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Original Article

A Retrospective Analysis Exploring the Impact of Psychiatric Comorbidities on the Time to Initiate HIV Treatment

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Abstract

Background: Timely initiation of antiretroviral therapy (ART) is critical for optimal HIV management. However, psychiatric comorbidities may influence treatment adherence, healthcare engagement, and overall outcomes. This retrospective cohort study explored the impact of major depressive disorder (MDD), generalized anxiety disorder (GAD), and schizophrenia on the time to initiation of ART for HIV management. **Methods:** Using TriNetX, a de-identified database encompassing 66 U.S. healthcare organizations, adults aged 18 and older with an HIV diagnosis were identified through insurance billing codes. Participants were categorized into four groups based on psychiatric history: MDD, GAD, schizophrenia, or no psychiatric diagnosis. Each psychiatric group was propensity score–matched to a control group without a prior psychiatric history to minimize bias. Measures of association and Kaplan-Meier survival analyses were conducted to assess time to ART initiation. **Results:** There was an observed association between having a psychiatric diagnosis prior to acquiring HIV and a higher likelihood of initiating ART, compared to controls. Additionally, those with a psychiatric diagnosis were observed to have initiated ART sooner. The median time to ART initiation was 136 days for MDD, 129 days for GAD, and 163 days for schizophrenia, compared to 312, 229, and 302 days in their respective control groups. **Conclusion:** Individuals with psychiatric comorbidities were more likely to begin ART earlier than those without a psychiatric condition. This may reflect increased healthcare engagement among patients with established psychiatric care, highlighting the importance of integrated behavioral and medical health services for improving HIV treatment outcomes.

Introduction

In the United States, it is estimated that over 1.2 million individuals over the age of 13 are currently living with HIV. Yearly, over 30,000 individuals acquire HIV in this country.1 The timely initiation of antiretroviral therapy (ART) is of paramount importance to clinicians and public health practitioners. Current guidelines recommend initiation of ART on the same day or within 72 hours among those who have a confirmed HIV diagnosis, a pending reactive HIV screening, a positive confirmatory HIV test, or an acute HIV infection.2 Rapid initiation of ART amongst people living with HIV (PLWH) has been shown to reduce the time to viral suppression, increase retention in medical care, and greatly reduce the transmission of HIV.2 Additionally, asymptomatic patients are shown to experience a myriad of benefits with early ART initiation. Timely prescription of ART has been shown to reduce HIV-related morbidity and mortality, delay or prevent immunocompromise, and potentially lower the risk of viral resistance.[3-5]

Despite these benefits, barriers such as lack of access to affordable care, stigma of HIV and mental health disorders can limit an individual's ability to safely access and maintain ART.[6] Various psychiatric comorbidities can adversely impact the management of HIV, particularly in patients who have conditions such as major depressive disorder (MDD), generalized anxiety disorder (GAD), or schizophrenia. For instance, one study found that those with a psychiatric disorder were more likely to be non-adherent to ART.7 These conditions can complicate treatment adherence, healthcare engagement, and overall patient outcomes, creating a critical need for targeted research in this area. Thus, the interplay between mental health and HIV care is critical yet remains understudied in the context of ART initiation. While research has highlighted the negative effects of psychiatric conditions on ART adherence and retention in care, there is limited exploration of how mental health disorders specifically affect the timing of ART initiation in the United States. Studies conducted in other regions, such as South Africa, suggest that conditions like depression and anxiety can delay ART initiation. For example, one study found that individuals with depression were less likely to start ART within 90 days of diagnosis and had overall lower odds of long-term retention in care.[8] Similar trends were observed in individuals with anxiety, pointing to a broader pattern of psychiatric disorders impacting timely ART initiation.[8] However, findings from these studies may not generalize to the

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U.S., where structural, cultural, and healthcare system differences, including greater access to mental health services, different models of HIV care delivery, and distinct patterns of stigma and social support, could influence both psychiatric diagnoses and ART initiation. As such, there is a need for U.S.-based research to understand how these mental health conditions intersect with ART initiation in this context.

Given the well-documented consequences of delayed ART initiation, such as increased morbidity, mortality, and transmission rates, understanding how psychiatric comorbidities influence this crucial aspect of HIV care is essential.[9] Further investigation of this topic can inform targeted interventions and policies aimed at improving treatment adherence and overall health outcomes for PLWH. Furthermore, the evolving social, economic, and healthcare landscapes in the U.S. may present distinct challenges and opportunities for addressing these barriers.[9]

This study seeks to address this gap by examining the impact of psychiatric comorbidities, specifically MDD, GAD, and schizophrenia, on the time to initiate ART for HIV. This initial study focuses on individuals with these conditions. Through a retrospective cohort study design, we aim to better understand the relationship between mental health conditions and ART initiation, with the goal of elucidating the experience of PLWH in the U.S. who may be affected by psychiatric conditions. Based on previous literature, we hypothesize that individuals with these psychiatric comorbidities may initiate HIV treatment at a later date compared to those without a psychiatric comorbidity.

Methods

The current study used the US Collaborative Network in TriNetX to assess the presence of comorbid psychiatric conditions in patients with HIV. This database contains electronic medical records including diagnosis and procedure billing codes across various large US healthcare organizations (HCOs). This network contained 66 HCOs and all data was downloaded on January 11, 2025, 18:18:53 UTC.

Patient cohorts were defined based on select ICD-10-CM billing codes which are outlined in ***Table 1.*** Patients across all cohorts were 18 years of age and older and had a diagnosis of HIV. After satisfying these criteria, patients were then divided into groups based on a concomitant psychiatric condition–MDD, GAD, and schizophrenia–or lack thereof. Patients were excluded from the study if they were diagnosed with more than one of the psychiatric conditions of interest or if their diagnosis with HIV infection occurred more than 20 years ago. Patients with missing data were still included in the study.

The total number of patients in each group prior to balancing cohorts was as follows: 12,011 in the MDD group, 11,248 in the GAD group, 6,388 in the schizophrenia group, and 238,073 in the control groups. Propensity score matching across all cohorts was performed based on age, sex, race, and ethnicity before each head-to-head analysis. Each experimental group was propensity-matched to a control group ***(Supplemental Tables 1A-1C).*** Each experimental group was also propensity-matched to other experimental groups ***(Supplemental Tables 2A-2C).*** After propensity matching, there were 11,349 individuals each in the MDD group and its control, 11,168 individuals each in the GAD group and its control, and 6,622 individuals each in the schizophrenia group and its control.

Table 1. Cohort Definitions for Control, Major Depressive Disorder (MDD), Generalized Anxiety (GAD), and Schizophrenia Groups.

	Must Have		Cannot Have	
	ICD-10-CM Code	**Diagnosis**	**ICD-10-CM Code**	**Diagnosis**
Control	B20-B20	HIV disease	F41.1	Generalized Anxiety Disorder
			F33.0, F33.1, F33.2	Major depressive disorder, recurrent, mild, moderate, or severe without psychotic features
			F20	Schizophrenia
MDD	B20-B20	HIV disease	F41.1	Generalized Anxiety Disorder
	F33.0, F33.1, F33.2	Major depressive disorder, recurrent, mild, moderate, or severe without psychotic features	F20	Schizophrenia
GAD	B20-B20	HIV disease	F33.0, F33.1, F33.2	Major depressive disorder, recurrent, mild, moderate, or severe without psychotic features
	F41.1	Generalized Anxiety Disorder	F20	Schizophrenia
Schizophrenia	B20-B20	HIV disease	F41.1	Generalized Anxiety Disorder
	F20	Schizophrenia	F33.0, F33.1, F33.2	Major depressive disorder, recurrent, mild, moderate, and severe without psychotic features

Table 2. Risk Analysis of Psychiatric Comorbidity Groups to Controls. Table Name.

	Risk of starting ART		Risk Value	95% CI	z	p
Major Depressive Disorder (MDD)						
No MDD, GAD, or Schizophrenia	0.605	**Risk Difference**	-0.140	(-0.152, -0.128)	-22.504	<0.001
MDD	0.745	**Risk Ratio**	0.812	(0.797, 0.827)		
Generalized Anxiety Disorder (GAD)						
No MDD, GAD, or Schizophrenia	0.598	**Risk Difference**	-0.124	(-0.137, -0.112)	-19.364	<0.001
GAD	0.722	**Risk Ratio**	0.828	(0.812, 0.844)		
Schizophrenia						
No MDD, GAD, or Schizophrenia	0.609	**Risk Difference**	-0.028	(-0.045, -0.011)	-3.161	0.002
Schizophrenia	0.636	**Risk Ratio**	0.957	(0.931, 0.983)		

Legend: Comparing the risk of starting antiretroviral therapy (ART) in those with major depressive disorder, generalized anxiety, and schizophrenia compared to those without any psychiatric diagnoses.

Table 3. Risk Analysis Between Psychiatric Comorbidity Groups.

	Risk of Prescribing ART		Risk Value	95% CI	z	p
MDD vs. GAD						
MDD	0.737	**Risk Difference**	0.010	(-0.003, 0.023)	1.571	0.116
GAD	0.727	**Risk Ratio**	1.014	(0.997, 1.032)		
MDD vs. Schizophrenia						
MDD	0.749	**Risk Difference**	0.114	(0.097, 0.130)	13.547	<0.001
Schizophrenia	0.635	**Risk Ratio**	1.179	(1.151, 1.208)		
GAD vs. Schizophrenia						
GAD	72.47	**Risk Difference**	0.093	(0.076, 0.111)	10.283	<0.001
Schizophrenia	63.15	**Risk Ratio**	1.148	(1.118, 1.178)		

Legend: Comparing the risk of starting antiretroviral therapy (ART) between groups with HIV and comorbid major depressive disorder (MDD), generalized anxiety (GAD), or schizophrenia.

Table 4. Analysis of the Time to ART Initiation in Patients with a Psychiatric Comorbidity Compared to Controls.

			Kaplan Meier Log-Rank Test		Hazard Analysis		Proportionality Testing	
	Median Time to ART (days)	Probability of no ART (%)	χ^2	p	Hazard Ratio	95% CI	χ^2	p
Major Depressive Disorder (MDD)								
MDD Control	312	6.48						
MDD	136	6.71	165.471	<0.001	0.816	(0.790, 0.843)	1.660	0.198
Generalized Anxiety Disorder (GAD)								
GAD Control	299	10.43						
GAD	129	9.23	138.723	<0.001	0.826	(0.799, 0.854)	1.840	0.175
Schizophrenia								
Schizophrenia Control	302	0.00						
Schizophrenia	163	10.91	17.949	<0.001	0.910	(0.870, 0.951)	12.453	<0.001

Legend: Comparing Kaplan-Meier analysis, log rank tests, and hazard ratios for patients with major depressive disorder, generalized anxiety disorder, or schizophrenia compared to those without these diagnoses to assess time to starting ART. *Degrees of freedom for all analyses = 1

Table 5. Kaplan-Meier Analysis of the Time Until ART Initiation Between Patients with Different Psychiatric Comorbidities.

	Kaplan Meier Analysis		Log-Rank Test		Hazard Analysis		Proportionality Testing	
	Median time to ART (days)	Probability of no ART (%)	χ2	p	Hazard Ratio	95% CI	χ2	p
MDD vs. GAD								
MDD	136	7.17						
GAD	126	9.42	0.075	0.784	0.995	(0.962, 1.028)	16.394	<0.001
MDD vs. Schizophrenia								
MDD	124	6.96						
Schizophrenia	165	10.90	29.293	<0.001	1.121	(1.074, 1.170)	31.512	<0.001
GAD vs. Schizophrenia								
GAD	119	10.19						
Schizophrenia	159	11.52	17.935	<0.001	1.101	(1.051, 1.153)	9.953	0.002

Legend: The Kaplan-Meier analysis, log rank tests, and hazard ratios between groups with major depressive disorder (MDD), generalized anxiety disorder (GAD), or schizophrenia were compared to assess time to starting ART.

Results

Propensity score matching largely showed no significant differences in the demographic breakdown between groups, with few exceptions ***(Tables 1A-1C and 2A-2C).*** For all control versus experimental analyses, the American Indian or Native Alaskan population was significantly different between groups (MDD: p=0.004, GAD p=0.012, Schizophrenia p=0.048, ***Supplemental Table 1A-1C).*** For the MDD-to-control and Schizophrenia-to-control Native Hawaiian or Pacific Islander was also significantly different (MDD: p=0.009, Schizophrenia p=0.011, Supplemental Figure 1A and 1C).

Our findings demonstrate an association between comorbid MDD, GAD, or schizophrenia and higher rates of ART initiation among patients with HIV, relative to those without these psychiatric conditions ***(Table 2).*** Risk analysis showed the control group had a statistically significant decreased risk of starting ART compared to balanced patient cohorts with either MDD (Risk difference = -0.140, CI 95% = -0.4152, -0.128, p < 0.001; Risk ratio = 0.821, 95% CI = 0.797, 0.827), GAD (Risk difference = -0.124 CI 95% = -0.137, -0.112, p < 0.001; Risk ratio = 0.828, CI = 0.812, 0.844), and schizophrenia (Risk difference = -0.028, CI 95% = -0.045, -0.011, p = 0.002; Risk ratio = 0.957, CI = 0.931, 0.983).).

When assessing risk across groups with psychiatric comorbidities, those with schizophrenia had a significantly lower risk of initiating ART treatment compared to the other experimental groups ***(Table 3).*** Those with MDD were significantly more likely to start ART compared to those with schizophrenia (Risk difference = 0.114, CI 95% = - 0.097, 0.130, p < 0.001; Risk ratio = 1.014, CI 95% = 0.997, 1.032). The same occurred when comparing patients with GAD to those with schizophrenia (Risk difference= 0.093, CI 95% = 0.076, 0.111, p < 0.001; Risk ratio = 1.148, CI 95% = 1.118, 1.178). No significant change in risk was observed when comparing the MDD and GAD groups (Risk difference = 0.010, 95% CI = -0.003, 0.023, p=0.116; Risk ratio = 1.014, 955 CI = 0.997, 1.032).

Kaplan-Meier analysis indicates that those with comorbid MDD, GAD, or schizophrenia received ART treatment in significantly less time than their respective control groups after cohort balancing ***(Table 4).*** The median times to initiate ART for those in MDD, GAD, and schizophrenia groups were 174, 134, and 139 days less than their balanced control groups, respectively (MDD: Log Rank Test: $\chi 2$ = 165.471, df = 1, p<0.001; GAD: Log Rank Test: $\chi 2$ = 138.723, df = 1, p<0.001; Schizophrenia: Log Rank Test: $\chi 2$ = 17.949, df = 1, p<0.001 = 1, p<0.001). Hazard ratios showed a significantly reduced rate of starting ART in control groups compared to those with a diagnosis of MDD (HR=0.816, CI 95% = 0.790, 0.843), GAD (HR = 0.826, CI 95% = 0.799,0.854) and schizophrenia (HR=0.910, CI 95% =0.870, 0.951). Proportionality tests indicate that the only analysis which had significantly different variance between groups was the comparison between schizophrenia and its control group ($\chi 2$ = 12.453, df = 1, p <0.001). This was not seen in the MDD ($\chi 2$ = 1.660, df = 1, p = 0.198) or GAD analyses ($\chi 2$ = 1.840, df = 1, p = 0.175). When evaluating the percentage of patients who did not start ART, the only significant difference existed between schizophrenia and its control group: 10.91% of the schizophrenia group did not receive ART by the end of the interval time, whereas all of those in the matched control group had received ART ***(Table 4).***

Kaplan-Meier analyses between groups with comorbid MDD, GAD, or schizophrenia indicate that those with schizophrenia had a significantly longer time to start ART treatment compared to the other groups ***(Table 5).*** Our data shows that patients in the schizophrenia group took roughly 40 days longer than the MDD

and GAD groups to initiate ART (MDD vs Schizophrenia: Log Rank Test: $\chi 2$ = 29.293, df = 1, p<0.001; GAD vs Schizophrenia: Log Rank Test: $\chi 2$ = 17.935, df = 1, p<0.001). Furthermore, hazard ratios showed that those with schizophrenia had a significantly reduced rate of getting ART prescribed compared to groups with MDD and GAD (MDD: HR = 1.121, CI 95% = 1.074-1.170; GAD: HR = 1.101, CI 95% =1.051-1.153). Kaplan Meier Analysis and hazard ratios showed no significant differences between the MDD and GAD groups (Log Rank Test: $\chi 2$ = 0.075, df = 1, p=0.784; HR = 0.995, CI 95% = 0.962-1.028). For all the combinations assessed, proportionality tests suggest that none of the hazard ratios had significant variance over time (MDD vs GAD: $\chi 2$ = 16.394, df = 1, p <0.001; MDD vs Schizophrenia: $\chi 2$ = 31.512, df = 1, p < 0.001; GAD vs Schizophrenia: $\chi 2$ = 9.953, df = 1, p = 0.002). A larger number of patients in the schizophrenia group also never started ART therapy when compared to MDD and GAD groups ***(Table 5).***

Discussion

In contrast to the South African study by Truong et al., our data showed that patients in the U.S. diagnosed with MDD, GAD, or schizophrenia were more likely to initiate ART than those without these diagnoses and were also more likely to initiate it earlier. Initiation of ART for all patients with HIV holds the highest ratings for recommendation and evidence at A and I, respectively, underscoring the importance of prompt treatment.[10] In this respect, it is important to recognize these diagnoses as a possible factor when it comes to initiating the recommended treatment of HIV. However, further research is needed to clarify whether this association reflects access patterns, diagnostic practices, or other underlying mechanisms.

These findings are somewhat unexpected, given the extensive literature that people suffering from psychiatric conditions typically experience worse health outcomes and higher rates of premature mortality compared to the general population.11 Compared to the study by Troung et al., the present study included a much larger sample size, providing greater statistical power. However, it is important to acknowledge that a multitude of other factors may be related to the incongruence between the results presented here and previously published articles. Differences in sociocultural norms, perceptions of mental illness and HIV, healthcare infrastructure, and access between countries may all contribute to the discrepancies in these findings. It may also be possible that receiving a diagnosis of MDD, GAD, or schizophrenia has different implications for the different populations being studied. The National Institute of Mental Health published a study showing that 50.6% of adults in the US with mental illness received treatment in 2022,[12] while a 2023 study published in the SSM Mental Health Journal estimates that up to 75% of South Africans living with common mental illnesses do not receive treatment.[13] Understanding the implications that lead to these differences may be key to identifying necessary change for facilitating earlier initiation of ART.

Though there is a consensus among the medical community that early initiation of ART results in reduced overall morbidity and mortality for patients diagnosed with HIV, the mean time for initiation of ART was well beyond official recommendations for all groups involved in this study.[10] For example, the average time to initiation of ART in the MDD group was 136 days compared to 312 days for the MDD control group, and limited information exists on whether starting at 136 days provides a clear clinical benefit versus 312 days post diagnosis. While this represents a statistically significant difference, both values fall well beyond the recommended 72-hour window, and there is limited literature assessing the clinical impact of ART initiation at these extended time points. Therefore, while the earlier initiation observed in psychiatric cohorts is statistically significant, its clinical significance remains uncertain and warrants further study.

Importantly, our results show that psychiatric comorbidities evaluated in this study were associated with a statistically significant decrease in the median time to initiation of ART, though causality cannot be inferred. One possible explanation of these findings is that patients with diagnosed psychiatric conditions may have more frequent interactions with the healthcare system, increasing opportunities for earlier intervention. There have been studies supporting this notion, including research published by the American Heart Association in 2013, which showed that a diagnosis of depression independently predicted greater utilization of healthcare resources in patients with heart failure.[14]

Our data showed that people who have been diagnosed with schizophrenia were less likely to start ART. If ART was initiated, they were more likely to start later than those who were diagnosed with MDD or GAD. Given that the schizophrenia, MDD, and GAD groups were propensity score matched, schizophrenia may represent an independent risk factor for lower rates and delayed initiation of ART. It has already been made clear that both factors contribute significantly to morbidity and mortality in those with an HIV diagnosis. Therefore, patients with schizophrenia diagnosed with HIV should be considered at greater risk of poor outcomes than patients with MDD or GAD diagnosed with HIV. Because many regions in the US are limited when it comes to community resources such as screening and early intervention programs, it is important for healthcare providers and public health officials to know how to direct these resources. Prior studies have shown that patients with schizophrenia are less likely to receive routine healthcare, such as blood pressure or cholesterol screening in primary care settings.[15] These findings highlight the importance of funding for programs such as Assertive Community Treatment (ACT), which aim to provide integrated care to people suffering from chronic psychotic disorders.16 One extensive systematic review including studies over a 17-year period showed that patients with severe mental illness such as schizophrenia who were enrolled in ACT were significantly more likely to remain in contact with services than those receiving standard community care.[17] Another study exploring integrated primary care within an ACT service showed that screening for chronic illness substantially increased with this healthcare model versus the general population of those

diagnosed with severe mental illness.[18] Although this healthcare model can present its own distinct challenges and the literature on such programs remains limited, the utilization of intensive community outreach programs for managing chronic illness should continue to be explored.

This study was limited to information available in the TriNetX database, which relies on comprehensive and proper entry of insurance billing codes to classify what patients are being treated for, meaning that the accuracy of our patient classifications is subject to human error during documentation. Additionally, entry of insurance billing codes, as well as a diagnosis of mental illness and/or HIV, implies adequate access to healthcare. People struggling with mental illness have been shown to have several barriers to healthcare, which can affect the identification and treatment of physical and mental illness.19 Consequently, it is possible that our data underestimates the rate and timeliness in which people struggling with MDD, GAD and schizophrenia begin ART therapy, especially those who are "silently" struggling with mental illness without a formal diagnosis. There also exists a well-documented, longstanding and complex racial disparity regarding mental health care utilization in the US. One study analyzing data from 12,241 respondents found that individuals identified as either Latino or African American were less likely to have received any mental health care services in the last year than their White counterparts.[20] Accordingly, as our data requires a mental health diagnosis, it is possible that it is not racially representative of the general population living with HIV. Additionally, due to our use of insurance billing codes within the US, the data presented may not be generalizable to populations outside of the US.

As an initial study, our data was limited to patients with MDD, GAD or schizophrenia, as well as their propensity score matched control groups. To further understand the association between mental illness and beginning ART once diagnosed with HIV, as well as the average time until ART is initiated, future research could include patients who have been diagnosed with other mental illnesses, such as the bipolar affective disorders, post-traumatic stress disorder, obsessive compulsive disorder, or other conditions. Because different mental illnesses have varying demographic associations and differing likelihoods of healthcare utilization, this may help identify traits contributing to earlier and more frequent initiation of ART.[21] Similarly, comparing individuals with psychiatric conditions to those with other chronic conditions that require routine care, such as diabetes, congestive heart failure, or chronic obstructive pulmonary disease, may yield additional insights. Additional studies could also evaluate the impact of morbidity and mortality in patients who start ART at different time intervals after the recommended 72-hour timeframe.

Conclusion

Our study showed that those with psychiatric comorbidities were more likely to initiate ART sooner than those without psychiatric comorbidities. While the psychiatric comorbidities evaluated in this study may be associated with earlier initiation of ART, patients with schizophrenia did not benefit from this association as much as the other comorbid groups. Furthermore, the findings may indicate that consistent interactions with the healthcare system increase a patient's likelihood of starting HIV treatment. Future studies could further explore other psychiatric comorbidities with ART initiation or the impact delayed HIV treatment at different time points after the 72-hour recommendation.

Summary – Accelerating Translation

Main Problem to Solve.

In the United States, more than 1.2 million people live with HIV, and over 30,000 new cases are diagnosed each year. For people living with HIV, starting antiretroviral therapy (ART) as soon as possible is essential. ART helps control the virus, improves quality of life, and reduces the chance of transmitting HIV to others. Current medical guidelines recommend starting treatment on the same day as diagnosis or within 72 hours.

However, many people face barriers to starting treatment quickly. These can include the high cost of care, limited access to healthcare, and the stigma that still surrounds both HIV and mental illness. Mental health conditions like depression, anxiety, and schizophrenia can make it even harder for people to stay engaged in care or to follow through with their treatment plans.

Previous research has mostly focused on how mental illness affects whether people stay on HIV medication, but not on how it affects when they start treatment. Studies from other countries, like South Africa, suggest that depression and anxiety can delay starting ART. But because healthcare systems and access to mental health services differ greatly between countries, it's not clear if the same is true in the United States. Understanding how mental health affects the timing of HIV treatment in the U.S. can help improve care and guide public health efforts.

Aim of the Study

This study explored how having certain mental health conditions—major depressive disorder (MDD), generalized anxiety disorder (GAD), or schizophrenia—affects how soon people with HIV begin ART in the United States. The researchers expected that people with these mental health conditions might start ART later than people without them.

Methodology

To investigate this, researchers used data from TriNetX, a large national database that includes de-identified health records from 66 healthcare organizations across the U.S.

The study included adults aged 18 and older who had been diagnosed with HIV. Participants were divided into four groups: those with major depressive disorder (MDD), those with generalized anxiety disorder (GAD), those with schizophrenia, and those with no psychiatric diagnosis. To make fair comparisons, the research team matched each mental health group with a control group that had similar characteristics, such as age, sex, race, and ethnicity.

Researchers then measured how long it took each person to start ART after being diagnosed with HIV. They also compared the overall likelihood of starting treatment between those with and without mental health conditions. Because this study used existing, de-identified data, no personal information was used, and no participants were contacted directly.

Results:
Contrary to what the researchers expected, people with mental health conditions started HIV treatment earlier than those without. Participants with psychiatric diagnoses initiated ART significantly sooner than controls. The median time to ART initiation was 136 days for people with major depressive disorder, 129 days for those with generalized anxiety disorder, and 163 days for those with schizophrenia. In contrast, the control groups for these conditions started treatment after 312, 299, and 302 days, respectively.

This means that across all three psychiatric groups, people with mental health diagnoses began treatment several months earlier than those without. However, there were still meaningful differences within the psychiatric groups. Those with schizophrenia were slower to start treatment than those with depression or anxiety and were less likely overall to receive ART than individuals with other psychiatric diagnoses.
While these differences were statistically significant, the study also found that all groups—regardless of mental health status—began treatment much later than the national recommendation of starting within 72 hours.

Conclusion
These findings were surprising because many studies have shown that people with mental health conditions often face more challenges in accessing and maintaining medical care. However, the results of this study suggest that people with diagnosed psychiatric conditions may actually have more frequent contact with the healthcare system, giving them more opportunities to receive HIV treatment earlier.
In the United States, mental health services are often integrated into hospitals or clinics, meaning patients with ongoing psychiatric care may be more closely monitored and referred to other medical services, including HIV care. This could explain why those with depression or anxiety started treatment sooner.

Still, people with schizophrenia seemed to face unique challenges. They started treatment later and were less likely to start at all compared to people with depression or anxiety. This finding highlights the need for targeted outreach and support for people living with both schizophrenia and HIV, who may experience higher barriers to care.

This study found that people living with HIV who also had depression, anxiety, or schizophrenia started antiretroviral therapy sooner than those without a psychiatric diagnosis. However, among the three groups, people with schizophrenia faced more delays and were less likely to receive treatment at all.

These results suggest that regular contact with healthcare services, often part of mental health care, may increase the likelihood of starting HIV treatment. At the same time, they highlight the ongoing need to support people with severe mental illnesses, who may struggle the most with accessing consistent medical care.

Future research should include more psychiatric conditions and explore whether earlier treatment among these groups leads to better long-term outcomes. It should also investigate how to bring all patients closer to the recommended goal of starting HIV treatment within 72 hours of diagnosis..
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Supplementary Material

Table 1A. Demographics for Major Depressive Disorder Analysis Post-Propensity Score Matching with Control.

	Control		MDD		Statistics	
Demographics	**N**	**%**	**N**	**%**	**P-value**	**SD**
	11,349	100%	11,349	100%		
Sex						
Female	3,721	32.8	3,733	32.9	0.865	0.002
Male	7,403	65.2	7,374	65.0%	0.686	0.005
Unknown						
Race						
White	4,728	41.7	4,685	41.3	0.562	0.008
Black	4,749	42.0	4,723	41.6	0.0536	0.008
Native	30	0.3	57	0.5	**0.004**	0.039
Other	393	3.5	417	3.7	0.371	0.012
Unknown	1,356	11.9	1,360	12.0	0.935	0.001
Asian	62	0.5	79	0.7	0.151	0.019
Hawiian	11	0.1	27	0.2	**0.009**	0.034
Ethnicity						
Hispanic or Latino	1,396	12.3	1,481	13.0	0.090	0.023
Non-Hispanic or Latino	7,889	69.5	7,816	68.9	0.294	0.014
Unknown Ethnicity	2,064	18.2	2,052	18.1	0.836	0.003
Age	**Mean Age**	**SD**	**Mean Age**	**SD**	**P-Value**	**SD**
Current Age	53.0	13.4	52.9	13.3	0.684	0.005
Age at Index	46.2	13.0	46.1	13.0	0.698	0.005

Table 1B: Demographics for Generalized Anxiety Disorder (GAD) Analysis Post-Propensity Score Matching with Control.

	Control		GAD		Statistics	
Demographics	**N**	**%**	**N**	**%**	**P-value**	**SD**
	11,168	100%	11,168	100%		
Sex						
Female	3090	27.7%	3132	28.0%	0.531	0.008
Male	7741	69.3%	7664	68.6%	0.265	0.015
Unknown						
Race						
White	6165	55.2%	6073	54.4%	0.216	0.017
Black	2668	23.9%	2667	23.9%	0.987	<0.001
American Indian or Alaskan Native	37	0.3%	62	0.6%	**0.012**	0.034
Native Hawaiian or Other Pacific Islander	30	0.3%	67	0.6%	0.012	0.034
Unknown	2799	25.1%	2771	24.8%	0.665	0.006
Asian	99	0.9%	114	1.0%	0.302	0.014
Other	416	3.7%	430	3.9%	0.624	0.007
Ethnicity						
Hispanic or Latino	1354	12.1%	1420	12.7%	0.181	0.018
Non-Hispanic or Latino	7015	62.8%	6977	62.5%	0.599	0.007
Unknown Ethnicity	2799	25.1%	2771	24.8%	0.665	0.006
Age	**Mean Age**	**SD**	**Mean Age**	**SD**	**P-Value**	**SD**
Current Age	52.0	13.6	52.0	13.6	0.778	0.004
Age at Index	45.4	13.3	45.4	13.3	0.961	0.001

Table 1C. Demographics for Schizophrenia Analysis Post-Propensity Score Matching with Control.

	Control		Schizophrenia		Statistics	
Demographics	**N**	**%**	**N**	**%**	**P-value**	**SD**
	6,622	100%	6,622	100%		
Sex						
Female	2,107	31.8	2,119	32.0	0.823	0.004
Male	4,473	67.5	4,454	67.3	0.725	0.006
Unknown						
Race						
White	1,517	22.9	1,511	22.8	0.901	0.002
Black	3,644	55.0	3,624	54.7	0.727	0.006
Native	10	0.2	21	0.3	**0.048**	0.034
Other	203	3.1	206	3.1	0.880	0.003
Unknown	1,204	18.2	1,194	18.0	0.821	0.004
Asian	39	0.6	41	0.6	0.823	0.004
Hawiian	10	0.2	25	0.4	**0.011**	0.044
Ethnicity						
Hispanic or Latino	528	8.0	521	7.9	0.822	0.004
Non-Hispanic or Latino	4,206	63.5	4,203	63.5	0.957	0.001
Unknown Ethnicity	1,888	28.5	1898	28.7	0.847	0.003
Age	**Mean Age**	**SD**	**Mean Age**	**SD**	**P-Value**	**SD**
Current Age	52.1	13.2	52.2	13.2	0.691	0.007
Age at Index	45.0	12.5	45.1	12.4	0.672	0.007

Table 2A. Demographics for Propensity-Matched Major Depressive Disorder (MDD) vs. Schizophrenia Analysis.

	MDD		Schizophrenia			
Demographics	**N**	**%**	**N**	**%**	**P-value**	**SD**
	6036	100%	6036	100%		
Sex						
Female	1904	31.5	1916	31.7	0.814	0.0400
Male	4087	67.7	4083	67.6	0.938	0.00100
Unknown	0	0	0	0	-	-
Race						
White	1468	24.3	1468	24.3	1	<0.001
Black	3687	61.1	3643	60.4	0.412	0.0150
American Indian	13	0.2	20	0.3	0.222	0.0222
Other	213	3.5	200	3.3	0.515	0.0120
Unknown	593	9.8	642	10.6	0.141	0.0270
Asian	44	0.7	39	0.6	0.582	0.0100
Hawiian	18	0.3	24	0.4	0.354	0.017
Ethnicity						
Hispanic or Latino	466	7.7	486	8.1	0.499	0.0120
Non-Hispanic or Latino	4386	72.4	4316	71.5	0.292	0.0190
Unknown Ethnicity	1202	19.9	1234	20.4	0.468	0.0130
Age	**Mean Age**	**SD**	**Mean Age**	**SD**	**P-Value**	**SD**
Current Age	51.5	13.1	51.8	13.2	0.217	0.0220
Age at Index	44.8	12.6	44.9	12.5	0.621	0.00900

Table 2B. Demographics for Propensity-Matched Major Depressive Disorder (MDD) vs. Generalized Anxiety Disorder (GAD) Analysis.

	MDD		GAD			
Demographics	**N**	**%**	**N**	**%**	**P-value**	**SD**
	9330	100%	9330	100%		
Sex						
Female	2770	29.7	2770	29.8	0.923	0.00100
Male	6375	68.3	6372	68.3	0.962	0.00100
Unknown	0	0	0	0	-	-
Race						
White	4665	50.0	4715	50.5	0.464	0.0110
Black	2969	31.8	2958	31.7	0.863	0.00300
American Indian	54	0.6	54	0.6	1	<0.001
Other	409	4.4	383	4.1	0.345	0.0140
Unknown	1129	12.1	1111	11.9	0.685	0.00600
Asian	78	0.8	84	0.9	0.636	0.00700
Hawiian	26	0.3	25	0.3	0.888	0.00200
Ethnicity						
Hispanic or Latino	1376	14.7	1280	13.7	0.044	0.0290
Non-Hispanic or Latino	6289	67.4	6403	68.6	0.0740	0.0260
Unknown Ethnicity	1665	17.8	1647	17.7	0.0740	0.00500
Age	**Mean Age**	**SD**	**Mean Age**	**SD**	**P-Value**	**SD**
Current Age	52.5	13.7	52.9	13.7	0.0710	0.0260
Age at Index	45.7	13.2	46.0	13.3	0.0710	0.0260

Table 2C. Demographics for Propensity-Matched Generalized Anxiety Disorder (GAD) vs Schizophrenia Analysis.

	GAD		Schizophrenia			
Demographics	**N**	**%**	**N**	**%**	**P-value**	**SD**
	5308	100%	5308	100%		
Sex						
Female	1752	33.0	1764	33.2	0.805	0.00500
Male	3519	66.3	3506	66.1	0.790	0.00500
Unknown	0	0	0	0	-	-
Race						
White	1474	27.8	1468	27.7	0.896	0.00300
Black	2921	55.0	2922	55.0	0.984	<0.001
American Indian	21	0.4	21	0.4	1	<0.001
Other	199	3.7	199	3.7	1	<0.001
Unknown	637	12.0	635	12.0	0.952	0.00100
Asian	33	0.6	39	0.7	0.478	0.014
Hawiian	23	0.4	24	0.5	0.884	0.00300
Ethnicity						
Hispanic or Latino	478	9.0	481	9.1	0.919	0.00200
Non-Hispanic or Latino	3651	68.8	1695	69.6	0.355	0.0180
Unknown Ethnicity	1179	22.2	1132	21.3	0.269	0.0210
Age	**Mean Age**	**SD**	**Mean Age**	**SD**	**P-Value**	**SD**
Current Age	51.0	13.6	51.4	13.2	0.091	0.0330
Age at Index	44.6	13.0	44.7	12.4	0.508	0.0130