



Research article

HIV- related knowledge, attitude, practices, and stigma among healthcare providers caring for HIV in Jordan: Identification of several organizational challenges

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ABSTRACT

Background: There is a paucity of data on Healthcare Providers (HCPs) caring for people living with HIV in Jordan.

Objective: We aimed to understand HCPs' knowledge, attitude, stigma, and practices, to assess the gaps in HIV care in Jordan.

Methods: We conducted recorded in-depth interviews with all five HCPs working at the only HIV Service Center in Jordan, using semi-structured questions in 2021. Content analysis was performed.

Results: Several organizational challenges were identified. Only one had received HIV training. All were uncertain of updated recommendations with little knowledge of international guidelines, vertical transmission, contraception, sexually transmitted infections (STIs), non-communicable diseases (NCDs), and prophylaxis. Four HCPs perform counseling, focusing on easing anxieties, risk modification, and the importance of treatment adherence. However, their counseling on contraception, risk of transmission, STIs, and NCDs is inadequate, and they have little-to-no experience with prophylaxis. Most had a positive attitude towards people living with HIV, especially HCPs working at the center the longest, encouraging marriage and reproduction. Most do not approve of mandatory testing, or of breaching patient confidentiality. They repetitively described risky behavior as 'immoral behavior', empathizing more with patients who caught HIV through blood transfusion or birth, and demonstrating embedded stigmatized beliefs. They reported people living with HIV experience anticipated stigma and stigma by their general community including by other HCPs.

Conclusion: This is the first study on HCPs caring for people living with HIV in Jordan. It highlights the suboptimal knowledge, practices, and stigma which improve with greater participatory exposure to HIV care. HCPs had an overall positive attitude, more evident in HCPs working at the clinic the longest.

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1. Introduction

The prevalence of HIV in the Middle East and North Africa (MENA) region is around 0.1 % among 15–49 year old's, and this was designated as one of the lowest rates of HIV among world regions by the Joint United Nations Program on HIV/AIDS (UNAIDS) [1]. However, between 2001 and 2012, the MENA region experienced the highest rate of increase in the world, with a 73 % increase in the number of newly diagnosed individuals and a 52 % increase in the number of new infections [2]. Jordan, with a population of just over 10 million, is considered a low HIV/AIDS prevalence country, with an estimated prevalence rate of 0.02 % among the general population [3]. However, the number has doubled in the last 15 years, and some argue that this rate is an underestimation [4,5]. Low HIV/AIDS prevalence countries might contain a sizable amount of people living with HIV who are undiagnosed due to a lack of awareness about testing and attitudes towards self- or healthcare-initiated testing [6].

Challenges related to knowledge and widespread stigmatizing beliefs and attitudes are well documented among healthcare providers (HCPs) [7–10]. These challenges interfere with preventative care and management, creating access barriers to patients seeking information, testing, and medical care [8,11,12]. There is a paucity of published literature on the topic in Jordan. A 2012 systematic review of four databases and the grey literature, from 1980 to 2009, only found eight published articles related to behavioral and/or social outcomes of HIV/AIDS in Jordan, and all were cross-sectional [13]. Only seven other studies were published between 2009 and 2021. Two of them were on HCPs, but only including nurses at primary health clinics (PHC) or specialty hospitals [14,15], and the rest were conducted on college students [16,17], patients [18], or men who have sex with men (MSM) [19].

To our knowledge, no study was ever conducted on HCPs working directly with people living with HIV in Jordan. Thus, the purpose of this study is to understand the knowledge, attitude, and practices of HCPs caring for people living with HIV in Amman, Jordan, and to assess the stigma and gaps in HIV/AIDS primary care and response in the nation.

2. Methods

2.1. Study design

Only one health center provides HIV-related counseling, and care and dispenses anti-retroviral therapy (ART) to people living with HIV from all 12 directorates in Jordan. This center, the Voluntary Counseling and Testing Services Center (VCT) is in Amman and is run by the Ministry of Health (MOH). We conducted qualitative in-depth interviews because there are only five HCPs in total providing care to people living with HIV, and this design allows for greater flexibility and better in-depth assessment, assuring data saturation.

2.2. Data collection

We developed a semi-structured interview guide, with questions and relevant probes adapted from previous studies [12,20–29], [Appendix 1](#). Interviewers were encouraged to attend to emergent themes as appropriate. Questions focused on participants' characteristics, workload, training, knowledge, attitudes, practices, and stigma.

We assessed knowledge of HIV guidelines, testing indications, window period, vertical transmission, contraception, other sexually transmitted infections (STIs), noncommunicable diseases (NCDs), and ART including pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP).

We also assessed attitudes towards introducing HIV testing into PHC clinics, voluntary versus mandatory testing, testing of high-acquisition risk groups, testing of clinic staff, need for extra personal protective equipment (PPEs), HIV status sharing to partners, patients' right to marriage and children, and general opinion of people living with HIV. Attitude towards personally getting infected or having a family member contracting HIV was assessed. We also asked about the stigma felt by people living with HIV and by HCPs due to their type of work and about HCPs' stigma towards people living with HIV.

We assessed HCP's practices including prescreening counseling and HIV status sharing. As the pharmacist only meets patients once their HIV status is confirmed, these questions are only answered by physicians and nurses. We asked all HCPs about post-screening counseling including counseling on sexual intercourse, marriage, and children, what other STIs and NCDs they test, examine, counsel for, or manage, their referral mechanism, precautionary measures when examining people living with HIV, their practice in terms of medication provision, including PrEP and PEP, and their response to needle stick injuries.

We followed the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist, as applicable, [Appendix 2](#). An appointment was taken from the HCPs ahead of time; however, to increase credibility, researchers did not meet the HCPs until the day of the interviews and no pilot interviews were conducted.

Ethical approval was obtained from the Institutional Review Board at Jordan MOH on March 30, 2021 (the IRB approval No. MoH/Rec/2021/056). Written informed consent was obtained from each participant. Participation remained anonymous and data were treated with confidentiality. The consenting process as well as the interviews were done in private in each participant's office, face-to-face and in Arabic, to ensure rapport-building, maintain authenticity of ideas, and secure the highest quality responses. HCPs were asked to sign an informed consent form, that describes the intended use of the data, how and where data will be stored, anonymized, and protected. Permission to record was requested from HCPs before commencing. Data was collected by two female researchers (R.S. and M.S.) experienced in qualitative research. Randa Saad, MD, conducted the interviews. She is a graduate of the Scholars in Health Research Program (SHaRP) and is a Research Specialist at the Global Health Development | Eastern Mediterranean Public Health Network. The other researcher (M.S) took field notes, which included facial and non-verbal expressions to maintain contextual

perspective. Each participant was given a signed copy of their consent form and was provided with a study ID number, for which the respective de-identified interview recording and notes were labeled.

2.3. Data analysis

The two researchers transcribed the interviews verbatim, in Arabic, then translated them into English. One researcher coded the raw data, using root codes: workload, training, knowledge, attitude, stigma and practices, and child codes as per pre-specified themes, Fig. 1. Deductive content analysis was performed. Direct quotations are reported as is, translated from Arabic, and each is identified by the participant's number (P.1, P.2, P.3, P.4, and P.5).

3. Results

3.1. Interview setting

All five interviews, spanning 23–40 min each, took place over two days. Four were recorded, while one HCP declined audio-recording, necessitating detailed note taking. The interviews covered HCP characteristics, workload, training, and included 14 questions on knowledge, 14 on attitudes, 16 on practices, and five on stigmas. Additionally, HCPs were questioned about their experiences, both rewarding and challenging, at the clinic.

The clinic's accessibility was hindered by its undisclosed location, absence from online Global Positioning Systems, and a lack of signage indicating its building or floor. Situated on the third floor of an old building, access required entry through another health clinic for the disabled, with no elevator.

3.2. Healthcare providers' characteristics

HCPs included two physicians, two as nurses, and one pharmacist, aged 29–56 years, two of which were females. Both physicians were specialized in either Internal Medicine or Community Medicine. One nurse had a nursing diploma, while the other held a bachelor's degree. Their post-graduation work experience varied from 4 to 14 years. Three HCPs had recently joined, working at the clinic for ≤ 3 months, while the others had been there for 1–2 years, Table 1.

3.3. Workload

HCPs reported an average of two new cases per month since the start of the COVID-19 pandemic, along with a monthly follow-up

Topic	HIV Care					
Root Code	Workload	Training	Knowledge	Attitude	Stigma	Practice
Child Codes	<ul style="list-style-type: none"> # of follow-up patients # of new patient Effect of COVID-19 on workload 	<ul style="list-style-type: none"> Training received Training needs and gaps 	<ul style="list-style-type: none"> Guidelines Screening and window period Vertical Transmission Contraception STIs NCDs ART, PreP, PEPs 	<ul style="list-style-type: none"> Screening at PHC (voluntary vs. mandatory) Screening of HCPs HIV in family members or own self Special precautions and PPEs PLHIV Marriage and HIV status disclosure 	<ul style="list-style-type: none"> Experienced by PLHIV Experience by HCPs HCPs stigma towards PLHIV 	<ul style="list-style-type: none"> Prescreening counselling Post screening counseling Counseling on sexual intercourse, marriage and children STI and NCD services, management and referral HIV treatment Precautions and PPEs

Fig. 1. Root and child codes used for content analysis. ART: Antiretroviral therapies, HCP: healthcare providers, HIV: Human immunodeficiency virus, NCDs: non-communicable diseases, PEP: post-exposure prophylaxis, PHC: primary health clinic, PLHIV: patients living with HIV, PPEs: personal protective equipment, PreP: pre-exposure prophylaxis, STIs: sexually transmitted infections.

Table 1
 Characteristics of healthcare providers working at the Voluntary Counseling and Testing Services Center in Amman, Jordan.

Participant Characteristics	Number
Sex (women)	2
Age (years), range	29–56
Marital status	
Single	1
Married	3
Divorced	1
Education	
Diploma	1
Bachelors (BS, BEng)	2
Specialty Medical Degree	2
Masters	1
Job Category	
Physician	2
Nurse	2
Pharmacist	1
Professional experience (years), range	4–14
Experience at facility (months), range	1–24
Number of people living with HIV reported to be seen per month, range	
Follow-up	50–250
New	2

BS: Bachelor of Science, BEng: Bachelor of Engineering, HIV: Human Immunodeficiency Virus.

range of 50–250, [Table 1](#). Notably, the clinic's records show 387 registered patients for medications distribution. Unfortunately, many patients have been lost to follow-up without active efforts to reach them. While some were contacted by phone, tracking changes in contact information or determining patient status is challenging. Patients lost-to-care are still listed in non-standardized Excel sheets and each physician maintains their own document, which lacks regular updates and sharing with other HCPs.

4. Knowledge

4.1. Knowledge of HIV testing and HIV guidelines

All HCPs demonstrated awareness of HIV acquisition risk factors, but none followed a specific testing protocol. They found the 2018 Jordanian HIV guidelines unclear on testing criteria, and pro-active testing was limited to certain situations like immigrant screening, blood donors and employment checks.

“What is followed (in Jordan) is the screening of immigrants, blood donors, and for employment purposes. In Jordan, we have institutes that test individuals prior to hiring them, but that's about it.” P.4

International HIV screening guidelines and the Centers for Disease Control and Prevention (CDC) recommendations were unfamiliar to all HCPs. However, two HCPs, influenced by their clinic experience, believed in encouraging voluntary testing for everyone:

“I am with everyone being tested, especially since I started working here, (...) not only the most vulnerable but the normal (non-high risk) people too, those who do not have any abnormal practices or perversions, at least once or twice. As for those who have perversions, they need regular testing.” P.2

HCPs had limited knowledge of international management guidelines, and even though the Jordanian HIV guidelines are available at the clinic, two HCPs were unaware of its content:

“Yes, there are guidelines (in Jordan), but honest to God I do not know what is in them.” P.3

They recently adopted the 30-min SD Bioline HIV/Syphilis Duo® rapid test (Standard Diagnostics, product code 06FK35), followed by enzyme-linked immunosorbent assay (ELISA), and Western Blot confirmation of reactive. They acknowledged the need for caution with negative results during the window period, except for one HCP who admitted a lack of training and information:

“I have never heard of this term (window period). See, I'm telling you, we lack so much training and information.” P.5

4.2. Knowledge of HIV vertical transmission

HCPs lacked confidence with their knowledge of HIV vertical transmission. Regarding when it can occur, there was no consensus. Three HCPs believed it could happen during pregnancy, while others disagreed. Similarly, opinions differed on the transmission during delivery, with three HCPs suggesting it can occur and two stating it cannot and recommending normal vaginal delivery even with unsuppressed viral loads.

However, all HCPs correctly agreed that HIV can be transmitted through breastfeeding, even when the mother is on treatment with a low viral load. They also unanimously understood the importance of the mother continuing her medications during pregnancy.

4.3. Knowledge of contraception methods

None of the HCPs recommended dual contraception, and most mistakenly believed that only barrier contraceptives were suitable options. One HCP was aware that different contraceptive methods are used in other countries. One participant incorrectly expressed concern that all hormonal medications interfere with ARTs.

4.4. Knowledge of STIs and NCDs

While only two HCPs recognized the commonality of STIs in people living with HIV, mainly citing Syphilis as the most prevalent co-infection, the rest believed STIs were rare and lacked knowledge about the appropriate tests and treatments.

In Jordan, no specific NCD-HIV care model exists. When asked about NCDs, only one HCP acknowledged the potential link between ARTs and NCD development. The rest, despite recognizing the NCD burden in people living with HIV, emphasized their clinic's lack of capacity for NCD detection and management. However, all HCPs agreed on the importance of maintaining the health of people living with HIV, highlighting factors such as maintaining a healthy body weight, adopting a healthy lifestyle, quitting smoking, and abstaining from alcohol, especially to prevent medication resistance.

4.5. Knowledge of medications

All HCPs promptly initiate ARTs upon a positive test result. Regarding ART side effects, proactive monitoring is not common, only occurring if the patient reports any issues, which is infrequent.

The two nurses were unaware of PrEP or PEP. Physicians, however, were well-informed about both prophylaxis methods. They correctly use PrEP for sero-different couples seeking conception, allowing barrier-free intercourse. They also understood that PEPs should be started within 72 h of exposure and continued for a month and can be administered during pregnancy. One physician prescribes PEP for sero-different married couples, while the other does so for sex workers, or in the case of needle stick injuries with a known HIV-positive patient. If a patient's HIV status is unknown, testing is performed, and if confirmed positive, PEP is initiated within the 72-h window. The pharmacist was aware of PrEP but did not know it should be given directly post-exposure.

5. Attitude

5.1. Attitude towards HIV testing at primary health clinics and of health staff

Voluntary routine HIV testing at PHC clinics is not available in Jordan, and faces predominantly negative attitudes among HCPs. Four HCPs argue against it, citing the country's 'low prevalence' status and concerns about 'cost effective'. Only one HCP supports such testing, even if compulsory, while the rest firmly oppose mandatory testing.

However, attitudes shift when discussing specific patient categories. Two HCPs advocate testing women during pre-conception counseling at PHC clinics, with one proposing inclusion in the mandatory premarital screen done in Jordan, emphasizing the importance of early diagnosis, especially to prevent marital conflicts:

"The saddest thing is when you see children with HIV ... it is normal if it is an older person, but a child, that is a pity. We have two children that we see at the clinic, one is five years old, and the other is seven years. They only do thalassemia as a premarital test (mandatory in Jordan), but if we add HIV, we solve a lot of problems, especially that diagnosis after marriage can lead to divorce." P.1

All HCPS support testing for high-acquisition risk individuals, including sex workers, MSM, and individuals who inject drugs. One HCP includes nightclub owners and employees in the high-risk category.

When it comes to regular staff testing at the VCT, most HCPS express positive views, with three in favor. However, one is strongly against it, and another sees it unnecessary but not problematic if not compulsory.

5.2. Attitude if HIV affects a family member or own self

When asked about how they would respond if a family member contracted HIV, all HCPs expressed a positive and supportive attitude. They emphasized calmness, patience, and treating it like any other chronic disease, echoing a compassionate approach.

"After becoming familiar with the individuals (people living with HIV) that I have met, I will deal with it very calmly and patiently and make him feel that it is like any chronic disease." P.5

However, one HCP voiced concern that, like most patients seen at the clinic, the family member might be diagnosed at a late stage of the disease.

When asked to describe their own feelings if they were to contract HIV, two HCPs stressed that it would only happen as a result of their work with people living with HIV and not due to risky or 'immoral behavior':

"If I contracted HIV, it will certainly be as a result of my job." P.1

"As a healthcare worker, it will not be due to an immoral behavior, it will be due to a needlestick injury." P.4

They explained that this absence of 'immoral behavior' enables them to inform their partners if they ever contracted HIV. Fear of transmitting it to their families and concerns about stigma by family members due to ignorance that HIV can be managed and the association with 'immoral behavior' were mentioned. However, four HCPs believed their families would eventually come to understand and be supportive.

5.3. Attitude towards special HIV precautions

The newest HCP at the clinic strongly advocated for extra precautions and additional PPEs when caring for people living with HIV. In contrast, the other four HCPs adopted a more practical stance emphasizing the importance of universal precautions for all patients. One HCP explained a resonal evolution in their approach, noting that they initially took extreme precautions due to lack of knowledge about HIV and AIDS. However, as they gained better understanding of the disease, they concluded that all patients, whether with or without HIV, should be treated in the same manner:

"We had a case when we first started, and we were not introduced to AIDS in Jordan before, and the health staff had no background at all. So, my fear was how to deal with the patient, and the only solution was to wear everything possible to protect myself. But in general, after delving more into the topic of AIDS, I do not think that we need to wear extra (PPEs)." P.3

5.4. Attitude towards people living with HIV

Three HCPs embraced an inclusive attitude, refusing to categorize people living with HIV into distinct groups based on how they acquired the virus, whether through blood transfusion, birth, or risky behavior. They emphasized the clinic as a safe space where no profiling occurs.

However, the newest HCP held a more critical perspective, emphasizing a difference between these groups. They suggested the need for religious and legal policies for those who acquired HIV through what they termed as "immoral" means:

"Of course, there is a difference, these people were wronged (infected through blood donation or vertical transmission). There should be religious and legal policies for those who catch the disease in an immoral way. It's not me who is supposed to judge them, but those are not the same as those." P.5

Another HCP mentioned that some people living with HIV unintentionally face labels, based on their appearance and behavior. Nevertheless, despite the differing opinions on patient categories, all HCPs agreed that no patient made them uncomfortable, and they treated everyone equally.

5.5. Attitude towards marriage and sharing or discussing HIV status

All HCPs displayed a supportive attitude toward people living with HIV getting married and having children. One HCP stressed that marriage is not only a legitimate humanitarian right but also a religious demand in Islam:

"This is a legitimate humanitarian and Sharia 'a demand before everything." P.5

They emphasized the importance of informing one's partner about their HIV status but acknowledged that they cannot force patients to do so:

"If he said he does not want to inform his partner I won't force him (...) As a center I do not force, I only educate, and I would never go and tell." P.3

Their role is to facilitate communication and provide counseling, highlighting that concealing the status could lead to marital problems in the long run. One HCP believed that the patient's "consciousness should push him to tell".

However, another HCP held a more critical view, expressing that despite the lack of legal authority in Jordan to inform the patient's partner, they did not view it as a matter of personal privacy. They referenced practices in other countries where there are expectations for patients to inform their partners, and legal measures are taken if they do not:

"In Jordan, I do not have the authority (...) but I do not see it as personal privacy (...) the patient's privacy ends when the other person's privacy starts (...). we look at (other) countries (...), you have six months, If you (the patient) do not inform, they (the government) will." P.1

6. Stigma

6.1. Stigma experienced by people living with HIV

HCPs recognized that people living with HIV experience blame and discrimination, even from family members, which stem from

societal ignorance about HIV. Nevertheless, none of the HCPs had witnessed or heard of such discrimination leading to physical violence. Instead, they mentioned instances of divorce, job loss, and lawsuits from partners, often for financial compensation:

“Yes, a lot of divorces and firing from jobs, but violence no. Sometimes, there are lawsuits from partners claiming they contracted the disease from the patient, only so that they get financial compensation.” P.4

People living with HIV were described as coming into the clinic with fear, anticipating humiliation and stigmatization. They believed others viewed them with disdain, even if it were not the case:

“(…) they (people living with HIV) are sensitive, and they feel you are looking at them in an abnormal manner, even though you don't. They feel that people look at them with distaste and treat them differently.” P.4

6.2. Stigma experienced by HCPs

Four HCPs affirmed that they personally do not experience stigma or discrimination as a result of their job. However, one HCP reported encountering stigma, describing how people react with disgust upon learning about their work, even among fellow healthcare professionals who sometimes make derogatory comments:

“They say, you work with AIDS (making a disgusted face). And they say yiiii, as if I am working with something dirty. Even physicians, I mean I heard them say this HIV doctor likes these kinds of (immoral) stories.” P.4

Another HCP mentioned that HCPs not involved in HIV care are usually surprised to learn of HIV cases in Jordan as if they believe the country is “immune” to the virus.

6.3. HCP's stigma towards people living with HIV

We asked HCPs to describe the people living with HIV who come to the clinic and if their perception of them has changed since working there. They confirmed that it has:

“I describe them (people living with HIV) now as (…) too benign (…) the image I had before was that they are a little aggressive (…) a little resentful of society, and that they do not care about themselves or those around them (…) I had this picture in my mind, However, when I came to this clinic, I was genuinely surprised. you see that they are very caring individuals who prioritize their well-being.” P.2

“(I describe them as) classy. I imagined that a person with AIDs had done something wrong, but those I dealt with when I started, are wonderful and classy people, and you don't feel that the reason is immoral.” P.5

7. Practice

7.1. Pre- and post-screening counseling

Physicians and one nurse engage in prescreening counseling, discussing risk behaviors, safe practices, and safe sex:

“We talk about risk behavior, and counsel on safe practices and safe sex. The fact that he came to us means he was scared, so I use this opportunity to explain things to him and for counselling.” P.1

In contrast, the other nurse, noting the patient's desire for a quick test result, does not engage in extensive prescreening discussions. HCPs explained that most patients already know they have HIV when they come to the clinic, typically after doing the test for residency purposes, or for blood donation. When patients are unaware, the physicians (and sometimes nurses) gently inform them, emphasizing the benefits of early detection and the possibility of a normal life with medications.

All HCPs provide post-screening counseling, in accordance with CDC guidelines. They focus on the next steps in management, emphasize the nonlethal nature of the disease with treatment, and stress the importance of medication compliance and a healthy diet.

“Everyone provides (post-screening) counseling (…) the nurses come do it, the doctor does it (...). If this person is busy, the other person comes and does it.” P.2

7.2. Sexual intercourse, marriage, and children

As mentioned earlier, all HCPs support marriage and parenthood for people living with HIV. They all discourage breastfeeding among women with HIV. However, they exclusively recommend condoms as contraception and do not discuss dual contraception with patients. Of note, not all HCPs feel at ease discussing contraception with women, with one male HCP referring female patients to a female colleague if contraception questions arise.

7.3. STIs and NCDs services, management and referrals

Physicians routinely test for STIs, including Syphilis, Cytomegalovirus, Toxoplasmosis, Hepatitis A, B and C, and Herpes-simplex, as listed on the clinic's HIV Test Request form provided by the MoH's Central Lab in Jordan. However, they do not routinely test sexually active individuals for urogenital and rectal *Neisseria Gonorrhoea*, *Chlamydia Trachomatis*, or vaginal trichomoniasis, in alignment with CDC recommendations.

The pharmacist does not participate in laboratory testing or patient examination, and consequently, is unaware of any co-existing STIs. The clinic does not provide any medication or antibiotic, other than those for.

During patient encounters, HCPs primarily focus on identifying co-infection, not NCDs. NCD management is referred to governmental hospitals, although the process is not always streamlined, as some external physicians decline to see people living with HIV. Efforts to establish a referral system with governmental hospitals were disrupted by COVID-19. Nonetheless, HCPs do counsel people living with HIV on adjusting their behavior to reduce NCD risk, emphasizing the importance of a healthy diet and alcohol abstinence.

7.4. HIV treatment

All HCPs initiate ARTs directly after confirming HIV positivity with the Western Blot test, regardless of CD4 count, following CDC recommendations. In Jordan, there is no method of testing HIV drug resistance, so treatment decisions rely on response, CD4, and viral load monitoring to consider alternative ARTs. All three HCPs aware of prophylaxis expressed a desire to use it more frequently, but medication scarcity poses a major obstacle.

7.5. Precautions and PPEs

HCPs uniformly implement universal precautions with HIV-positive patients, similar to other patients. While only one reported witnessing a needle stick injury (outside the clinic), the involved nurse followed the hospital's incident report protocol. In case of accidents at the clinic, all HCPs would promptly initiate an incident report and perform a rapid test.

7.6. Rewards and challenges

HCPs expressed positive experiences, especially owing to personal gratification from caring for an underserved group of patients. One HCP also stated that focusing on one disease and field gives them an opportunity for personal growth and development. Another appreciated the manageable administrative workload due to a relatively low patient volume.

However, they identified several challenges. First, HIV diagnosis in Jordan is mainly passive, with no proactive testing efforts. HIV testing is not part of antenatal care, leaving a significant portion of the population underserved. Lack of awareness among the general population and healthcare professionals contributes to underdiagnosis and stigma. Most of the general population, as well as external HCPs in Jordan, assume the country is immune to such an infection as Jordan is a conservative society that does not participate in what they describe as 'immoral behavior'. There are also no specialized HIV HCPs in Jordan, and at the clinic, there is a lack of HIV educational background and HIV service provision training. Training opportunities are scarce, with only one HCP having received prior training from Forearms of Change, a non-governmental organization (NGO).

"I need training ... I honestly never had (any training). There are no other centers in Jordan, but how would I know if I am working correctly or not." P.1

"I barely knew anything about HIV when I arrived, and everything I know now I have taught myself (...) I have tried to read as much as possible and educate myself, but there was not much to start with. What if I am not doing it right?" P.1

"I want to know from A to Z, I want to know about the disease itself and its signs. I need to know how to provide advice/counseling in an effective way." P.5

They shared that other external physicians also lack training on HIV, and most never test for HIV, even if patients present with red flags such as recurrent fungal infections.

The absence of an electronic health information system, limited funding, and low prioritization, by the MOH are major challenges. The clinic often relies on NGOs for support.

"The entire clinic is worn down ... this is our biggest obstacle. We have a problem at the ministry, meaning for them patients with HIV are only 500–600 individuals, so not that big for a priority to work on, and they tell you to rely on yourself and on supporting institutions (NGOs). For them (MoH), 500 patients from 10 million (Jordan population), is nothing." P.3

Additionally, patients from different governorates have to travel to reach the clinic, as there are no alternative clinics in Jordan, highlighting the need for decentralized HIV services. They also stated that they should have specialists available, including dentists and dermatologists, and a laboratory all in one place for easier patient access.

HCPs see potential in expanding prophylaxis use, especially in high-acquisition risk groups, and enhancing laboratory capacity for monitoring HIV drug resistance and collecting quality data.

The COVID-19 pandemic decreased the number of patients presenting for their appointments at the clinic due to country-wide lockdowns, and elective surgery cancellations resulted in fewer blood donations, potentially affecting the HIV diagnosis rate in

2020. When the pandemic started, HCPs started providing two months instead of one month's worth of medications to patients.

8. Discussion

This study assesses the knowledge, attitudes, and practices of HCPs, at Jordan's sole HIV center, highlighting critical issues. It underscores the stigma and the urgent need for HIV HCP training, revising and disseminating the 2018 National Guidelines on HIV in Jordan [4], and promoting HIV awareness within the broader community and among other HCPs to promote earlier diagnosis to prevent HIV progression into AIDS.

Most HCPs were unaware of the CDC's recommendations for general population screening, between the ages of 13 and 64, without acquisition risk factors, at least once for HIV [30], emphasizing Jordan's low HIV prevalence. Most patients are diagnosed passively as there is little provider-initiated or self-initiated testing, even in key populations such as MSM and sex workers. The numbers in Jordan may not represent true prevalence and may be driven by illness, access, and chance when HIV screening is done on donated blood units [31]. Early perceived low acquisition risk leads to slow response to epidemics, especially with HIV which has an extended latency period. Most new HIV infections, vertical transmission, and death from AIDS occur in low-prevalence countries [32], and HCPs informed us that most patients are usually caught at an advanced stage.

Vertical transmission can occur in utero, intrapartum, and postnatally through breastfeeding [33]. However, knowledge with regard to perinatal vertical transmission was inadequate among HCPs. Even though all discouraged breastfeeding if the mother has HIV, in agreement with the CDC and the American Academy of Pediatrician recommendation for non-resource-limited settings [33, 34], some encouraged normal delivery even if the viral load is not adequately suppressed, which goes against the CDC's recommendation of a cesarean section in such cases [33]. Not everyone was comfortable discussing contraception with women, and most HCPs opted for directly advising condom use. Several HIV expert organizations have however, reaffirmed that hormonal contraceptives are safe for women infected with HIV and that women should be counseled and encouraged to also use condoms, as there are benefits with dual contraception, especially in people living with HIV [35].

Some activities put people living with HIV at higher risk of acquisition of STIs, especially patients who practice sex without a condom and those who have multiple sexual partners [36]. The most updated CDC STIs treatment guidelines do not require the integration of prevention counseling with HIV screening programs in healthcare settings, but note that HIV screening is an opportunity to conduct counseling on HIV prevention and impart acquisition risk-reduction messages [37].

Similarly, with the advancement of HIV care, people living with HIV are living longer, and in 2011, the UNAIDs recognized the need to integrate NCD management with HIV response [38], with multiple HIV/NCD care models developed since then [39]. The four NCDs that account for the most comorbidities in people living with HIV in low-and-middle income countries (LMICs) such as Jordan, are cardiovascular diseases, cervical cancer, depression, and diabetes [40]. HIV results in chronic inflammation, and in addition to the adverse events caused by ARTs, HIV can promote NCD development [38]. HCPs had little knowledge of NCDs, and although some did emphasize the importance of a healthy diet, smoking cessation, and alcohol abstinence, no emphasis was placed on human papilloma virus (HPV) vaccination or cervical cancer screening. Most felt ill-equipped to deal with NCDs, and the preference was to refer to an outside facility, although a systemized referral system was missing.

International guidelines recommend that ART be started as soon as the patient is diagnosed with HIV [41,42], which is done routinely at the clinic. Most HCPs were satisfied with the available choice of ART, but physicians complained of the limited supply, prohibiting the use of these medications as prophylaxis. Physicians were aware of PrEP use as a peri-conception practice, which is effective, and its safety is backed up by several studies [43], however, nurses were unaware of PrEP and PEP, and even though the HCP acting as a pharmacist knew ARTs well, he lacked knowledge on how PEP are best utilized. Not having the capacity to test for HIV drug resistance is a serious challenge, and is a critical aspect that has been addressed by the 2017–2021 World Health Organization (WHO) Global Action Plan on HIV Drug Resistance [44]. According to the WHO, pretreatment drug resistance affects around 10 % of treatment naïve individuals and is highly prevalent in LMIC [44,45], such as Jordan.

People living with HIV are usually associated with behavior that are perceived to breach social norms [46], resulting in symbolic stigma which is a moralistic and value-based prejudice for what HIV symbolizes for people [47]. HCPs illustrated how patients come into the clinic with anticipatory stigma, reflecting the degree to which people living with HIV expect to be treated with discrimination [48]. They told us stories of patients who dealt with discrimination in the workplace, from family members, and partners. Discriminatory behavior is rooted in the lack of knowledge, especially in relation to modes of transmission of the virus [49].

All HCPs had no problem treating any patient, and some said they were surprised when they started working at the VCT, as they did not expect to meet "wonderful and classy" individuals, they had imagined meeting stereotypes who are resentful, carless, or had "engaged in immorality". This change in stigmatization was evident in HCPs who have been working at the VCT longer than others, similar to what is seen in other studies [47]. This was also evident when the newest working HCP, believed hospitals and medical staff should be informed if a patient has HIV so that they take extra precautions, while longer serving HCPs stated that with time, their knowledge of HIV improved so they started taking the same precautions with all patients with or without HIV. Of note, the WHO recommends using universal precautions with all patients whether or not they have HIV [50].

Even though they would accept doing the test routinely if requested by the clinic, HCPs prefer it to be voluntary and most did not see a need for such measures. Lack of perceived acquisition risk of contracting the disease has been reported as a major reason why health staff do not seek testing [51]. They stressed that if they themselves ever caught the disease, it will not be through what they describe as "immoral behavior". We probed to assess the extent of blame and see if HCPs differentiate between those who caught the disease by blood transfusion or birth and those who contracted the virus through risky behavior, and indeed, one HCP felt "*there should be religious and legal policies for those who caught the disease in an immoral way*".

Jordan is a conservative society with strict social norms, especially in relation to sex, sexual norms, and unacceptable behaviors, and very little is published regarding HIV in Jordan [5]. Therefore, it is not surprising that HCPs described their communities' reaction, including the reaction of other HCP colleagues, as surprise that Jordan has HIV cases. Indeed, there is a wide concern that the HIV/AIDS epidemic will continue to expand as a result of restrictions to providing HIV information in a conservative society, in addition to the invisibility of people living with HIV and poor health seeking behavior among patients engaged in risky behavior [52].

The WHO and the United Nations have highlighted that HIV testing centers must adhere to the five C's: Consent, Confidentiality, Counseling, Correct Status, and Connections [53]. Most HCPs agreed with the need for consent and were against mandatory HIV testing, even compulsory testing of HCPs caring for people living with HIV. This is in accordance with all international bodies, recommending that testing never be made compulsory [54]. However, one HCPs suggested incorporating HIV into the mandatory premarital screen. Mandatory HIV premarital screen is a controversial topic, it has been implemented in several 'high-prevalence' countries and by certain religious groups, and other countries have tried to implement it, however, there was severe resistance from humanitarian and civil societies, as it was seen to have severe ethical repercussions [55]. Standard of care in other countries, and as recommended by the CDC, include providing patients with the voluntary option of routine HIV testing at PHC clinics [56]. However, all HCPs stated that confidentiality is important, and this is one of the reasons why it is difficult to integrate HIV testing into PHC centers in Jordan.

They also stressed that they would only advise patients to inform their partners, they would never break patient-doctor confidentiality and inform the partners themselves. One physician stated that even though he would not do it, he believes he should, as some other countries criminalize those who do not inform their sexual partners. Partner notification within the framework of HIV is a complex ethical issue [57]. However, even if many countries, including the United States, have mandatory partner notification laws, in which the patient or even the HCP may be legally obliged to inform the sex partner of the patient's HIV status, the WHO and UNAIDS do not support this, and instead supports voluntary partner notification using passive or assisted approaches [57,58].

As for Counseling, most HCPs perform pre-screening risk behavior and prevention counseling. Similarly, they all perform post-screening counseling, focusing on easing anxieties of death, debunking misconceptions, discussing the next steps in management, and reassuring patients of normal healthy lives if adherent to ART, with the possibility of marriage and children, in accordance with CDC recommendations [37]. Marriage is seen as a human and religious right, and all HCPs encourage it. Having a partner and having children, has never been discouraged by international guidelines, instead, guidelines provide acquisition risk reduction options for couples with different statuses and guidance for limiting vertical HIV transmission [59,60].

HCPs follow a testing algorithm to ensure Correct Status delivery. They perform the Rapid test, followed by ELISA and Western Blot if positive. However, they do not follow specific guidelines, are hesitant to use what they call suboptimal Jordanian HIV Guidelines, and their knowledge of international testing protocols is limited. Furthermore, they all pointed to a large gap in the linkage of patients to HIV prevention and treatment (5th C: Connections), since this is the only center that provides care for people living with HIV in all 12 governorates of Jordan, especially in terms of a systemized non-discriminatory referral scheme that ensures appropriate patient care.

As the prevalence of HIV in Jordan is 0.02 %, it suggests that there are around 2000 people living with HIV in the whole country. Given that there is only one HIV center currently available in Jordan, the overall number of people living with HIV followed by the center ($n = 387$) suggests that more than three-quarters of people living with HIV in Jordan are unaware of their condition. However, these are only rough estimates and caution should be used in building conclusions from this.

The strengths of this study lie in its qualitative nature, which enabled in-depth discussion and examination of the knowledge, attitudes, and beliefs of HCPs. The data is based on the HCPs' experiences and is comprehensive in that it includes all HCPs providing care to individuals living with HIV in Jordan. Limitations of this study are inherent to the fact that there are only five HCPs providing care to people living with HIV in Jordan, however, the interview style questions provided us with the opportunity to probe and explore certain themes, giving us greater insight. The risk of social desirability bias in HCPs could have affected responses to questions relating to attitude and stigma, and we tried to limit this by assuring them of the anonymity of their responses and by using nominative techniques. Furthermore, half of the HCPs were only recently employed by the center, but this gave us an opportunity to evaluate the perspectives of new employees and shed light on the extent to which training is needed.

9. Conclusion

This study highlights the challenges and knowledge gaps among HCPs caring for people living with HIV. It underscores how stigma and suboptimal practices stem from a lack of awareness, which can be overcome through greater participatory exposure to HIV care provision. Overall, HCPs displayed a positive attitude towards people living with HIV, particularly those with more experience at the clinic. However, various obstacles prevent optimal care, such as the lack of structural and financial support by the MOH.

To enhance HIV management, there is an urgent need for comprehensive HCP training. They play a crucial role in HIV care and should receive education based on international HIV guidelines and best practices. This includes building their capacity for essential skills in primary care settings to ensure optimal, stigma-free attitudes and practices.

Future research could delve deeper into the training needs requirements for improving knowledge, attitude, and practice among HCPs, as well as addressing the root causes of stigma.

Recommendations

- 1 As HCPs are not HIV specialists, they need specialized HIV training, especially at the start of employment, with yearly updates. Training can be in the form of video tutorials or lectures on the different topics, created by expert HIV consultants.

- 2 Specialized HIV experts should be contracted to revisit and update the 2018 National Guidelines on HIV.
- 3 The success of the global HIV response rests on people's knowledge of their HIV status. According to the WHO, many at the highest risk of contracting HIV are still unreached by testing services, especially men and adolescent girls [61]. Globally, women are caught earlier due to the provision of HIV testing during antenatal care [61]. Most HCPs should be made aware of testing recommendations, especially in the presence of red-flags. This is done through awareness sessions and campaigns, that cater to HCPs around the nation. Many success stories of opt-out instead of opt-in for HIV testing exist, such as the success in maternity wards in England [62].
- 4 Multiple examples of NCD-HIV integrated care models exist and incorporating screening for diabetes and hypertension should be done at the clinic, referring patients to specialized care if these diseases are detected. This can become part of the guideline and HIV care algorithm.
- 5 A list of specialized physicians willing to care for people living with HIV should be available at the clinic to ensure easier transition of care if needed.
- 6 Vertical transmission is preventable if prophylaxis is initiated early, and pregnancy is monitored by an expert obstetrician. There is a need to train and employ obstetricians who can provide antenatal, delivery and postpartum care to women living with HIV.
- 7 Adequate supply of ART is lacking, limiting the clinics capacity to use them as PrEP and PEP. Resource mobilization should move towards better utilization of medications as prophylaxis, and specialized training on prophylaxis should be done.
- 8 The availability of only one center in Jordan, limits the access of individuals from different parts of the country to HIV services and counseling. Efforts should be made to make HIV services more accessible across the country.
- 9 In a conservative society with strict rules governing social norms, certain key populations are subject to discrimination and may not seek healthcare services in fear of prosecution. There is a need to develop service delivery approaches to ensure safe, appropriate, and timely access to care for key populations. Enlisting the assistance of NGOs is vital, as they may have better reach than a governmental clinic.
- 10 Stigmatized ideas, myths, and taboos changed once HCPs started working with people living with HIV. Globally, stigma leads to fear of testing, lack of sharing of HIV status, poor adherence to ARTs and an overall poorer health outcome [63]. There are a multitude of anti-stigma measures that have been shown to be successful, including by the Horizon initiative [64]. These measure included helping healthcare-facilities recognize the stigma that exist in their facilities through a participatory approach of sharing of data about levels and types of stigma, engaging hospital and clinic manager in participatory development of HIV/AIDS care policy, enlisting people living with HIV to sensitize and train HCPs, developing and disseminating information on infection control procedures and PEPs, combining HIV-related counseling and services with other healthcare services, and using media campaigns to show that HIV has a human face, among others [64].
- 11 In May 2020, WHO and UNAIDS addressed the severity of the interruptions in HIV health services and medication supplies during COVID-19 [65]. The regularly updated technical guidance of the US President's Emergency Plan for AIDS Relief recommended, as a cornerstone response during the pandemic, that a 3–6 (preferred) multi-month ART dispensing system be implemented in addition to decentralized delivery of medications, listing several possible mechanisms for decentralized delivery [66]. It also noted that it is especially important during confinement, that attention be given to delivery of condoms, PrEP, and PEP for HIV prevention in addition to psychosocial services [66].

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Ethics statement

This study was reviewed and approved by the Institutional Review Board at Jordan Ministry of Health on March 30, 2021, with the approval number: MoH/Rec/2021/056. All participants provided written informed consent to participate in the study.

Data availability

Data has not been deposited into a publicly available repository and will be made available upon request.

CRedit authorship contribution statement

Randa K. Saad: Writing - review & editing, Writing - original draft, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Yousef Khader:** Writing - review & editing, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Ashraf Jamil Aqel:** Writing - review & editing, Resources, Methodology, Data curation. **Srinath Satyanarayana:** Writing - review & editing, Validation, Resources, Funding acquisition. **Nevin Wilson:** Writing - review & editing, Validation, Resources, Funding acquisition, Conceptualization. **Hiba Abaza:** Writing - review & editing, Validation, Supervision, Resources, Project administration, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

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