

Evaluation of the national AIDS program and HIV/AIDS surveillance system in Jordan

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Abstract

Introduction: The National AIDS Program in Jordan has faced numerous challenges, including insufficient funding, limited resources, and complexities brought on by refugee influxes. The absence of a reliable HIV/AIDS surveillance system further complicates tracking and responding to the epidemic. This study aimed to evaluate the performance and functionality of the National AIDS Program and the HIV/AIDS surveillance system.

Methods: A qualitative study was conducted to evaluate the National AIDS Program and the HIV/AIDS Surveillance System in Jordan. The study involved 14 key informants specialized in HIV/AIDS Surveillance Systems. Interviews were guided by an interview guide based on the Updated Centers for Disease Control and Prevention Guidelines for Evaluating Public Health Surveillance Systems. Data analysis was performed through directed content analysis.

Results: The Voluntary Counseling and Testing Center in Jordan confronts multiple challenges, including poor infrastructure, limited accessibility, and inadequate facilities. Additionally, there is a lack of effective coordination between the Voluntary Counseling and Testing center and the Chest Diseases and Migrant Health Directorate, particularly regarding testing for Tuberculosis. HIV screening in Jordan is hindered by various factors, including disease sensitivity. Voluntary Counseling and Testing lacks HIV/AIDS specialists AND staff adequate training and fails to adhere to updated treatment guidelines. Persistent deficiencies in human resources, equipment, and training continue to plague the HIV/AIDS Surveillance System. Key informants expressed dissatisfaction with the data's usefulness, citing concerns over poor data quality. The data were seldom used for prioritizing resources, identifying at-risk individuals, assessing HIV/AIDS risk factors, or evaluating prevention and control measures.

Conclusion: The National AIDS Program and HIV/AIDS Surveillance System activities in Jordan are unstructured, poorly coordinated, and inefficient. Many gaps related to National AIDS Program and HIV/AIDS Surveillance System performance and data were identified. Recommendations include developing an electronic surveillance system for data collection, notification, and reporting, and building the capacities of HIV/AIDS healthcare providers in screening, diagnosis, and management.

Keywords

HIV, AIDS, surveillance, evaluation, national AIDS program

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Introduction

The Human Immunodeficiency Virus (HIV) remains a significant concern in global public health. In the Eastern Mediterranean Region (EMR), an estimated 420,000 people were living with HIV (PLHIV) in 2020, with 41,000 people becoming newly infected with HIV.¹ Jordan is considered a low HIV prevalence country with an estimated prevalence rate of 0.02% among the general population.² The prevalence is doubled (0.05%) among key populations, including commercial sex workers, persons who inject drugs, and men who have sex with men.² In December 2017, the total count of identified HIV/AIDS cases reached 1408.² Heterosexual transmission accounted for 51%, blood and blood products for 14%, vertical transmission for 0.2%, men who have sex

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with men for 17%, injection drug use for 0.5%, and unknown transmission for 17.2%.²

Public health systems rely on surveillance systems to fulfill the fundamental functions of public health—assurance, assessment, and policy development.³ Consequently, numerous countries globally conduct regular or frequent evaluations of their surveillance systems. For example, surveillance programs in the United States routinely assess their systems to uphold data quality and pinpoint potential instances of underreporting and reporting delays. At the national level, the Centers for Disease Control and Prevention (CDC) conducts duplicate reviews across states to guarantee that each case is accurately counted once within the National HIV Surveillance System.⁴ The European Surveillance System (TESSy)⁵ collects data on 52 infectious diseases and conditions through nominated disease-specific networks from 30 countries in Europe. TESSy is designed to identify problems in the system, such as data quality and comparability, which can influence the quality of analysis of surveillance data and then respond accordingly to resolve these problems.

Despite global efforts to increase awareness and education, improve access to antiretroviral therapy (ART), and strengthen the capacity of healthcare providers, the HIV/AIDS epidemic in the Middle East and North Africa (MENA) region remains inadequately understood⁶ and is viewed as the missing piece in the HIV/AIDS world map in terms of HIV/AIDS epidemiological data.⁷ Several factors contribute to the limited understanding of HIV epidemiology in the MENA, including societal stigma that hampers efforts to collect accurate data, limited resources and infrastructure, and political instability and conflict in some parts of the MENA region that can disrupt healthcare services and hinder data collection efforts.

In Jordan, data on HIV prevalence in the general population are scarce because of the absence of a reliable HIV/AIDS surveillance system. No systematic studies on HIV surveillance have been conducted among either the general population or specific high-risk groups. The low prevalence of HIV/AIDS in Jordan often results in it being assigned a lower priority in healthcare agendas. Consequently, resources and attention may not be adequately allocated for HIV/AIDS surveillance, resulting in insufficient funding and resources dedicated to this crucial aspect of public health.

The National AIDS Program (NAP) was established in 1986 under the Directorate of Disease Control at the Ministry of Health (MOH), aiming to halt the progression and control the prevalence of HIV/AIDS locally, as well as alleviate the suffering of People Living with HIV (PLWH) and their families, and raise awareness regarding HIV/AIDS among the general population and healthcare providers.^{8,9} Since 1986, NAP has supported the development and implementation of programs and services in the field of HIV prevention and treatment, including HIV education for the general public and young people, voluntary counseling and testing (VCT), and ART for persons living with HIV.

The HIV/AIDS surveillance system in Jordan relies on multiple layers of reporting structure from the facility to the central level. The notification sites include public and private hospitals and laboratories, blood banks, the National TB Program (NTP), rehabilitation centers for addicts in the Ministry of Health and Public Security Department (Ministry of Interior), VCT center, community-based organizations, and nongovernmental organizations (NGOs) implementing HIV/AIDS programs. Therefore, it is crucial that the system is well designed and implemented efficiently to avoid any delays in the release of data.¹⁰ The program encountered different challenges stemming from inadequate funding, a scarcity of resources, the influx of refugees, and the insufficiency of training for care providers, all of which significantly hampered local control efforts. As a result, the MOH recognized the need for systematic program evaluation. The program evaluation will help to monitor progress toward national and program goals and determine whether program components are producing the desired effects. Therefore, this study aimed to evaluate the performance and functionality of the NAP and HIV/AIDS surveillance system. The preprint of this manuscript is available on ResearchGate (DOI: 10.2196/preprints.43817).

Methods

Study design

A qualitative study was conducted to evaluate the NAP and HIV/AIDS Surveillance System in Jordan in 2021. Different methods and data sources were used to collect the data between June and July 2021. A 2-day workshop was conducted for 14 key informants, stakeholders, and experts from the VCT Center, Central Laboratory, Blood Bank, Forearms of Change Center to Enable Community (FOCCEC—SAWAED), Chest Disease and Migrant Health Directorate, and International Organization for Migration (IOM) to answer the evaluation key questions. The key informants encompassed individuals with diverse specialties and roles within the framework of the HIV/AIDS Surveillance System. All of them were approached by telephone, invited to participate in the study, and agreed to participate.

The objective of the workshop was to explore the stakeholders' perceptions of HIV/AIDS and STDs Surveillance Systems. The workshop was facilitated by a male researcher, a senior technical advisor with a PhD degree in public health and extensive experience in qualitative research and surveillance systems. Prior to the commencement of the study, the researcher communicated with participants and provided them with information about the study objectives and procedures. Participants were aware of the researcher's background, including his qualifications, affiliation, and motivation for conducting the research. The facilitator's reasons and interests in the research topic were likely communicated to participants to provide context and establish rapport. The facilitator guided

the session and employed a semistructured questionnaire comprising open-ended inquiries. These questions were designed to foster dialogue and prompt participants to share their thoughts freely and spontaneously. Subsequently, each participant underwent an interview guided by the interview guide in a meeting room at the facilitator's institution. The interviewer provided a set of questions, prompts, or interview guides to facilitate data collection. No repeat interviews were conducted. Interviews ranged from 30 min to 2 h. Data saturation was reached. Transcripts were not returned to participants according to the study protocol. Two recorders were used to ensure data backup.

The researchers assured the participants that their involvement in the study was entirely confidential and voluntary, emphasizing their right to withdraw from the study at any time. Ethical approval was obtained from the Institutional Review Board (IRB) at the Ministry of Health on March 30, 2021 (IRB approval No. MoH/Rec/2021/056). All participants voluntarily signed an informed consent form, which included consent to audiotape the discussion.

Moreover, field visits were made to the VCT Center, Central Laboratory, Blood Bank, FOCCEC—SAWAED, and IOM to interview other concerned personnel to ensure the completeness of the needed data. Additional information was obtained from different data sources, including surveillance reports and patient files. A desk review was conducted to obtain data on NAP functions, roles, and activities, the services of the VCT Center, and the HIV/AIDS Surveillance System components.

Interview guide

An interview guide (Supplemental file) was developed based on the Updated CDC Guideline for Evaluating the Public Health Surveillance System¹¹ and other relevant resources.^{12,13} The revised CDC guideline serves as a standardized and validated framework for assessing Public Health Surveillance Systems. The interview guide included questions to assess the NAP central level, HIV/AIDS diagnosis and management, screening and contact tracing, laboratory services, infection control, and supportive supervision. It also included additional questions to evaluate the HIV/AIDS surveillance systems' attributes, such as usefulness, simplicity, acceptability, and data quality. The interview guide underwent expert validation by a panel of three experts with extensive knowledge and experience in the evaluation of surveillance systems. They assessed various aspects, including the questions' clarity, the content's comprehensiveness, the appropriateness of the response options, and the overall suitability of the questionnaire for the intended purpose. Experts provided feedback on the questionnaire's wording, suggesting revisions to improve clarity and eliminate ambiguity. They also evaluated the questionnaire's alignment with the CDC guidelines, ensuring that it captures relevant variables. The feedback provided by the expert panel was used

to iteratively refine the questionnaire. The interview guide contained open-ended questions based on the study's aims, followed by directed questions about the main categories extracted from the CDC guidelines and previous research. After each interview session, the entire interview was transcribed verbatim immediately and with utmost care.

Data analysis

We employed Directed Content Analysis, also known as the Deductive Content Analysis approach.¹⁴ This method involved analyzing qualitative data based on predetermined questions posed to participants during discussions. To structure our analysis, we developed a guiding framework inspired by the Updated CDC Guideline for Evaluating the Public Health Surveillance System¹¹ and other relevant resources,^{12,13} which helped us identify key attributes or "themes" of the NAP and surveillance system under study, such as diagnosis and management, screening and contact tracing, laboratory services, infection control, and surveillance system attributes. These themes were organized into a structured analysis matrix, which served as a framework for coding and analysis. This matrix included operational definitions for each theme and category we intended to code for, ensuring clarity and consistency in our analysis process. We transcribed all discussions verbatim in Arabic to preserve the integrity and credibility of the findings, later translating them into English for wider accessibility. The transcribed interviews, along with field notes, served as the primary units of analysis. Upon multiple readings of the transcribed interviews, we derived a formative matrix of main categories and subcategories. This formative matrix was characterized by a combination of deductive and inductive approaches, allowing for the incorporation of established theoretical concepts while remaining open to the emergence of new categories. We meticulously refined the theoretical definitions of these categories, ensuring accuracy and objectivity in our analysis. Subsequently, we established coding rules to guide the categorization process, enhancing the clarity and distinction between different categories within the matrix. Given the single researcher involved in the coding process and data analysis, a pilot study for testing the categorization matrix was deemed unnecessary. Instead, we focused on selecting meaning units from the data that aligned with the study's aims and the categorization matrix. Preliminary codes were then organized and categorized based on their meanings, similarities, and differences. This process facilitated a comprehensive interpretation of participants' answers, statements, thoughts, suggestions, and recommendations, enabling us to derive meaningful insights from the data. Data analysis may have been conducted manually. Participants had the opportunity to review and comment on the findings. Due to privacy concerns and the sensitivity surrounding this topic in Jordan, direct quotations have been omitted from the text.

Table 1. The characteristics of key informants who participated in the evaluation of the NAP and HIV/AIDS surveillance system.

| Variable | Number | Percentage (%) |
|---|--------|----------------|
| Gender | | |
| Male | 9 | 64.3 |
| Female | 5 | 35.7 |
| Age | | |
| 30–39 | 6 | 42.9 |
| 40–49 | 2 | 14.3 |
| 50–59 | 6 | 42.9 |
| Profession | | |
| Medical laboratory sciences | 2 | 14.3 |
| Nurse | 1 | 7.1 |
| Pharmacist | 2 | 14.3 |
| Physician | 8 | 57.1 |
| Public health | 1 | 7.1 |
| Years of experience related to HIV and surveillance | | |
| ≤5 | 8 | 57.1 |
| >5 | 6 | 42.7 |

Results

Key informants' characteristics

A total of 14 key informants participated in evaluating the NAP and Surveillance System. They have different specialties and roles in the NAP and HIV/AIDS Surveillance System. Eight (57.1%) key informants were physicians (Table 1). Six (42.9%) participants had more than 5 years of experience related to HIV/AIDS, STDs, and surveillance.

Assessment of the NAP

Infrastructure and human resources

The VCT center, the only one in the country, is located in a dilapidated building that is not easily accessed by people, especially those with disabilities and older people. The sanitary installations are unsatisfactory, with no toilets for the patients. There is a lack of information about the center and its location. A total of three physicians, two nurses, one pharmacist, and two part-time psychiatrists work at the VCT, which provides services for all HIV/AIDS patients in Jordan. The VCT Center lacks a specialist or a physician with special training in HIV/AIDS. The NAP manager did not receive formal training regarding health program management. The VCT center staff reported that they did not receive training on HIV/AIDS case management. The key informants reported that there is a problem in recruiting and retaining physicians and nurses in the VCT center because of the sensitivity of the disease in the Jordanian culture, and health workers do not receive any additional incentives beyond their basic salary due to the stigma attached to HIV. The sensitivity surrounding HIV in Jordanian culture stems from a combination of factors, including religious beliefs, cultural

norms, and social stigma.¹⁵ Misconceptions about HIV transmission, such as associating it with promiscuity or immoral behavior, may conflict with Islamic teachings and lead to stigma surrounding the disease.

HIV/AIDS diagnosis, screening, and contact tracing

Overall, the HIV/AIDS diagnosis and detection in Jordan is very good, organized, reliable, accurate, verified, and confidential. However, key informants reported a delay in the diagnosis of HIV/AIDS in some cases. Concerns regarding confidentiality, social judgment, and discrimination can dissuade individuals from seeking testing services, thereby delaying diagnosis. Moreover, access to testing remains limited in certain regions, especially rural and underserved communities. Additionally, inadequate training and knowledge among some healthcare providers regarding HIV/AIDS, testing protocols, and treatment options may lead to missed opportunities for diagnosis during healthcare visits.

The coordination between the VCT center and the Chest Diseases and Migrant Health Directorate (NTP central level) to test persons with HIV for TB and vice versa is weak and poorly organized. Resource constraints, such as funding shortages, staff shortages, and inadequate infrastructure, may hinder their ability to establish and maintain effective coordination mechanisms for HIV/TB testing and care. Additionally, limited training opportunities, unclear mandates, and inadequate accountability mechanisms may exacerbate organizational challenges and coordination gaps.

Contact tracing is facilitated and done by the VCT center. The patient's children are also tested if the patient is female or the wife of the person with HIV tested positive for HIV during the contact testing to rule out any possibility that the children are infected. Screening for HIV in Jordan has numerous limitations and considerations due to the disease's sensitivity. Screening is mandatory for two groups only, including migrants and persons who inject drugs.

HIV/AIDS management

The VCT staff noted that while there exists a well-crafted and printed national guideline for HIV testing and management in Jordan, they have not received training on these guidelines because of resource limitations, such as budget constraints and competing priorities within healthcare facilities. Furthermore, they have not been adhering to the latest updated WHO guidelines for HIV/AIDS treatment. On the other hand, HIV/AIDS drug adverse effects are not documented in the patient's file, and there is no database to record these adverse effects. The VCT center provides psychosocial support for the patients and their families through a specialized team of psychiatrists and social workers.

Laboratory services

The key informants reported that the performance of the central laboratory services is very good for HIV confirmation as well as follow-up. The results are reliable, verified, and confidential. However, the main gap in the central laboratory is that there is no software or database for data entry. All results are recorded in the registry notebook.

Infection control

There is no infection control office/unit or officer, possibly because of limited financial resources. The infection control measures have never been assessed or monitored. The main gap observed regarding infection control in the VCT is that the patients do not have separate toilets, and sometimes, they share the same toilets with the VCT staff.

HIV/AIDS surveillance system in Jordan

The purpose and operation of the HIV/AIDS and STIs surveillance systems

The key informants reported that the HIV/AIDS surveillance system is still facing some challenges in terms of deficiencies in human resources, equipment, and training. It has been observed that not all HIV/AIDS surveillance system objectives, including reducing the spread of HIV among the Jordanian population, determining priorities, identifying people at high risk for HIV/AIDS, and evaluating prevention and control measures, were met in the past. The system activities were not directed to these objectives; accordingly, only some objectives were met.

Level of usefulness

Key informants rated the level of usefulness of the data as not satisfactory for several reasons. They reported that the system data were never used to determine priorities, identify those at risk, determine HIV/AIDS risk factors, and evaluate prevention and control measures. No examples are available to show how and when decision-makers are using the data for policymaking. The data that the system provides is not well utilized or analyzed thoroughly. According to the staff in the VCT center, the number of HIV/AIDS cases greatly undercounts the true number of HIV/AIDS cases in Jordan.

Simplicity

The data for HIV/AIDS patients are not easy to collect because the information (variables) in the patient's file is not well structured or clear to the healthcare providers. The lack of structure in the file, often consisting of loose papers within a plastic cover, increases the risk of misplacing important documents such as test results, treatment updates, and referral forms. The time needed to collect the necessary data is

almost more than 1 h (including the counseling time). According to the NAP/VCT center, there is a need to modify and add more variables to the patient's file.

Acceptability

According to the staff in the VCT center, the participation rate of data providers in the HIV surveillance system in Jordan remains notably low, indicating a concerning gap in the system's data collection efforts. Despite concerted efforts to encourage participation, a significant portion of healthcare facilities and providers have yet to fully engage in reporting HIV-related data. Moreover, they stated that obstacles are still hindering the timely and accurate data transmission to the central surveillance authority. The reasons for low participation rates among data providers include that some healthcare providers may not fully understand the importance of reporting HIV-related data, and some healthcare providers may perceive the reporting process as burdensome, requiring additional time and effort that they may not have available amidst their other responsibilities.

Data completeness, quality, and analysis

Upon assessment of patient files, it was evident that some data variables were incomplete or missing altogether. This shortfall can be attributed to several factors. First, patients may withhold personal information, particularly sensitive details, due to stigma or feelings of embarrassment. Moreover, certain patients discontinue or irregularly attend follow-up visits at the VCT center, contributing to data gaps. Another significant issue lies within the system itself—reliance on paper-based data collection and notification for HIV/AIDS allows for the misplacement of documents and ambiguity in the recorded information. Data management relies heavily on Microsoft Excel, with no specialized software dedicated to HIV/AIDS and STD data. The Excel sheets contain limited variables, focusing mainly on patient identification, demographics, and medication, with a separate sheet for documenting deaths. Importantly, there is no designated personnel responsible for data entry, further compromising data accuracy and integrity. While all identified HIV/AIDS patients in Jordan are recorded in the Excel sheets, the data are incomplete.

A notable gap identified in this evaluation pertains to data quality, which key informants rated as low. Inconsistencies in reporting case numbers and essential information were prevalent issues. Additionally, there is a critical deficiency in data entry, cleaning, and classification processes. Analysis of the data is predominantly descriptive and simplistic, lacking thorough examination and validation for outliers or data quality. Analysis typically occurs quarterly, annually, or upon request from the Ministry of Health (MOH) and the World Health Organization (WHO). The analysis is constrained to the frequency distribution of a few

variables and is limited to reporting the number of cases. This analysis has been conducted by the head of the VCT. Notably, none of the VCT center staff have received training in data management, analysis, or interpretation, highlighting a critical area for improvement in the system's functionality and effectiveness.

Ethical considerations and data security

While medical records should be available for all HIV/AIDS patients upon diagnosis, Jordanian law emphasizes the voluntary nature of testing and treatment for persons with HIV. This principle is underscored by the name of the VCT center, reflecting the voluntary aspect of HIV counseling, testing, and treatment in Jordan. Patients cannot be compelled to undergo testing or treatment, nor are they obliged to disclose their condition to their partners. Before confirming testing and providing data, persons with HIV are required to sign a consent form. In cases where patients refuse to provide data or undergo treatment, the VCT center continues to engage with them, encouraging them to initiate or adhere to treatment and disclose their status to their partners.

Access to HIV/AIDS patient data is limited to select personnel involved in the HIV/surveillance system. Healthcare providers at the VCT center have full access to patient data, while the central laboratory has access solely to laboratory results. Patient privacy and system security are maintained through rigorous policies and procedures. Patient information is collected in a private, enclosed room, and access to data is restricted to authorized personnel within the center. Summary data without identifying information are used for reporting purposes. However, medical records are not adequately protected against unforeseen events such as fires.

The release of data follows a formal approval process by the Ministry of Health's Institutional Review Board (IRB) for research purposes. Even with approval, patient personal information is withheld and deleted before data submission to researchers. These policies are documented and upheld at the VCT center to safeguard patient privacy and confidentiality.

Discussion

The NAP and HIV/AIDS surveillance system in Jordan is not well structured or organized and is not working properly. In addition, many gaps related to detection, diagnosis, screening, supportive supervision, operation, and performance were identified throughout this evaluation.

Almost 40 years after the first HIV case was detected in Jordan, HIV prevalence among the general population, as well as among most at-risk populations (MARPs), remains very low. Potential factors that may have contributed to the limited spread of HIV so far include the overall conservative culture and religious norms and values.^{16–20} However, the history of HIV/AIDS in many countries has shown that complacency and underestimation of HIV/AIDS may lead to a

sudden and rapid spread of HIV, particularly in the context of changing socioeconomic and cultural contexts. Recent social, economic, and cultural changes in Jordan pose a potential risk and may leave significant numbers of Jordanian citizens and refugees vulnerable to HIV/AIDS. These changes include poverty and high unemployment rates, increased influxes of refugees and labor migrants, gender inequality, sexual and gender-based violence, and HIV-related stigma and discrimination.^{18–20} Poverty and high unemployment rates in Jordan may push individuals into high-risk behaviors, increasing their vulnerability to HIV infection.²¹ Moreover, displaced populations often face precarious living conditions, limited access to healthcare, and social marginalization, all of which can increase their vulnerability to HIV/AIDS.²²

Concerted efforts, including those of civil society organizations, will be necessary to ensure that HIV prevalence is halted before the currently low incidence/prevalence rate becomes a hard-to-solve problem in the future.

While basic surveillance is in place, there is very limited reliable data on the nature and scale of the HIV epidemic in Jordan. The health-sector-based surveillance system for HIV/AIDS is limited to passive case-finding, and the VCT center services are very low, which further hampers an adequate understanding of the number of persons with HIV.²³ In addition, the planned second-generation surveillance (SGS) system for MARPs groups still needs to become effectively operational. The first round of biological-behavioral data collection was conducted in 2008, but the data collection process faced many methodological flaws that compromised the validity of the data.^{8,24} On the other hand, an integrated biobehavioral survey (IBBS) was implemented in 2012–2013 in three major cities. However, the data were not analyzed, and the report was unpublished. According to the staff in the VCT center, HIV/AIDS cases are under-reported. The WHO estimated that the prevalence of HIV among the general population in Jordan was 0.1% in 2016.²⁵ This estimate is five times higher than the official estimate.

The current evaluation showed that the sanitary installations in the VCT center need to be improved, and new toilets need to be built for patients' use.

Considering the human resources, our findings showed that the healthcare providers at the VCT center need to receive advanced training on HIV/AIDS case management to raise the quality of the healthcare services provided to persons with HIV. At least one specialist working 1 day a week at the center is needed to improve the quality of services. Additionally, some form of compensation or incentive beyond their salaries needs to be given to the physicians and other healthcare workers at the VCT to motivate and retain them.

The coordination between the VCT center and other parties involved in the surveillance system is informal and ineffective. Therefore, it is important to develop or use electronic surveillance for notification and coordination to make these

processes better, faster, easier, and more formal. In addition, a coordination plan or policy has to be established between the VCT center and the Chest Diseases and Migrant Health Directorate (NTP central level) to identify roles and procedures to facilitate the process of testing HIV and TB patients.

Screening program for people at high risk, including sex workers, persons who inject drugs, men who have sex with men, and prisoners. To accomplish this goal, it is imperative to enhance the capacity of the VCT center to develop, implement, and evaluate the screening program. The treatment protocol for persons with HIV in the VCT center must be standardized and follow the latest updated WHO guidelines.²⁶ Moreover, it is recommended that HIV drug safety monitoring and management be performed continuously to ensure the safety of persons with HIV. The adverse effects of HIV medication must be documented in the patient's file and in a separate database.

The main gap in the central laboratory is that there is no database for data entry. An electronic database for data entry and management is recommended to ensure all laboratory data are documented and registered electronically to facilitate the utilization of this data.

The evaluation of the HIV/AIDS surveillance system showed many gaps in the system itself, its objectives, reporting process, data quality, and data analysis. To ensure that the surveillance data are collected, analyzed, and presented accurately and effectively to inform policy and decision-making, a systematic, comprehensive, and innovative electronic system and action plan must be established and implemented. The data collection in the surveillance should be linked with specific targets, indicators, and outcomes. It is recommended to agree on a set of performance indicators to report on the outcomes related to the program's objectives in the form of a comprehensive annual report. Additionally, it is recommended that a monitoring system be established to monitor the activities aimed at achieving the program objectives.

We recommend the formation of a specialized committee comprising stakeholders to establish indicators and develop the monitoring system. The committee will leverage existing international frameworks and best practices to guide the selection of indicators and the development of a robust monitoring system customized to the program's objectives and contextual requirements.

The importance of collecting complementary sociodemographic and behavioral information has become increasingly apparent. In order to obtain information about potential behavioral determinants of HIV spread in Jordan and to monitor the effectiveness of prevention programs, we recommend collecting data on sociodemographic characteristics of persons testing HIV-positive and on the transmission route and data on essential sexual (and drug use) behavior indicators.

Data compilation and presentation serve two purposes: information and motivation. A plan has to be set to analyze

the data regularly (monthly, quarterly, or bi-annually), and a protocol for in-depth analysis of surveillance data should be established to reveal high-risk groups who are vulnerable to the disease, assess trends in Jordanians as well as refugees and migrants, and measure impact and target program interventions more effectively. To achieve this, it is essential to create a standardized protocol for conducting data analysis. This protocol should clearly outline the procedures, methodologies, and responsibilities of all staff involved. Subsequently, it is crucial to provide comprehensive training to the surveillance staff on these procedures. It is worth noting that established training programs, such as the Field Epidemiology Training Program, can serve as valuable resources for this purpose. These programs offer structured training modules designed to enhance the analytical skills of surveillance staff and ensure consistency and accuracy in data analysis practices.

Surveillance reports should be issued regularly and contain a summary of recent surveillance findings, clear and simple graphic presentations of data alongside their interpretation, and a discussion of conclusions. Given that HIV infections are interconnected by time, location, and specific population groups, it is crucial to pinpoint the locations and demographics where both prevalent and incident infections are occurring, along with understanding the modes of transmission.²⁷ Moreover, breaking down the data by age and gender is invaluable in identifying key populations and comprehending the trends and dynamics of transmission. Those responsible for data collection and reporting, policy and decision-makers, researchers, advocacy groups, and media representatives should all be included in the distribution list.

Equally vital is the establishment of a standardized national-level set of core indicators and guidelines for uniform data reporting, essential for monitoring progress toward the eradication of HIV/AIDS. Health system indicators, encompassing diagnosis, treatment, and outcomes, should be disaggregated by variables such as sex, age, province, nationality, and other stratifications. The presentation of disaggregated data serves to prompt population health researchers and public health planners to examine the interplay of determinants that either exacerbate or mitigate health inequities and disparities in health outcomes.

The involvement of all HIV/AIDS surveillance systems parties, in addition to the level of reporting and notification, should be strengthened. There is a need to develop and agree on a protocol for HIV/AIDS notification and reporting in Jordan to standardize the reporting process and ensure effective communication and coordination to control HIV/AIDS in Jordan.

Compared to other HIV/AIDS surveillance systems in MENA region countries, there are no sufficient resources indicating significant differences between HIV/AIDS surveillance systems in Jordan and other MENA region countries. Limited information exists regarding the epidemiology of the HIV epidemic within the region. No recent rigorous studies have been

conducted in the MENA region to deeply assess the HIV/AIDS surveillance system in a specific country; however, some studies have assessed the HIV surveillance systems in the region as a whole. Inadequate surveillance combined with a scarcity of robust research in the scientific literature constrains the understanding of HIV epidemiology. For instance, an examination of HIV surveillance systems in the region discovered that out of 23 MENA countries, only four possessed sufficient systems for estimating HIV epidemic patterns.²⁸ Furthermore, views of HIV colored by a “sinful” perspective, which encompasses considerable homophobia, have encouraged the concealment of risky behaviors and hindered the establishment of organizations to support vulnerable populations.²⁹ It has been noted that among all surveyed countries, HIV case reporting was a universal component of surveillance. STI case reporting was adopted by 14 countries, while etiological STI case reporting was implemented in just eight. Notably, nine countries (Bahrain, Djibouti, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, Syria, and the UAE) lacked both IBBS and Population Size Estimation (PSE) studies for Key Populations (KPs). Among the surveyed nations, Afghanistan, Iran, and Morocco were the only ones to have implemented all five recommended HIV surveillance components for countries with concentrated HIV epidemics. However, it is worth highlighting that in Morocco, IBBS for KPs have only been conducted since 2017, within the past 5 years.²⁸

An assessment of the quality of HIV surveillance systems in the MENA region has shown that in Djibouti, Iran, Morocco, and Pakistan, surveillance systems facilitate the evaluation of epidemic trends within consistent populations and areas, utilizing identical sampling approaches over time. Collectively, Djibouti, Iran, Morocco, and Pakistan have established comprehensive HIV surveillance systems with nationwide coverage. However, Afghanistan, Egypt, Jordan, Lebanon, Somalia, Sudan, South Sudan, Tunisia, and Yemen have systems that operate at partial capacity. In the remaining 10 countries, HIV surveillance exhibits inadequate performance primarily due to infrequent implementation and the exclusion of populations at the highest risk of HIV.²⁹ On the other hand, the MENA region countries have established better information systems to track the HIV epidemic.^{30–32} However, several countries still resist transitioning to second-generation surveillance systems that amalgamate HIV serological and risk information from diverse origins, for a variety of reasons that mainly center around cultural barriers, stigma, health issues priorities, and lack of resources.

HIV/AIDS is a sensitive issue and taboo in Jordan, and resolving such issues regarding ethical considerations requires a comprehensive and well-structured plan to ensure the patients’ privacy and confidentiality while controlling the disease at the same time.

Limitations

The study was limited by the availability of resources, including time, limited funding, and personnel, which could

have impacted the depth and breadth of data collection and analysis. The findings of this study might be specific to the context of Jordan and might not be directly applicable to other countries or regions with different healthcare systems, resources, or sociocultural contexts.

Conclusion

Our study revealed significant gaps in Jordan’s NAP and HIV/AIDS Surveillance System, including infrastructure, human resources, system functionality, coordination, and HIV/AIDS data. The current framework of the NAP and the expertise of personnel are not adequately equipped for effective HIV/AIDS control. In addition, there is a noticeable lack of an intersectoral approach in national health policies, crucial for establishing robust surveillance systems essential for informed policy decision-making. This absence has resulted in limited prevention programs and social interventions compared to treatment-focused actions. Moreover, the surveillance system for HIV/AIDS in the health sector primarily relies on passive case-finding, and the services provided by the VCT center are notably limited. This inadequacy significantly impedes the accurate determination of the number of individuals infected with HIV. Furthermore, the implementation of the planned SGS system targeting MARPs is yet to be fully functional. These populations need tailored preventive programs alongside healthcare and social support. The government must recognize HIV/AIDS as a potential national health threat and prioritize it in the national health agenda, allocating necessary resources for control programs. The main recommendations of this study include the following:

Partnerships:

- Mobilize concerted efforts, including those of civil society organizations, to ensure that HIV prevalence is halted before the currently low incidence/prevalence rate escalates into a significant problem.
- Surveillance and data management
- Implement electronic surveillance for efficient notification and coordination.
- Establish a coordination policy between the VCT center and the Chest Diseases and Migrant Health Directorate to define roles and procedures for testing HIV and TB patients.
- Strengthen the involvement of all parties in HIV/AIDS surveillance systems.
- Enhance the level of reporting and notification within these systems.
- Standardize notification and reporting protocols in Jordan.
- Collect sociodemographic and behavioral data on HIV-positive individuals to identify HIV risk behaviors and assess prevention efforts.
- Create a standardized protocol for conducting data analysis and dissemination.

- Healthcare Provider Training and Resources:
- Provide advanced HIV/AIDS case management training for VCT center staff.
- Ensure a specialist works weekly at the VCT center.
- Offer additional incentives to VCT healthcare workers.
- Screening Program:
- Screen high-risk populations such as sex workers, drug users, MSM, and prisoners.
- Enhance the VCT center's capacity for developing and evaluating the screening program.
- Standardize treatment protocols and continuously monitor drug safety.
- Performance Monitoring:
- Develop performance indicators and establish a monitoring system.
- Form a committee to oversee performance indicators and monitoring.

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Authors' contributions

Moad J Al-Rahamneh: Data collection, Data analysis, Manuscript writing, Manuscript revision; Yousef Khader: Data collection, Manuscript writing, Manuscript revision; Ashraf Jamil Aqel: Data collection, Manuscript revision; Hiba Abaza: Manuscript revision; Srinath Satyanarayana: Manuscript revision; Ala'a Fuad Al-Shaikh: Manuscript revision; Heyam Hilal Mukattash: Data collection, Manuscript revision; Areej Hamed Shoubaki: Manuscript revision; Tareq Haytham Aldamen: Manuscript revision.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Consent to participate

All participants voluntarily signed an informed consent form, which included the consent to audiotape the discussion.

Consent for publication


Not applicable.

Trial registration

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Supplemental material

Supplemental material for this article is available online.

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