2022-2023 Service Category Definition - DSHS State Services

Local Service Category:	**Mental Health Services**
Amount Available**:**	**To be determined**
Unit Cost	
Budget Requirements or Restrictions **(TRG Only)**:	Maximum of 10% of budget for Administrative Cost.
DSHS Service Category Definition	Mental Health Services include psychological and psychiatric treatment and counseling services offered to individuals with a diagnosed mental illness, conducted in a family/couples, group or individual setting, based on a detailed treatment plan, and provided by a mental health professional licensed or authorized within the State to provide such services, typically including psychiatrists, psychologists, and licensed clinical social workers. Mental health counseling services includes outpatient mental health therapy and counseling (individual and family/couple) provided solely by Mental Health Practitioners licensed in the State of Texas. Mental health services include: • Mental Health Assessment • Treatment Planning • Treatment Provision • Individual psychotherapy • Family psychotherapy • Conjoint psychotherapy • Group psychotherapy • Psychiatric medication assessment, prescription and monitoring • Psychotropic medication management • Drop-In Psychotherapy Groups • Emergency/Crisis Intervention General mental health therapy, counseling and short-term (based on the mental health professional's judgment) bereavement support is available for family members or significant others of people living with HIV.
Local Service Category Definition:	**Individual Therapy/counseling** is defined as 1:1 or family-based crisis intervention and/or mental health therapy provided by a licensed mental health practitioner to an eligible person living with HIV. **Family/Couples Therapy/Counseling** is defined as crisis intervention and/or mental health therapy provided by a licensed mental health practitioner to a family or couple (opposite-sex, same-sex, transgendered or non-gender conforming) that includes an eligible person living with HIV.

2022-2023 Service Category Definition - DSHS State Services

	Support Groups are defined as professionally led (licensed therapists or counselor) groups that comprise people living with HIV, family members, or significant others for the purpose of providing emotional support directly related to the stress of caring for people living with HIV.
Target Population (age, gender, geographic, race, ethnicity, etc.):	People living with HIV and affected individuals living within the Houston HIV Service Delivery Area (HSDA).
Services to be Provided:	Agencies are encouraged to have available to clients all modes of counseling services, i.e., crisis, individual, family, and group. Sessions may be conducted in-home. Agency must provide professional support group sessions led by a licensed counselor.
Service Unit Definition(s) **(TRG Only)**:	**Individual Crisis Intervention and/or Therapy:** A unit of service is defined as an individual counseling session lasting a minimum of 45 minutes. **Family/Couples Crisis Intervention and/or Therapy:** A unit of service is defined as a family/couples counseling session lasting a minimum of 90 minutes. **Group Therapy:** A unit of service is defined as one (1) eligible client attending 90 minutes of group therapy. The minimum time allowable for a single group session is 90 minutes and maximum time allowable for a single group session is 120 minutes. No more than one unit may be billed per session for an individual or group session. A minimum of three (3) clients must attend a group session in order for the group session to eligible for reimbursement. **Consultation:** One unit of service is defined as 15 minutes of communication with a medical or other appropriate provider to ensure case coordination.
Financial Eligibility:	Income at or below 400% Federal Poverty Guidelines.
Client Eligibility:	For individual therapy session, person living with HIV or the affected significant other of a person living with HIV, resident of Houston HSDA. Person living with HIV must have a current DSM diagnosis eligible for reimbursement under the State Medicaid Plan. Client must not be eligible for services from other programs or providers (i.e. MHMRA of Harris County) or any other reimbursement source (i.e. Medicaid, Medicare, Private Insurance) unless the client is in crisis and cannot be provided immediate services from the other programs/providers. In this case, clients may be provided services, if the client applies for the other

	programs /providers, until the other programs/providers can take over services. Medicaid/Medicare, Third Party Payer and Private Pay status of clients receiving services under this grant must be verified by the provider prior to requesting reimbursement under this grant. For support group sessions, client must be either a person living with HIV or the significant other of person living with HIV. Affected significant other is eligible for services only related to the stress of caring for a person living with HIV.
Agency Requirements **(TRG Only)**:	Agency must provide assurance that the mental health practitioner shall be supervised by a licensed therapist qualified by the State to provide clinical supervision. This supervision should be documented through supervision notes. Keep attendance records for group sessions. Must provide 24-hour access to a licensed counselor for current clients with emotional emergencies. Clients eligible for Medicaid or 3rd party payer reimbursement may not be billed to grant funds. Medicare Co-payments may be billed to the contract as ½ unit of service. Documentation of at least one therapist certified by Medicaid/Medicare on the staff of the agency must be provided in the proposal. All funded agencies must maintain the capability to serve and seek reimbursement from Medicaid/Medicare throughout the term of their contract. Potential clients who are Medicaid/ Medicare eligible may not be denied services by a funded agency based on their reimbursement status (Medicaid/Medicare eligible clients may not be referred elsewhere in order that non-Medicaid/Medicare eligible clients may be added to this grant). Failure to serve Medicaid/Medicare eligible clients based on their reimbursement status will be grounds for the immediate termination of the provider's contract. Must comply with the State Services Standards of Care. Must provide a plan for establishing criteria for prioritizing participation in group sessions and for termination from group participation. Providers and system must be Medicaid/Medicare certified to ensure that Ryan White funds are the payer of last resort.
Staff Requirements:	It is required that counselors have the following qualifications: Licensed Mental Health Practitioner by the State of Texas (LCSW,

	LMSW, LPC PhD, Psychologist, or LMFT). At least two years' experience working with HIV disease or two years' work experience with chronic care of a catastrophic illness. Counselors providing family sessions must have at least two years' experience in family therapy. Counselors must be covered by professional liability insurance with limits of at least $300,000 per occurrence.
Special Requirements **(TRG Only)**:	All mental health interventions must be based on proven clinical methods and in accordance with legal and ethical standards. The importance of maintaining confidentiality is of critical importance and cannot be overstated unless otherwise indicated based on Federal, state and local laws and guidelines (i.e. abuse, self or other harm). All programs must comply with the Health Insurance Portability and Accountability Act (HIPAA) standards for privacy practices of protected health information (PHI) information. Mental health services can be delivered via telehealth and must follow applicable federal and State of Texas privacy laws. Mental health services that are provided via telehealth must be in accordance with State of Texas mental health provider practice requirements, see Texas Occupations Code, Title 3 Health Professions and chapter 111 for Telehealth & Telemedicine. When psychiatry is provided as a mental health service via telehealth then the provider must follow guidelines for telemedicine as noted in Texas Medical Board (TMB) guidelines for providing telemedicine, Texas Administrative Code, Texas Medical Board, Rules, Title 22, Part 9, Chapter 174, RULE §174.1 to §174.12 Medicare and private insurance co-payments are eligible for reimbursement under this grant (in this situation the agency will be reimbursed the client's co-payment only, not the cost of the session which must be billed to Medicare and/or the Third-party payer). Extensions will be addressed on an individual basis when meeting the criteria of counseling directly related to HIV illness. Under no circumstances will the agency be reimbursed more than two (2) units of individual therapy per client in any single 24-hour period. Agency should develop services that focus on the most current Special Populations identified in the *Houston Area Comprehensive Plan for HIV Prevention and Care Services* including Adolescents, Homeless, Incarcerated & Recently Released (IRR), Injection Drug Users (IDU), Men who Have Sex with Men (MSM), and Transgender populations. Additionally, services should focus on

	increasing access for individuals living in rural counties. Must comply with the Houston EMA/HSDA Standards of Care. The agency must comply with **the DSHS Mental Health Services Standards of Care**. The agency must have policies and procedures in place that comply with the standards ***prior*** to delivery of the service.

2022-2023 Service Category Definition - DSHS State Services

FY 2022 RWPC "How to Best Meet the Need" Decision Process

Step in Process: **Council**		Date: **06/10/2021**
Recommendations:	Approved: Y:_____ No: _____ Approved With Changes:_____	If approved with changes list changes below:
1.		
2.		
3.		

Step in Process: **Steering Committee**		Date: **06/03/2021**
Recommendations:	Approved: Y:_____ No: _____ Approved With Changes:_____	If approved with changes list changes below:
1.		
2.		
3.		

Step in Process: **Quality Improvement Committee**		Date: **05/18/2021**
Recommendations:	Approved: Y:_ ___ No: _____ Approved With Changes: _____	If approved with changes list changes below:
1.		
2.		
3.		

Step in Process: **HTBMTN Workgroup #2**	Date: **04/20/2021**
Recommendations:	Financial Eligibility:
1.	
2.	
3.	

MENTAL HEALTH SERVICES
2019 CHART REVIEW

PREFACE

DSHS Monitoring Requirements

The Texas Department of State Health Services (DSHS) contracts with The Houston Regional HIV/AIDS Resource Group, Inc. (TRG) to ensure that Ryan White Part B and State of Texas HIV Services funding is utilized to provide in accordance to negotiated Priorities and Allocations for the designated Health Service Delivery Area (HSDA). In Houston, the HDSA is a ten-county area including the following counties: Austin, Chambers, Colorado, Fort Bend, Harris, Liberty, Montgomery, Walker, Waller, and Wharton. As part of its General Provisions for Grant Agreements, DSHS also requires that TRG ensures that all Subgrantees comply with statutes and rules, perform client financial assessments, and delivery service in a manner consistent with established protocols and standards.

As part of those requirements, TRG is required to perform annual quality compliance reviews on all Subgrantees. Quality Compliance Reviews focus on issues of administrative, clinical, data management, fiscal, programmatic and quality management nature. Administrative review examines Subgrantee operating systems including, but not limited to, non-discrimination, personnel management and Board of Directors. Clinical review includes review of clinical service provision in the framework of established protocols, procedures, standards and guidelines. Data management review examines the Subgrantee's collection of required data elements, service encounter data, and supporting documentation. Fiscal review examines the documentation to support billed units as well as the Subgrantee's fiscal management and control systems. Programmatic review examines non-clinical service provision in the framework of established protocols, procedures, standards and guidelines. Quality management review ensures that each Subgrantee has systems in place to address the mandate for a continuous quality management program.

QM Component of Monitoring

As a result of quality compliance reviews, the Subgrantee receives a list of findings that must be address. The Subgrantee is required to submit an improvement plan to bring the area of the finding into compliance. This plan is monitored as part of the Subgrantee's overall quality management monitoring. Additional follow-up reviews may occur (depending on the nature of the finding) to ensure that the improvement plan is being effectively implemented.

Scope of Funding

TRG contracts with two Subgrantees to provide hospice services in the Houston HSDA.

INTRODUCTION

Description of Service

Mental Health Services are treatment and counseling services offered to individuals with a diagnosed mental illness, conducted in a group or individual setting, and provided by a mental health professional licensed or authorized within the State to render such services. **Individual Therapy/counseling** is defined as 1:1 or family-based crisis intervention and/or mental health therapy provided by a licensed mental health practitioner to an eligible HIV positive or HIV/AIDS affected individual. **Support Groups** are defined as professionally led (licensed therapists or counselor) groups that comprise HIV positive individuals, family members, or significant others for the purpose of providing emotional support directly related to the stress of caring for an HIV positive person.

Tool Development

The TRG Mental Health Services Tool is based upon established local standards of care.

Chart Review Process

All charts were reviewed by Bachelors-degree registered nurse experienced in treatment, management, and clinical operations in HIV care of over 10 years. The collected data for each site was recorded directly into a preformatted computerized database. The data collected during this process is to be used for service improvement.

File Sample Selection Process

Using the ARIES database, the file sample was created from a provider population of 216 who accessed mental health services in the measurement. The records of 51 clients were reviewed, representing 24% of the unduplicated population. The demographic makeup of the providers was used as a key to file sample pull.

NOTES: DSHS modified their review process to exclude indicators that were <51% in last years this year. As a result, only one (1) indicator was reviewed in 2018. The results listed below are from 2017, with the exception of the one (1) indicator reviewed.

Demographics- Mental Health

2018 Annual

Total UDC: 216

Age	Number of Clients	% of Total
Client's age as of the end of the reporting period		
Less than 2 years	0	0.00%
02 - 12 years	0	0.00%
13 - 24 years	4	1.85%
25 - 44 years	73	33.80%
45 - 64 years	127	58.80%
65 years or older	12	5.55%
Unknown	0	0.00%
	216	100%
Gender	**Number of Clients**	**% of Total**
"Other" and "Refused" are counted as "Unknown"		
Female	20	9.26%
Male	196	90.74%
Transgender FTM	0	0.00%
Transgender MTF	5*	2.31%
Unknown	0	0.00%
	216	100%
Race/Ethnicity	**Number of Clients**	**% of Total**
Includes Multi-Racial Clients		
White	138	63.89%
Black	73	33.80%
Hispanic	38*	17.59%
Asian	2	0.93%
Hawaiian/Pacific Islander	0	0.00%
Indian/Alaskan Native	1	0.46%
Unknown	2	0.93%
	216	100%

From 01/01/18 - 12/31/18

2019 Annual

Total UDC: 282

Age	Number of Clients	% of Total
Client's age as of the end of the reporting period		
Less than 2 years	0	0.0%
02 - 12 years	0	0.0%
13 - 24 years	9	3.2%
25 - 44 years	139	49.2%
45 - 64 years	119	42.2%
65 years or older	15	5.3%
Unknown	0	0.0%
	282	100%
Gender	**Number of Clients**	**% of Total**
"Other" and "Refused" are counted as "Unknown"		
Female	42	14.9%
Male	240	85.1%
Transgender FTM	0	0.00%
Transgender MTF	9*	3.19%
Unknown	0	0.00%
	282	100%
Race/Ethnicity	**Number of Clients**	**% of Total**
Includes Multi-Racial Clients		
White	160	56.7%
Black	115	40.8%
Hispanic	66*	23.4%
Asian	0	0.0%
Hawaiian/Pacific Islander	1	0.35%
Indian/Alaskan Native	2	0.70%
Multi/Unknown	4	1.4%
	282	100%

From 01/01/19 - 12/31/19

RESULTS OF REVIEW-2018

Psychosocial Assessment

Psychosocial Assessment completed no later than third counseling session.

	Yes	No	N/A
Clients with psychosocial assessment completed no later than the 3rd appt.	59	-	-
Client records reviewed that included in this measure.	59	-	-
Rate	**100%**	-	-

Psychosocial Assessment: Required Elements

Psychosocial Assessment included assessment of all elements in the Mental Health Standards.

	Yes	No	N/A
Clients with assessment completed no later than the 3rd appt.	59	-	-
Client records reviewed that included in this measure.	59	-	-
Rate	**100%**	-	-

Treatment Plan

(**NEW 2018**) Documentation of detailed treatment plan and services provided within client's primary record.

	Yes	No	N/A
Treatment plan and services detailed in client record.	38	12	1
Client records reviewed that included in this measure.	50	50	51
Rate	**76%**	**24%**	2%

Treatment Plan completed no later than third counseling session.

	Yes	No	N/A
Clients with treatment plans completed no later than the 3rd counseling session.	52	-	7
Client records reviewed that included in this measure.	52	-	59
Rate	**100%**	-	12%

Treatment Plan: Signed by Therapist

Treatment Plan was signed by the mental health professional who rendered service.

	Yes	No	N/A
Clients with treatment plans signed by the mental health professional rendering service.	52	-	7
Client records reviewed that included in this measure.	52	-	59
Rate	**100%**	-	12%

Treatment Plan: Reviewed/Modified

Treatment Plan was reviewed and/modified at least every ninety (90) days.

	Yes	No	N/A
Clients with treatment plans reviewed/modified every 90 days.	50	2	7
Client records reviewed that included in this measure.	52	52	59
Rate	**96%**	**4%**	12%

Services Provided: Required Elements

Treatment included counseling covering all elements outlined in the Mental Health Standards.

	Yes	No	N/A
Clients who received counseling covering all elements.	59	-	-
Client records reviewed that included in this measure.	59	-	-
Rate	**100%**	-	-

Services Provided: Psychiatric Evaluation

Treatment included psychiatric evaluation was conducted/referral completed if needed.

	Yes	No	N/A
Clients who psychiatric evaluation was conducted/referral completed if needed.	1	-	58
Client records reviewed that included in this measure.	59	-	59
Rate	**100%**	-	-

Services Provided: Psychiatric Medication

Treatment included psychotropic medication management services, if needed.

	Yes	No	N/A
Clients who documented psychotropic medication management service was provided if needed.	-	-	59
Client records reviewed that included in this measure.	59	-	59
Rate	**0%**	-	100%

Services Provided: Progress Notes

Progress notes completed for each counseling session and contained all elements outlined in the Mental Health Standards.

	Yes	No	N/A
Clients with progress notes complete and containing all elements.	59	-	-
Client records reviewed that included in this measure.	59	-	-
Rate	**100%**	-	-

Services Provided: Medical Care Coordination

Evidence that care was coordinated as appropriate across all medical care coordination team members.

	Yes	No	N/A
Clients with care coordinated across team.	59	-	-
Client records reviewed that included in this measure.	59	-	-
Rate	**100%**	-	-

Referrals: Referrals Made as Needed

Documentation that referrals were made as needed to specialized medical/mental health providers/services.

	Yes	No	N/A
Clients with referral needed and made.	27	-	32
Client records reviewed that included in this measure.	27	-	59
Rate	**100%**	-	-

Referrals: Referrals Outcome

Documentation is present in client's record of the referral and the outcome of the referral.

	Yes	No	N/A
Clients with referral document with outcome of referral.	27	-	32
Client records reviewed that included in this measure.	27	-	59
Rate	**100%**	-	-

Discharge Planning

Documentation is present that discharge planning was completed with the client.

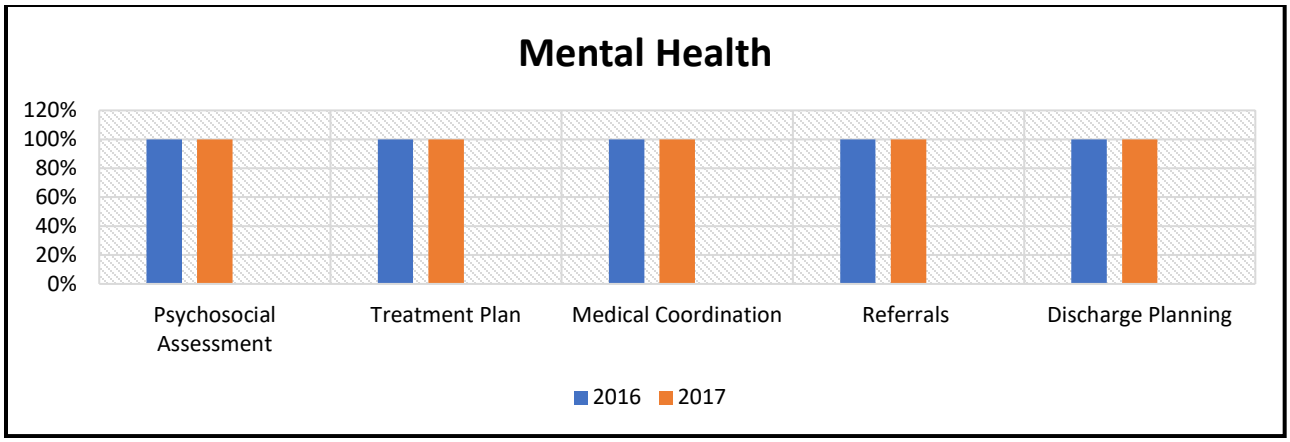
	Yes	No	N/A
Clients with documented discharge planning.	26	-	33
Client records reviewed that included in this measure.	26	-	59
Rate	**100%**	-	-

Discharge

Documentation is reason for discharge is located in the client's record and is consistent with agency policies.

	Yes	No	N/A
Clients with documented reason for discharge.	23	-	36
Client records reviewed that included in this measure.	23	-	59
Rate	**100%**	-	-

HISTORICAL DATA



CONCLUSION

Quality of mental health services continues to excellent. All clients reviewed (100%) completed a psychosocial assessment no later than the third counseling session, all clients had a treatment plan and medical care coordination was appropriate across all medical care coordination team members. Eleven data elements were met at 100%.

Integrating Mental Health Care Services Into HIV Comprehensive Care

Stephen Scroggins, MSc; Enbal Shacham, PhD; and Montara Renee November, MPA

ABSTRACT

OBJECTIVES: HIV prevention strategies prioritize medication adherence among people living with HIV (PLWH). Of the 1.1 million PLWH in the United States, more than two-fifths are not virally suppressed and thus experience increased morbidity and mortality as well as transmission risk. Integrated care models are meant to address these gaps and often cite the importance of mental health care services (MHCS). However, research into the impact of integrating MHCS has been limited to those in homogenous treatment.

STUDY DESIGN: This study used an analytic observational cross-sectional design to achieve the above objectives.

METHODS: This study utilized a cross-sectional survey aimed to identify needs among PLWH in the Midwestern region of the United States and to stratify by both MHCS need and receipt. The survey, administered throughout 2018 in 12 HIV service organizations, was completed by PLWH receiving different supportive services. Comparative logistic regression models were calculated to identify the likelihood of nonadherence based on both MHCS receipt and need.

RESULTS: Of the 537 survey respondents, 20% reported receiving integrated MHCS, 8% reported needing but being unable to receive MHCS, and 72% reported not needing or receiving MHCS. Overall, 50% of the sample reported missing at least some HIV medication within the past 30 days. Individuals who needed but did not receive MHCS were more likely to report treatment nonadherence. No significant difference in adherence was identified between those who received MHCS and those who did not need MHCS.

CONCLUSIONS: Results suggest that continued assessment of needs and integration of MHCS into HIV care improves the likelihood of medication adherence. Further, our study highlights how systematically asking PLWH about their needs and connecting them to services may critically affect HIV management.

Am J Manag Care. 2020;26(8):357-360. doi:10.37765/ajmc.2020.44072

HIV treatment adherence plays a critical role in the US National HIV/AIDS Strategy, which is ultimately aimed at reducing the number of new HIV infections by 75% within 5 years.[1] Adherence to antiretroviral therapy results in decreased likelihood of HIV-related morbidity and mortality and a 96% reduction in likelihood of viral transmission.[2,3] However, of the 1.1 million people living with HIV (PLWH) in the United States, only an estimated 63% are virally suppressed (HIV RNA < 200 copies/mL), signifying decreased treatment adherence.[4,5] The HIV integrated care model was developed to address these barriers to continued engagement in care and adherence. This system of care is developed to be individualized and community centered, which may leave PLWH without comprehensive treatment plans.[6-8] Mental health care persists as a common need among PLWH, with limited service availability.[9]

Psychiatric disorders are more prevalent among PLWH; however, those who are able to initiate and engage in active treatment plans often manage their HIV effectively.[10,11] Further, psychological distress symptoms are more common among PLWH who are not virally suppressed compared with those who are virally suppressed.[12] Thus, there are urgent needs to deliver mental health care services (MHCS) among this population. Identifying PLWH who are engaged in MHCS juxtaposed with populations who report needing but not receiving MHCS may help illuminate the role of repeated assessment across the HIV care network.

The aim of this study was to determine the association between reported MHCS need and medication adherence among PLWH to better understand how receipt of care may influence HIV management. Of particular interest were the PLWH who reported the need for MHCS yet did not receive such care.

METHODS

Data for this study utilized 2017 cross-sectional anonymous survey responses completed by PLWH who reside within a 12-county Midwestern region. This annual survey was developed by the region's Ryan White HIV/AIDS Program Planning Council and is distributed

TAKEAWAY POINTS

Mental health care is cited as an important component of integrated HIV care. However, previous studies are often limited to respective samples in homogeneous treatment plans. Among a sample of people living with HIV, our study finds that:

- unique differences exist between those in need of mental health care services and those receiving mental health care services,
- receipt of mental health care services significantly improves likelihood of medication adherence, and
- developing and utilizing methods to identify gaps in integrated HIV care allows for more precise understanding of needs and service delivery.

by HIV case managers within the region. This survey assesses which support service needs are currently important to PLWH in the region.

Inclusion criteria for this study included having previously received a diagnosis of HIV, being 18 years or older at time of survey, and receiving comprehensive HIV case management services funded by the Ryan White HIV/AIDS Program at 1 of 12 case management locations throughout the region. Respondents complete a cross-sectional needs assessment survey annually; thus, they both are familiar with and play an integral role in developing the survey items and protocols. Surveys were conducted as program evaluation of the support services in the region; thus, informed consent was not sought. The data were shared without any identifying information.

Within the survey, MHCS were defined per service guidelines outlined by the Health Resources and Services Administration and the HIV/AIDS Bureau.[13] This includes "psychological and psychiatric treatment and counseling services…provided by a mental health professional licensed or authorized within the State to render such services." Respondents were asked whether (1) they had received MHCS within the past 12 months and (2) mental health care was a service they needed but had not received within the past 12 months. Based on responses, individuals were stratified into 1 of 3 groups by MHCS need and enrollment: group 1, receiving MHCS within the past year; group 2, needing MHCS but have not received them; or group 3, not needing nor receiving MHCS within the past year. Individuals who chose contradictory responses were excluded from analysis. In final predictive modeling, included sociodemographic characteristics were age, gender, race/ethnicity, history of chronic homelessness, and history of incarceration, based on their previously identified modification of HIV medication adherence within current literature.[14,15] In addition, respondents were asked to identify from a list of 26 other medical and social services listed on the survey which services they needed and whether they were receiving them. The numbers of services chosen by each participant were summed and incorporated into the adjusted model to differentiate MHCS from overall gaps in integrated care.

An adapted form of the Basel Assessment of Adherence Scale was used to assess HIV medication adherence. The single-item question is shown to be accurate and reliable among participants who manage chronic disease medication.[16] Further, self-reporting adherence among PLWH is correlated with viral load measurements.[17,18] Respondents were asked to estimate how often they missed doses of prescribed HIV medication during the past 30 days with choices ranging from "none" to "daily." Responses were then dichotomously coded as (1) adherent (no missed doses) or (2) nonadherent (some missed doses). Although a continuous measurement of adherence typically explains a higher proportion of variability, dichotomization is appropriate when categorical data (eg, responses) are skewed and is consistent with similar research.[19]

Descriptive statistical tests of sociodemographics were conducted among the total sample along with each stratified group by MHCS need and receipt to better understand how the groups may differ. Three logistic regression models were completed to determine the crude likelihood of reporting nonadherence based on MHCS group. Models 1 and 2 compared individuals in group 1 and group 2 with group 3, respectively, and model 3 compared adherence differences between groups 1 and 2. A final adjusted model was developed to account for the sociodemographic characteristics previously identified to be associated with adherence. Significance was reported at $\alpha = 0.05$.

RESULTS

Of nearly 6000 PLWH receiving services within the region, 599 participants attempted the survey.[20] Of the total, 55 (9.2%) surveys were excluded from analysis because of missing or incomplete responses. A small portion (n = 7; 1.2%) were excluded because of contradictory responses regarding receipt of mental health care in the past 12 months. A total of 537 (89.6%) participants completed surveys that were included in analysis.

The mean (SD) age among the sample was 43.8 (11.4) years. Most of the sample identified as male (n = 372; 69.3%) and as a racial/ethnic minority (n = 382; 71.1%). One in 5 participants reported ever having experienced chronic homelessness (n = 106; 20%), and 12.5% reported ever having been incarcerated (n = 68). Participants chose a mean (SD) of 2.2 (2.5) services that they needed but were not receiving. Half the sample (n = 269; 50.5%) reported missing 1 or more doses of HIV medication within the past 30 days.

Among the sample, 105 participants reported receiving MHCS within the past year (19.6%), 43 participants reported needing but not receiving MHCS (8.0%), and 389 individuals reported not needing nor receiving MHCS within the past year (72.4%). Additional sample characteristics by MHCS need are detailed in **Table 1**.

Logistic predictive model details and comparisons are depicted in **Table 2**. Crude results reveal no significant difference in medication adherence between group 1 and group 3 (odds ratio [OR], 0.96; 95% CI, 0.62-1.48). Individuals in group 2 were significantly more likely to report nonadherence compared with individuals in group 3 (OR, 3.08; 95% CI, 1.51-6.29) and group 1 (OR, 3.2; 95% CI, 1.46-7.04).

TABLE 1. Sample Characteristics of People Living With HIV According to Mental Health Care Service Need and Receipt

	Group 1[a] (n = 105; 19.6%)	Group 2[b] (n = 43; 8.0%)	Group 3[c] (n = 389; 72.4%)	Total (N = 537)
Number of unmet service needs, mean (SD)	2.1 (1.8)	4.9 (4.8)	2.0 (2.1)	2.2 (2.5)
Age in years, mean (SD)	45.3 (10.3)	39.4 (10.8)	43.9 (11.7)	43.8 (11.4)
Current gender male, n (%)	58 (55.2)	37 (86.0)	277 (71.2)	372 (69.3)
Racial/ethnic minority,[d] n (%)	76 (72.4)	26 (60.5)	280 (72.0)	382 (71.1)
History of chronic homelessness, n (%)	27 (25.7)	15 (34.9)	64 (16.5)	106 (19.7)
History of incarceration, n (%)	17 (16.2)	7 (16.3)	44 (11.3)	68 (12.7)
Missed ≥ 1 dose of HIV medication in the past 30 days, n (%)	49 (46.7)	32 (74.4)	188 (48.3)	269 (50.1)

[a]Received mental health care services within the past year.

[b]Needed but did not receive mental health care services within the past year

[c]Reported not needing or receiving mental health care services within the past year.

[d]Nonwhite, non-Hispanic.

TABLE 2. Likelihood of Missing HIV Medication Within Past 30 Days Based on Mental Health Care Service Need and Receipt[a]

	Model 1 Crude OR[b]	Model 2 Crude OR[b]	Model 3 Crude OR[b]	Model 4 Adjusted OR[b]
Group 1[c]	0.96 (0.62-1.48)		Reference	0.99 (0.62-1.58)
Group 2[d]		**3.08 (1.51-6.29)**	**3.21 (1.46-7.04)**	**3.09 (1.37-6.97)**
Group 3[e]	Reference	Reference		Reference
Number of unmet service needs				0.95 (0.88-1.03)
Age in years				**0.97 (0.95-0.98)**
Current gender male				1.12 (0.75-1.69)
Racial/ethnic minority				1.23 (0.84-1.92)
History of chronic homelessness				**1.84 (1.14-2.97)**
History of incarceration				1.61 (0.90-2.91)

OR, odds ratio.

[a]Bold entries indicate significance at $\alpha < 0.05$. Model 1 indicates no significant difference in medication adherence between group 1 and group 3. Model 2 indicates group 2 is significantly more likely to report nonadherence compared with group 3. Model 3 indicates group 2 is significantly more likely to report nonadherence compared with group 1.

[b]OR calculated from exponentiated β and 95% CIs.

[c]Received mental health care services within the past year.

[d]Needed but did not receive mental health care services within the past year.

[e]Reported not needing or receiving mental health care services within the past year.

Upon adjusting for age, gender, race/ethnicity, history of homelessness, history of incarceration, and overall unmet service need, individuals in group 2 were significantly more likely to report nonadherence (adjusted OR, 3.09; 95% CI, 1.37-6.97). In addition, older individuals were less likely to report being nonadherent for every year of age increase (adjusted OR, 0.97; 95% CI, 0.95-0.98), and individuals who reported experiencing chronic homelessness were significantly more likely to report nonadherence (adjusted OR, 1.84; 95% CI, 1.14-2.97).

DISCUSSION

These findings suggest the importance of routine assessment and linkage to supportive services to achieve HIV viral suppression. This study identified that PLWH who report needing but not receiving MHCS are significantly more likely to report nonadherence with HIV medication compared with both individuals who received MHCS and individuals who reported not needing MHCS. This increased likelihood of nonadherence among group 2 remained even after adjusting for sociodemographic characteristics and history of homelessness and incarceration. Whereas MHCS need and receipt were found to be significantly associated with medication adherence, other documented unmet service needs were not associated with medication adherence in the adjusted model.

Although HIV integrated treatment plans are meant to address adherence challenges, a large portion of PLWH remain virally unsuppressed.[21] These results identify the importance of routine assessment and integrating an MHCS component into HIV care models. Further, this study found that MHCS need was more relevant to medication adherence than other unmet needs. This highlighted the unique need for MHCS among PLWH, one that will require additional support from integrated care providers to implement. Although our findings are aligned with those of similar studies, we

believe our research is unique and adds to the discourse because of the emphasis on routine assessment and referrals in integrated care models.[22,23]

Limitations

Limitations and alternative explanations were explored in an effort to more effectively contextualize our findings. Although self-reported data are commonly utilized in similar research, more vigorous methods of clinical data collection are available, yet not available to the study team.[19] However, by utilizing these self-reported data, we were able to capture and empower the voices and unique experiences of PLWH.[24] Future studies would benefit by comparing our findings with additional sources of data. Further, this study did not distinguish between types of mental health care treatment. However, these findings offer a novel introduction that effectively argues for the inclusion of routine assessments for the need for MHCS and their provision within integrated care models. Insights could be gained from additional research that examines the efficacy of different types of mental health care treatment and the association of those treatments' effectiveness with HIV outcomes.

CONCLUSIONS

Many PLWH continue to struggle with complex challenges and needs that contribute to increased transmission rates among populations.[25] Continuing to identify more effective components of integrated care models will aid in addressing these inequities. This study identifies that MHCS is one of those components. ■

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Source of Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. This research was completed in collaboration with institutional partners and community advocates.

Author Disclosures: The authors report no relationship or financial interest with any entity that would pose a conflict of interest with the subject matter of this article.

Authorship Information: Concept and design (SS, ES); acquisition of data (SS, ES, MRN); analysis and interpretation of data (SS); drafting of the manuscript (SS, ES); critical revision of the manuscript for important intellectual content (SS, ES); statistical analysis (SS); provision of patients or study materials (SS); obtaining funding (SS, ES, MRN); administrative, technical, or logistic support (SS, MRN); and supervision (SS, ES).

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Laurenzi CA et al. *Journal of the International AIDS Society* 2020, **23**(S5):e25556
http://onlinelibrary.wiley.com/doi/10.1002/jia2.25556/full | https://doi.org/10.1002/jia2.25556

JIAS
JOURNAL OF THE INTERNATIONAL AIDS SOCIETY

COMMENTARY

Preventing mental health conditions in adolescents living with HIV: an urgent need for evidence

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Abstract

Introduction: As adolescents transition from childhood to adulthood, they experience major physical, social and psychological changes, and are at heightened risk for developing mental health conditions and engaging in health-related risk behaviours. For adolescents living with HIV (ALHIV), these risks may be even more pronounced. Research shows that this population may face additional mental health challenges related to the biological impact of the disease and its treatment, the psychosocial burdens of living with HIV and HIV-related social and environmental stressors.

Discussion: Psychosocial interventions delivered to adolescents can promote positive mental health, prevent mental health problems and strengthen young people's capacity to navigate challenges and protect themselves from risk. It is likely that these interventions can also benefit at-risk populations, such as ALHIV, yet there is little research on this. There is an urgent need for more research evaluating the effects of interventions designed to improve the mental health of ALHIV. We highlight four priorities moving forward. These include: generating more evidence about preventive mental health interventions for ALHIV; including mental health outcomes in research on psychosocial interventions for ALHIV; conducting intervention research that is sensitive to differences among ALHIV populations; and involving adolescents in intervention design and testing.

Conclusions: More robust research on promotive and preventive mental health interventions is needed for ALHIV. Programmes should be informed by adolescent priorities and preferences and responsive to the specific needs of these groups.

Keywords: adolescents; interventions; public health; social support; mental health; psychosocial interventions

Received 16 January 2020; **Accepted** 3 June 2020

1 | INTRODUCTION

As adolescents transition from childhood to adulthood, they undergo major physical, social and psychological changes [1]. Physical changes, which include puberty and rapid brain development, take place in the context of newly developing autonomy, responsibility and decision-making abilities. This transition is also influenced by a complex set of socio-economic factors, including family and cultural environments, which interact with each other and shape adolescents' health trajectories and vulnerabilities [2]. During this dynamic yet precarious life stage, adolescents are at heightened risk for developing mental health conditions (such as depression and anxiety) and engaging in health-related risk behaviours. As many as 10% to 20% of people will develop mental health conditions during adolescence, and it is estimated that up to 50% of all mental health conditions start before the age of 14 [3]. Self-harm, which includes suicidal behaviours, is among the top three causes of death for 15- to 19-year-old boys and girls globally [4]. Furthermore, mental health conditions during this period are associated with a range of risk behaviours, including tobacco and alcohol use, drug misuse, risky sexual behaviours and violence [5,6], the effects of which may persist throughout the life course.

Adolescents living with HIV (ALHIV) are at an even greater risk of developing mental health conditions and risk behaviours [7]. Worldwide, an estimated two million adolescents are living with HIV, with over 80% of them residing in sub-Saharan Africa [8]. Depression, anxiety, hopelessness and fear for the future are common in this population, which makes mental health a vital area of concern for ALHIV [9]. Research shows that these risks are manifold, related to the biological impact of the disease and its treatment, the psychosocial burden of living with HIV and HIV-related social and environmental stressors. From a biological perspective, for adolescents who acquired HIV perinatally, the effects of the virus on brain development persist into adolescence [10], and there is mixed evidence on whether highly active antiretroviral therapy can

slow or reverse damage to the developing brain [11,12]. ALHIV also face numerous psychosocial challenges. Many young people with perinatally acquired HIV first learn they are living with HIV during adolescence, which can be highly stressful and create familial tensions if they blame their parents for their condition [13]. Relatedly, ALHIV may also experience grief from losing one or both parents, or other caregivers, contributing to their own expectations and fears of illness and death [9,14]. Social and environmental stressors include experiencing heightened stigma and isolation; adolescents may also be increasingly required to manage their own treatment adherence [15,16]. ALHIV engaging in romantic and sexual relationships for the first time need to grapple with how to disclose their status to partners and protect against potential fears of rejection [17]. Additionally, adolescents living in vulnerable households with others who are also living with HIV may have additional mental health needs that intersect with experiences of poverty and illness [18].

There is additional evidence that the mental health of ALHIV affects other domains of their health and wellbeing. In general, clinical outcomes for adolescents tend to be worse than those of adults, and adolescents have poorer levels of adherence to antiretroviral therapy (ART) and thus higher viral loads [19,20]. Evidence from adult populations reveals a complex relationship between mental health and HIV, including poor physiological and psychological outcomes related to factors such as disease progression, medication side effects, social isolation and the financial burden of being ill [21]. The same mechanisms that can contribute to poor health in adults living with HIV are likely to affect ALHIV; however, improving mental health can also foster better HIV outcomes such as adherence and retention in care [22], especially for adolescents [23].

2 | DISCUSSION

Adolescence is thus a critical time to intervene with this vulnerable group – to prevent mental conditions, to promote positive mental health and to strengthen young people's capacity to navigate challenges and protect themselves from risk. Psychosocial interventions have been identified as beneficial when delivered to universal, or general, adolescent populations: these interventions adopt a psychological, behavioural, and/or social approach to improve psychosocial wellbeing and reduce the risk of poor mental health outcomes [24]. Our meta-analysis found that psychosocial interventions that included specific components (emotional regulation, interpersonal skills, mindfulness, assertiveness training, problem solving, stress management, and alcohol and drug education) were associated with more successful programme outcomes for adolescent mental health [24].

However, there is less research about the impact of these types of interventions among targeted groups, such as ALHIV, who are likely to have specific, additional psychosocial support needs. From an equity perspective, it is critical to consider if and how psychosocial interventions might benefit special populations, including ALHIV. The same skills taught and practiced in a psychosocial intervention for a universal population of adolescents – for example, navigating changing peer dynamics or setting goals – may take on new significance as they help ALHIV disclose their status to a trusted peer, or conceptualise a healthy, fulfilling adult life. With a growing number of adolescents globally – including the largest number of children born with HIV to survive into adolescence – this imperative is even greater.

Helping Adolescents Thrive (HAT), a joint initiative between the World Health Organization and UNICEF, represents one such attempt to provide more evidence for both universal and targeted interventions for adolescent mental health. A 2019 evidence review linked with HAT, conducted in preparation for the development of the WHO Guidelines on Mental Health Promotive and Preventive Interventions for Adolescents, found only three randomised controlled trials targeting mental health outcomes for ALHIV ages 10 to 19 [25-27], shown in Table 1. As the burden of HIV and mental health continues to persist among this population, there is an urgent need for research evaluating the effects of interventions designed to improve the mental health of ALHIV. Drawing primarily on this review, we have distilled four recommendations to guide future research in this area.

2.1 | Invest in high-quality research to test the effectiveness of interventions to prevent mental health conditions and promote positive mental health for ALHIV

There is a clear need to invest in more research about the mental health of ALHIV. Increased HIV-related research on adolescents regarding new strategies for biomedical treatment and adherence, given their unique risk profile and susceptibility to worse HIV outcomes, is promising [28]. However, there are glaring omissions in the evidence on mental health for ALHIV. Mental health, as a critical foundation for overall wellbeing and quality of life, must be prioritised in research and interventions with ALHIV. We argue that there should be an equally robust approach to generating evidence about how best to promote positive mental health, and prevent mental conditions and risk behaviours, in this population. Integrating services that consider and address mental health into existing HIV services that adolescents routinely access is one way to bridge this gap. Recent reviews have identified the need for integrating mental health services into HIV care in high-burden settings [29], especially for adolescents [7]. Integrated models, which might consist of multidisciplinary teams coordinating care in a "one-stop shop", or service providers managing two-way referrals between HIV and mental health care, have been found to be both feasible and acceptable in high-burden, low-resource settings [30,31].

There is also a need to build process data into studies evaluating effectiveness, to give stakeholders and funders a multidimensional understanding of the complexity of programming with ALHIV. Process measures might include attendance, dosage and coverage of sessions; delivery characteristics; delivery and participation costs; content relevance; contextual barriers and enablers; implementer competence; and implementer soft skills. For adolescents who are more difficult to reach, more innovative engagement methods may be necessary. These include adolescents who do not access clinical care or HIV treatment consistently, those in age-disparate relationships, those living in vulnerable family circumstances and those who are involved in sex work or transactional relationships [32,33]. Research using process data holds important lessons for understanding why certain interventions may be easier to implement in given populations, or why some interventions may show limited evidence of effectiveness.

Table 1. Summary of studies included in review

Author and year	Article name	Country	Programme Intent	Total sample (N), % girls	Age (mean, sd)	Study population description	Mental health outcomes measured[a]	Summary of findings as reported by authors
Bhana *et al.* (2014)	The VUKA family programme: piloting a family-based psychosocial intervention to promote health and mental health among HIV infected early adolescents in South Africa	South Africa	RCT to prevent depression and anxiety; promote communication and mental wellbeing	65, 49.2%	11.57, n/s	Recruited children between 10 and 14 years old enrolled in HIV care at the hospital and aware of their HIV status at two clinical sites in KwaZulu-Natal	• Positive mental health (mental wellbeing and mental functioning) • Mental disorders (depression and anxiety)	At 3 months post-intervention, intervention participants showed a significant improvement in positive mental health (youth/caregiver communication comfort, β = 0.796, p = 0.002 and communication frequency, β = 0.478, p = 0.09). Mental disorders showed a non-significant reduction in symptoms (depression, β = 0.736, p = 0.417).
Webb *et al.* (2018)	Mindfulness instruction for HIV-infected youth: A randomized controlled trial	United States	RCT to prevent stress, aggression and lower CD4 count; promote mindfulness, mental functioning, life satisfaction and adherence	72, 45.8%	18.71, 2.31	Adolescent participants were eligible if they received their medical care at one of the clinics, did not have any significant cognitive, behavioural, or psychiatric disorders and had a current CD4 count above 200	• Mental disorders (depression and anxiety) • Positive mental health (mental wellbeing and mental functioning) • Adherence to antiretroviral treatment • Aggressive, disruptive and oppositional behaviours	At three months post-intervention, intervention participants showed significant improvements in positive mental health (mindfulness, β = 0.65, 95%CI [0.06,1.24], p = 0.03, problem-solving coping β = 0.49, 95%CI [0.05, 0.92], p = 0.03, and life satisfaction, β = 0.57, 95%CI [0.01, 1.13], p = 0.05) and aggressive, disruptive and oppositional behaviours (aggression, β=−0.89, 95%CI [−1.41, to 0.37], p = 0.002).

Table 1. (*Continued*)

Author and year	Article name	Country	Programme Intent	Total sample (N), % girls	Age (mean, sd)	Study population description	Mental health outcomes measured[a]	Summary of findings as reported by authors
Willis *et al.* (2019)	Effectiveness of community adolescent treatment supporters (CATS) interventions in improving linkage and retention in care, adherence to ART and psychosocial wellbeing: a randomized trial among adolescents living with HIV in rural Zimbabwe	Zimbabwe	RCT to promote adherence, self-esteem and quality of life	94, 59.6%	10 to 15, n/s	Adolescents living with HIV, receiving ART at three selected clinic sites	• Positive mental health (mental wellbeing) • Adherence to antiretroviral treatment	At 12-month follow-up, intervention participants reported significant increases in positive mental health (confidence, self-esteem and self-worth, point difference = 0.49, 95%CI [0.313,0.667], $p < 0.001$) and adherence to ART (OR = 3.934, 95%CI [1.404, 11.02], $p = 0.0087$). Significant increases in quality of life were reported for both intervention participants (point difference = 0.29, 95%CI [0.031, 0.549], $p = 0.028$) and control participants (point difference = 0.26, 95%CI [0.061, 0.459], $p = 0.011$).

[a]These measures are worded accordingly to the outcome specifications in the review.
RCT = randomised controlled trial

2.2 | Include mental health outcomes in studies of the effectiveness of psychosocial interventions to promote HIV treatment adherence and reduce risk behaviours

There is a large body of evidence relating to behavioural and psychosocial interventions for ALHIV; however, these studies rarely report on mental health outcomes specifically, often focusing on treatment adherence and sexual and reproductive health outcomes [34-37]. Existing interventions tend to be specifically designed to promote adherence to ART and prevent risky sexual behaviours such as unprotected intercourse [38], which are seen as essential to supporting adolescent health and preventing onward transmission. At the same time, these interventions tend to employ content and delivery mechanisms that are also likely to benefit mental health, such as decision-making skills, self-esteem, coping skills, support networking, psychoeducation and peer support [35,39,40].

As such, it is critical that measures that capture self-reported or parent-reported mental health are included in these types of studies as primary or secondary outcomes. In the absence of these measures and accompanying data, it is impossible to know whether psychosocial interventions have positive, null, or potentially negative effects on participants' mental health. Similarly, the effectiveness of adherence and risk behaviour interventions may be mitigated by underlying mental health outcomes that are not being accurately considered or incorporated into analysis: for example, the impact of self-harm or suicidal ideation on non-adherence. Embedded within this recommendation is a note of caution about context. As psychosocial interventions for ALHIV are increasingly implemented in sub-Saharan African settings, selecting the appropriate mental health measures and ensuring their validity among the research population is essential to gathering high-quality data [41].

2.3 | Conduct intervention research that is sensitive to individual differences and specific needs among heterogenous populations of ALHIV

While many ALHIV share a common set of vulnerabilities, acknowledging the diversity and complexity of this group is critical when considering how to design and implement programmes. Differences in mode of infection, age group (younger versus older) and gender, as well as additional adolescent comorbidities, may affect how adolescents engage with an intervention. Evidence shows that as children born with HIV transition into adolescence, the way that they relate to their HIV status and engage in treatment behaviours may change, as they gain autonomy, come to terms with their illness and take control of their own health care-seeking [42,43]. Adolescents who acquire HIV later in their teens may experience a different set of challenges that complicate their ability to initiate care, with underlying mental health problems contributing to poorer health and adherence outcomes [44]. Depending on mode of infection – and on the duration of their illness, access to social support networks and other intersecting life stressors and risk behaviours – ALHIV may have ways of relating to their illness that are diverse. Research that is attuned to differences by mode of HIV infection could provide a more nuanced approach to improving mental health and could identify means of engaging and retaining adolescents in these interventions.

2.4 | Involve and empower adolescents in intervention development and testing

Actively involving and engaging adolescents throughout the conceptualisation and implementation stages of interventions is important for ensuring interventions are acceptable and relevant – and ultimately effective. Special considerations should be made to develop adolescent-friendly interventions that actively include adolescents at all stages, and not to retrofit interventions used with adult populations. Co-production strategies, such as adolescent advisory boards, allow adolescents to drive how content is delivered and what messages are emphasised [45,46]. As this field develops, adolescents should take a lead role in crafting interventions that speak to their distinct needs and are also informed by cutting-edge evidence.

3 | CONCLUSIONS

ALHIV are faced with many potential risks to their mental health, yet there are few evaluations of promotive and preventive mental health interventions for this group. This group is a critical population to engage further through more frequent, robust research that can inform the development of new interventions. We call for more high-quality research into interventions for ALHIV that is informed by adolescent priorities and preferences and responsive to the specific needs of this group.

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COMPETING INTERESTS

The authors declare no competing interests.

AUTHORS' CONTRIBUTIONS

CAL conceptualized and drafted the manuscript, and coordinated further writing and editing among the co-authors. SS led the team that conducted the systematic reviews in collaboration with the WHO. SG, OAO, NA, MB, AB, SD and GJMT, along with CAL, all worked on the systematic review team and made important contributions to identifying eligible articles, extracting data, assessing risk of bias, analysing data, and conducting literature reviews to contextualise findings. MT, CS, TD and DAR provided leadership and input to the review team throughout the duration of the project and supported in conceptualising the manuscript. All authors reviewed the manuscript and provided feedback at various stages, and read and approved the final manuscript.

ABBREVIATIONS

ALHIV, adolescents living with HIV; ART, antiretroviral therapy; HIV, human immunodeficiency virus; WHO, World Health Organization.

ACKNOWLEDGEMENT

None declared.

FUNDING

This work was funded by the World Health Organization.

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Journal of the International Association of Providers of AIDS Care
Volume 20: 1-18

DOI: 10.1177/2325958220985665
journals.sagepub.com/home/jia
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Mental Health in Women Living With HIV: The Unique and Unmet Needs

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Abstract

Women living with HIV (WLWH) experience depression, anxiety, and posttraumatic stress symptoms at higher rates than their male counterparts and more often than HIV-unaffected women. These mental health issues affect not only the well-being and quality of life of WLWH, but have implications for HIV management and transmission prevention. Despite these ramifications, WLWH are under-treated for mental health concerns and they are underrepresented in the mental health treatment literature. In this review, we illustrate the unique mental health issues faced by WLWH such as a high prevalence of physical and sexual abuse histories, caregiving stress, and elevated internalized stigma as well as myriad barriers to care. We examine the feasibility and outcomes of mental health interventions that have been tested in WLWH including cognitive behavioral therapy, mindfulness-based interventions, and supportive counseling. Future research is required to address individual and systemic barriers to mental health care for WLWH.

Keywords

women living with HIV, HIV/AIDS, mental illness, mental health treatment

Date received: 14 July 2020; revised: 10 November 2020; accepted: 08 December 2020.

Overview and Epidemiology of Mental Illness Among WLWH

There are over 17 million women worldwide and a quarter million women in the U.S. living with HIV.[1] Women constitute over half of individuals living with HIV globally[2] and nearly a quarter of those living with HIV in the U.S.[3] Women living with HIV (WLWH) are more likely to have comorbid mental health conditions,[4] concurrent mental and physical health comorbidities,[5] and worse overall mental health,[6] than men living with HIV and HIV-negative women.[7] This may be due, in part, to women with mental illness being in vulnerable positions associated with HIV acquisition (e.g., including intimate partner violence, inconsistent condom use, bartering sex, history of other sexually transmitted infections) as compared to women without mental health problems.[8] Alternatively, HIV diagnosis may lead to mental illness symptomatology or exacerbate existing mental illness symptoms for women due to stigma and psychological stress associated with disease management. For example, women experience more than 3 times as many mental health issues after, as compared to before, their HIV diagnosis.[9] Thus, established gender disparities in mental health conditions including depression,[10] anxiety,[11] and posttraumatic stress disorder[12,13] may be exacerbated in the context of HIV.[9] Women also tend to be diagnosed with and begin receiving treatment for HIV in later stages of infection

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What Do We Already Know About This Topic?

Individuals living with HIV are at high risk for mental health concerns including stress, depression, and PTSD, that can detrimentally impact their self-care and management of HIV.

How Does Your Research Contribute to the Field?

This article increases awareness of the burden and contributing and sustaining factors of mental illness specific to women living with HIV, along with research on mental health treatments for this population.

What Are Your Research's Implications Toward Theory, Practice, or Policy?

This article demonstrates the need to expand the research and dissemination of evidence-based mental health treatments for women living with HIV.

than men[14] and the prevalence of neuropsychiatric issues increases in later stages of HIV infection.[15] In addition, HIV disparities associated with gender, race/ethnicity, poverty, and rural location, along with their intersectionality, may also contribute to poor mental health among WLWH.

Psychiatric illness among WLWH has been linked to worse antiretroviral therapy (ART) medication adherence and medical appointment attendance,[16-19] which may play a role in health-related quality of life. Given the prevalence of comorbid HIV and mental illness alongside the clinical ramifications of this intersectionality, our objective was to synthesize the current understanding of the specific mental health problems experienced by WLWH along with the implications on overall health. Furthermore, we sought to describe existing interventions tailored to this vulnerable population and identify areas for future research. We included special sections on pregnant and parenting WLWH due to the distinct clinical implications for behavioral health among this population.

Method

For this narrative review, we conducted a comprehensive literature search using PUBMED, Cochrane Library, and PsycINFO databases. The search terms were "Women* or female* or girls* or pregnant* or perinatal* or postpartum*" AND "HIV* or AIDS* or human immunodeficiency virus* or acquired immunodeficiency syndrome*" AND "mental illness* or mental health* or psychiatric* or depression* or mental health intervention* or psychosocial intervention* or therapy* or mental health treatment* or depression treatment*." All relevant papers were identified and reviewed for inclusion criteria by 2 members of the research team (EMW and VW). We included papers that reported on 1) WLWH, including women of trans experience, and 2) psychological health or illness and/or therapeutic or psychosocial interventions specifically designed to address mental illness among WLWH. We excluded papers that did not explicitly report results for WLWH and those that reported only on neurodegenerative or neuropsychiatric conditions to limit the scope of the review to the most prevalent mental health conditions faced by WLWH. Articles that met these criteria were included and described in this narrative review.

Ethical Approval and Informed Consent

Ethics approval was not required for this narrative review.

Stress and Stigma Among WLWH

WLWH face unique stressors that contribute to mental health issues. A meta-analysis of studies looking at stress and coping among WLWH found that perceived health status and functional limitations are major sources of stress despite the widespread availability of ART.[20] Around the world, many women face issues with access to and acceptability of community-based health services for HIV.[9,21,22] Following receipt of an HIV diagnosis, women report stress over their interpersonal relationships, disclosure of their HIV status,[23] and management of their sexual and reproductive health.[9,24] In addition, WLWH from low, mid, and high-income nations tend to have higher rates of intimate partner violence than the general population,[25,26] which is linked to poor mental health.[25]

In the U.S., more than four-fifths of WLWH are racial/ethnic minorities.[2] Ethnic/racial minority WLWH have reported higher levels of perceived stress than the general population,[27] potentially due to the intersection of health status, race, poverty, health care accessibility, and gender-based discrimination.[9,28] The experience of racism may also contribute to HIV-related stigma in women.[29] WLWH in the U.S. and Canada report higher levels of HIV stigma than men with HIV.[30,31] WLWH exist within several intersections vulnerable to stigma: first, as persons living with HIV; second, as persons with much higher risk for mental health issues or symptoms which may be worsened by HIV as a stigmatized illness; third, as women; fourth, (if applicable) as racial and ethnic minorities. Stigma, discrimination, and social prejudice negatively impact the social and psychological health and well-being of persons living with HIV; They are associated with low social support, poor physical and mental health, and a poorer quality of life, and can delay or impede their getting help and treatment for mental health concerns and/or HIV.[32,33] Perception and internalization of HIV stigma is associated with greater depressive symptoms and poorer psychological adjustment to HIV diagnosis and management.[17,34-36] For example, a longitudinal study of Black, African American, and Caribbean WLWH in Canada found a significant correlation between HIV-related stigma, gender-based discrimination, racism, and depression.[37]

More broadly, stigma associated with HIV has been linked to anxiety, depression, poor self-esteem, and poor adherence to care.[38] The combination of WLWH's physical, functional, interpersonal, and systemic stressors likely contributes to the burden of mental health issues in this population, including depression, trauma-related symptomatology, and anxiety.

Mental Health Conditions of Women Living With HIV

Depression

Depression is prevalent among WLWH. Studies conducted in the U.S. show that, compared to HIV-seronegative women, rates of major depressive disorder diagnoses are 4 times as high in WLWH[39] and WLWH experience significantly worse depressive symptom severity.[27,39,40] Further, symptoms of depression are highly prevalent; they were endorsed by 82% of respondents in a study of WLWH from 94 countries.[9] U.S. WLWH have rates of depressive disorder and symptoms up to twice as high as men living with HIV[4,41,42] and WLWH in Iran and the U.S. report more severe depressive symptomatology.[43-45] Of concern, depressive disorders among individuals living with HIV is often underdiagnosed, particularly for women[46] and it is estimated that less than half of U.S. WLWH are adequately treated for depression.[47]

Studies conducted in the U.S. have found that depression among WLWH is associated with challenges with interpersonal relationships. For example, depressive symptoms in WLWH is associated with lowered functioning within their families and a decreased ability to fulfill responsibilities at home.[40] There is a negative correlation between depression and disclosure of HIV-positive status[48] and perceived social support.[48,49] Thus, depression among WLWH can worsen social isolation, perpetuating and exacerbating the depressive symptoms and disorder.

Depressive disorders among WLWH globally are associated with an increased health burden including greater HIV disease progression, more severe HIV-related symptomatology, and increased mortality.[50-56] In a 7-year longitudinal study of 765 WLWH from the HIV Epidemiology Research Study in the U.S., Ickovics and colleagues found that, after controlling for clinical and treatment factors, women with chronic depressive symptoms experienced significantly greater declines in CD4 counts than those without chronic depressive symptoms and were twice as likely to die than women with minimal to no depressive symptoms.[41] Similarly, data from the U.S. multisite Women's Interagency HIV Study (WIHS) also found that chronic depression was associated with greater HIV disease progression and mortality.[57] In fact, analyses of WIHS data showed that the association between depressive symptoms and mortality was greater in magnitude than the association between failing to initiate ART and mortality, and hazard of death for depressed women not on ART was over 7 times that of non-depressed women on ART.[54] Symptoms of depression include disrupted memory, concentration, appetite, and sleep—all factors that can contribute to alterations in sleep/wake cycles or medication administration in relation to meals. These data underscore the need to aggressively identify and treat depressive symptoms when present as a means to optimize HIV-related care.

The impact of depression on HIV disease progression and mortality among WLWH may be multifaceted.[58] Depression can negatively affect the immune system, with several possible mechanisms having been postulated including chronic inflammation. HIV induces immune activation in the brain which may lead to tryptophan depletion and a resultant reduction in serotonin, thus exacerbating or maintaining depressive symptoms.[59] In addition, several behavioral consequences of depression can impact HIV health outcomes. International studies have shown that depressive symptomatology impedes the activation required to begin and maintain antiretroviral medication and disease management.[16,17] Symptoms of depression that may act as potential barriers to medication and disease management include feeling helpless, disempowered, and negativistic,[17] difficulty concentrating,[16] fatigue, poor sleep[60] and the tendency for self-neglect.[61] In studies conducted in the U.S., Turan and colleagues found that for WLWH, depression mediates the relationship between internalization of HIV stigma and lower ART adherence, in part through decreased social support and increased loneliness, a relationship that was particularly strong for Hispanic and non-Hispanic Black women.[17,36]

Trauma-Related Mental Health Issues

Depression and trauma are closely linked in WLWH globally.[62] Studies from the U.S. have found a strong association between history of childhood trauma, intimate partner violence, and depression among WLWH.[63,64] WLWH from low, mid, and high-income nations report high rates of exposure to traumatic events, especially intimate partner violence,[26] and posttraumatic stress symptoms.[63,65-67] In fact, a meta-analysis of psychological trauma and posttraumatic stress disorder (PTSD) in WLWH in the U.S., Western Europe, Scandinavia, Australia, and New Zealand found that approximately 70% of study participants reported experiencing abuse in their lifetimes and 30% had recently experienced PTSD, more than 5 times the rate for recent PTSD among women in the general population.[68] Additionally, a study of 1223 HIV-positive mothers recruited from 22 sites across the U.S. reported that 23% of the sample met screening criteria for PTSD.[69] Of note, the study found that the majority of HIV-positive mothers with comorbid psychiatric disorders at screening, especially a combination of PTSD, depression, and/or anxiety, still met criteria for 1 or more of these disorders 1 to 3 years later and only 4.5% were receiving mental health treatment at screening.[69]

Traumatic experiences have been shown to have deleterious effects on the mental and physical health of WLWH.[63,70,71] According to studies conducted in the U.S., greater posttraumatic stress symptomatology has been linked to lower T-cell counts in WLWH[65] and experiencing more traumatic events is

Table 1. Summary of Research Findings on Common Mental Health Conditions Among Women Living With HIV.

Condition	Mental Health Consequences and Associations	Behavioral/Physical Health Consequences and Associations
Depression	Interpersonal difficulties Cognitive difficulties Sleep concerns Appetite concerns Internalization of HIV stigma	Disease progression More severe HIV-related symptomatology Increased mortality Lower HAART/ART adherence
PTSD and PTSS	Often comorbid with depression	Lower T-Cell counts Lower HAART/ART adherence High-risk acquisition or transmission behavior
Anxiety	Stigma	Disease progression Worse quality of life

HAART: Highly Active Antiretroviral Therapy; ART: Antiretroviral Therapy; PTSD: Posttraumatic Stress Disorder; PTSS: Posttraumatic Stress Symptoms.

associated with worse medication adherence, greater likelihood of virologic failure,[72,73] and higher HIV-related mortality.[74] Findings from a systematic review and meta-analysis found that WLWH with a history of intimate partner violence had significantly lower odds of using and adhering to ART and achieving viral suppression.[19] Further, trauma has been implicated in high-risk acquisition or transmission behavior for women with or at risk for HIV infection internationally.[75-80] Given the high prevalence of depression and trauma in WLWH, their shared association with HIV disease progression and transmission are of critical concern.

Anxiety

In addition to depression and posttraumatic stress symptomatology, prior research has found that WLWH report more severe anxiety symptoms than HIV-negative women.[27,39] Clinical levels of anxiety have been reported as high as 40% in the U.S. and Canada.[81,82] Anxiety disorders and severe anxiety symptomatology tend to be more common among WLWH than in men living with HIV as reported in studies from the U.S. and Iran.[4,45] Anxiety in WLWH may be related to HIV-related stigma.[82] For women of reproductive age, worries over reproductive health concerns such as fear of perinatal transmission and perceived judgment regarding reproductive desires may also be a source of anxiety.[82] Anxiety among individuals living with HIV has been shown to be related to disease progression and lead to worse quality of life.[83] A summary of common mental health conditions among WLWH can be found in Table 1.

Mental Health Among Pregnant, Postpartum, and Mothers Living With HIV

Pregnant and postpartum WLWH face additional challenges with potential attendant mental health consequences. Pregnancy and the postpartum period are times of significant biological, social, and psychological changes for women[84] and women are at increased risk for depression, anxiety, obsessive compulsive disorders, and postpartum psychosis in this window.[85,86] Many WLWH must also confront perceived stigma from obstetric providers, disclosure of HIV-status as it is related to the pregnancy, and stress regarding prevention of perinatal HIV transmission, a study from Uganda found.[23] Moreover, violence and abuse do not abate with pregnancy or birth. One prospective cohort study of pregnant WLWH in the U.S. found that 9% experienced partner abuse or violence during pregnancy or the postpartum.[87] A U.S.-based study reported that women who experienced intimate partner violence during pregnancy have poorer ART adherence and take longer to achieve viral suppression.[88]

Prior international research has found more severe perinatal depressive symptoms in WLWH with worse perceived social support, stress, and internalized stigma.[29,49,89,90] While not all study findings are uniform (see, for example,[91-93]), some U.S. studies have found heightened levels of depression for perinatal WLWH as compared to HIV-negative perinatal women,[49,94] even after controlling for the somatic symptoms that are shared by both pregnancy and depression such as fatigue and changes in appetite.[49] Two international meta-analyses of perinatal depression in WLWH found 36-44% prevalence of antenatal depression and 21-31% prevalence of postnatal depression, assessed by positive screening or diagnostic clinical measures.[95,96] A study of 273 pregnant and postpartum WLWH at a HIV Perinatal Center in Los Angeles, found that women with a CD4 nadir less than 200 cells/mm^3 were 3 times more likely to have a perinatal depression diagnosis than mothers with a CD4 count above 500 cells/mm^3.[94] Depression and anxiety during the perinatal period have implications for self-care, care of the neonate, and prevention of perinatal HIV transmission.[97] Specifically, perinatal depression among U.S. and Kenyan WLWH has been linked to suboptimal ART adherence, substance misuse during pregnancy,[94] and lower rates of HIV care initiation.[97] A systematic review and meta-analysis of low, middle and high-income countries demonstrated that only 73.5% of pregnant women achieved optimal ART adherence. Selected barriers to adherence included depression, alcohol and drug use, and psychosocial issues.[98] A comprehensive international literature review looking at the mental health of HIV

Seropostive women during pregnancy and postpartum period concluded that psychiatric symptoms, especially depression were widespread globally and clinical and structural interventions were necessary.[99]

Beyond the early postpartum period, parenting WLWH face a number of stressors that can negatively affect their mental health and quality of life. Parenting WLWH must balance caregiving responsibilities with their own HIV care.[100] Among parenting U.S. WLWH, experiencing both stressful life events and parenting stress is associated with HIV treatment nonadherence, specifically missed ART doses and missed medical appointments.[18]

Mental Health Treatment for Women Living With HIV

Given the prevalence of stressors and mental health conditions faced by WLWH and the connection between mental illness symptoms and suboptimal disease management, accessible and acceptable mental health interventions tailored to the unique needs of this population are crucial. Despite this need, there is a significant gap in evidence-based mental health interventions for WLWH[101-103] and disparity in mental health care access and utilization. For example, it is estimated that less than half of depressed WLWH in the U.S. are adequately treated.[47] When the need for mental health treatment for WLWH is met, the benefits go beyond improvement in psychological symptoms. Two studies from the WIHS cohort demonstrated that mental health service usage was associated with increased use of ART and decreased mortality.[57,104] Some notable exceptions have attempted to address this gap in mental health treatment, incorporating stress management, cognitive-behavioral, and supportive modalities. These are described below.

Management of Stress

Although the research on formal psychosocial mental health interventions for WLWH is incomplete, there has been considerable research on coping among this population. Coping behaviors such as self-care, stress management, cognitive flexibility, and maintaining social support networks have been linked to better mental and physical quality of life among WLWH in the U.S.[20,27,67,105] Further, the coping behaviors of engaging in supportive relationships and positive self-appraisal are associated with psychological and spiritual growth in U.S. WLWH.[106,107] Specifically, the type of coping in which a woman living with HIV engages is predictive of medication adherence, with avoidant behaviors associated with more missed doses and active coping predictive of better adherence.[48,108] Spirituality and prayer are also coping tools that WLWH use to combat stress and distress.[20,109,110] A study of 142 Puerto Rican WLWH in New York City found that spirituality was protective against depression and that self-esteem and sense of mastery mediated the relationship between spirituality and depression.[111]

Mental Health Treatment Studies: Psychosocial Interventions

Effective, acceptable, and culturally competent mental health treatments are necessary given the prevalence and specific needs of WLWH. Much research has focused on treatments that integrate psychosocial components into interventions for improving antiretroviral medication adherence, other health behaviors, or overall health,[112] as compared to interventions with the primary aim of decreasing the burden of mental illness. Of the psychosocial interventions that have been tested and reported for this population, many utilized evidence-based approaches such as cognitive behavioral therapy techniques, motivational interviewing, interpersonal effectiveness skills, and relaxation.[112] A summary of the published interventions is depicted in Table 2.

Cognitive-behavioral interventions. Cognitive-behavioral interventions for WLWH are the most frequently studied. One of the most widely disseminated is the Stress Management and Relaxation Techniques/Expressive Supportive Therapy (SMART/EST) study.[113] The SMART/EST study was a 3 stage, multi-site randomized trial designed to test the feasibility and effectiveness of enhanced cognitive behavioral stress management. The study was conducted in several U.S. regionally-diverse community health centers with participants who were ethnically representative of WLWH, including a majority African American, Latina, and Caribbean women.[114] Cognitive behavioral stress management includes cognitive-behavioral and interpersonal skills training plus relaxation tailored to the psychosocial needs of WLWH.[115] In the SMART/EST study, cognitive behavioral stress management was augmented with an expressive and supportive component in a 10-week group intervention. The intervention led to improved quality of life, including improved cognitive functioning, decreased health-related distress,[116] increased positive well-being,[117] and increased emotion-focused coping related to medication adherence.[118] Participants in the enhanced cognitive behavioral stress management intervention were found to have lower depressive symptom severity at the end of treatment and at the 1-year follow-up assessment.[119] Secondary analyses examining specific components of the SMART/EST psychosocial intervention found that women in the group intervention practicing guided imagery had lower cortisol levels at post-tests compared to pre-intervention levels.[120] Increases in CBT skills and self-efficacy were inversely correlated with viral load and depressive and anxious symptoms,[113] even 1 year after the intervention ended.[121]

The effectiveness of the SMART/EST intervention was examined when led by community health center staff (versus doctoral level psychologists and post-doctoral fellows).[122] While the authors acknowledge challenges to translating their research to real-world health settings,[123] they found comparable effects between staff-led interventions and those led by the mental health professionals,[122] opening the door to non-traditional modes of this intervention. Despite its demonstrated

Table 2. Summary of Published Mental Health Interventions for Women Living With HIV.

	Country of Study	Articles (First Author, Year)	Sample on ART/ HAART (If Reported)	Intervention	Mental Health Targets	Primary Results	Limitations
Cognitive-Behavioral Interventions							
SMART/EST (Stress Management and Relaxation Techniques/ Expressive Supportive Therapy)	USA	Lechner, 2003 Ironson, 2005 Laperriere, 2005 Jones, 2007 Antoni, 2008 Jones, 2010 Jensen, 2013	~50% prescribed HARRT 75% 77%	-Enhanced cognitive behavioral stress management tailored to WLWH -Group intervention -10 weekly sessions	-Stress -Distress -Depressive symptoms -Psychological well-being -Coping -Self-efficacy -Interpersonal functioning	-Lower depressive symptom severity -Increased quality of life and well-being -Decreased health-related distress -Improved cognitive functioning -Better emotion-focused coping related to medication adherence	-Generalizability: WLWH with active major depressive disorder and substance dependence excluded
Adapted SMART/EST	USA	Weiss, 2015 Lopez-Patton, 2015	63% reported perfect adherence at baseline	-SMART/EST delivered by community health center (CHC) staff	-Stress -Distress -Depressive symptoms -Psychological well-being -Coping -Self-efficacy -Interpersonal functioning	-Comparable effects for CHC staff-led intervention	-Generalizability: WLWH with active major depressive disorder and substance dependence excluded; only tested in inner-city settings -Sustainability: Limited evidence that the intervention could be sustainable without research funding
Computerized Stress Management Training	USA	Brown, 2011		-Brief cognitive–behavioral computerized stress management training for WLWH -Single session	-Stress -Coping -Self-efficacy -Depressive symptoms	-Improved knowledge of stress management techniques -(Compared to CG) No significant improvement in stress, depressive symptoms, or coping self-efficacy	-Dose: single session may have been too low of a dose for the interventions to be efficacious
Mindfulness-based cognitive therapy (MBCT)	Iran	Samhkaniyan, 2015		-MBCT -8 weekly sessions -Group intervention	-Loneliness -Quality of life	-Improved quality of life -Decreased loneliness	-Generalizability: WLWH "treated because of a physical or psychological illness" were excluded -Applicability: no measures of depressive symptoms
L.I.F.T. (Living in the Face of Trauma)	USA	Sikkema, 2007 Puffer, 2011		-Coping skills group intervention -15 weekly sessions -CBT skills and trauma processing	-Coping -PTSS -Well-being	-Improved psychological well-being -Decreased intrusive and avoidant posttraumatic stress symptoms[1]	-Variable attendance at weekly sessions -Generalizability: All WLWH were from New York City

(continued)

Table 2. (continued)

	Country of Study	Articles (First Author, Year)	Sample on ART/ HAART (If Reported)	Intervention	Mental Health Targets	Primary Results	Limitations
STEP-AD (Striving Toward Empowerment and Medication Adherence)	USA	Dale, 2018	100%	-Medication adherence program with CBT skills for coping with trauma and discrimination psychological sequelae tailored for Black WLWH	-Coping -PTSS -Resilience -Distress (related to discrimination)	-Decreased posttraumatic stress symptoms	-Generalizability: Urban setting only -Proof of efficacy: Outcomes presented for 5 women
Supportive Treatment Interventions							
Positive Self-Management Program	USA	Webel, 2010	73%	-Peer-facilitated medication adherence group intervention -7 sessions -Cognitive and emotion management	-Problem-solving skills -Emotion regulation	-Improved HIV Mastery -Decreased disclosure worries -Good acceptability reported by WLWH -(Compared to CG) No significant improvement in symptom management	-Generalizability: Urban setting only -Difficulty in delivering intervention by peer facilitators
WEP (Women's Empowerment Program)	USA	Enriquez, 2006	68%	-Peer and nurse-facilitated group intervention -4 monthly sessions -Social support, HIV psychoeducation, self-esteem, and self-care	-Self-esteem -Self-care -Depressive symptoms	-Improved self-care behaviors -Improved social support -Non-significant increase in self-esteem -Non-significant reductions in depressive symptoms	-Generalizability: Designed for and tested in U.S. Midwestern city -Focus: Participants wanted more content on emotional concerns and depression
UNITY program	USA	Rao, 2018		-Peer-led HIV stigma reduction workshops for Black WLWH -2 sessions -Coping skills and social support	-Stigma -Coping	-Non-significant reductions in stigma	-Generalizability: Urban settings only -Long-term effect: Reductions in stigma from intervention not sustained without additional social support
Interventions for Pregnant and Parenting Women Living with HIV							
Structural Ecosystems Therapy	USA	Szapocsnik, 2004 Mitrani, 2012		-In-home counseling focused on improving support network for African American Mothers LWH	-Psychosocial functioning	-Decreased psychological distress -Decreased family-related stress	-Logistically challenging: Low engagement rates and cost-ineffective

(continued)

Table 2. (continued)

	Country of Study	Articles (First Author, Year)	Sample on ART/ HAART (If Reported)	Intervention	Mental Health Targets	Primary Results	Limitations
HIV Self-Care Symptom Management Intervention for African American Mothers	USA	Miles, 2003		-Nurse home visits to improve self-care, symptom management, and cognitive reframing for African American Mothers LWH	-Self-care -"Mental health problems" (e.g. depression)	-Lower stigma -Decreased depressive and anxiety symptoms -Improved physical functioning	-Logistically challenging: In home-visits -High rate of attrition
Project TALC (Project Teens and Adults Learning to Communicate)	USA	Rotheram-Borus, 2001 Rotheram-Borus, 2012	76.3% had perfect adherence at baseline	-Group intervention for mothers and children -Coping with emotions, illness, and disclosure -Parenting skills	-Coping -Emotion regulation -Problem solving skills -Interpersonal functioning (in the family)	-2001 study: Decreased depressive and anxiety symptoms -2012 study: (Compared to CG) Non-significant improvement in Global distress	-Inconsistent results across time and setting
Mobile-based Acceptance & Commitment Therapy	Nigeria	Ishola, 2015		-Mobile-based Acceptance & Commitment Therapy (ACT) in the prevention of mother to child HIV transmission -1 session of ACT -Weekly value-based health messages for 3 months of pregnancy	-Psychological flexibility	-Increased psychological flexibility	-Generalizability: Sample recruited from major PMTCT centers in one geographic region -Applicability: No measures of depressive symptoms
Interactive Group Counseling Intervention	Tanzania	Kaaya, 2012		-Group counseling with problem-solving therapy for pregnant WLWH -Psychosocial support -Disease management -Disclosure	-Interpersonal functioning -Problem solving skills -Relaxation skills	-(Compared to CG) Non-significant reduction in rate of depression	-Attrition: High rate of participant attrition -Dose: 6 weeks may be too short in the perinatal period
Telephone Support for HIV-Infected Pregnant Women	Thailand	Ross, 2013		-Telephone-based psychosocial support to pregnant WLWH delivered by RN	-Depressive symptoms	-Decreased depressive symptom severity	-Generalizability: Small sample size -Inconsistent acceptability of telephone mode of delivery of intervention

(continued)

Table 2. (continued)

	Country of Study	Articles (First Author, Year)	Sample on ART/ HAART (If Reported)	Intervention	Mental Health Targets	Primary Results	Limitations
Peer Mentoring to Support South African WLWH	South Africa	Rotheram-Borus, 2014		-Perinatal peer-mentoring group intervention -Psychosocial support -Disease management -Disclosure	-Coping -Depressive symptoms	-Decreased depressive symptoms	-Attrition: High rate of participant attrition
Interventions for Women of Trans Experience							
Seeking Safety	USA	Empson, 2017	85.7%	-Manualized cognitive-behavioral group therapy -12 weekly sessions -Substance Use -PTSD	-PTSD -Substance use	-Non-significant reduction in posttraumatic stress symptom severity -Non-significant reduction in substance use	-Generalizability: Small sample size

ART: antiretroviral therapy; HAART: highly active antiretroviral therapy; CG: Control Group; RN: Registered Nurse; PTSS: Posttraumatic Stress Symptoms; PTSD: Posttraumatic Stress Disorder.
[1]Combined data for women and men living with HIV.

efficacy, the SMART/EST study has limited generalizability as an intervention targeting mental health. The study excluded WLWH with active major depressive disorder.[116,118] Although women were allowed to participate in the study after receiving treatment, their initial exclusion limits the ability to draw conclusions about the SMART/EST intervention's effectiveness as a treatment for depression. In addition, the SMART/EST intervention was only tested in inner-city community health clinics and 60% of these sites had discontinued the program 2 years post-study termination.[123] Thus, it is unclear if the program could be sustainable without research funding or in non-urban settings.

Several other studies have examined cognitive-behavior based psychosocial interventions for WLWH. Brown and colleagues conducted a randomized controlled trial in the U.S. testing a single session computerized stress management training against a waitlist control condition.[124] The intervention provided psychoeducation on stress, information on cognitive reappraisal of stressors, coping strategies, relaxation training, and motivational interviewing. Participants were also given a workbook of activities and a relaxation CD to practice at home.[124] The women in the intervention had significantly greater knowledge of stress management techniques but no changes in their perceived stress, depressive symptoms, or coping self-efficacy as compared to the waitlist condition.[124] The authors attribute this lack of significant changes to the single session intervention being too low of a dose or the follow-up period being too short. They hypothesized that it may take longer than 1 month for changes in coping to be detectable.[124] Another intervention for WLWH with cognitive behavioral techniques is mindfulness-based cognitive therapy (MBCT). It is an 8-week group intervention that incorporates formal and informal mindfulness practices with cognitive therapy techniques.[125,126] MBCT was originally designed as an intervention to prevent depression relapse.[126] One research group in Iran tested this among WLWH and found that it improved participants' quality of life and decreased their sense of loneliness compared to a control group of WLWH who did not receive the intervention.[127] However, this study did not measure the intervention's effect on mental illness symptomatology, including depressive symptoms. Further, the authors excluded women receiving treatment for "psychological illness" (pp. 108). Thus, as with the SMART/EST study, it is not possible to generalize the findings of this study to interventions for WLWH with active mental illness.

Due to the high prevalence of trauma among WLWH, some cognitive-behavioral interventions have attempted to address the unique needs of WLWH with posttraumatic stress symptoms. The group intervention, Living in the Face of Trauma (L. I. F. T.) was designed for individuals living with HIV with childhood sexual trauma histories to improve coping and reduce posttraumatic stress symptoms.[128] Intervention groups were either all-male or all-female and took place at community health care clinics in New York City. Women in the intervention were invited to 15 sessions of a weekly coping skills group that provided psychoeducation, adaptive problem-focused and emotion-focused coping skills application, and group processing. The skills taught included cognitive-behavioral techniques such as cognitive restructuring, communication, and decision-making improvement, as well as trauma-focused techniques like sharing trauma narratives and addressing the thoughts and behaviors common to WLWH with sexual abuse histories.[129] The authors reported that there was variable attendance at the intervention sessions with approximately 30% of intervention participants attending fewer than two-thirds of sessions.[128] Nevertheless, for both men and women in the L.I.F.T. intervention, it was effective in reducing intrusive and avoidant symptoms of posttraumatic stress[128] and for the WLWH, it improved psychological well-being.[129]

Another cognitive-behavioral intervention for WLWH that included a focus on trauma symptomatology was the Striving Toward Empowerment and Medication Adherence (STEP-AD) study.[130] Although the primary aim of the study was to improve medication adherence, it employed cognitive behavioral problem-solving techniques and coping skills for dealing with trauma symptomatology and racial and HIV-related discrimination, along with skills to improve medication adherence. The authors reported that women's self-reported posttraumatic stress disorder symptoms decreased over the course of the study and, as such, concluded that STEP-AD was an acceptable treatment for addressing trauma symptomatology.[130] However, these findings were derived from a sample size of 5 U.S. women, so there is a need for more rigorous studies of this intervention in the future.

Supportive treatments. Supportive, peer-facilitated programs have also been utilized in addressing the psychosocial and mental health issues faced by WLWH. In these programs, having WLWH as the program facilitators engendered credibility and engagement in the intervention and decreased feelings of isolation among the WLWH participants.[131,132] The credibility piece has been particularly salient for interventions promoting self-care and self-management of disease.[131]

Webel and colleagues conducted a randomized controlled trial of a 7-session group self-management intervention led by trained peer leaders following the Positive Self-Management Program in a U.S. urban setting.[132] The majority of sessions focused on medication adherence and other health behaviors but some dealt with cognitive symptom management, emotion regulation, problem-solving, relaxation, and techniques to manage depression.[132] Those in the intervention group demonstrated better quality of life scores in the domains of HIV mastery and disclosure worries but not in symptom management.[132] When discussing the lack of significance in their primary outcome, self-management, the authors noted that the peer-facilitators in the study sometimes struggled with delivering the intervention, specifically with the wording of the scripts. This highlights the importance of tailoring psychosocial interventions to both facilitators and recipients. Despite this limitation, the participants in the study felt the content was helpful and the intervention fostered a sense of community.[132]

The Women's Empowerment Program (WEP) utilized a dual-facilitator design to provide participants with expertise in 2 areas of HIV-related self-care: 1) a nurse with extensive knowledge in women's health and HIV care and 2) a WLWH peer facilitator with knowledge on self-management regarding living with HIV.[131] The study aimed to assess if the self-care management program would lead to decreases in depressive symptoms. WEP consisted of 4-hour sessions held once a month for 4 months. The sessions included a communal meal, small-group breakout sessions, role-playing, and didactic portions covering social support, HIV-related information, self-esteem, and self-care specifically designed for WLWH in the U.S. Midwest.[131] On average, participants experienced improvement in feelings of social support and self-esteem, use of self-care behaviors, and depressive symptoms, although the changes in self-esteem and depression were not statistically-significant. The authors attributed their non-significant findings to the study's small sample size (N = 34). Although the results of this study were promising, WLWH participants provided feedback that they would have liked more program content surrounding emotional problems and depression.[131]

The UNITY program is another supportive intervention that utilized workshops led by peer facilitators in an attempt to reduce HIV-related stigma for African-AmericanWLWH.[133] This 2-session program included group discussions and multimedia on coping skills and social support exercises to deal with stigma. This intervention's efficacy was tested in a U.S.-based randomized controlled trial. Although women in the intervention demonstrated a decrease in illness-related stigma, the reduction was not significant when compared to the study's control group that also exhibited reduction in stigma.[133] The authors hypothesized that peer support, which was present in both the intervention and control condition, was more important in combatting stigma than the HIV-specific education delivered in the intervention.[133]

Mental Health Treatment Among Pregnant and Parenting Women Living With HIV

A series of interventions addressed improving the mental and physical health of pregnant and parenting WLWH through their support networks and families. One such intervention is structural ecosystems therapy which consists of a counselor meeting with a woman living with HIV in her home and working with her on improving support networks to better serve her needs.[134,135] Studies of structural ecosystems therapy conducted in the U.S. have shown it to be efficacious in reducing psychological distress and family-related hassles.[134,135] Authors of some studies, however, note the logistical difficulty in conducting in-home sessions with WLWH and their families and lower than expected engagement rates of WLWH.[134,135]

Another home-visit intervention involved nurses conducting sessions on self-care symptom management with African-American mothers living with HIV in the U.S.[136] The sessions covered stress and concerns of the mother, cognitive reframing, self-care, and HIV symptom management.[136] A randomized controlled trial of this intervention found that compared to a usual care condition, women receiving the sessions reported less stigma and improved physical functioning.[136] Although the women in the intervention did not demonstrate significant reductions in overall depressive symptom severity, there were significant reductions in their symptoms of depressed/dejected mood and tense/anxious mood.[136] The authors of the study reported high participant attrition (approximately 40%) but it is unclear if WLWH dropped out during the intervention or research follow-up period.

In another intervention for mothers living with HIV, women and their adolescent children attended group sessions separately for half of the intervention and together for the other half. The mothers' group aimed to improve parenting and health behaviors and decrease mental health issues through coping with illness, emotions, and disclosure.[137,138] When the intervention was tested in New York City in the 1990s, they found significantly lower depressive and anxious symptoms at both 15 months and 2 years after the end of the intervention[138] but these results were not replicated in another study of the same intervention in Los Angeles 10 years later.[137] When accounting for the inconsistency in outcomes, the authors of these studies underscore the changing demographics of women living with HIV and HIV-related services and treatment available at the time of the 2 studies.[137]

Mental health treatments for pregnant and postpartum mothers living with HIV have primarily been provided as part of prevention of mother-to-child transmission interventions or as an adjunctive piece to usual HIV care.[139-141] The majority of psychosocial interventions for pregnant WLWH targeted depressive symptoms, although one mobile-based intervention in Nigeria used Acceptance and Commitment Therapy techniques in an attempt to improve psychological flexibility.[141] Other perinatal programs in Tanzania, South Africa, and Thailand used psychosocial support as their main form of treatment,[139,140,142] often complementing psychoeducation on disease management, skill building, and if and how to disclose their HIV-positive status to their support networks.[139,140] Despite the reported improvements in psychosocial outcomes, several perinatal studies noted participant attrition in their discussion of study limitations.[139,140] The authors attributed this in part to systemic barriers such as women not being able to attend treatments due to lack of flexibility in their schedules from work and other commitments and from fear of unintended disclosure by attending the intervention at the health clinic.[139,140]

Mental Health Treatment Among Women of Trans Experience

Women of trans experience have an estimated 14% prevalence of HIV and high rates of depression symptomatology (44%) and trauma experiences (56%).[143] They tend to have worse self-reported mental health than cisgender women[144] and cisgender men living with HIV.[145] Although there are instances of psychosocial interventions recruiting trans men and women,[128] there is limited research on interventions for women of trans

experience or what the outcomes are for this specific group of women. One exception is a pilot study in the U.S. which evaluated the Seeking Safety group therapy intervention on substance use and posttraumatic stress symptoms.[146] Through 12 weekly group sessions focusing on cognitive, behavioral, and interpersonal concerns associated with trauma and substance use, enrolled women saw reductions in posttraumatic stress, alcohol abuse, and drug abuse symptom severity. Although it is difficult to draw sweeping conclusions about this intervention due to the pilot study's small sample size (N = 7), the combination of social support and therapeutic skills appeared to be beneficial.[146]

Psychopharmacologic Treatment of Mental Illness Among Women Living With HIV

In addition to psychosocial and psychotherapeutic treatments, psychopharmacologic treatments for psychiatric disorders can be helpful, ideally in combination, or alone for WLWH. When the psychiatric disorder is more severe, the role of psychopharmacology can be an important addition to psychotherapeutic interventions. For major depressive disorder in particular, the combination of therapy and antidepressant medication is associated with better ART adherence as demonstrated in an international meta-analysis of 12,000 adults with HIV[147] and a U.S. multi-center study of 2,628 WLWH.[148] In another U.S.-based study looking at psychopharmacologic treatment for depressive symptoms in people living with HIV/AIDS, greater adherence to psychopharmacologic treatments regardless of medication class was positively associated with higher ART adherence and mediated the association between depressive symptoms and ART adherence.[149]

For pregnant WLWH, untreated symptomatic psychiatric disorders can have a deleterious effect on the pregnancy and mother. Thus, effective treatment is imperative. For major depressive disorder, a class of antidepressant medications, the selective serotonin reuptake inhibitors (SSRIs) are often used due to their tolerability and safety profiles. These medications have a reassuring safety profile in pregnancy,[150] breastfeeding,[151] and in combination with ART.[152] There is a randomized controlled trial in progress in Uganda comparing the effects of an evidence based depression care model versus usual care on adherence called M-DEPTH. This study will incorporate a stepped up care continuum with psychotherapeutic and psychopharmacologic interventions including SSRIs.[153]

There are few published studies on psychopharmacologic treatments and their effect on mental illness that are specific to individuals living with HIV.[154] Instead, many studies from the general population have been extrapolated to inform clinical practice. For WLWH, there are specific gaps in evidence pertaining to pharmacotherapy. The first is potential drug-drug interactions between antiretroviral medications and antidepressants, anxiolytics, antipsychotics, mood stabilizers, or other medications for psychiatric illness.[155] It is always important to review drug-drug interactions whenever prescribing any medication to understand the treatment implications while balancing the risks. Every medication will have a different profile and potential effect on the cytochrome P450 isoenzymes.[156] Another consideration is the mental health treatment preference of each individual woman living with HIV while providing the most informed treatment recommendations for their condition. In the U.S., for example, African Americans and Latinas are less likely than their white counterparts to find antidepressant medications acceptable.[157,158] Although antidepressant use in the U.S. increased for African-American and Hispanic individuals over a decade from the 1990s to 2000s, they were still far less likely to take such medication compared to their white counterparts.[159] Given the extant racial and ethnic disparity in HIV prevalence,[2] psychopharmacologic treatment for WLWH requires attention to these patient preferences to optimize adherence and self-efficacy.

Discussion

WLWH experience a greater burden of mental health conditions and symptomatology compared to the general population, women without HIV, and men living with HIV. Mental health issues in WLWH, particularly depression, posttraumatic stress, and anxiety are associated with a decreased quality of life and worse HIV-related health outcomes. Due to the connection between mood and anxiety symptoms and negative HIV-related health outcomes, several health interventions have incorporated psychosocial aspects such as cognitive reappraisal and stress management into routine HIV care. However, there have been few researched interventions with the primary aim of addressing mental illness in WLWH.

There is a large research base showing that depression is commonplace among WLWH, with harmful consequences for social, occupational, and familial functioning. It has also been linked to poor HIV management including ART adherence and worse disease progression. Yet few psychosocial interventions have specifically addressed treatment of active depression in WLWH and even fewer have been shown to be effective in reducing depressive symptoms. Some notable studies that addressed depressive symptomatology did not include WLWH with major depressive disorder in their samples so results cannot be extrapolated to women with depression.[116,118] Given the high rate of major depressive disorder, this constitutes a critical gap in the knowledge-base of mental health interventions for WLWH.

While access to mental health treatment specific to the needs of WLWH in general is inadequate, there is also a lack of research on mental health treatment for specific groups of WLWH. The periods of pregnancy and the postpartum see an increase in stress, depression, and anxiety for women and engender additional stressors regarding disclosure, prevention of transmission to baby, and stigma for WLWH. Research on perinatal mental health conditions for WLWH has been done primarily in Africa. The majority of research has been done as part of transmission prevention programs, rather than as direct

mental health interventions. Another group with a dearth of research is women of trans experience. Although the research on HIV among transgender women has grown exponentially in recent years, studies on mental health treatment for transgender women have not. Little is known on how psychosocial interventions could benefit transgender WLWH with mental health issues.

Existing research demonstrates that psychosocial interventions can be beneficial for WLWH. Interventions that target the unique needs of WLWH such as decisions regarding disclosure of HIV serostatus, intersectional stigma, and coping with medical symptom management have demonstrated improved quality of life. Group interventions that offer a peer-support component have been shown to be acceptable to WLWH. Indeed, improving the support networks, whether it be family or other WLWH, can help to improve mental health in this population.

Despite the existing research on mental health and mental health interventions for WLWH, more work is necessary to adequately address the needs of this population. Future research should examine how the mental health of WLWH compares to women living with other chronic medical conditions as this may illuminate the role of HIV sequelae in mental illness and targets for mental health interventions. In regard to mental health interventions for WLWH, several questions remain. First among these is what types of mental health interventions are effective for WLWH who present with clinically significant mental health issues. Limited research has focused on mental health-specific interventions that are feasible, acceptable, and accessible for WLWH. Second, as demonstrated in this review, several interventions with psychosocial components for the health of WLWH have been shown to be efficacious in controlled research settings. However, much less research has focused on implementation: whether these studies of efficacy translate to effectiveness when implemented in real-world settings. Prior research has illustrated the harmful effect of HIV-related stigma on mental health and how some interventions have tried to address this construct; Very little mental health intervention research has examined how to overcome the additional stigma of mental illness and mental health treatment among WLWH. For instance, wellness and exercise-based interventions may carry less stigma than traditional mental health interventions and have been shown to improve depression and quality of life in people living with HIV, but there is a lack of this research among WLWH.[160,161]

We know that the burden of mental health issues is great among WLWH and that supportive and cognitive-based components of health interventions have shown promise for addressing these issues. We also know that pharmacotherapy may be an effective approach in some cases, but studies on acceptability and health systems approaches to increasing access to psychopharmacology within the existing HIV care delivery system are lacking. In summary, research targeting mental health, particularly through the lens of dissemination and implementation is warranted to fill the extant gaps in services for WLWH.

Authors' Notes

The findings and conclusions are those of the authors and do not represent the official position of the Centers for Disease Control and Prevention.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported in part by the Third Coast Center for AIDS Research: Third Coast CFAR SP0029591.

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HHS Public Access

Author manuscript

AIDS Behav. Author manuscript; available in PMC 2021 December 01.

Published in final edited form as:

AIDS Behav. 2020 December ; 24(12): 3522–3532. doi:10.1007/s10461-020-02913-2.

Improvements in retention in care and HIV viral suppression among persons with HIV and comorbid mental health conditions–Patient-centered HIV Care Model

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Abstract

The Patient-centered HIV Care Model (PCHCM) integrated community-based pharmacists with medical providers and required sharing of patient clinical information and collaborative therapy-related action planning. We determined the proportions of participants with HIV and mental health conditions who were retained in care and the proportion virally suppressed, pre- and post-implementation. Overall, we found a relative 13% improvement in both retention (60% to 68% [p=0.009]) and viral suppression (79% to 90% [p<0.001]). Notable improvements were seen among persons triply diagnosed with HIV, mental illness and substance use (+36% [50% to 68%, p=0.036] and +32% [66% to 86%, p=0.001] in retention and viral suppression, respectively). There were no differences in the proportions of persons adherent to psychiatric medications, pre- to post-implementation, nor were there differences in the proportions of persons retained in care or virally suppressed by psychiatric medication adherence, post-implementation. PCHCM

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The findings and conclusions of this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

demonstrated that collaborations between community-based pharmacists and medical providers can improve HIV care continuum outcomes among persons with mental health conditions.

Abstract

Resumen

El modelo de atención para el VIH centrada en el paciente (PCHCM) integró a farmacéuticos de la comunidad y a proveedores médicos, y requirió compartir la información clínica del paciente y planificar medidas colaborativas relacionadas con la terapia. Determinamos las proporciones de participantes con VIH y afecciones de salud mental que permanecieron bajo atención médica y la proporción de quienes habían logrado la supresión viral, antes y después de la implementación. En líneas generales, hallamos una mejoría relativa del 13% tanto en la permanencia bajo atención médica (60% a 68% [p=0.009]) como en la supresión viral (79% a 90% [p<0.001]). Se observaron mejorías notables entre personas con diagnóstico triple de VIH, enfermedad mental y consumo de sustancias (+36% [50% a 68%, p=0.036] y +32 % [66% a 86%, p=0.001] en la permanencia bajo atención médica y la supresión viral, respectivamente). No hubo diferencias en las proporciones de personas con adhesión a los medicamentos siquiátricos, desde antes hasta después de la implementación, ni tampoco diferencias en la proporción de personas que permanecieron bajo atención médica o con supresión viral por su adhesión a los medicamentos siquiátricos, después de la implementación. El PCHCM demostró que las colaboraciones entre los farmacéuticos de la comunidad y los proveedores médicos pueden mejorar los resultados del proceso continuo de atención para el VIH entre personas con afecciones de salud mental.

Keywords

HIV; mental disorders; retention in care; sustained virologic response; Patient-centered HIV Care Model

Palabras clave

VIH; trastornos mentales; permanencia bajo atención médica; respuesta virológica sostenida; modelo de atención para el VIH centrada en el paciente

Introduction

Mental health disorders are prevalent among persons with HIV; an estimated 63% of persons with HIV have a mental health disorder compared to 31% of persons without HIV. (1, 2) Depression, in particular, is common among persons with HIV with an estimated prevalence of 20% to 40%. (3, 4)] Comorbid depression is associated with poorer outcomes along the HIV care continuum. Persons with HIV and depression are less likely to be retained in HIV care (5), adherent to antiretroviral therapy (ART)(6, 7), and virally suppressed. (8, 9) Also, depressive symptoms have shown a dose-response relationship to missed clinical appointments and virologic failure. (10)

Although most studies of HIV and mental illness focus on depression, the estimated prevalence of and association with other mental health conditions is high. For example,

prevalence of generalized anxiety disorder and post-traumatic stress disorder is estimated at 16% and from 10% to 74%, compared with 2% and 8% among the general population, respectively. (11) Additionally, HIV has been associated with increased risk of schizophrenia and acute psychosis, particularly in the first few years after HIV diagnosis. (12) While the association of depression and HIV care continuum outcomes is well documented (5–10), the associations of care continuum outcomes and other mental health conditions (e.g., psychotic disorders, bipolar and other mood disorders) have shown mixed results. (7)

Potentially compounding the effect of mental illness on HIV outcomes is concomitant substance use. Like mental illness, the prevalence of substance use disorder among persons with HIV is high at an estimated 48%. (13) Further, the United States Substance Abuse and Mental Health Services Administration (SAMHSA) estimates that nearly one-quarter of persons with HIV, in the United States, need treatment for illicit drug or alcohol use. (14) Substance use or dependence is, by itself, associated with poor retention in HIV care and virologic failure (15, 16); these effects may be exacerbated by the co-occurrence of mental health disorders. In fact, several studies have shown that co-occurring psychosocial or “syndemic” factors (in particular, mental illness, alcohol and substance use, childhood sexual abuse, and intimate partner violence) increase risk of poor HIV viral suppression, poor retention in care, ART nonadherence, and mortality. (12, 17–22) Syndemic health problems occur when multiple health conditions act synergistically to contribute to excess disease burden in a population. (20)

Given the high prevalence of comorbid mental health conditions among persons with HIV and evidence that these conditions adversely affect health outcomes, interventions that improve outcomes among this population are necessary. As such, we used data from the Patient-centered HIV Care Model (PCHCM), a ten-site demonstration project, to conduct a sub-analysis of model outcomes. In previous analyses of project outcomes, the PCHCM was found to improve retention in HIV care and viral suppression among the entire participant cohort by a relative 13% and 15%, respectively. (23, 24) This sub-analysis sought to answer the following questions: 1) Does the model improve retention in care and viral suppression among persons with HIV and mental health conditions? 2) Does the model improve adherence to psychiatric medications? and 3) Do persons with HIV and mental health conditions, who adhere to their psychiatric medications, have better retention in care and viral suppression than those who are non-adherent or not on psychiatric medications?

Methods

Patient-centered HIV Care Model

The Patient-centered HIV Care Model integrated community-based pharmacists with primary medical providers for patient-centered HIV care. The PCHCM was implemented between August 2013 and September 2016 at ten project sites within the United States (Albany, GA; Chicago, IL; Fort Lauderdale, FL; Kansas City, MO; Miami, FL; New York, NY; Palm Springs, CA; Philadelphia, PA; St. Louis, MO; and Washington, D.C.). Each project site was comprised of ≥1 community-based HIV specialty retail pharmacy partnered with a medical clinic. A convenience sample of 765 participants was enrolled in the project; each participant received between 12 and 24 months of model services.

The PCHCM and the main outcomes for the entire participant cohort are described in detail elsewhere. (23, 24) In brief, the model built upon the existing Medication Therapy Management (MTM) model and included additional services. Medication Therapy Management broadly includes a range of pharmacist-led services meant to optimize therapeutic outcomes. (25) These services may include: comprehensive or targeted review of medications for indication, effectiveness, safety and adherence; adherence counseling or other support; and patient education. The PCHCM built upon MTM by requiring: 1) clinic medical providers to share patient clinical information with pharmacists and 2) collaborative action planning to address identified therapy-related problems. The pharmacists' review of patient clinical information (e.g., HIV viral load, CD4 and drug resistance test results, medical problem lists, and failed medication regimens) enabled the pharmacists to most effectively conduct MTM. In addition, the pharmacists proactively monitored patients' prescription refill patterns and laboratory test results and provided individualized adherence support. The pharmacists then worked closely with the clinic medical providers (e.g., HIV physicians, physician assistants, nurse practitioners) and/or patients to develop plans to address therapy-related problems identified through the pharmacists' activities. Patients were scheduled for quarterly follow-up with the pharmacists. At each patient visit with the pharmacist, the patients' ART was reviewed; other comorbid conditions were reviewed when deemed clinically necessary by the pharmacist. No formalized practice agreements were established between pharmacists and prescribers. The Office of Research Compliance, on behalf of the Institutional Review Board of the University of North Texas Health Science Center, determined the project met criteria for exempt status (exempt category: demonstration projects designed to study public benefit or service programs).

Mental health cohort

A person was considered to have a mental health condition if they had a mental health diagnosis within the pre-implementation clinic record (up to 24 months prior to project enrollment) or had filled ≥1 prescription for a medication within the Medi-Span® Generic Product Identifier (GPI) major class of "antidepressant," "antianxiety" or "antipsychotic," in the pre-implementation period. Non-psychotic mental health conditions were defined as a diagnosis of adjustment disorder, anxiety disorder, bipolar disorder, depression, dysthymia, panic disorder or post-traumatic stress disorder or ≥1 prescription fill for an antidepressant or antianxiety medication, in the pre-implementation period. Psychotic mental health conditions were defined as a diagnosis of schizoaffective disorder, schizophrenia, schizophreniform disorder or psychotic disorder (not otherwise specified) or ≥1 prescription fill for an antipsychotic medication, in the pre-implementation period. Substance use was defined by documentation of substance use, abuse or dependence in the pre-implementation clinic record and included illicit (including marijuana) and controlled substances and alcohol.

Retention in care

The proportion of persons with HIV and a mental health condition who were retained in care was calculated, pre- and post-model implementation. Retention in care was defined as ≥1 medical visit with a physician, nurse practitioner, or physician assistant, in each 6-month period of a 12-month measurement period with a minimum of 60 days between medical

visits. (26) Retention was measured from 12 months prior to (and included) the enrollment date (pre-implementation) and from one day after the enrollment date to 12 months forward (post-implementation). Persons were included in the analysis if they had a documented HIV diagnosis or evidence of HIV diagnosis (e.g., HIV viral load test result) ≥12 months prior to the enrollment date. A person was excluded if there were no recorded date(s) for clinic visits in the pre-implementation period. (23)

Viral suppression

The proportion of persons with HIV and a mental health condition who were virally suppressed was calculated, pre- and post-model implementation. Viral suppression was defined as an HIV viral load of <200 HIV RNA copies/mL at the last test in the 12–month measurement period. (26) In the pre- and post-implementation periods, the *last viral load test* was the viral load test result closest to and furthest from the enrollment date, respectively. Measurement periods were the same as those used for the retention analysis. (24) Persons were included in the viral suppression analysis if they had ≥1 viral load test result in the measurement period.

Adherence to psychiatric medications and therapy-related issues

Adherence to psychiatric medications was based on the Proportion of Days Covered (PDC). The PDC is a pharmacy claims-based metric that determines the proportion of days for which a person has medication available during a measurement period. The PDC is calculated by dividing the number of days a person has medication during the measurement period by the length of the measurement period; adjustments are made for fill days' supply and for days with overlapping medication supply. (27)

Adherence was defined as a PDC ≥0.80 and calculated pre- and post-model implementation. (28) A PDC was calculated, for each medication, from the date of the index fill to the date of the last fill in the 12 months pre- and post-model implementation. For each medication, persons were included in the analysis if they filled prescriptions that covered at least 90 days within the 12 months pre- and post-implementation. Prescriptions for benzodiazepines, hydroxyzine and mental health medications with <30-day supplies, per prescription, were excluded from the analysis; these medications were excluded to limit PDC calculations to medications intended for long-term rather than short-term use.

Adherence was calculated for persons on medications within the following three drug groupings: antidepressant and/or antianxiety medication(s) only; antipsychotic medication(s) only; both antidepressant and/or antianxiety medication(s) and antipsychotic medication(s). If, during the measurement period, more than one medication was filled within any of the drug groupings, a PDC was calculated for each medication and adherence was based on the average PDC. The overall mean PDC, PDC range and the proportion adherent was calculated for each category of psychiatric medication, pre- and post-model implementation. In addition, pharmacist identified psychiatric therapy-related problems and suggested resolutions were determined.

Retention in care and viral suppression by psychiatric medication adherence level

The proportion of persons retained in care and the proportion virally suppressed were determined by psychiatric medication adherence (PDC ≥0.80 and <0.80) within each drug grouping. Persons with a diagnosis of depression, dysthymia or anxiety in the pre-implementation clinic record but who never filled a prescription for an antidepressant/antianxiety medication were included in a "not on therapy" level in the antidepressant/antianxiety drug grouping. A "not on therapy" level was not included in the antipsychotic or both antidepressant/antianxiety and antipsychotic drug groupings because of the small number of persons diagnosed with a psychotic disorder who were not on therapy.

Censoring

Persons were censored from the analyses at the first date that one of the following occurred: person died, too ill (e.g., moved into hospice), moved out of area, transferred care to non-project participating clinic or provider, incarcerated, voluntarily withdrew from project, or transferred prescriptions to a non-project (or non-project network) pharmacy. If one of the aforementioned conditions occurred but no date was recorded for the event, then the person was censored one day after their last clinic visit. Two project sites did not collect censoring data. For these two sites, persons were censored one day after the date of the last clinic visit if a person had no clinic visit, HIV viral load, or CD4 test drawn for >6 months, but continued to fill prescriptions at the project pharmacies in the last six months of the project implementation period.

Statistical analysis

The proportion of persons with mental health conditions who were retained in care and the proportion virally suppressed were modeled using log-binomial regression. Generalized estimating equations (GEE) with an exchangeable working correlation structure accounted for repeated measures. Overall, pre- and post-implementation retention and viral suppression was compared by including the implementation period (pre- or post-) as the sole main effect in the model. Similar comparisons were made within each level of the demographic and other characteristics (e.g., category of mental health diagnosis and baseline substance use diagnosis) by including the main effect terms for the implementation period and the demographic or other characteristic, and an implementation period by demographic or other characteristic interaction term. The relative percentage change in the proportion of persons retained and virally suppressed was also calculated, pre- to post-model implementation. Pre- and post-implementation mean PDC and the proportion adherent were compared using GEE with normal and binomial distributions, respectively.

Lastly, multivariable log-binomial regression was used to calculate the relative risk (RR) and 95% confidence intervals of being retained in care and the RR of being virally suppressed by psychiatric medication adherence category within each drug grouping, post-implementation. The relative risks of retention and the risks of viral suppression in the non-adherent and "not on therapy" groups were estimated relative to the risk in the adherent group. The RR estimates for retention in care were adjusted for pre-implementation retention in care. In cases where data were too sparse to generate stable estimates using log binomial regression, we performed stratified contingency table analyses and computed the adjusted logit

estimates of the RR with exact unconditional 95% confidence limits. The RR estimates for viral suppression were initially adjusted for both pre-implementation viral suppression and adherence to ART (defined as three antiretroviral medications [excluding boosters], as outlined by treatment guidelines, or one of the following nonstandard regimens: lamivudine used in combination with two other antiretroviral drugs or the combined use of darunavir/dolutegravir/ritonavir (29, 30); an ART PDC of ≥0.90 was considered adherent (26)). However, because approximately 90% of study participants were virally suppressed post-implementation, the RR estimates were unstable due to sparse data. The RR estimates for viral suppression were, therefore, stratified by drug grouping and left unadjusted.

Results

Of the 765 persons enrolled in the project, 453 (59%) had a mental health condition in the pre-implementation period and were included in this analysis. (Table I) Among these individuals, the largest proportions were non-Hispanic black (36%), male (71%) and Medicaid-insured (32%). The median age was 49 years (interquartile range: 40 – 56). The majority (88%) had a diagnosis for a non-psychotic mental health condition and 15% had a diagnosis for substance (alcohol or drug) use in the pre-implementation period. (Table I) The analytic cohorts are shown in Figure 1.

Psychiatric therapy-related issues and suggested resolutions

The largest proportion of psychiatric therapy-related issues identified by project pharmacists were related to suboptimal therapy (12%), patient adherence (11%), and medical record documentation (10%). Medical record documentation refers to updating the medical record to reflect any changes to patients' medical history or treatment (e.g., update patient medication list to remove discontinued medications). The largest proportion of pharmacist suggested resolutions to identified problems were medication modification (16%) and medical record update (10%) (data not shown).

Retention in care

Overall, retention in care improved among persons with mental health conditions a relative 13% from 60% to 68% (p=0.009), pre- to post-model implementation. Increases in retention in care were seen among persons who were: non-Hispanic black (+21%; 62% to 75% [p=0.007]); female (+21%; 56% to 68% [p=0.036]); Medicare insured (+40%; 65% to 91% [p=0.028]); covered by the Ryan White/AIDS Drug Assistance Program (ADAP) (+29%; 62% to 80% [p=0.023]); and diagnosed with baseline substance use (+36%; 50% to 68% [p=0.036]). There were also substantial increases among persons with a psychotic disorder (+31%; 59% to 78% [p=0.056] and persons covered by private insurance (+21%; 60% to 72% [p=0.207]) although these increases were not significant at the p<0.05 level. (Table I)

Viral suppression

Overall, viral suppression improved among persons with mental health conditions a relative 13% from 79% to 90% (p<0.001), pre- to post-model implementation. Increases in viral suppression were seen within most demographic groups with notable improvements among non-Hispanic black persons (+32%; from 64% to 84% [p<0.001]) and persons with a

baseline diagnosis of substance use (+32%; 66% to 86% [p=0.001]). Viral suppression improved a relative 20% (70% to 83%, [p=0.070]) among persons with a psychotic disorder although this improvement was not significant at the p<0.05 level. (Table I)

Adherence to psychiatric medications

The mean PDC for each drug grouping was ≥0.80 in both the pre- and post-implementation periods. Overall, there were no statistically significant differences in the mean PDC or the proportions of persons adherent to psychiatric medications in any drug grouping, pre- to post-implementation. (Table II)

Retention in care and viral suppression by psychiatric medication adherence level

After adjustment for baseline retention in care, there were no statistically significant differences in the proportion of persons retained in care by adherence level in any psychiatric drug grouping (including persons not on therapy), post-implementation. There were no statistically significant differences in the proportion of persons virally suppressed by adherence level in any psychiatric drug category, post-implementation. (Table III)

Discussion

The Patient-centered HIV Care Model increased both retention in care and viral suppression among persons with HIV and co-morbid mental health conditions, a relative 13%. Post-implementation, both the proportion retained in care and virally suppressed were higher than national estimates for the general HIV population which are 57% and 60%, respectively. (31) In addition, viral suppression improved among most demographic groups with the overall proportion suppressed reaching 90%, a level which reached the Joint United Nations Programme on HIV/AIDS (UNAIDS) viral suppression goal of 90% and surpassed the 2020 U.S. National HIV/AIDS Strategy viral suppression goal of 80%. (32, 33) Persons with a baseline substance use diagnosis had notable improvements in both retention in care and viral suppression. Noteworthy improvements were also seen among persons with a baseline diagnosis of a psychotic disorder; although these differences did not reach statistical significance at the p-value threshold of <0.05 (which was likely due to small sample size) the improvement may, nonetheless, be clinically significance. The model did not improve adherence to psychiatric medications. There was no association found between adherence to psychiatric medications and retention in care or viral suppression which might be reflective of high baseline psychiatric medication adherence.

Large improvements were seen in retention in care and viral suppression among persons with co-occurring mental health condition(s) and substance use. These improvements are meaningful because substance use is, by itself, associated with key determinants of health outcomes such as ART non-adherence and immunosuppression (34) and because psychosocial co-morbidities have shown a dose response relationship to poor HIV care continuum outcomes (i.e., the greater number of syndemic factors the greater likeliness of poor care continuum outcomes). (17, 18, 20, 21) Further, persons triply diagnosed with HIV, mental illness and substance use have been shown to have lower viral suppression than either persons with substance use only or persons with neither condition. (35, 36) For

example, a cross-sectional study from seven HIV Research Network clinical sites demonstrated that persons with HIV who had both mental illness and illicit drug use (Odds ratio 0.66 [95% CI: 0.58 – 0.75]) or illicit drug use only (Odds ratio 0.77 [0.67 – 0.88]) had lower odds of viral suppression compared with persons with neither condition. (35) Also, HIV outbreaks among persons who inject drugs have resulted in large numbers of new infections and rapid transmission. (37–39) A key goal of HIV outbreak response is to quickly link newly diagnosed persons into care and to achieve viral suppression. Collaborative models of care that improve viral suppression among this population can not only improve the health of individuals with HIV but can help reduce transmission risk.

Although less is known about the syndemic effect of mental illness and substance use on retention in HIV care, studies have shown an inverse relationship between substance use and retention in care. (13, 40, 41) A study from the multisite Center for AIDS Research Network of Integrated Clinical Systems found lower proportions of persons with substance use disorder were retained in care (67%) compared to those without a substance use disorder (76%). (13) Our study found that the PCHCM collaborative model increased retention in HIV care a relative 36%, among persons with substance use and mental health conditions.

The PCHCM did not improve adherence to psychiatric medications. However, baseline adherence to psychiatric medications was high with the mean PDC within each drug category at ≥0.80. After adjusting for baseline retention in care we found no statistically significant difference in post-implementation retention by adherence to any category of psychiatric medication. However, the sample of persons non-adherent (or not on therapy) to their psychiatric medication(s) was small; the viral suppression outcome showed similar results.

The project analyses have limitations. First, we were unable to distinguish between episodic and ongoing mental health conditions. However, we tried to minimize the inclusion of persons with episodic or short-term conditions by excluding persons with prescriptions for psychiatric medications meant for short term use (e.g., benzodiazepines, prescriptions with less than 30-day supply). Utilization of mental health services has been associated with retention in HIV care (5); we, however, were unable to account for this potential confounder. The PDC measure is a proxy for adherence which measures the amount of time a person has medication in hand not whether a person is taking their medication; adherence was, therefore, likely overestimated. Substance use was determined by documentation of a diagnosis of substance use or dependence in the baseline clinic record. The analysis did not account for new substance use diagnoses (i.e., diagnoses during the post-implementation period), the severity of substance use (e.g., use versus dependence), type of substances used and did not distinguish between current and past use. Lastly, the PCHCM was a demonstration project, not a research study; the pretest-posttest evaluation design is not as rigorous as a study with control groups.

Conclusion

The Patient-centered HIV Care Model demonstrated a relative 13% improvement in both retention in care and viral suppression among persons with HIV and mental health

conditions. Further, both outcomes improved >30% among persons triply diagnosed with HIV, mental illness and substance use. These improvements are significant because the presence of complex syndemics, such as co-morbid mental illness and substance use, can undercut the benefits of HIV care. Programs, such as the PCHCM, that require collaboration between community-based pharmacists and primary medical providers and extend outside of medical clinics settings can be successfully implemented to improve HIV care continuum interventions among persons with HIV and mental health conditions.

Acknowledgements

This work was supported by the Secretary's Minority AIDS Initiative Fund and the Centers for Disease Control and Prevention through a co-operative agreement [grant number NU65PS004275] with the University of North Texas Health Science Center System College of Pharmacy. Walgreens Co. provided all pharmacist services in-kind.

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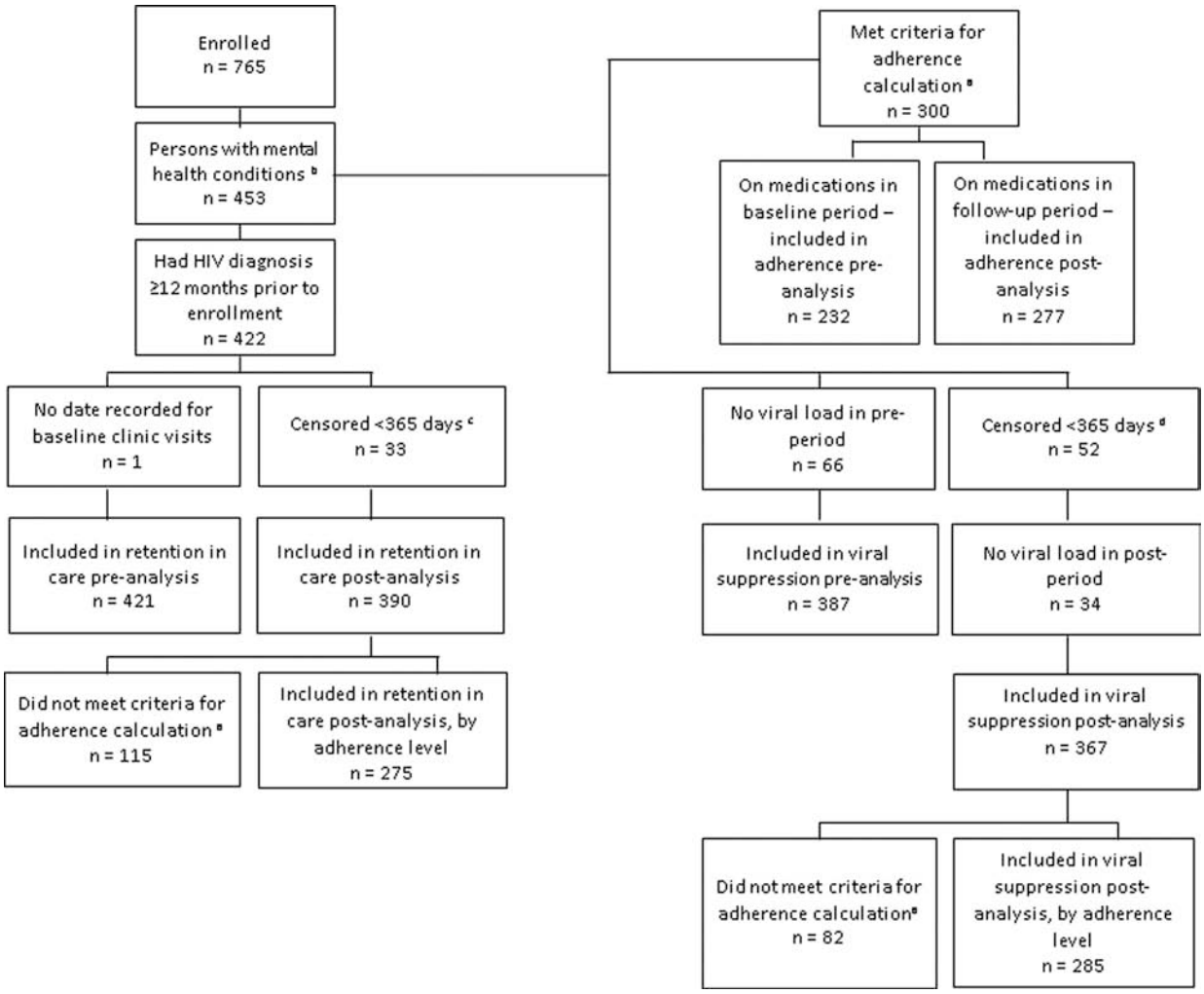

Figure 1: Flow diagram of inclusion in retention in care, HIV viral suppression and adherence analyses among persons with HIV and comorbid mental health conditions, Patient-centered HIV Care Model, 2014 – 2016, United States

[a] Adherence was calculated for persons with at least a total of 90 days' supply (in a 12 month measurement period) of an antidepressant, antianxiety or antipsychotic medication, excluding prescriptions for benzodiazepines, hydroxyzine and for <30-day supplies of medications.

[b] Persons were considered to have a mental health condition if they had a mental health diagnosis in the pre-implementation clinic record or had filled ≥1 mental health prescription (for an antidepressant, antianxiety, or antipsychotic medication) in the pre-implementation period.

[c] Persons were censored in the post-implementation period and were excluded from the retention in care analysis. Persons were censored for the following reasons: 1 immediately censored; 4 died; 2 too ill; 7 moved out of the area; 7 transferred care; 5 no longer able to fill at project (or project network) pharmacy for insurance reasons; 2 transferred prescriptions to a non-project (or non-project network) pharmacy. Two project sites did not collect censoring data. For individuals from these two sites, persons were censored one day after the date of the last clinic visit if a person had no clinic visit or HIV laboratory test drawn for >6 months

but continued to fill prescriptions in the last six months of the project implementation period; 5 persons were censored for this reason.

[d] Persons were censored in the post-implementation period and were excluded from the viral suppression analysis. Persons were censored for the following reasons: 7 patients died; 3 too ill; 10 moved out of area; 9 transferred care; 2 incarcerated; 10 no longer able to fill at project (or project network) for insurance reasons; 5 transferred prescriptions to a non-project (or non-project network) pharmacy. Two project sites did not collect censoring data. For individuals from these two sites, persons were censored one day after the date of the last clinic visit if a person had no clinic visit or HIV laboratory test drawn for >6 months but continued to fill prescriptions in the last six months of the project implementation period; 6 persons were censored for this reason.

Table I:

Proportion of persons with HIV and mental health conditions[a] who were retained in care and virally suppressed pre- and post-model implementation, by characteristic, Patient-centered HIV Care Model, 2014 – 2016, United States

Characteristic		Total n (%[d])	Retained in care[b]				HIV RNA <200 copies/mL[c]			
			Baseline (n = 421) n (%)	Follow-up (n = 390) n (%)	% Change[e]	p-value[f]	Baseline (n = 387) n (%)	Follow-up (n = 367) n (%)	% Change[e]	p-value[f]
Total		453 (100)	252 (60)	265 (68)	13	0.009	306 (79)	329 (90)	13	<0.001
Age in Years	18–24	9 (2)	4 (57)	4 (67)	17	0.701	4 (50)	6 (86)	71	0.096
	25–34	68 (15)	37 (62)	38 (69)	12	0.353	35 (69)	45 (82)	19	0.106
	35–49	150 (33)	83 (59)	88 (68)	15	0.115	92 (73)	103 (87)	19	0.001
	≥50	226 (50)	128 (60)	135 (68)	13	0.076	175 (87)	175 (94)	9	0.008
Race/ethnicity	Black, non-Hispanic	165 (36)	94 (62)	108 (75)	21	0.007	91 (64)	115 (84)	32	<0.001
	Hispanic	54 (12)	35 (69)	32 (70)	2	0.960	41 (85)	43 (98)	14	0.040
	White, non-Hispanic	130 (29)	64 (54)	60 (56)	4	0.731	90 (86)	94 (95)	11	0.019
	White, ethnicity unknown	55 (12)	30 (57)	35 (67)	19	0.210	48 (98)	45 (92)	−6	0.088
	Other/Unknown	49 (11)	29 (63)	30 (73)	16	0.272	36 (86)	32 (84)	−2	0.708
Sex	Male	323 (71)	181 (61)	187 (68)	12	0.066	230 (83)	246 (93)	11	<0.001
	Female	120 (27)	64 (56)	71 (68)	21	0.036	72 (71)	76 (82)	16	0.032
	Transgender	10 (2)	7 (78)	7 (70)	−10	0.768	4 (50)	7 (88)	75	0.087
Medical Insurance	Medicaid	144 (32)	78 (59)	76 (63)	6	0.500	89 (71)	100 (86)	20	0.005
	Medicare	37 (8)	22 (65)	29 (91)	40	0.028	24 (75)	27 (90)	20	0.030
	Ryan White/ ADAP[g]	59 (13)	32 (62)	39 (80)	29	0.023	33 (70)	41 (84)	19	0.093
	Private Insurance	39 (9)	22 (60)	23 (72)	21	0.207	24 (86)	29 (100)	17	0.052
	Multiple	85 (19)	38 (49)	45 (58)	20	0.242	65 (88)	68 (97)	11	0.026
	Uninsured/ Unknown	89 (20)	60 (68)	53 (67)	−2	0.867	71 (88)	64 (89)	1	0.691

Characteristic		Total n (%[d])	Retained in care[b]				HIV RNA <200 copies/mL[c]			
			Baseline (n = 421) n (%)	Follow-up (n = 390) n (%)	% Change[e]	p-value[f]	Baseline (n = 387) n (%)	Follow-up (n = 367) n (%)	% Change[e]	p-value[f]
Category of diagnosis	Non-psychotic Disorder[h]	397 (88)	220 (60)	227 (67)	11	0.043	274 (80)	294 (91)	13	<0.001
	Psychotic Disorder[i]	56 (12)	32 (59)	38 (78)	31	0.056	32 (70)	35 (83)	20	0.070
Baseline substance use diagnosis[j]	No	386 (85)	221 (62)	225 (68)	10	0.058	266 (82)	278 (90)	11	<0.001
	Yes	67 (15)	31 (50)	40 (68)	36	0.036	40 (66)	51 (86)	32	0.001

[a] Persons were considered to have a mental health condition if they had a mental health diagnosis in the baseline clinic record or had filled ≥1 prescription for an antidepressant, antianxiety or antipsychotic medication in the pre-implementation period.

[b] Retention in care was defined as ≥1 medical visit with a physician, nurse practitioner, or physician assistant, in each 6-month period of a 12-month measurement period with a minimum of 60 days between medical visits. Pre-implementation retention was measured during the 12 months leading up to and including the enrollment date and post-implementation retention was measured from one day after the enrollment date to 12 months forward.

[c] Viral suppression was defined as an HIV viral load of <200 HIV RNA copies/mL at the last test in the 12–month measurement period. In the pre- and post-implementation periods, the last viral load test was the viral load result closest to and furthest from the first comprehensive medication review date, respectively.

[d] Column percentage.

[e] Relative percentage change.

[f] P-values were calculated using log binomial regression with an interaction term for time (pre- and post-implementation) by demographic factor level.

[g] ADAP = AIDS Drug Assistance Program.

[h] Includes persons with either a diagnosis for a non-psychotic mental health condition in the baseline clinic record (adjustment disorder, anxiety disorder, bipolar disorder, depression, dysthymia, panic disorder or post-traumatic stress disorder) and persons who filled ≥1 antidepressant/antianxiety prescription in the pre-implementation period. Persons who had a diagnosis for both a psychotic disorder and a non-psychotic disorder or who had filled both an antipsychotic medication and an antidepressant/antianxiety were categorized as having a psychotic disorder.

[i] Includes persons with a diagnosis for schizoaffective disorder, schizophrenia, schizophreniform disorder or psychotic disorder (not otherwise specified) in the baseline clinic record and persons who filled ≥1 antipsychotic medication in the pre-implementation period.

[j] Includes persons with a mental health condition and a diagnosis of substance (alcohol or drug) use, abuse or dependence in the pre-implementation period.

Table II.

Mean adherence and the proportion of persons adherent (Proportion of Days Covered [PDC] ≥0.80) to mental health medications, pre- and post-model implementation Patient-centered HIV Care Model, 2014 – 2016, United States

	Mean PDC and range[a]			Proportion with PDC ≥0.80[b]			
Drug Category	**Baseline Mean (range)**	**Follow-up Mean (range)**	**p-value**	**Baseline %**	**Follow-up %**	**% Change[c]**	**p-value**
Antidepressant/Antianxiety[d]	0.88 (0.28 – 1.00)	0.90 (0.37 – 1.00)	0.207	79%	84%	+7	0.186
Antipsychotic[e]	0.80 (0.42 – 1.00)	0.86 (0.48 – 1.00)	0.276	50%	65%	+30	0.302
Both Antidepressant/Antianxiety & Antipsychotic[f]	0.87 (0.31 – 1.00)	0.88 (0.32 – 1.00)	0.061	78%	80%	+3	0.470

[a] Adherence was calculated for persons with at least a total of 90 days' supply of an antidepressant, antianxiety or antipsychotic medication, excluding prescriptions for benzodiazepines, hydroxyzine and for <30-day supplies of medications. The PDC was calculated from the index fill date to the date of the last fill within a 12-month measurement period.

[b] A PDC ≥0.80 was considered adherent.

[c] Relative percentage change.

[d] The total number of persons who filled antidepressant/antianxiety medications only, in either the pre- or post-implementation period: n = 211; of these individuals 166 and 172 filled this category of medication in the baseline and follow-up periods, respectively.

[e] The total number of persons who filled antipsychotic medications only, in either the pre- or post-implementation period: n = 22; of these individuals 16 and 20 filled this category of medication in the baseline and follow-up periods, respectively.

[f] The total number of persons who filled antidepressant/antianxiety medications and antipsychotic medications, in either the pre- or post-implementation period: n = 67; of these individuals 50 and 85 filled both categories of medications in the baseline and follow-up periods, respectively.

Table III:

Proportion of persons with HIV and mental health conditions who were retained in care and the proportion virally suppressed post-implementation, by drug category and adherence level, Patient-centered HIV Care Model, 2014 – 2016, United States

Retained in care[a]					
Drug category	**Adherence level**[b]	**n**[c]	**% retained in care**[d]	**RR**[e] **(95% CI)**[f]	**p-value**
Antidepressant/Antianxiety					
	Adherent	127	68%	ref	---
	Non-adherent	25	64%	0.943 (0.691, 1.29)	0.713
	Not on therapy	29	69%	1.11 (0.890, 1.37)	0.329
Antipsychotic					
	Adherent	12	83%	ref	---
	Non-adherent	7	86%	1.69 (0.588, 4.89)	0.343
Both Antidepressant/Antianxiety & Antipsychotic					
	Adherent	60	75%	ref	---
	Non-adherent	15	73%	1.02 (0.742, 1.39)	0.919
Virally suppressed (HIV RNA <200 copies/mL)					
Drug category	**Adherence level** [b]	**n** [c]	**% virally suppressed** [d]	**RR**[g] **(95% CI)** [f]	**p-value**
Antidepressant/Antianxiety					
	Adherent	129	92%	ref	---
	Non-adherent	24	83%	0.905 (0.731, 1.12)	0.358
	Not on therapy	38	79%	0.844 (0.685, 1.04)	0.112
Antipsychotic					
	Adherent	13	92%	ref	---
	Non-adherent	6	67%	0.733 (0.404, 1.33)	0.308
Both Antidepressant/Antianxiety & Antipsychotic					
	Adherent	61	92%	ref	---
	Non-adherent	14	100%	0.376 (0.022, 6.43)	0.607

[a] Retention in care was defined as ≥1 medical visit with a physician, nurse practitioner, or physician assistant, in each 6-month period of a 12-month measurement period with a minimum of 60 days between medical visits. Pre-implementation retention was measured during the 12 months leading up to and including the enrollment date and post-implementation retention was measured from one day after the enrollment date to 12 months forward.

[b] Adherence was calculated for persons with at least a total of 90 days' supply of an antidepressant, antianxiety or antipsychotic medication, excluding prescriptions for benzodiazepines, hydroxyzine and for <30-day supplies of medications. Adherence was measured as the Proportion of Days Covered (PDC). The PDC was calculated from the index fill date to the date of the last fill within the 12-month measurement period. Adherence was defined as a PDC ≥0.80. A PDC <0.80 was considered non-adherent. The "not on therapy" level included persons with a diagnosis of depression or dysthymia and/or anxiety (without any other co-morbid mental health condition) who never filled a prescription for a mental health medication during the measurement period.

[c] The number of persons in each adherence level.

[d] Proportion of persons retained in care or virally suppressed within each adherence level.

[e] RR = relative risk of retention in care by adherence level (i.e., risk of retention in care among persons non-adherent or "not on therapy" relative to the risk among persons adherent to their psychiatric medication); the RR estimates were adjusted for baseline retention in care.

[f] CI = confidence interval.

[g] RR = relative risk of viral suppression by adherence level (i.e., risk of viral suppression among persons non-adherent or "not on therapy" relative to the risk among persons adherent to their psychiatric medication); the RR estimates are unadjusted.