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Breaking HIV stigma: the role of communication and treatment adherence in the mental health of injected drug users in Pakistan

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Abstract

The universal and disparaging nature of HIV stigma fuels discrimination, discourage HIV testing and treatment, and perpetuate cycles of marginalization in key populations, such as injecting drug users living with HIV/AIDS. Therefore, the objective of this research is to explore the correlation among HIV stigma, HIV-related communication, treatment adherence, and mental health in HIV positive injecting drug users in Pakistan. A cross-sectional survey research design was employed to recruit 200 consecutive participants purposively from the Mayo HIV Clinic, Lahore, Pakistan. HIV-positive injecting drugs users (IDU's) who were on follow-up treatment taking antiretroviral therapy (ART) were only recruited in this study. The study employed four established self-report measures: the HIV stigma scale, HIV-related communication scale, ART adherence measure, and an 18-item mental health inventory. Findings indicated that there is a significant negative association in HIV stigma and factors, such as HIV communication, treatment adherence, and mental health. Hierarchical regression analysis revealed that HIV-related communication and treatment adherence are significant positive predictors of mental well-being. Moreover, the parallel mediation model indicated that HIV communication and treatment adherence mediate in the association between HIV stigma and mental health. Addiction specialists and HIV clinicians must address issues, such as HIV related stigma and poor treatment adherence, as they are essential to enhance the overall well-being of HIV positive-IDUs. Furthermore, HIV clinicians must incorporate non-judgmental communication about HIV and simplified ART regimens to reduce the psychological toll of HIV stigma and treatment challenges.

Keywords: *HIV communication. HIV positive drug injectors. HIV. Mental health. Treatment adherence.*

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Introduction

The National AIDS Control Program Pakistan reports 0.24 million HIV patients indicating an alarm of danger[1]. Out of 46,912 HIV/AIDS patients, only 26,093 are receiving treatment, while about 45% have not initiated their treatment[1], despite providing free of cost HIV testing and treatment services[2]. The general prevalence of HIV positive drug injectors may reach up to 68,000 in 2020, while specific prevalence may range from 46% to 56% in Karachi and 44% to 50% in Lahore[3]. HIV-positive injecting drug users (IDUs) in Pakistan incorporate religious rituals into their treatment, including seeking spiritual healing as an alternative to lifelong antiretroviral therapy (ART). This may involve visiting religious scholars for practices, such as Dam Darood, during which ART may be temporarily suspended for 6 months[2]. Concealing HIV status due to fear of prejudice and discriminatory treatment results in limited support and follow-ups[2]. Therefore, it is more difficult to treat and prevent the growing HIV/AIDS epidemic in Pakistan[4]. Experiencing HIV stigma contributes to elevated level of chronic stress[5] risky behaviors, poor health outcomes, and increased rates of HIV transmission in HIV patients[6].

Stigma is a complex social phenomenon[7] encompassing the social devaluation and discrediting status of an individual associated with specific characteristics, attributes, and behaviors[8]. Minority stress theory explains the impact of chronic stressors, such as HIV stigma, on the health outcomes of marginalized populations, such as injected drug users[9]. HIV stigma is the negative feelings, attitudes, and beliefs directed toward oneself or toward people living with HIV[10]. Due to anticipated shame or rejection associated with HIV status, HIV-positive IDUs are more likely to feel reluctant while freely discussing HIV status or needs of HIV treatment with healthcare professionals, intimate partners, or other injecting drug users[11]. Such a type of poor communication leads to avoidance of healthcare and lack of social support, compromised treatment adherence, which is defined as the consistent use of ART for effective management of HIV/AIDS[12]. Factors, such as HIV stigmatization, poor HIV communication, and treatment adherence, cause poor mental health, which encompasses depressive and anxiety symptoms along with psychological distress[13].

According to the Health Stigma and Discrimination Framework, people who have stigmatized someone or something may act in a way that is discriminatory toward HIV patients[14]. In addition, it shows itself as prejudice and stereotypes, which refer to uninfected people's negative feelings (such as contempt, anger, and fear) toward persons living with HIV and the traits of HIV patients that are frequently assigned to specific individuals living with HIV[14]. The framework also suggests that stigma expressions affect people living with HIV/AIDS use of healthcare services, compliance with HIV treatment[15]. The stigmatized status of HIV/AIDS causes individuals to not engage in HIV testing[16], because of fear of negative consequences of a positive HIV test result[17]. Only 17% of the injecting drug users were adherent to treatment, with higher rates of non-adherence observed among single injecting drug users without children[18]. Similarly, another study reported that 59% injecting drug users were missed follow-up, and only 20% were adherent to treatment as compare to the non-injecting drug users that had a follow-up loss rate of 2%, with 90% treatment adherence[19]. Treatment adherence was linked to low level of depressive symptoms[20] while discontinuation of ART was associated with poor mental health[21]. Similarly, depressive symptoms were strongly linked to uncontrolled viral replication and poor treatment adherence[22]. Beside other factors, stigma was one of the factors associated with suboptimal treatment adherence[23], while other found no link between HIV stigma and treatment non-adherence[24].

HIV related communication is a technique that leads to advanced understanding regarding transmission of HIV/AIDS, HIV prevention strategies, and risky behavior[25], resulting in early diagnosis, HIV-related testing, and adherence to care[26]. HIV-related communication increases HIV testing, reduces HIV stigma, and results in health-seeking behaviors[6,27]. In light of the current literature, HIV-related communication with healthcare professionals, injecting drug users, and intimate partners has not yet been investigated in a sample of HIV-positive IDUs. Looking into the scarcity of literature regarding the effective interventions to combat HIV stigma[28], this study hypothesized that facilitating HIV related communication and treatment adherence may improve the mental health of HIV positive IDUs. Engaging treatment-resistant HIV-positive IDUs and newly injecting drug users in HIV-related communication may likely refrain them from sharing contaminated syringes, encourage the utilization of HIV/AIDS testing facilities and access to appropriate healthcare services. Through effective HIV communication, we may control HIV transmission and improve treatment adherence among both resistant and untested injecting drug users.

Using the health stigma and discrimination framework, this study investigates the protective factors, such as HIV communication and treatment adherence, which shield HIV positive IDUs against the mental health problems. Therefore, the objectives of this study include (a) to determine the association between HIV stigma, HIV communication, treatment adherence and mental health (b) to assess which independent variable is the best predictor of mental health in HIV-positive IDUs, (c) to examine the mediating role of HIV-related communication and treatment adherence in the association between HIV stigma and mental health in HIV-positive IDUs.

Method

Ethical statement

After granting approval from the Board of Advanced Studies and Research, Lahore Garrison University, and the Psychology Departmental Research Committee, the researcher approached the Punjab AIDS Control Program (PACP) to recruit HIV positive IDUs, visiting HIV clinics for taking ART. After completing all necessary requirements, PACP granted a permission letter to collect data from the HIV clinic at Mayo Hospital. Data collection took place over 3 months at Mayo Hospital's HIV clinic. The research's ethical considerations, such as the right to withdraw participation at any stage of the study confidentiality of information, and procedures, were thoroughly explained to each participant.

Study setting and sampling

This study utilized a cross-sectional research design to recruit 200 HIV-positive IDUs purposively from the HIV Clinic at Mayo Hospital, Lahore, Pakistan, with a collaboration of the Punjab AIDS Control Program. HIV-positive IDUs who were on follow-up treatment taking ART were only included in this study. While HIV-positive IDUs along with other comorbidities such as hepatitis and tuberculosis, having any physical disability, unable to respond, visiting HIV clinic for screening purposes, taking injections, such as antihistamines were excluded. After taking an informed consent, all the research participants filled the questionnaire booklet. The researcher cross-checked all the questionnaires to navigate if any question is not responded.

HIV stigma scale

The Urdu version of the HIV stigma Scale, the Brief version, was administered to measure the HIV-stigma-related experiences of HIV-positive IDUs[29]. This scale can be categorized into 4 sub-scales, including personalized stigma, disclosure concerns, concerns about public attitudes, and negative self-image. This standardized assessment tool is comprised 12 items having a 4-point Likert response format, ranging from 1 (strongly disagree) to 4 (strongly agree). All the responses were simply added up to determine the scale's score. The HIV stigma scale's reliability coefficient value for the English and Urdu versions was 0.87-0.96 and 0.95, respectively[30].

HIV-related communication

A single-item tool having an overall mean of 0.96 (SD = 0.91) was adopted from previous studies[31] to assess HIV related communication in HIV-positive IDUs. The Urdu version item "*During previous year, if they had participated in discussions with healthcare professionals, injected drug users and intimate partners regarding transmission and management of HIV/AIDS"* was asked from each participant and recorded on a 4-point Likert response format ranging from (4 = often to 1 = never). The arithmetic mean of this item in this study was (M = 1.58, SD = 0.89).

ART adherence

The 3-item adherence scale is a standardized assessment tool[32] having a reliability index of 0.83 and was employed to measure the level of treatment adherence of HIV-positive IDUs. For all three adherence items, the responses were transformed linearly to a 0-100 scale, with a score of zero representing the worst adherence and a score of 100 indicating the best adherence. The reliability index of the Urdu version in the current study was 0.89.

Mental health inventory (MHI)

The mental health of HIV-positive IDUs was assessed through administering MHI-18, a brief translated Urdu version of MHI-38[33], having a reliability index of 0.93. The MHI-18 consists of four subscales: depression, anxiety, positive affect, and behavioral control. Participants rate their responses on a 6-point Likert scale, ranging from 1 (all the time) to 6 (none of the

time). The scoring process involves reverse scoring for items 1, 3, 5, 7, 8, 10, 13, and 15. After reverse scoring of the aforementioned items, the mean of the scale is calculated. To transform the mean score to a range of 0-100, the mean score is subtracted by 1, multiplied by 100, and divided by 5. A higher score on the MHI-18 indicates better mental health. The translated Urdu version of the MHI-18 demonstrated a reliability index of 0.92, indicates a high level of internal consistency.

Data collection

The researcher approached each HIV-positive IDU who visited the Mayo HIV Clinic for a follow-up appointment. A sample size of 153 was calculated considering the 44% ART adherence rate of HIV-positive IDUs in Pakistan[34] with a 95% confidence interval and 5% error of measurement. The pre-selected alpha level was 0.05 with a power of 0.95 (95%) and an effect size of 0.15 (15%). The pre-selected type II error was 0.05 (5%). These calculations parallel well with the statistical testing methods, such as mediation and moderation analysis. The online sample size calculator was used to determine the pre-study sample size[35]. The sample size for this study was slightly bloated for augmenting the accuracy of statistical analyses. HIV-positive IDUs who provided informed consent to participate were evaluated based on the aforementioned inclusion criteria to determine their eligibility. A survey booklet was provided to targeted participants to fill it independently. The survey booklet typically took participants approximately 20-25 min to complete. HIV-positive IDUs having no education were interviewed by researchers, and their responses were recorded. After completion of the survey booklets, they were checked for accuracy. Questions that were left unanswered were completed again by the research participants.

Statistical analysis

The Statistical Package for the Social Sciences version 26 and Hayes Macro Process version 3.4 were employed to statistically analyze the collected data. The data entry errors were minimized through a process of double data entry by two main iinvestigators KM and FY. The main statistical tools utilized in this study were descriptive statistics, Pearson product-moment correlation, multiple hierarchical regression analysis, and parallel mediation analysis. Pearson product-moment correlation was utilized to assess the linear relationship between variables having a normal data distribution. Multiple hierarchical regression analysis allows the inclusion of several explanatory factors, such as HIV stigma, HIV communication, and treatment adherence, to predict the outcome - mental health in the current study. Since parallel mediation analysis utilizes multiple mediators, allows them to correlate, restricts the casual influence between mediators, and has as much indirect effects as the number of mediators, allowing researchers to understand the complex assessment of processes through which independent variables effect dependent variables[36], therefore this study utilizes parallel mediation analysis.

Results

Table 1 indicates the demographic distribution of recruited HIV positive IDUs.

Table 2 indicates the frequency distribution of treatment adherence and HIV-related communication of HIV-positive IDUs. The majority of the recruited injecting drug users reported poor treatment adherence (n = 159, 79.5%), have good to excellent adherence quality (n = 113, 56.5%), almost average frequency of adherence. Furthermore, more than half of the recruited participants were not engaged in HIV-related communication.

Findings demonstrated a significant negative association between HIV social stigma and HIV-related communication ($r [200] = -0.22$, $p < 0.01$), treatment adherence ($r [200] = -0.17$, $p < 0.05$), and mental health ($r [200] = -0.23$, $p < 0.01$). HIV-related communication was significantly positively linked to treatment adherence ($r [200] = 0.21$, $p < 0.01$) as well as mental health ($r [200] = 0.44$, $p < 0.01$). Similarly, the results revealed a significant positive link between treatment adherence and mental health ($r [200] = 0.38$, $p < 0.01$) (Table 3). Findings suggest that HIV positive IDUs engage in HIV communication and treatment adherence are more likely to have better mental health outcomes.

Table 4 indicates the multiple hierarchical regression analysis of HIV stigma, HIV-related communication, treatment adherence and mental health in HIV positive IDUs. Findings revealed that both HIV communication and treatment adherence were significant positive predictors, whereas HIV stigma was not a significant predictor of mental well-being. Hierarchical regression analysis demonstrates that HIV stigma is not a significant predictor of poor mental health. However, HIV communication and treatment adherence improve the mental well-being of HIV positive IDUs.

The findings of parallel mediation analysis indicate significant total effects of HIV stigma on mental Health ($\beta = -0.75$, $p < 0.00$). Furthermore, table 4 depicted

Table 1. Frequency distribution of demographic variables (n = 200)

Demographic variables	Characteristics	F-value	Percentage
Age (years)	18-29	91	45.5
	30-42	81	40.5
	43-55	28	14.0
Education	Primary	121	60.5
	Secondary	56	28.0
	Undergraduate	23	11.5
Marital status	Married	98	49.0
	Unmarried	102	51.0
Family income	25K-50K	170	85.0
	50K-75K	22	11.0
	75-100K	8	4.0
Type of injecting illicit drugs	Heroine	143	71.5
	Cocaine	10	5.0
	Amphetamine	47	23.5
Duration of injecting drugs (years)	1-4	87	43.5
	5-8	67	33.5
	9-12	46	23.0
Source of injecting syringes	Contaminated syringes	106	53.0
	Borrowing from friends	88	44.0
	Medical store	06	3.0
HIV/AIDS status of spouse	Yes	13	6.5
	No	187	93.5
Duration of HIV/AIDS (years)	1-3	127	63.5
	4-6	38	19.0
	7-9	35	17.5
Weight Loss after HIV/AIDS (kg)	1-5	42	21.0
	6-10	68	34.0
	11-15	90	45.0
Perceived chances of recovery (%)	20	14	7.0
	40	12	6.0
	60	116	58.0
	80	38	19.0
	100	20	10.0
HIV status disclosure	Yes	173	86.5
	No	27	13.5

Table 2. Frequency distribution of self-reported treatment adherence and HIV communication (n = 200)

Variables	Frequency	Percentage
Missed doses		
Missed a few or no doses (0-33)	25	12.5
Missed some doses occasionally (34-66)	16	8
Missed many doses or frequently (67-100)	159	79.5
Adherence quality		
Very poor	27	13.5
Poor	21	10.5
Fair	39	19.5
Good	67	33.5
Very good	29	14.5
Excellent	17	8.5
Adherence frequency		
Never	28	14
Rarely	19	9.5
Sometimes	52	26.0
Usually	48	24.0
Almost always	20	10.0
Always	33	16.5
HIV-related communication		
Never	128	64.0
Ever	36	18.0
Sometime	27	13.5
Often	9	4.5

significant effects of HIV stigma on HIV-related communication ($\beta = -0.02$, $p < 0.01$) and HIV-related communication on mental health ($\beta = 8.67$, $p < 0.00$). Similarly, HIV stigma has a significant effect on treatment adherence ($\beta = -0.68$, $p < 0.05$) and treatment adherence on mental health ($\beta = 0.21$, $p < 0.00$). Findings showed full mediation between HIV stigma, HIV-related communication, treatment adherence and mental health. As after controlling HIV communication and treatment adherence, the direct effect of HIV stigma on mental health reduced ($\beta = -0.34$, SE = 0.19, $p > 0.05$) (Fig. 1), and c' path was insignificant (Table 5). Mediation analysis indicated that HIV stigma is not predicting poor mental health, but it hinders both HIV communication and treatment adherence, which subsequently leads to poor mental health.

Findings indicated that there was a significant total indirect effect of HIV stigma via HIV-related communication and treatment adherence on mental health (Table 6).

Discussion

Pakistan, being a predominantly Muslim country with strong cultural and religious values, experiences

Table 3. Relationship between HIV stigma, HIV-related communication, treatment adherence and mental health in HIV positive IDUs (n = 200)

Variables	M	SD	1	2	3	4
HIV stigma	41.80	6.81	-	–0.22†	–0.17*	–0.23†
HIV communication	1.58	0.88	-	-	0.21‡	0.44‡
Treatment adherence	60.60	28.27	-	-	-	0.38‡
Mental health	30.07	21.74	-	-	-	-

*p < 0.05.
†p < 0.01.
‡p < 0.001.
M: mean; SD: standard deviation.

Table 4. Multiple hierarchical regression analysis of HIV stigma, HIV-related communication, treatment adherence, and mental health of HIV-positive IDUs (n = 200)

Variables	B	95% CI		SE	B	R^2	ΔR^2
		LL	UL				
Step 1 HIV stigma	–0.75	–1.18	–0.31	0.22	–0.23†	0.05	0.05†
Step 2 HIV communication	9.97	6.83	13.11	1.59	0.40‡	0.21	0.15‡
Step 3 Treatment adherence	0.22	0.12	0.31	0.04	0.28‡	0.28	0.07‡

*p < 0.05.
†p < 0.01.
‡p < 0.001.
Outcome: mental health; CI: confidence interval; LL: lower limit; UL: upper limit, B: standardized coefficient, β: unstandardized coefficient; SE: standard error.

Table 5. Regression coefficients, standard error, and model summary information for HIV stigma, HIV related communication, treatment adherence, and mental health in HIV positive IDUs (n = 200)

Antecedent	Consequent											
	HIVC (M1)				TA (M2)				MH (Y)			
	Model pathways	β	SE	p	Model pathways	β	SE	p	Model pathways	β	SE	p
HIVS (X)	a1	–0.02	0.00	0.00†	a2	–0.68	0.29	0.02*	c′	–0.34	0.19	0.08
HIVC (M1)									b1	8.67	1.54	0.00‡
TA (M2)									b2	0.21	0.04	0.00‡
Constant	I	2.82	0.38	0.00‡	i	89.36	12.30	0.000‡	i	17.38	9.81	0.03*
				R^2 = 0.05			R^2 = 0.03			R^2.28		
				F (1,198) = 10.78			F (1,198) = 5.60			F (3,196) = 26.60		
				p = 0.00†			p = 0.01*			p = 0.00‡		

*p < 0.05.
†p < 0.01.
‡p < 0.001 is statistically significant.
HIVS: HIV stigma, HIVC: HIV communication, TA: treatment adherence, MH: mental health, SE: standard error, β: regression coefficient.

specific challenges related to HIV/AIDS. The emphasis on maintaining honor and social standing in Pakistani society further contributes to the stigmatization of HIV/AIDS. Therefore, this study adopted a cross-sectional research design to investigate the link between HIV stigma, treatment adherence, HIV communication, and

Table 6. The indirect effect of HIV stigma on mental health through HIV-related communication and treatment adherence in HIV-positive IDUs (n = 200)

Indirect path	Estimate	SE	LL	UL
HIVC	–0.08	0.03	–0.15	–0.01
TA	–0.04	0.01	–0.08	–0.01

HIVC: HIV communication; TA: treatment adherence; LL: lower limit; UL: upper limit.

mental health, using standardized assessment tools. The majority of the recruited injecting drug users were exhibiting poor treatment adherence (n = 159, 79.5%), and a lack of HIV-related communication (n = 128, 64.0%) with healthcare professionals, injected drug users, and intimate partners.

The findings of the correlation analyses indicated that there is a significant negative connection between HIV stigma and HIV-related communication, reinforcing previous literature[6,24]. This relationship could be attributed to the lack of comprehensive sex education, use of illicit drugs, and unprotected sex[37]. Such limited knowledge and understanding about HIV infection perpetuates fear and misinformation, causing hindrance of HIV related open communication and reinforcement of HIV stigma. Furthermore, HIV stigma is speculated to hinder the HIV-related communication with healthcare professionals, injected drug users, and intimate partners because of fear of stigmatization. Therefore, it is assumed that HIV related communication will decelerate the discriminatory attitude of healthcare professionals, inhibiting the exchange of syringes with other injected drug users and unprotected sex with intimate partners in injecting drug users living with HIV/AIDS.

This study revealed that HIV stigma is significantly negatively associated to treatment adherence in HIV positive IDUs, reinforcing the existing literature[23]. Individuals are discouraged to adhere to ART regimens in Pakistan because of breaches of confidentiality, judgment, and fear of discrimination due to their HIV status[38]. Studies documented barriers to treatment adherence in Pakistan include use of holy water, traditional potions from traditional healers, and prayers to cure HIV[39], undermining the efforts of medical communities to initiate and retain HIV-positive IDUs on ART[40]. The unwavering connection of Pakistani HIV-positive IDUs to religious leaders and traditional healers discourage them from the use of complimentary pharmacotherapy, consequently eroding their trust in the healthcare systems[41]. The plethora of systematic review studies revealed that 71% of cross-sectional research studies reported a negative link between HIV stigma and treatment adherence, while 86% of longitudinal studies reported no relationship between HIV stigma and treatment adherence[42]. This association could be explained by misinformation, limited access to services regarding healthcare, and a lack of trust on system of healthcare[43]. However, the misalignment with the cross-sectional and longitudinal studies could be attributed to contextual differences or variations of sample characteristics, which demonstrate the need of investigating the link between HIV stigma and treatment adherence in the unique cultural and religious context of Pakistan.

The findings of this study determine a significant negative relationship between HIV stigma and the mental health of HIV-positive IDUs, aligning with the previous literature[44]. The incurable nature of HIV infection can be attributed to the perpetuating nature of HIV stigma, which leads to difficulties in accessing proper health care services and concerns about the maintenance of overall health[45]. The limited knowledge about HIV infection, such as its association with immoral behaviors among the general public cause them to avoid HIV positive IDUs due to fear of transmission. Similarly, misunderstanding of HIV infection as a result of personal sins exacerbates the stigma, causing fear of HIV status disclosure, decreased self-worth, and an elevated level of distress[46]. The societal prejudice toward HIV positive IDUs characterized them as being lesser than humans[47]. In the simplest forms, poor treatment adherence and prejudiced behavior toward HIV patients cause their poor mental health.

The current study revealed a significant positive link between HIV-related communication and the mental health of HIV-positive IDUs. In Pakistan, discussions about sexual health and HIV infections are considered as taboo due to the conservative attitude of people toward sexuality[37]. Whereas, literature suggested that engagement in HIV-related communication contribute to the reduction of stigma associated with HIV infection[24]. This novel understanding of HIV related communication and mental health indicates that HIV-related communication may empower HIV-positive IDUs to access accurate information, share experiences related to their health and HIV infection, and empowers them to seek social support. HIV-related open dialogues help injecting drug users with HIV/AIDS to challenge norms of society, addressing internalized stigma and seeking support and validation of their stigmatized status.

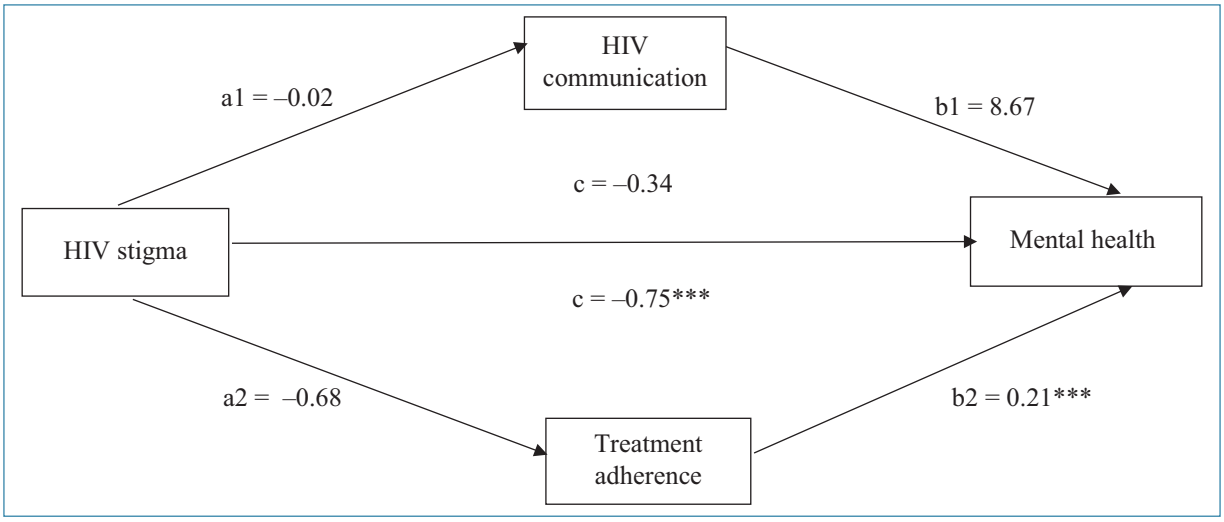

Figure 1. Parallel mediation model of HIV stigma, HIV-related communication, treatment adherence, and mental health.

Such type of empowerment, support, and self-acceptance lead to improved psychological health.

The current study demonstrated a significant positive link between treatment adherence and the mental health of HIV positive IDUs. The possible explanation regarding the relationship between treatment adherence and mental health could be provided by looking to treatment adherence as an act of commitment and responsibility to improve one's health in line with cultural values of personal well-being and self-care. Therefore, the adherence of HIV positive IDUs to ART may improve their mental health[48]. Furthermore, treatment adherence indicates a proactive approach of an individual to manage HIV/AIDS infection, nourishing self-control over one's health[49]. The improvement in physical health due to treatment adherence, coupled up with self-control over one's health, improve self-esteem, and reduce psychological distress[50].

Parallel mediation analysis indicated the association between HIV stigma and mental health is significantly mediated by HIV-related communication and treatment adherence. According to the knowledge of researcher, this is the first study investigating the mediating role of treatment adherence and HIV-related communication in the association between HIV stigma and mental health in HIV-positive IDUs. HIV/AIDs stigma is strongly ingrained in the cultural and religious beliefs of Pakistani society, associating HIV infection with immoral behaviors, such as extramarital affairs and sexual intercourse with prostitutes. Such stigmatization leads to feelings of guilt and shame, isolation, and social rejection of HIV-positive IDUs. Therefore, it is assumed that HIV positive individuals engaged in open HIV-related communication may experience less stigmatization, building of self-acceptance and resilience, and access to healthcare services, which may in turn improve their mental health. Furthermore, HIV related communication may lead to adherence of HIV positive IDUs to ART regimens, aiding in getting greater self-control over one's health and improved physical health. The combined effect of both HIV related communication and treatment adherence improves the mental health of HIV positive individuals. The mediating link of HIV related communication and treatment adherence illustrates their prospects to achieve better mental health of HIV-positive IDUs.

Limitation

The present study is a preliminary study that investigated the relationship between HIV stigma and HIV-related communication, treatment adherence and mental health, contributing significantly to existing literature but it has some limitations, which are mentioned below:

– The present research is a quantitative study and self-report measures were used, which may limit the interpretation of findings due to a risk of recall inaccuracies and social desirability. For future research, the qualitative method of inquiry can be used to assess the indigenous effect of Pakistani culture and social values on mental health of HIV-positive IDUs.

- The available standardized questionnaire of HIV communication is a single-item tool that lacks a complex assessment of this construct. It is recommended for future research to develop an Urdu-validated comprehensive assessment tool to measure HIV related communication.
- The sample recruited in this study was HIV-positive IDUs, which may limit the generalizability of the study's findings to non-injecting drug users HIV-positive patients.
- Researchers used cross-sectional research design in the present study, which may restrict the ability to draw causal inference between the study variables. Researchers in the future may adopt a longitudinal research design to identify the causal relationships and temporal dynamics of HIV stigma, HIV-related communication, treatment adherence, and mental health outcomes.

Practical implications

The current research study accentuates the need of proposing a comprehensive HIV-related education program, especially focusing on injectable illicit drugs use to prevent the transmission and reduction in incidence rate of HIV/AIDS infection. This study also necessitates the promotion of HIV-related communication among injected drug users, health care professionals and their intimate partners to prevent the incidence of HIV/AIDs in injecting drug users. Simplest ART regimens must be advised to injected drug users to enhance their both physical health and mental well-being. There is a need of a focused program to upgrade the psychological health of HIV-positive IDUs by addressing the intersectional effects of HIV stigmatization and HIV/AIDS infection.

Conclusion

This study highlights the intricate interplay between HIV stigma, HIV-related communication, treatment adherence, and mental health among HIV-positive IDUs in Pakistan. The findings revealed that HIV stigma negatively impacts various aspects of well-being, including open discussion about HIV and adherence to treatment, ultimately leading to poorer psychosocial health outcomes. Cultural and religious values in Pakistan significantly hinder discussions about HIV/AIDS, contributing to the persistence of stigma. However, this study also underscores the transformative potential of HIV-related communication and consistent treatment adherence in the management and prevention of HIV/AIDS infection, as well as in enhancing mental health outcomes. Addressing these issues are pivotal in fostering a supportive environment that promotes the health and well-being among individuals living with HIV.

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Conflicts of interest

None.

Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval. The study does not involve patient personal data nor requires ethical approval. The SAGER guidelines do not apply.

Declaration on the use of artificial intelligence. The authors declare that generative artificial intelligence was used to fix language and grammar errors in the writing of this manuscript.

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