Review Article
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Medical Journal of the Islamic Republic of Iran (MJIRI)

Med J Islam Repub Iran. 2022 (29 Aug);36.98. https://doi.org/10.47176/mjiri.36.98

The Impact of COVID-19 on Disruptions of HIV-related Services: A Rapid Review

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Received: 14 Feb 2022 Published: 29 Aug 2022

Abstract

Background: People living with HIV (PLHIV) and those at risk of HIV are marginalized worldwide and need to reach services regularly. The COVID-19 pandemic can disrupt the HIV care continuum. This study aimed to identify the extent to which HIV-related services have been affected by the COVID-19 pandemic and how we can overcome these challenges.

Methods: In this rapid review, we systematically searched PubMed and Scopus databases, the references of studies, international agencies, and studies "cited by" feature in google scholar till May 28, 2021, without restrictions to language.

Results: Among the total of 1,121 studies, 31 of them were included in the review. The most important HIV-related services affected by the COVID-19 pandemic were; access to anti-retroviral drugs, HIV testing, periodic HIV-related testing in people living with HIV (PLHIV), pre-exposure prophylaxis, post-exposure prophylaxis, harm reduction services, psychological and counseling services. Some factors were introduced to mitigate the effects of these challenges, including increasing the resilience of health, protecting health care workers and their clients against COVID-19 through vaccination, providing HIV-related services through telehealth, and multi-month dispensing (MMD) of medicines.

Conclusion: The results of this review study showed that PLHIV had difficulty in accessing follow-up, care and treatment services during the COVID-19 pandemic. Programs such as the MMD or telemedicine can be useful in providing services to PLHIV during the pandemic.

Keywords: COVID-19, HIV Infection, Telemedicine, Health Medicine

Conflicts of Interest: None declared
Funding: This study was supported by National Institute for Medical Research Development (NIMAD), Grant No.4000921.

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Cite this article as: Mirzaei H, Moradi Y, Abbaszadeh S, Nasiri N, Mehmandoost S, Khezri M, Tavakoli F, Sharifi H. The Impact of COVID-19 on Disruptions of HIV-related Services: A Rapid Review. *Med J Islam Repub Iran.* 2022 (29 Aug);36:98. https://doi.org/10.47176/mjiri.36.98

Introduction

Coronavirus disease of 2019 (COVID-19) was first reported in China, in December 2019 and rapidly distributed worldwide. Globally, up to 5 November 2021, there have been 248,467,363 confirmed cases of COVID-19, including 5,027,183 deaths based on WHO reports (1). Male sex, older age, and comorbidities, including diabetes, hypertension, and chronic kidney disease, have been reported as predictors of severe outcomes (2). Some studies also reported that HIV is associated with severe outcomes and mortalities (2-4). In response to the COVID-19 pandemic, social distancing, quarantines, and lockdowns have been implemented by many countries. Public health authorities in many countries are focused on COVID-19 control; at the same time, other communicable and non-communicable diseases are needed for a comprehensive program for the prevention, control, and treatment of the pandemic (5).

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↑What is "already known" in this topic:
The results of this review help to identify the extent to which HIV-related services have been affected by the COVID-19 pandemic and how we can overcome these challenges.

→What this article adds:
The results of this review study showed that programs such as the MMD or telemedicine can be useful in providing services to PLHIV during the pandemic.

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[DOI: 10.47176/mjiri.36.98]

People living with HIV (PLHIV) and those at risk of HIV are marginalized worldwide and need to reach services regularly. To control of HIV pandemic around the world, 95% of PLHIV must know their HIV status, 95% of people who are diagnosed with HIV will receive sustained antiretroviral therapy (ART), and 95% of all people receiving ART will have viral suppression by 2030 (6). So, HIV-related services must consider and cover a wide range of services continuously to the needed clients. HIV-related care sources are allocated to COVID-19, and care-seeking PLHIV has reduced due to fear of getting COVID-19 infection (7). The COVID-19 pandemic can disrupt the HIV care continuum and achieve each of the three targets (7). A previous modeling study showed that supply interruption of ART services for six months among 50% of PLHIV who receive the ART would increase new HIV infections by 1.6 times and increase HIV-related deaths by 1.63 times in one year (8). Additional concerns exist around less attention to HIV due to the shortage of financial sources, social pressure and tension, engagement of the health system, and redirecting HIV resources and international/national funds to COVID-19, therefore, creating gaps in efforts to prevent and control HIV (9, 10).

In response to these challenges, we need to understand areas and care affected by COVID-19. Therefore, this study aimed to identify the extent to which HIV-related services have been affected by the COVID-19 pandemic and how we can overcome these challenges.

Methods

Search strategy

In this study, we systematically searched PubMed and Scopus databases, the references of studies, the references of publications found, and studies "cited by" feature in google scholar till May 2021. Moreover, in order to access . non-electronic resources were searched,the grey literature The resources include proceedings of the conferences, dissertations, and organizations that have research activities in the field of HIV and COVID-19. We searched databases of international agencies, including the World Health Organization (WHO), the Center for Disease Control and Prevention (CDC), the Joint United Nations Program on HIV/AIDS (UNAIDS), and global information and education on HIV and AIDS (AVERT) to find relevant reports about the effects of the COVID-19 pandemic on HIV-related services or solutions for these challenges. Search terms Included subject heading keywords relevant to COVID-19 (e.g., SARS-CoV-2 or coronavirus disease 2019 or COVID-19 or severe acute respiratory syndrome coronavirus 2 or coronavirus infection) and HIV (e.g., HIV immunodeficiency virus OR AIDS OR OR human Acquired Immunodeficiency Syndrome). Search terms were combined using appropriate Boolean operators. In the search, no limitation was considered on the language.

We searched using these terms: HIV, human immunodeficiency virus, AIDS, acquired imunudeficiency syndrome AND COVID-19, SARS-CoV-2, coronavirus, 2019-nCoV Disease, 2019 Novel Coronavirus Infection, 2019 Novel Coronavirus Disease, Severe Acute Respiratory Syndrome Coronavirus 2, SARS Coronavirus 2.

Inclusion criteria

Original studies in any method or language, from December 2019 to May 2021, aimed to provide information about the effects of the COVID-19 pandemic on HIV-related services or presented guidelines to overcome these challenges were included in this rapid review.

Screening and data extraction

Screening of potentially related studies was done in a multistage process. After excluding duplicates, studies were screened by titles and abstracts. For the remaining studies, full texts were evaluated for inclusion criteria. Four reviewers (HM, NN, SA, and YM) did the screening process, and disagreements were resolved by discussion of these individuals. Also, two reviewers (SM and MKH) searched and screened databases of international agencies, including WHO, CDC, and UNAIDS. Reviewers extracted information on both study and participant characteristics, including first author, year of publication, country or setting, target population, challenges of HIV-related services (services affected by the COVID-19 pandemic), and solutions for challenges.

Risk of bias assessment

Different checklists of the Joanna Briggs Institute's critical appraisal tools were used to assess the methodological quality of the included papers. These tools had eight items for the evaluation of cross-sectional studies, 11 items for cohort studies, 11 items for economic evaluation and modeling studies, ten items for qualitative studies, and six items for texts and opinions (commentaries, viewpoints, rapid communications, and notes from the field). Quality assessment was applied only for papers that were published in searched databases. The assessment was not applied to formal reports of an international organization.

Data analysis

We used the content analysis method to analyze the data qualitatively. Content analysis is an objective and rule-guided method used to make replicable and valid inferences. This method can analyze the characteristics of visual, verbal, and written documents (11).

Ethics consideration

This study protocol was reviewed and approved by the Research Ethics Committee of the National Institute for Medical Research Development (NIMAD) (Ethics ID: IR. NIMAD. REC.1400. 107).

Results

Totally, 1121 studies were found. After excluding duplicates (n = 311), and titles and abstracts screening (n = 741), 69 studies remained for full-text screening. During full-text evaluation, 38 studies were excluded (28 studies were unrelated, and 10 studies had evaluated the effects of HIV on COVID-19 or lessons learned from the HIV epidemic). Eventually, a total of 31 studies were included in the rapid review. Moreover, 31 reports were found from international

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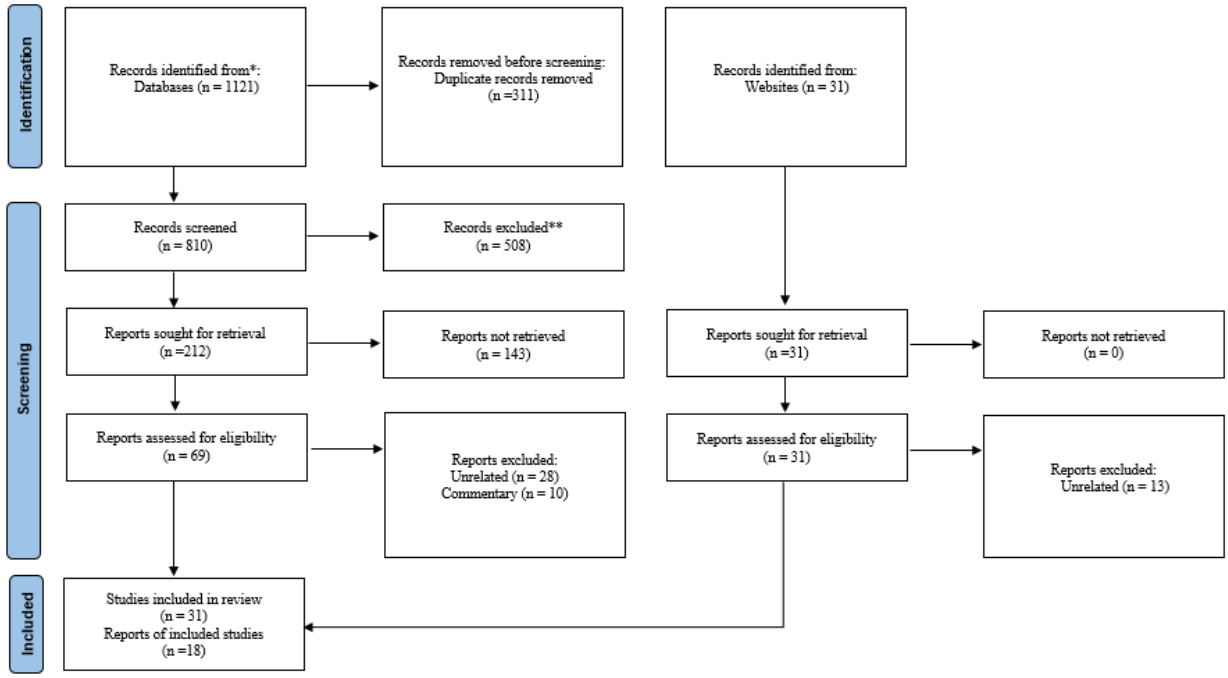

Fig. 1. Flow diagram for searches and screening of databases, registers and other sources for the impact of COVD_19 on the disruptions of HIV-related services

agencies, and 18 of them addressed challenges in HIV-related services or solutions for these challenges included in this review (Fig. 1). characteristics of included studies and reports of international organizations are presented in Table 1, and Table 2.

The impact of COVID-19 on HIV-related services

The access to ART was the most important HIV-related service affected by the COVID-19 pandemic. The other affected HIV-related services were: a) access to HIV testing and diagnosis services, b) routine periodic HIV-related diagnosing tests in PLHIV, c) access to pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP), d) HIV-related research, e) harm reduction services, including needle and syringe programs, condom and lubricant distribution programs, f) access to psychological and counseling services and lack of participation in social and innovative programs (Table 3).

Management of the challenges

These items were reported to manage the challenges: a) increasing the resilience of health systems which ensured the continuity of essential health services during the COVID-19 pandemic and other emergencies, b) providing the necessary protective equipment for staff, and introducing protocols for reducing the risks of transmission to both staff and patients, c) protecting health care workers and their clients against COVID-19 through vaccination, d) providing HIV-related services through telehealth, and multi-month dispensing of drugs (Table 3).

Discussion

We conducted a rapid review to determine the impact of the COVID-19 pandemic and the resulting care programs such as stay-at-home or lockdown on HIV/AIDS care, diagnosis, and treatment services worldwide. Overall, there was little and contradictory information about this issue globally. The lack of evidence and its inconsistencies have hindered the development of international and national programs on how to provide care and support to PLHIV during the COVID-19 pandemic. Results of this rapid review showed that the most important HIV-related services affected by the COVID-19 pandemic were access to ART services, access to PrEP and PEP, access to HIV diagnosis services, routine HIV-related testing in PLHIV, HIV-related research, harm reduction program (needle and syringe programs, as well as condoms and lubricants programs), access to psychological and counseling services and lack of participation in social and innovative programs.

Failure to provide adequate and timely HIV-related care and treatment services due to the COVID-19 pandemic in the world, especially in low- and middle-income countries, can lead to more severe and lasting complications than COVID-19 disease itself. The COVID-19 pandemic has increased indirect effects, such as unemployment, depression, and social anxiety among the marginalized population in the community, especially PLHIV, and those at higher risk of HIV. These factors can play a synergistic role as an aggravating factor in the occurrence of other health-related outcomes in these groups. So, supporting these populations should be the priority of countries to manage these issues to reduce the effect of the COVID-19 pandemic and similar

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Table 1. Characteristics of the included studies

First author	Country	Study type	Target population	Services affected by COVID-19
Algarin (12)	USA	Notes from the field	Elder people living with HIV	HIV care, stress, and continuing studies
Chow (13)	Australia	Cross-sectional	People who are at risk of HIV	Post-exposure prophylaxis (PEP)
Chow (14)	Australia	Cross-sectional	MSM[1]	Pre-exposure prophylaxis (PrEP)
Darcis (15)	Belgium	Cross-sectional	People at risk of HIV	HIV testing and diagnosis
Davey (16)	South Africa	Longitudinal	Pregnant women	PrEP
Dourado (17)	Brazil	Notes from the field	MSM and TGW[2]	PrEP
Junejo (18)	UK	Cross-sectional	People at risk of HIV	PEP
Jewell (19)	China	Modeling study	People at risk of HIV	Antiretroviral treatment (ART) supply, AIDS-related death
Ahmed (20)	Malesia	Viewpoints	Migrant workers living with HIV	HIV services, ART
Hogan (21)	low-income and middle-income countries (LMIC)	Modelling study	PLWHIV	Care, medicine, new ART initiations
Hoagland (22)	Brazil	Rapid communication	People at risk of HIV	PrEP
Kalichman (23)	Georgia	Longitudinal	PLHIV	Accessing food, medications, and health care
Jenness (24)	USA	Modelling study	MSM	Incidence rates of HIV and other STIs, sexual behaviors and services
Kalichman (25)	USA	Cross-sectional	PLHIV	Social relationships, HIV services
Linnemayr (26)	Uganda	Mixed methods	PLHIV	
Menza (27)	USA	Cross-sectional	MSM	Home HIV self-testing
Booton (28)	China	Cross-sectional	MSM	Condom use, HIV testing and ART initiation
Bulstra (29)	Ethiopia, Malawi, Mozambique, Tanzania, Uganda, Kenya, Nigeria, Zambia, Zimbabwe, South Africa	Modeling study	People at risk of HIV, PLHIV	HIV financing
Celestin (30)	Haiti	Modeling study	PLHIV	HIV care service delivery and continuity of HIV therapy
Chow (31)	Australia	Cross-sectional	People at risk of HIV	HIV testing and diagnosis
Ejima (32)	Japan	Cross-sectional	People at risk of HIV	HIV testing
Giuliani (33)	Italy	Cross-sectional	PLHIV	Retention in care
Quiros-Roldan (34)	Italy	Cross-sectional	PLHIV	Continuum of HIV care
Sanchez (35)	USA	Cross-sectional (online survey)	MSM	HIV testing, prevention and treatment services
Simões (36)	European Region	Rapid communication	People at risk of HIV	HIV testing
Sun (37)	China	Cross-sectional	PLHIV	ART
Kowalska (38)	Central and Eastern Europe	Cross-sectional (online survey)	PLHIV	HIV care and continuity of antiretroviral treatment (ART)
Ponticiello (39)	Uganda	Qualitative	People at risk of HIV	HIV testing
Oladele (40)	Nigeria	Notes from the field	People at risk of HIV, PLHIV	HIV financing
Odinga (41)	Kenya	Cross-sectional	MSM	HIV testing
Lagat (42)	Kenya	Notes from the field	People at risk of HIV	HIV testing

1: Men who have sex with men
2: Transgender women

events (23, 60-62).

PLHIV had some problems during the COVID-19 pandemic. The main problems were access to ART, and access to routine HIV-related diagnosing tests. ART has an important role in the control of HIV around the world, and low access to ART has some implications for the patients and other healthy populations. The WHO also emphasizes the importance of this issue as its statistics show that in 2020, up to 73 countries will face disruption and difficulty in providing ART services during the COVID-19 pandemic. Approximately 17 million PLHIV have been affected by this disruption in service delivery (13, 18). The organization along with UNAIDS estimates that a six-month delay in providing antiretroviral services could lead to an increase of 500,000 HIV/AIDS deaths in sub-Saharan Africa (63). Moreover, PLHIV needs to do some routine diagnosing tests, due to their immunity status and side effects of ART.

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Table 2. Characteristic of reports of international agencies on effects of COVID-19 on HIV services

Title of report	Organization	Year	Target population
Operational Considerations for Maintaining Essential Services and Providing Care and Treatment for those Living with HIV in Low-Resource and non-US Settings During the COVID-19 Pandemic (43)	CDC	2020	PLHIV
Disruption in HIV, Hepatitis and STI services due to COVID-19 (44)	WHO	2020	All populations
Information notes on HIV and COVID-19 (45)	WHO	2021	PLHIV, and people who are at risk of HIV
Coronavirus disease (COVID-19): COVID-19 vaccines and people living with HIV (46)	WHO	2021	PLHIV
Coronavirus disease (COVID-19): HIV and antiretrovirals (47)	WHO	2020	PLHIV
Successful continuation of antiretroviral therapy delivery during COVID 19 – best practices from the South East Asia Region (48)	WHO	2020	PLHIV
Continuing PrEP services for adolescents in Brazil despite COVID-19 disruptions (49)	WHO	2020	At risk adolescents
Pre-exposure prophylaxis services in Thailand during COVID-19(50)	WHO	2020	People with high-risk sexual behaviors
access to HIV medicines severely impacted by COVID-19 as AIDS response stalls (51)	WHO	2020	PLHIV
UNODC, WHO, UNAIDS and OHCHR joint statement on COVID-19 in prisons and other closed settings (52)	WHO	2020	People who are at risk of HIV in prisons
The cost of inaction: COVID-19-related service disruptions could cause hundreds of thousands of extra deaths from HIV (53)	WHO	2020	PLHIV, and people who are at risk of HIV
COVID-19 and HIV: 1 moment, 2 epidemics, 3 opportunities—how to seize the moment to learn, leverage and build a new way forward for everyone's health and rights (54)	UNAIDS	2020	PLHIV, and people who are at risk of HIV
UNAIDS calls on governments to strengthen HIV-sensitive social protection responses to the COVID-19 pandemic (55)	UNAIDS	2020	PLHIV, and People who are at risk of HIV
Condoms and lubricants in the time of COVID-19	UNAIDS	2020	People who are at risk of HIV
The impact of the COVID-19 response on the supply chain, availability and cost of generic antiretroviral medicines for HIV in low- and middle-income countries (56)	UNAIDS	2020	People who are at risk of HIV
Strategic considerations for mitigating the impact of COVID-19 on key-population-focused HIV programs (57)	UNAIDS	2020	PLHIV, and people who are at risk of HIV
Maintaining and prioritizing HIV prevention services in the time of COVID-19 (58)	UNAIDS	2021	PLHIV, and people who are at risk of HIV
Six concrete measures to support women and girls in all their diversity in the context of the COVID-19 pandemic (59)	UNAIDS	2020	Women and girls

Table 3. HIV-related services affected by the COVID-19 pandemic and solutions

Challenges	Solutions
Access to ART services	- Increasing the resilience of health systems ensure the continuity of essential health services during the COVID-19 pandemic and other emergencies. - Adapting and revising HIV service delivery policies to include antiretroviral therapy (ART) distribution of the community and multi-month dispensing (MMD) of ART for all people living with HIV - Providing the necessary protective equipment for staff and introducing protocols for reducing the risks of transmission to both staff and patients - Protection of health care workers against COVID-19 through vaccination - Protection of PLWH against COVID-19 through vaccination - Decentralization of care to the primary health care level, bringing it as close as possible to the doorsteps of PLHIV - Expansion of ART distribution through NGOs - Preparing online - Providing services by telemedicine and virtual clinics - Expanding the time of provided services can decrease waiting time and contacts between clients. - Increasing outreach support while maintaining in-person - visits for those regions where telemedicine is not feasible or advisable
Access to Pre-exposure Prophylaxis (PrEP) and post-exposure prophylaxis (PEP)	- Providing services by telemedicine and virtual clinics - Multi-month dispensing of PrEP and PEP - Providing the necessary protective equipment for staff and introducing protocols for reducing the risks of transmission to both staff and patients - Establishing a monitoring and surveillance system to continue remote track of these individuals during a pandemic - Launching online programs and sessions for education of the target groups during this pandemic - Increasing outreach support while maintaining in-person - Visits for those regions where telemedicine is not feasible or advisable

Disruption in providing these services, along with low access to consulting services, could treat the health of PLHIV. In addition, lack of access to ART services can lead to serious negative health outcomes for PLHIV (14, 64-66). People at risk of HIV were also faced with some barriers during the COVID-19 pandemic. These barriers were

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Table 3. Continued

Challenges	Solutions
Access to HIV diagnosis services or HIV testing services	- HIV service delivery centers should not be closed and health officials should inform at risk people that HIV diagnosis and treatment centers are readily available during the quarantine. - Providing the necessary protective equipment for staff and introducing protocols for reducing the risks of transmission to both staff and patients - Protection of health care workers against COVID-19 through vaccination - During the online consulting program, sending 2 kits for rapid HIV diagnosis to at risk people and providing instruction about using these kits. - Launching online application systems or online programs to sell HIV diagnostic services such as self-tests to at-risk groups - Decentralization of care to the primary health care level - Reducing waiting the time for HIV testing in clinics - Expanding time of provided services can decrease waiting time, and contacts between clients. - Increasing outreach support while maintaining in-person - Visits for those regions where telemedicine is not feasible or advisable
Routine HIV related testing in people living with HIV (CD4 cell count tests, viral load tests, and drug resistance tests)	- HIV service delivery centers should not be closed and health officials should inform at risk people that HIV diagnosis and treatment centers are readily available during the quarantine. - Using point-of-care technology for special populations who need expedited testing and other HIV related services - Providing the necessary protective equipment for staff and introducing protocols for reducing the risks of transmission to both staff and patients - Protection of health care workers against COVID-19 through vaccination - Decentralization of care to the primary health care level, and bringing it as close as possible to the doorsteps of PLHIV - Expanding time of provided services can decrease waiting time, and contacts between clients.
Initiating ART in newly diagnosed HIV cases	- Adaptation and revision of HIV service delivery policies to include antiretroviral therapy (ART) distribution in the community and multi-month dispensing (MMD) of ART - Providing counseling services through telehealth and providing ART drugs at home by mail, NGOs and counseling center staff - Decentralization of care to the primary health care level, and bringing it as close as possible to the doorsteps of PLHIV - Expanding time of provided services can decrease waiting time, and contacts between clients. - Protection of health care workers against COVID-19 through vaccination - Protection of PLWH against COVID-19 through vaccination
HIV related research	If conducting and continuing studies increase the risk of infection in participants and research staff, they should be stopped. Transition to remote data collection methods when applicable. - Ethics guidance should be strengthened by providing explicit advice regarding the ethical issues associated with disrupted research, and the reopening and termination of studies. - Study protocols should be revised and strengthened by considering in pandemic situations.
Harm reduction activities including needle and syringe distribution programs, as well as condom and lubricant distribution programs	- Multi-month dispensing of needles, syringes, condoms and lubricants - Vaccinating service providers and creating a safe environment for service delivery - Improving equipment availability through home delivery, provision by post, peer supported distribution, and vending machines
Addiction treatment services for PWIDs	- Multi-month dispensing of opioid substitution therapy - Providing the necessary protective equipment for staff and introducing protocols for reducing the risks of transmission to both staff and patients - Establishing regular virtual meetings - Training PWIDs family members to help treatment of addiction - Providing consulting services for PWIDs and their families through phone and other virtual environments and telehealth or telemedicine
Basic needs include food, and other living necessities	- Governments should help people living with HIV to provide basic needs. - Collecting NGOs, and public donations to meet the living needs of these people
Access to psychological and counseling services and lack of participation in social and innovative programs	- Providing counseling services via telemedicine or phone - Linking clients/patients to online support groups - Establishing regular virtual meetings among PLHIV and at-risk people

access to HIV testing, PEP, PrEP, and harm reduction services. Access with some difficulty among people at risk of HIV could increase the risk of HIV transmission among these populations.

Countries tried to manage these barriers using some predesigned or innovative strategies. Some countries have considered all care and treatment services as telemedicine or others have used the multi-month dispensing (MMD) policy to provide pharmaceutical services (67, 68). Some countries tried to provide ART, treatment and care services by post and door-to-door, but this type of service has its own challenges. While many PLHIV are not interested in

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receiving service by mail, on the other hand, due to stigma, discrimination and fear of disclosure, they are not fully satisfied with sending medicines or other services to the door (69, 70). In addition, there are three other problems with this type of service delivery. First, during the COVID-19 pandemic, the supply and production of medicines by pharmaceutical companies may have been problematic, in which case various countries, especially LMIC, may face a shortage of drugs in supply. Second, it is possible that due to fear of COVID-19 in-service staff, these people avoid providing all services to the PLHIV group or provide care services with stigma or discrimination (67, 69-71). The results of many surveys showed that a number of service providers, especially physicians in the infectious disease department, have avoided providing services to PLHIV for fear of developing COVID-19 (35). Third, in some countries, some personnel and physicians, who provided the services for PLHIV and those at-risk of HIV before COVID-19, had to shift to COVID-19 services. Therefore, there is a need to develop more basic and appropriate solutions for the equitable distribution of health and care services for PLHIV, and people at risk of HIV during the COVID-19 pandemic. In addition to these services, it is necessary to establish inter-sectoral cooperation in order to develop appropriate programs or support ongoing programs to provide remote services to PLHIV. This cross-sectoral cooperation during the COVID-19 pandemic can be very effective in coordinating service delivery (35, 72).

Our review had two limitations. First is the lack of publication of sufficient articles with appropriate information on high-risk groups, such as female sex workers, transgender people, and people who inject drugs. Therefore, conducting more studies with a larger sample size of these groups can be very useful and effective in developing a suitable program to provide services. Second, like another review, publication bias is another limitation in this study as we included only English-published papers or reports. These limitations could change the results. Countries' experience during the COVID-19 Pandemic showed that HIV services especially in developing countries, are vulnerable in emergency situations. So, countries need to increase resilience in such a situation. We recommend that countries must decrease inequality and HIV-related stigma. Also, we recommend countries provide infrastructure for providing offline services such as telemedicine.

Conclusion

The results of this rapid review showed that PLHIV, and people at risk of HIV had difficulty in accessing follow-up, care and treatment services during the COVID-19 pandemic. Programs such as the MMD or telemedicine can be useful in providing services to PLHIV during the COVID-19 pandemic. Developing such programs builds trust in these high-risk groups and, on the other hand, solves restrictions in access to services for these individuals and other high-risk groups. However, these innovative or predesigned services should consider the needs and restrictions of these populations.

Acknowledgment

This study was supported by National Institute for Medical Research Development (NIMAD), Grant No.4000921.

Conflict of Interests

The authors declare that they have no competing interests.

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