%) and UNAIDS (58%) for Tunisia. None of MENA countries have met the first 90 target and majority of them were even below 58%. Algeria with 76% diagnosed HIV is the closest to the first target among MENA countries. Followed by Djibouti, Lebanon, and Morocco with the highest percentages of 75%, 67%, and 63%, respectively. Meanwhile, Pakistan, Qatar, and Somalia only account for 6%, 18%, and 19%, respectively. The cases reported in some Arab countries like Saudi Arabia and Bahrain are mostly non-citizens. HIV testing in seven countries was available for all subgroups. HIV testing in Algeria was over 83% for all subgroups, while it was below 10% for Pakistan.

Stage 3

Figure 3 shows the program's second goal. ART coverage in Bahrain, Jordan, Kuwait, and Qatar is exclusively for their citizens. Most of the countries are above 24%, MENA average in 90-90-90 target. Only Qatar has passed the 81% goal and Kuwait is close to reaching it. Pakistan, Afghanistan, North and South Sudan are below 10% coverage. Moreover, 12-month retention of ART in all the reported countries is more than 70%.



Map 1. *Estimated number of PLWH and its distribution in MENA countries, December 2017.*

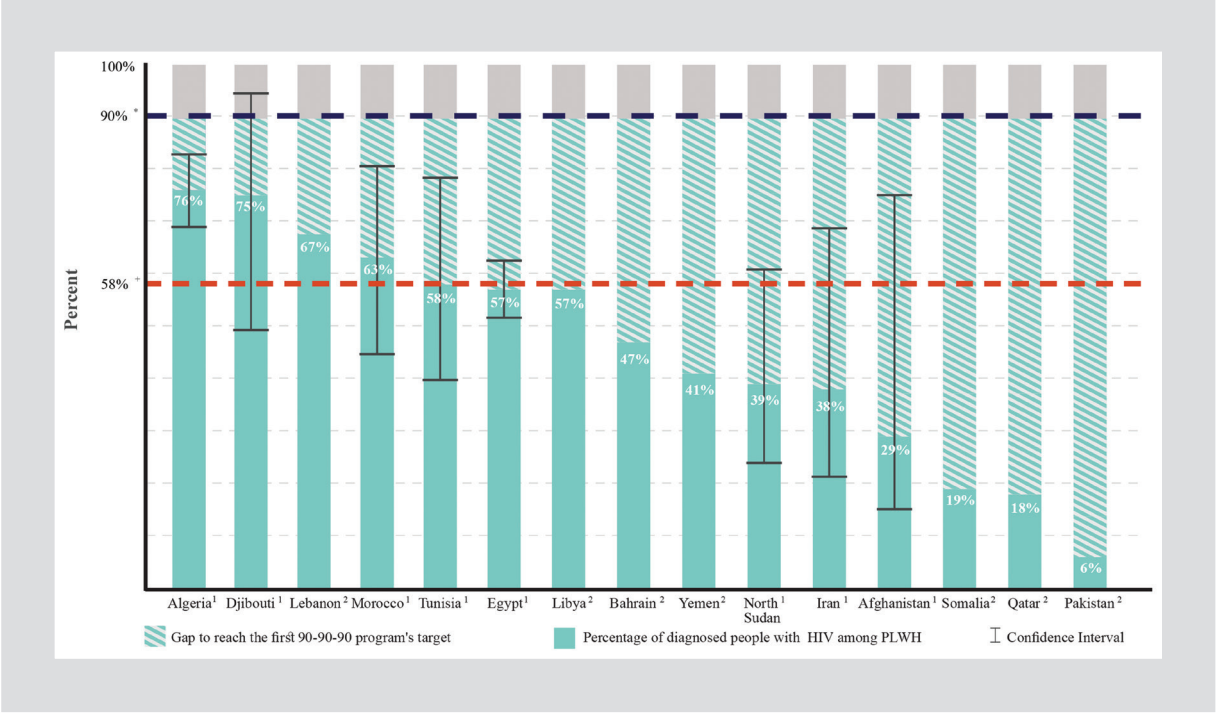


Figure 2. *Stage two: Knowledge of HIV status among PLWH, MENA region, 2016.*
**First 90-90-90 Program's target.*
+ MENA region's average in the first 90-90-90 Program's target.
[1]Source: UNAIDS. Ending AIDS: progress towards the 90-90-90 targets. GLOBAL AIDS UPDATE | 2017.
[2]Source: National reports available at unaids.org.

Stage 4

The last target of 90-90-90 target is shown in figure 4. Less countries have reported their viral suppression level. Viral load testing percentage varies dramatically between reported countries. Kuwait, Saudi Arabia, and Algeria with viral load testing coverage higher than 75% have achieved more than 50% viral

Table 1. All stages data. Last Update December 2017

Countries	Stage 1					Stage 2					Stage 3	Stage 4	
	PLWH's distribution in MENA	HIV distribution in MARP				PLWH who know their HIV status	National report	HIV testing			PLWH who are on ART	12-month retentions	PLWH who have viral suppression	People tested for viral loading
		SWs	MSMs	IDUs	MTCs			SWs	MSMs	IDUs				
Afghanistan	1%	13000	11000	41000	< 200	29%	22%	5.9%	17.4%	22.5%	7%	75%	6%	< 25%
Algeria	2%				< 500	76%	103%	94.4%	95.3%	83.2%	76%	90%	55%	> 75%
Bahrain	< 0.1%					47%					42%	48%		
Djibouti	1.50%				< 500	75%		99.4%			26%	94%	14%	25-49%
Egypt	2%	23000	64000	93000	< 500	57%	42%	30.2%	42.2%	10.5%	27%	77%	12%	
Iran	11.50%	1100	2000	200000	< 500	38%	31.5%	89.5%		27.6%	14%	88%	8%	< 25%
Jordan	< 0.1%										55%	73%	40%	
Kuwait	< 0.1%										80%	88%	72%	
Lebanon	0.50%	4220	4200	3100		63%	67.4%	64.2%	75%	100%	51%	95%	42%	> 75%
Libya	2%			4663-9779			57%		45.6%		48%	73%		
Morocco	4%	75000	45000	1500	< 500	63%	34%	25.5%	50.2%	23.2%	48%	> 95%		

(Continue)

Table 1. All stages data. Last Update December 2017 *(Continued)*

Countries	Stage 1					Stage 2				Stage 3	Stage 4			
	PLWH's distribution in MENA	HIV distribution in MARP				PLWH who know their HIV status	National report	HIV testing			PLWH who are on ART			
		SWs	MSMs	IDUs	MTCs			SWs	MSMs	IDUs		12-month retentions	PLWH who have viral suppression	People tested for viral loading	
Pakistan	23%	230000	830000	110000		2900		6%	8%		9.1%	7%		4%	25-49%
Qatar	< 0.1%							18%		25%		86%			
Saudi Arabia	1.00%					< 200						74%	86%	57%	> 75%
Somalia	4%	11000				1100		19%	20%			11%	83%		
Sudan North	10%	212462	131998			2000	39%		29.3%	16.9%		10%	69%		
South Sudan	35%	5000				9900						10%	68%		
Tunisia	0.50%	25000	28000	9000			58%	153%	23%	20%	18.2%	29%	84%	13%	
Yemen	2%	54000				< 500		41%		27.9%		18%	77%		

Source: UNAIDS special analysis, 2017. 2017 Global AIDS Monitoring. UNAIDS 2017 estimates. 2017. PLWH: PEOPLE living with HIV, MENA: Middle East and North Africa, SW: sex workers, MARP: most at-risk peoples, MSMs: men who have sex with men, IDUs: injecting drug users, ART: antiretroviral therapy

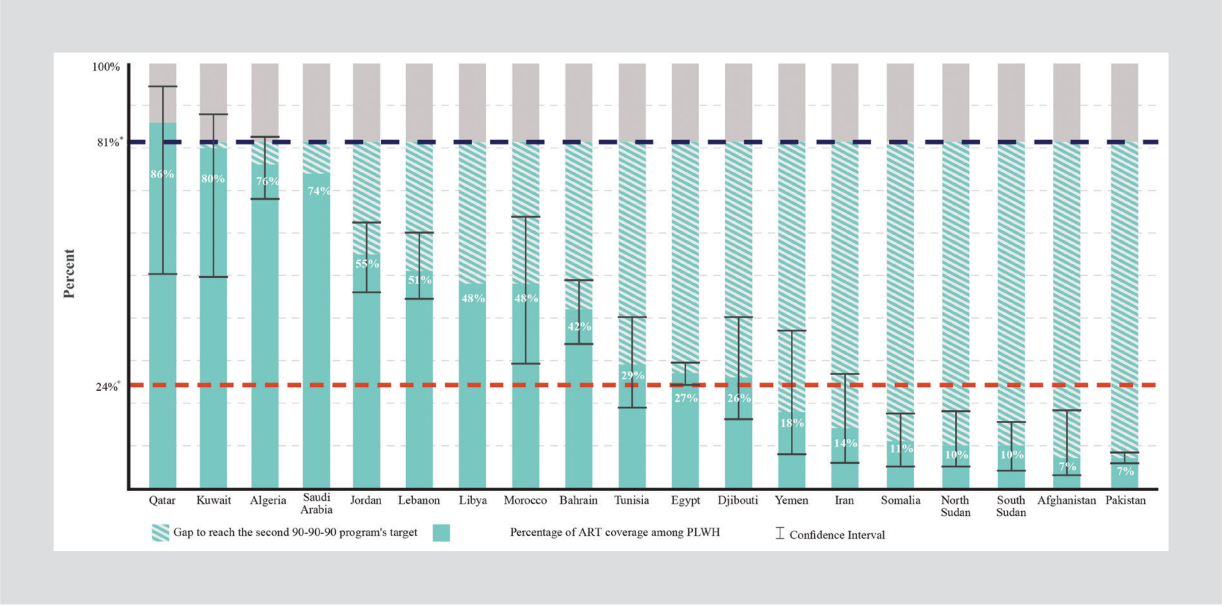


Figure 3. *Stage three: ART coverage among PLWH, MENA region, 2016.*
Source: UNAIDS. Ending AIDS: progress towards the 90–90–90 targets. GLOBAL AIDS UPDATE | 2017.
**Second 90-90-90 Program's target*
+ MENA region's average in the second 90-90-90 Program's target
Note: Confidence intervals were not available for some countries.

suppression. However, most of the countries are below the average of viral suppression in MENA (16%). For instance, Pakistan, Afghanistan, and Iran have 4%, 6%, and 8% viral suppression, respectively. They are among countries with low viral load testing.

Discussion

MENA region is notably lagging behind the global average to reach 90-90-90 goals. Although Algeria and Morocco are in the fast-track countries lists and there is hope for these countries to meet the 90-90-90 target by 2020, the majority of MENA countries have a long way ahead and some countries like Pakistan are unlikely to reach the program goals at all[22]. Based on our findings, some of the challenges and barriers that these countries are facing in each stage are as follows:

Stage 1

This stage is essential to better understand the magnitude of HIV and to calculate the 90-90-90 targets[23-25]. There are structural barriers to this stage in some countries like Syria, Iraq, and Palestine that have been experiencing civil war in recent years[26]. Economy crisis is another by-product of war, which can lead to lack of reliable resources, untrusted estimated size of PLWHA, and heterogeneous and scattered data due to insufficient infrastructure and surveillance systems[26].

Data censoring in MENA region is a common issue and some governments may not track or release HIV data due to stigma and bureaucratic pressures[23,24]. Moreover, the increase in migration and displacement of citizens in certain countries without knowledge of their HIV status significantly affect the prevalence of HIV in these countries. For example, there are 400,000 legal immigrants from Pakistan every year, with 3.5-4.5 million illegal immigrants. Furthermore, the forced refugees resulted from civil war represent a vulnerable population at risk for HIV due to unprotected or survival sex[26,27]. In addition, some countries like Afghanistan, Iran and Pakistan have human trafficking and narcotic problems leading to rapid spread of HIV/AIDS[28].

Many political and cultural factors such as religious beliefs remain a challenge in the region[29]. In some cultures and societies, low usage of alcohol and male circumcision can contribute to reduced risky behaviors. However, some societal factors and aspects of religion such as conservative rules, stigma, and discrimination may make it challenging to estimate the HIV exposure among people[29]. Sexual workers, MSMs, and transgenders are treated as taboo[17] leading to lack of information or underreporting in many countries such as Iran with only 1100 and 2000 for SWs and MSMs, respectively[8].

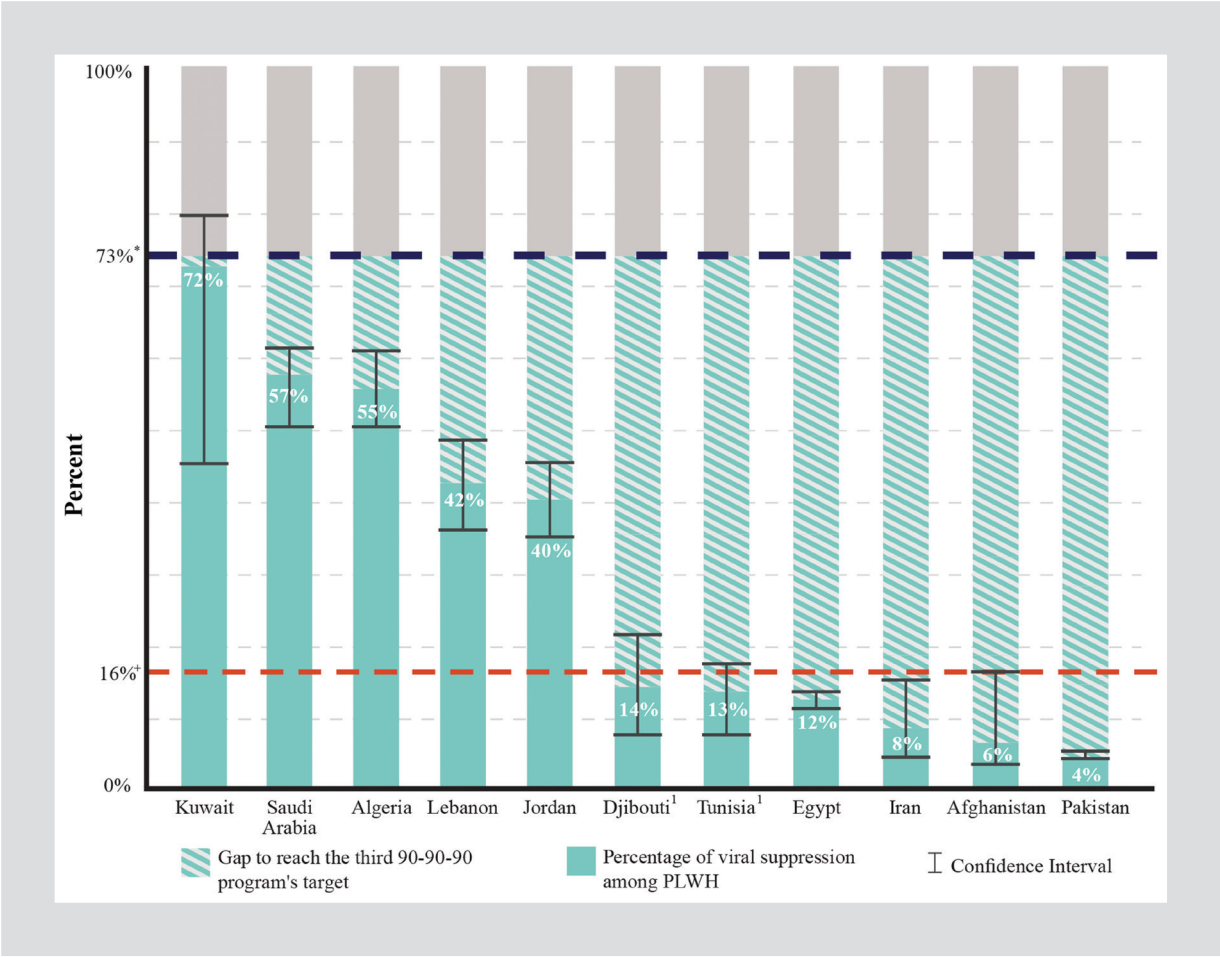


Figure 4. *Stage four: Viral Suppression among PLWH, MENA region, 2016.*
Source: UNAIDS. Ending AIDS: progress towards the 90–90–90 targets. GLOBAL AIDS UPDATE | 2017.
**Third 90-90-90 Program's target*
+ MENA region's average in the third 90-90-90 Program's target
[1]Data were available only for 2015.

Stage 2

Diagnosed HIV+ has increased by 10% (from 2015 to 2016) (from 48 [CI: 30-80%] to 58% [CI: 37–>89%]) in MENA region from 2015 to 2016[11]. More countries like Algeria, Djibouti, Egypt, Iran, Morocco, and Sudan have adopted community-based testing and treatment campaigns for MARP. In Morocco, diagnosis of people successfully has increased from 52% to 63%[11]. However, our results show noticeable gaps between expected target and current number for most of the countries. Higher coverage for HIV testing can lead to increased diagnosis of HIV+. For instance, focused HIV testing in Algeria has increased their reported cases of HIV+ by 22% over a year[11]. Some countries like Tunisia have some discrepancies in their national report. Diagnosed cases seem to be overestimated or biased as their reported cases with low HIV testing are almost 1.5 times higher than their total estimated number of PLWH. The failure in HIV testing can be caused by multiple factors at individual, structural (such as health-care system), or societal level (such as stigma)[14]. For example, in some countries like Saudi Arabia and Bahrain, most of the diagnosed cases are non-citizens[23,24]. The number of diagnosed people may exceedingly be biased for certain groups in Saudi Arabia since these cases were diagnosed through obligated annual checkups for issuing the immigration permit, while locals are mostly diagnosed through pre-marital tests[18]. Moreover, punitive laws against pre-marital, illegal, homosexual relationships, and gender inequality make it more difficult to monitor MARP and reduce stigma in these countries. This creates a barrier in reaching out to specific populations that are hidden and harder to find[8,29].

Furthermore, poor health-care systems have remained a challenge for many MENA countries. For instance,

lack of appropriate HIV testing and counseling (HTC) system, poor educational and behavioral programs can have adverse effects on registered cases[8,30]. Successful outcomes from other countries such as Brazil, China, Ukraine, and Uganda have shown an improvement in HIV diagnosis by adopting community-based services[30]. There are other models proposed such as facility-based, partner testing, religious facilities, opt-out testing, and self-testing[14,30]. A strategic combination of these models based on the health status of each country can significantly improve the diagnosis of HIV. These combined models need to be developed considering the nature of the epidemic, cost-effectiveness, equity of access, and the available resources for each country[30].

Stage 3

Numbers of people using ART have doubled in MENA region from 2010 to 2016, especially in countries like Algeria and Morocco[31,32]. Continuous revision of the treatment programs and choosing more focused and community-based outreach programs are among the reasons that more people now have access to ART. Countries like Kuwait and Qatar have also reached 80% for treatment coverage. However, other countries like Iran, Afghanistan, and Sudan accounting for the majority of PLWH have the least ART coverage. Failure in ART coverage has multifactorial reasons in different countries. Some of the barriers are due to stigma, lack of knowledge about ART, cost of treatment and health services, and economic crisis[30]. While some of the challenges are related to the delivery of service, access to health-care facility, ART eligibility, and drug availability[4,14,31]. For instance, in Saudi Arabia, HIV+ patients are only eligible to receive ART if they are citizens[23]. This is a violation of human rights, the rights of migrant workers, and the right to privacy[18].

Innovative and focused strategies like provider-initiated counseling and testing in low and concentrated-level, a combination of HTC strategies, mobile and outreach strategies in epidemic countries like South Sudan, Iran, and Somali, and decentralization can improve the situation[4,30,11].

Stage 4

Certainly, viral suppression following ART in the most of these countries is below the average suppression level in MENA. Viral load monitoring is poor in some countries such as Afghanistan, Iran, and Pakistan. Evidently, viral load test is an accurate sign of treatment failure and indicates multiple factors such as therapy effectiveness and drug resistance or toxicity[32]. Viral load test can help to increase the adherence rate or change the regimen. ART cost in the low- and middle-income countries fluctuate significantly and all countries may not be able to afford the best available regimen[17]. For example, the imposition of international sanctions against Iran has created a barrier to resolve this challenge[31]. Moreover, countries have hardly reported adherence (another indicator of treatment effectiveness), or they have poor adherence like Egypt[14,11]. All these factors can contribute to the low viral suppression rates. Adopting a combination of some approaches like community-based, decentralizing, and increasing ART treatments can lead to higher retention of treatment and high viral suppression as it did in Morocco[11]. Improvement of laboratory instruments, training skilled staff, and monitoring effective ART coverage through enhancing foreign or domestic investment is also crucial to reach this goal[11].

Conclusion

In general, it seems that 90-90-90 goal is unachievable by 2020 in MENA region with current circumstances. There are many factors leading to this gap such as disparities in national standards, civil wars, lack of organized surveillance and the health-care system, and sociocultural barriers. To improve the situation, first and foremost strategy is upgrading HIV surveillance system in many MENA countries. Since most of these countries are low- and middle-income, they need to employ both national and international resources to approach the targets. Furthermore, to stabilize the sociopolitical situation and reduce devastative consequences of the war in this region, international efforts should be doubled. The last but not least strategy is to advocate reducing societal stigmatization and discrimination for easier approach to HIV-affected individuals.

Strengths and limitations

To the best of our knowledge, this is the first study conducted in MENA to examine the opportunities and challenges to reach the 90-90-90 target by 2020. With sociopolitical sensitivity in this region regarding HIV/AIDS and shortage of related statistics, we have used different resources to find comparable data and comprehensive information on HIV status in this region. Thus, the results have generalizability to the whole MENA region. However, this study has some limitations. For instance, lan-

guage barriers made it difficult to obtain data from the resources in other languages than English or French. Data from Arabic countries were gathered from English and/or French reports. Furthermore, despite the researchers' relentless efforts, some data for some of the countries were not available in any resources.

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Conflict of interest

We confirm that there is not any conflict of interest for any authors.

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