

Changes in Clinical Management of Patients with Schizophrenia Treated with Long-Acting Injectable Antipsychotics (LAIs), Including Telepsychiatry Use, During the COVID-19 Pandemic

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Purpose: The COVID-19 pandemic substantially impacted care of patients with schizophrenia treated with long-acting injectable antipsychotics (LAIs). This study (OASIS-MAPS) examined how clinical sites adapted operations and used telepsychiatry to maintain standard of care for these patients during the pandemic.

Methods: Two online surveys (initial: October–November 2020, N = 35; follow-up: July–September 2021, N = 21) were completed by a principal investigator (PI) or PI-appointed designee at sites participating in the OASIS study (NCT03919994). Survey responses were analyzed descriptively.

Results: At the time of the initial survey, all 35 participating sites were using variants of telepsychiatry, with 20 sites adopting it after the pandemic started. Most sites reported no negative impacts of the pandemic on medication adherence, although approximately 20% of sites reported decreased adherence for LAIs. Twelve sites (34%) reported switching patients with schizophrenia from LAIs to oral antipsychotic medications, while 11 sites (31%) reported switching patients from shorter to longer injection interval LAIs during the pandemic. Most sites did not experience difficulties in implementing or expanding telepsychiatry services, although lower reimbursement rate for telepsychiatry and patients' lack of access to and training on relevant technologies were the most frequently reported barriers.

Conclusion: Changes made by sites after the pandemic onset were viewed by almost all participants as satisfactory for maintaining standard of care. Almost all participants thought that the use of telepsychiatry services would continue after the pandemic in a hybrid manner combining telepsychiatry and office visits. Ensuring that patients have equitable access to telepsychiatry will be important in the post-pandemic future.

Keywords: telehealth, coronavirus, care management, medication adherence

Introduction

The coronavirus disease 2019 (COVID-19) pandemic, caused by the SARS-CoV-2 virus, significantly impacted non-COVID health care for patients with physical and mental health conditions. One effect on health care providers (HCPs) was the need to reduce the number of on-site clinic visits to accommodate public health policies including social distancing. On-site visits to HCPs decreased by almost 60% in the United States (US) during the early period of the pandemic (ie, mid-March to late-May 2020).^{1,2} To maintain patients' care, HCPs increasingly adopted telemedicine, which uses a technology-based platform to deliver care virtually,³ for communicating with patients remotely.¹

Patients with serious mental illnesses (SMIs) have been disproportionately affected by the pandemic due to disparities in access to health care, social inequalities, and unhealthy behaviors (eg, smoking).⁴ Incidence of COVID-19 is higher in patients with schizophrenia or other SMIs compared to those without psychiatric diagnoses.^{5–7} Patients with schizophrenia who are infected with COVID-19 are at a higher risk of hospitalization and death than the general population.^{7–10} Survey studies have found that patients with SMIs report higher anxiety, stress, and depression, and worse behavioral responses (eg, weight gain, sleep disruption) as a result of the pandemic.^{11–13} Continuity of pharmacologic and psychosocial care for these patients is critical to reduce the likelihood of relapse, hospitalization, or other negative outcomes such as suicide.^{14–17}

Pre-pandemic research identified telemedicine as a viable strategy for communication between HCPs and patients with schizophrenia.^{18–20} Non-adherence to antipsychotic medications, a well-documented problem for this patient population,^{15,21} was improved in those who received telemedicine services.^{22,23}

Long-acting injectable antipsychotics (LAIs) are an effective treatment for schizophrenia, as they are associated with improvements in medication adherence,^{24,25} compared to oral antipsychotics (OAPs). However, because LAIs require administration by an HCP at regular intervals, typically during on-site visits, the pandemic introduced unique challenges for LAI administration.^{26,27} For example, patients treated with LAIs were at risk of missing doses due to office closures, or when they had to quarantine after contracting or being exposed to COVID-19.²⁶ Although no best practice guidance exists for use of LAIs during the pandemic, a variety of strategies such as utilizing LAIs with longer injection intervals, at-home LAI administration by a visiting HCP, or switching patients to OAPs are methods that have been employed to help ensure continuity of care.^{28,29}

Given the numerous obstacles to maintaining continuity of care during the pandemic, it is essential to understand how clinical facilities have adapted their services to continue supporting patients with schizophrenia. The objective of this study was to capture HCPs' perspectives on the impact of the COVID-19 pandemic on management of patients with schizophrenia, particularly those treated with LAIs, and the role of telepsychiatry in managing care for these patients.

Materials and Methods

Study Design and Procedures

The Observational Study of LAIs in Schizophrenia: Impact of COVID-19 Pandemic on Outpatient LAI Management and Use of Telepsychiatry for Patients with Schizophrenia (OASIS-MAPS) was an observational, online survey sub-study of the OASIS cohort study (NCT03919994). The objectives of the ongoing parent OASIS study are to describe demographic, clinical, and socioeconomic characteristics, as well as treatment patterns, clinical, economic, and patient-reported outcomes among patients who were newly prescribed a second-generation LAI at behavioral health clinics in the US over a 12-month period.

For the OASIS-MAPS sub-study, HCPs at participating OASIS sites received two surveys (an initial survey administered October 7 – November 2, 2020, and a follow-up survey administered July 28 – September 9, 2021; [Supplemental Surveys 1](#) and [2](#), respectively) asking about the pandemic's impact on the provision of health care at their sites. Pre-survey screening established that individuals met study eligibility criteria: a principal investigator (PI), or PI-appointed designee, who was also a prescribing clinician; was employed at the site for at least one year; and was sufficiently knowledgeable about the pandemic's impact on site operations. Only one individual per site was eligible to participate in each survey.

Initial survey participants were recruited from each of the 50 sites active in OASIS at the time of data collection. Follow-up survey participants were recruited from among the 35 sites that completed the initial survey. If the initial survey participant was unable to complete the follow-up survey, another eligible individual at that site could participate. Upon completion of the initial survey, the site received a \$50 honorarium. No honorarium was provided for completion of the shorter follow-up survey. Selected site characteristics (eg, geographic location, site type) were linked to participants via a Site ID.

All participants in both the initial and the follow-up surveys provided electronic consent, which included acknowledgement that de-identified responses may be published or presented.

Study materials were submitted for review to the Sterling Institutional Review Board (IRB; www.sterlingirb.com), which indicated that the study was exempt under Category 2(ii).³⁰ Because the initial survey met study exemption, the follow-up survey was not submitted for IRB review.

Survey Content

All initial and follow-up survey items were uniquely developed by health outcomes measurement researchers with input from expert clinicians to capture the concepts set out in the study objectives. The initial survey focused on gathering insight into the pandemic's impact on site operations and patient care, including changes in prescribing patterns, and perceived impact on patients' medication adherence. This survey also collected information about telepsychiatry services, including changes in frequency of use and acquisition of new technologies during the pandemic, as well as impressions of the service's capability and predictions for its use post-pandemic. The follow-up survey elicited more detailed information as to how prescribing patterns for patients with schizophrenia changed during the pandemic, including factors considered when switching treatment regimens, and types of treatment changes HCPs were willing to make based solely on communication with patients via telepsychiatry. Lastly, participants were asked about differential reimbursement rates for telepsychiatry and on-site visits, and if this affected willingness to utilize telepsychiatry. Only two participants indicated awareness of differential reimbursement rates, so results from these latter items are not reported here.

Most survey items were closed-ended (eg, choosing from among multiple listed response options; indicating degree of agreement with a statement on a Likert-type scale). Three open-ended items in the initial survey asked participants to provide free-text responses.

Data Analysis

Descriptive univariate analyses were conducted for responses to all closed-ended items. Categorical variables were summarized and reported as frequencies and percentages (only frequencies are reported wherever data for a subgroup of sites are presented), while continuous variables were summarized and reported as means and standard deviations (SDs). Responses to open-ended items were not formally analyzed; rather, selected quotations that inform findings are reported here.

No hypotheses were tested, and no inferential statistics, including those representing associations among variables, were calculated.

Results

Site and Participant Characteristics

Site characteristics for the initial and the follow-up surveys appear in [Table 1](#). Participants at 35 of the 50 active OASIS sites completed the initial survey. Fifteen of these 35 sites (43%) were in the Southern region of the US, and 21 (60%) were in an urban setting. Nearly all sites identified as either independent/private practices ($n = 16$, 46%) or community mental health clinics (CMHCs; $n = 17$, 49%). Twenty-one of the 35 sites completed the follow-up survey (60%). Site characteristics for the subset of sites that completed the follow-up survey were similar to those of the full sample ([Table 1](#)).

Participant characteristics for both the initial and the follow-up surveys appear in [Table 2](#). Ten participants completed both surveys; different individuals completed the initial and follow-up surveys at 11 of 21 sites. Participant characteristics were similar across the two surveys.

Findings from the Initial Survey

Impact of the COVID-19 Pandemic on Site Operations

[Table 3](#) reports the most frequently cited impacts of the pandemic by the participants. The most frequently reported impacts were increased safety precautions (eg, providing masks, hand sanitizer, and/or other personal protective equipment [PPE]) and procedural changes for office visits to adhere to governmental guidelines ($n = 30$, 86% each).

Strategies for Maintaining Continuity of Care for Patients During the COVID-19 Pandemic

All but one site reported implementing or expanding telepsychiatry services ($n = 34$, 97%) to maintain continuity of care for patients with schizophrenia treated with LAIs during the COVID-19 pandemic. Some sites did adopt other strategies including patient referral to off-site locations (eg, pharmacies, "minute clinics"; $n = 2$), and establishing a drive-thru clinic ($n = 1$) or in-home visits ($n = 1$).

Table 1 Characteristics of Participating Sites for Initial and Follow-Up Surveys

Site Characteristic	Initial Survey (N = 35)	Follow-Up Survey (N = 21)
Geographical location, n (%)		
Northeast	5 (14.3)	2 (9.5)
South	15 (42.9)	9 (42.9)
Midwest	8 (22.9)	5 (23.8)
West	7 (20.0)	5 (23.8)
Location type, n (%)		
Urban	21 (60.0)	12 (57.1)
Suburban	12 (34.3)	9 (42.9)
Rural	2 (5.7)	0 (0.0)
Type of site, n (%)*		
Academic center	5 (14.3)	3 (14.3)
Hospital network	5 (14.3)	4 (19.0)
Independent/private practice	16 (45.7)	8 (38.1)
Community mental health clinic	17 (48.6)	12 (57.1)
Active patients with schizophrenia, mean per site (SD) [†]	369.9 (316.7) [‡]	421.2 (334.8)

Notes: *More than one response option could be chosen. [†]999 was the maximum value allowed; three sites reported 999 patients. [‡]Data were missing for one site.

Abbreviation: SD, standard deviation.

Table 2 Characteristics of Initial and Follow-Up Survey Participants

Participant Characteristic	Initial Survey (N = 35)	Follow-Up Survey (N = 21)
Male, n (%)	28 (80.0)	16 (76.2)
Age (years), mean (SD)	55.0 (11.6)	55.6 (14.8)
Years practicing psychiatry/behavioral health, mean (SD)	22.6 (10.9)	25.4 (14.7)
Years prescribing LAIs, mean (SD)	16.2 (11.7)	18.6 (13.9)
Years working at current site, mean (SD)	13.1 (7.5)	12.9 (9.6)

Abbreviations: LAI, long-acting injectable antipsychotic medication; SD, standard deviation.

Table 3 Impact of the COVID-19 Pandemic on Participants' Sites (N = 35)

Impact	n (%) [†]
Provided PPE or took other precautions for in-person office visits	30 (85.7)
Changed in-person office visit procedures to adhere to safety guidelines	30 (85.7)
Started/increased the use of texts, emails, and/or telepsychiatry for medication reminders	19 (54.3)
Decreased scheduling of in-person office visits to adhere to government safety guidelines	18 (51.4)
Limited operations due to internal administrative decisions (other than staffing shortages)	14 (40.0)

Note: [†]More than one response option could be chosen.

Abbreviation: PPE, personal protective equipment.

Impact of the COVID-19 Pandemic on Prescribing Patterns and Medication Adherence

Approximately one-third of sites reported switching patients with schizophrenia from LAIs to OAPs ($n = 12$, 34%). A similar number of sites reported switching patients from shorter to longer injection interval LAIs ($n = 11$, 31%).

More sites perceived that medication adherence was unchanged for patients treated with LAIs ($n = 21$, 60%) than for those treated with OAPs ($n = 15$, 43%). Decreased medication adherence was reported by eight sites (23%) for patients treated with LAIs and 11 sites (31%) for those treated with OAPs. Among the eight sites reporting decreased medication adherence for LAIs, the most frequently reported reasons were decreased injection visits due to patients not wanting to leave their homes ($n = 6$) or reduced clinic hours ($n = 4$). Some of these sites reported adopting the following measures to improve medication adherence: educating patients on reducing exposure to COVID-19 when leaving their homes ($n = 5$), providing alternate sites for LAI administration ($n = 3$), assisting patients with transportation ($n = 3$), providing patients with PPE ($n = 3$), and switching patients from LAIs to OAPs ($n = 4$).

The following quotes provide more insight into how participants viewed the pandemic's impact on medication adherence at their sites:

- “All patients are seen via telemedicine on a monthly basis to ensure stability and medication adherence.”
- “Transportation is always a major barrier for our SMI clients, but clients missing LAIs has become more common.”
- “We have had good adherence by calling the patients to remind them even though they receive a reminder by email or text automatically.”

Implementation and Use of Telepsychiatry Services Before and After the Start of the COVID-19 Pandemic

All 35 sites reported using telepsychiatry during the pandemic. Among the 15 sites (43%) using telepsychiatry pre-pandemic, 13 expanded telepsychiatry services after the pandemic started. The remaining 20 sites (57%) adopted telepsychiatry only after pandemic onset.

Prior to the pandemic, an average of 12–15% of outpatient visits among all patients at participating sites occurred via telepsychiatry (Figure 1). During the pandemic, however, the proportion of telepsychiatry visits increased, ranging from 45%–69% across outpatient visit types. Routine visits experienced the largest increase, for which the use of telepsychiatry increased from 15% pre-pandemic to 69% after pandemic onset.

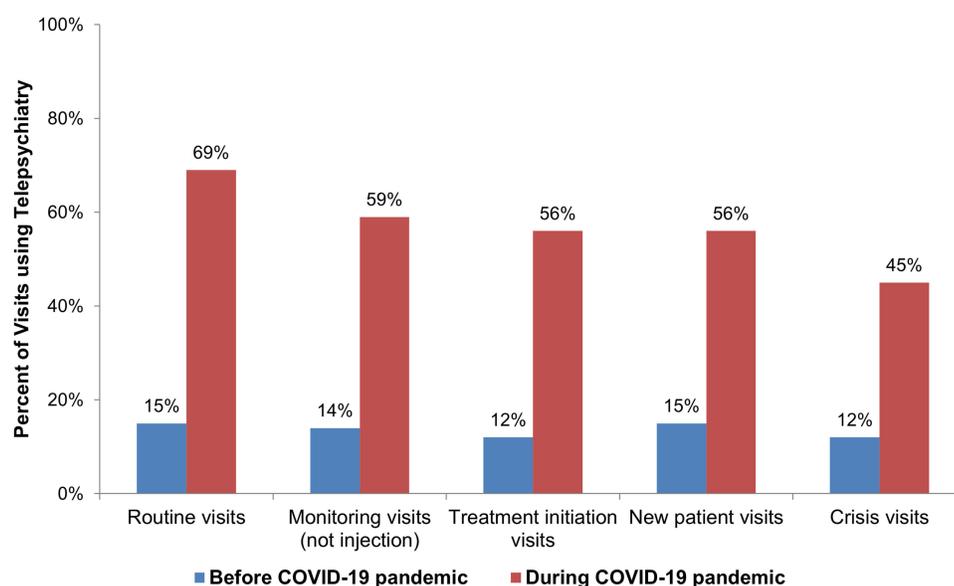


Figure 1 Percentage of outpatient visits using telepsychiatry before and during the COVID-19 pandemic across sites ($N = 35$).

Among the sites treating patients with schizophrenia, 28 (80%) utilized telepsychiatry for patients treated with LAIs, while 34 (97%) used telepsychiatry for those treated with OAPs. Sixteen sites (46%) increased use of telepsychiatry for patients treated with LAIs after pandemic onset, while 26 (74%) did so for patients treated with OAPs.

A differential impact of the pandemic on the frequency of “no shows” and/or cancellations among patients with schizophrenia treated with LAIs was observed for in-person and telepsychiatry visits. Twenty percent of sites ($n = 7$) observed an increase in the frequency of “no shows” and/or cancellations for in-person crisis visits, and 37% of sites ($n = 13$) observed the same increase for in-person new patient visits. Regarding telepsychiatry visits, 29% of sites ($n = 10$) reported a decrease in “no shows” and/or cancellations for treatment initiation visits, and 34% of sites ($n = 12$) reported the same for routine visits.

The most common modalities sites used for telepsychiatry visits with patients with schizophrenia treated with LAIs were audio only (eg, telephone; $n = 33$, 94%) and combined audio with video (eg, online conferencing; $n = 31$, 89%). Most sites ($n = 24$, 69%) purchased new technology and/or equipment after pandemic onset to facilitate telepsychiatry visits. A larger number of CMHCs ($n = 11$) reported such changes than independent/private practices ($n = 8$).

Most participants agreed that telepsychiatry visits were suitable for managing many aspects of care for patients with schizophrenia treated with LAIs (Figure 2), including side effect management, prescription of new antipsychotics, and patient care management.

Barriers for Implementation and Use of Telepsychiatry Services

Participants reported experiencing some barriers to implementing or utilizing telepsychiatry services (Figure 3). The most frequently reported barriers (moderately or extremely limiting) were financial (ie, reimbursement rates, costs of implementation), and were reported by approximately 31% and 29% of sites, respectively.

Participants also reported patient-related barriers to implementing or utilizing telepsychiatry services among patients with schizophrenia treated with LAIs (Figure 4). The most reported patient-related barriers were lack of internet/technology access (74%) and lack of technology training (60%).

When asked how to overcome patient-related barriers to telepsychiatry, the approaches participants most frequently endorsed were to improve patients’ comfort with telepsychiatry ($n = 22$, 63%), to assist patients in acquiring access to needed technology ($n = 19$, 54%), and to train patients to use this technology ($n = 18$, 51%).

Predictions for Use of Telepsychiatry in Post-Pandemic Health Care

Almost all survey participants ($n = 33$, 94%) predicted their sites would employ a hybrid approach that combines in-person and telepsychiatry visits after the pandemic has ended.

The following quotes provide more insight into participants’ predictions regarding how telepsychiatry would be used at their sites post-pandemic:

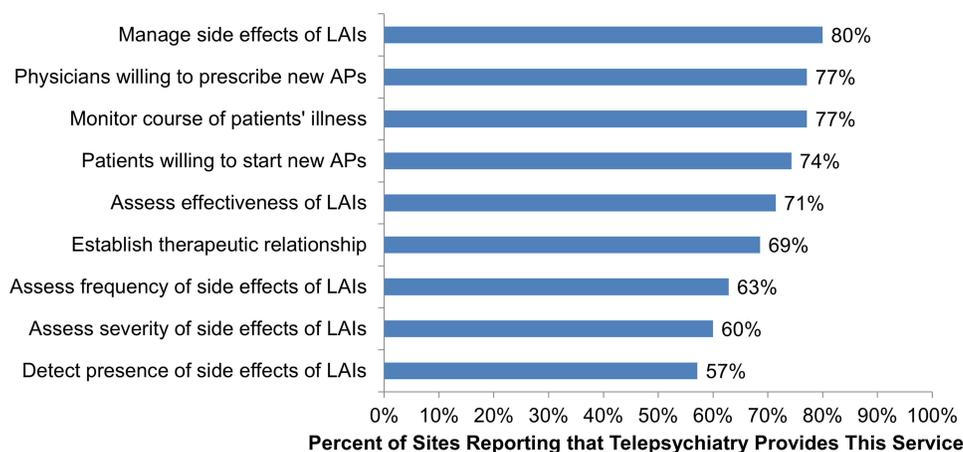


Figure 2 Percentages of sites reporting ability of telepsychiatry to provide a service (N = 35).

Abbreviations: AP, antipsychotic; LAI, long-acting injectable.

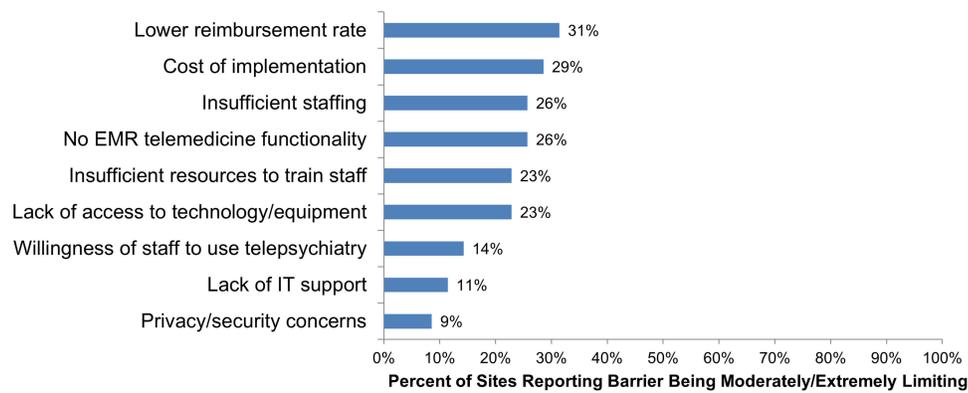


Figure 3 Site/system-related barriers for implementation and use of telepsychiatry services (N=35).

Abbreviations: EMR, electronic medical record; IT, information technology.

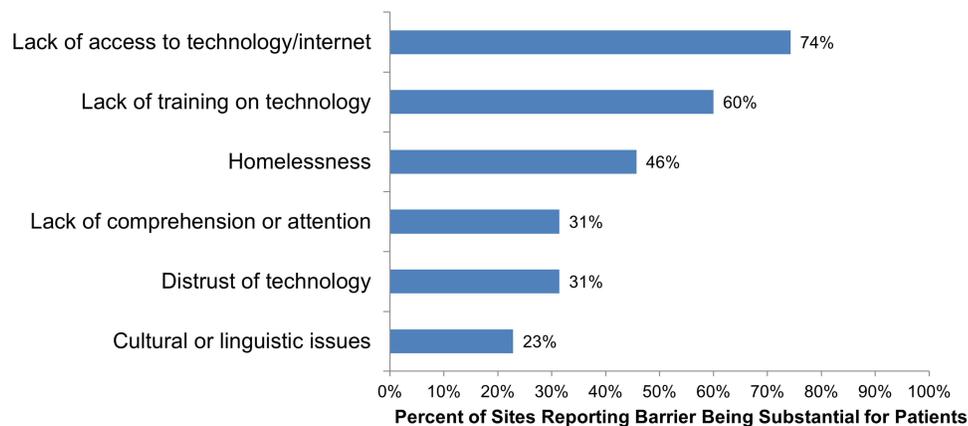


Figure 4 Patient-related barriers for implementation and use of telepsychiatry services (N=35).

- “We already have had a full-time telepsychiatry provider off site, and onsite providers have gone to [a] hybrid onsite and telework model. I am not sure if onsite providers will remain hybrid after the pandemic, but this has seemingly been a successful model so far.”
- “I will still do my own LAI injections in person. My preference will be for all appointments to be in office, but I would be willing to make exceptions now, as long as insurance will reimburse for the visit.”

Participants’ Satisfaction with Continued Care of Patients During the COVID-19 Pandemic

The vast majority of participants (n = 33, 94%) indicated satisfaction with using telepsychiatry to support patients with schizophrenia treated with LAIs.

The following quotes provide more insight into how participants viewed their sites’ abilities to support patients with schizophrenia treated with LAIs during the COVID-19 pandemic:

- “COVID-19 has hastened our adoption/expansion of telehealth services, especially in populations we may have considered the best candidates. We are happy with the success we have encountered.”
- “The COVID-19 pandemic has been without a doubt a big challenge for our practice and our patients. However, we have been able to maintain constant communication with our patients over the phone or virtual calls in order to guarantee their safety and their well-being.”

Follow-Up Survey

Impact of the COVID-19 Pandemic on Prescribing Patterns

Sixteen of the 21 sites that participated in the follow-up survey reported switching patients from an LAI to an OAP. Nine sites reported switching patients from a shorter to a longer injection interval LAI. However, at sites where these changes were made, they were typically made for a small proportion of patients: the median estimated percentage of patients who had been switched from LAIs to OAPs was 10%. The median estimated percentage of patients switched from a shorter to a longer injection interval LAI was also 10%.

Factors related to insurance coverage had the largest influences on decisions to switch patients from LAIs to OAPs at the 16 sites where such switches occurred. Six sites each reported being influenced by increased affordability of OAPs relative to LAIs due to changes in insurance coverage and by changes in insurance approval processes that made prescribing LAIs more difficult. Additionally, five sites reported switching to reduce the need for patients to leave their homes to attend on-site injection visits.

Six of the nine sites reported switching patients to longer injection interval LAIs for the purpose of limiting patients' need to attend in-person injection visits. No other listed reasons for switching were endorsed by more than one site.

Use of Telepsychiatry Services After the Start of the COVID-19 Pandemic

Sixteen of the 21 follow-up survey participants were willing to make treatment decisions about antipsychotic medications (eg, starting a new treatment, switching a patient from LAI to OAP medication or vice-versa) for patients with schizophrenia based solely on telepsychiatry visits for established patients, while 14 participants were willing to make these types of decisions for new patients.

Between seven and 15 of the 21 participants indicated a willingness to make several treatment decisions based solely on telepsychiatry. These decisions included switching patients from an LAI to an OAP, or vice versa, that uses the same medication; switching from an LAI to an OAP, or vice versa, that uses a different medication; switching from an OAP to a different OAP or from an LAI to a different LAI; prescribing an OAP or LAI to a new patient; and adding/removing an antipsychotic medication to/from a patient's current regimen ([Supplemental Table 1](#)).

Factors for making treatment decisions based solely on telepsychiatry visits considered by more than half of sites included efficacy and side effects experienced by the patient ($n = 15$ and $n = 16$, respectively), the duration of the treatment regimen ($n = 15$), and the patient's symptom severity ($n = 15$), while issues related to insurance coverage were cited by one-third or fewer sites ([Supplemental Table 2](#)).

Discussion

This study provides a firsthand account from experienced, practicing behavioral health professionals of the COVID-19 pandemic's impact on continued care of patients with schizophrenia being treated with LAIs in the US. Clinicians at all 35 sites that participated in this survey study reported using telepsychiatry services to care for patients with schizophrenia during the COVID-19 pandemic. The majority began using telepsychiatry services as a direct result of the pandemic, while sites that used telepsychiatry pre-pandemic expanded its use. Most sites reported no negative impact of the pandemic on medication adherence for patients treated with antipsychotic medications, with decreased adherence reported by only 23% of sites for LAIs and 31% of sites for OAPs. Most sites did not experience difficulties implementing or expanding telepsychiatry services. Insurance coverage and patient access to and training on relevant technologies were the most frequently reported barriers. Survey participants found telepsychiatry helpful for almost all aspects of care, and almost all predicted that use would continue in a hybrid manner with on-site visits after the pandemic ends.

The majority of participants in the current study reported that medication adherence in patients treated with LAIs was not negatively impacted by the pandemic. This finding is consistent with evidence from a clinical site in Pennsylvania where the number of LAI administrations remained consistent before and after the State of Emergency declared on March 13, 2020.³¹ Thus, while there were some cases of changing treatment regimens in that study, like in the current study, in most cases prescribing physicians continued to use LAIs, leaving medication adherence largely unaffected.

Remote care of patients treated with LAIs may be challenging, as LAIs typically require administration by an HCP on a fixed schedule. Patients' decreased willingness or ability to attend on-site visits for injections to reduce risk of COVID-19 exposure and a lack of alternative options for in-person injections (eg, drive-through clinics) were cited as reasons for clinicians switching patients from LAIs to OAPs or to longer injection interval LAIs, both of which require fewer on-site visits. Results from the initial survey (approximately seven to eight months following the start of the pandemic) indicated that one-third of sites switched patients with schizophrenia from LAIs to OAPs. Similar estimates were reported for sites switching patients from shorter to longer injection interval LAIs. Although these practices were likely due to the unique circumstances of the COVID-19 pandemic and appearance of new variants over the course of the pandemic, increased availability of alternate locations (such as pharmacies) for injection administration in general may help ensure continuity of care and increase medication accessibility for patients treated with LAIs.

Participants described some of the significant site/system-related barriers to telepsychiatry implementation, namely related to lower reimbursement rates for telepsychiatry visits, and costs to implement and support telepsychiatry services. Furthermore, reimbursement issues were partially mitigated with national healthcare policy changes, such as the Centers for Medicare and Medicaid Services' mandated parity in reimbursement between telemedicine and in-person visits on April 1, 2020.³² Reimbursement policies for telepsychiatry have evolved since the beginning of the pandemic and vary by payer type (public vs private); for Medicaid, these policies also vary by state.³³ Despite reported site/system-related barriers in the current study, HCPs were largely satisfied with the use of telepsychiatry in managing various aspects of patient care. This is consistent with findings from another recent survey of mental health care providers across the US who reported good experience with the use of telepsychiatry.³⁴

Participants also reported on patient-related barriers to utilization of telepsychiatry such as lack of access to technology and need for technological training. Sites implemented strategies to overcome these barriers by working with patients to improve their comfort with the modality and to provide training on best telepsychiatry practices. Very few participants thought that patients' distrust or unwillingness to use technology was a barrier to using telepsychiatry. This is consistent with findings from a previous survey in which the majority of patients with schizophrenia reported interest in online meetings with their HCPs,³⁵ as well as findings from a recent review reporting high acceptance of videoconferencing from participants with schizophrenia-spectrum disorders.³⁴ Another recent review of 26 studies comparing costs of telepsychiatry services with in-person office visits or usual care for patients with SMIs found that the majority of studies reported telepsychiatry visits to be the less expensive option for patients, primarily due to savings in travel time and expenses and a reduction in lost work time.³⁶ Clinicians' high satisfaction with telepsychiatry and its perceived acceptability among patients may contribute to the expectation held by nearly all participants that telepsychiatry would continue to be used in patient care, in combination with on-site visits in a hybrid manner, after the pandemic ends.

Since the start of the pandemic, patients, HCPs, researchers, and population health decision-makers have called for an increase in telepsychiatry utilization to ensure continuity of care for patients with SMIs.^{35,37–40} The current survey findings continue to underscore the need for a hybrid model for patient care, education of patients regarding available treatment options including LAIs for treatment of schizophrenia, and the need for best practice guidelines for telepsychiatry.

This study had several limitations. The relatively small number of participating sites may not be representative of all clinical sites treating patients with schizophrenia and prescribing LAIs, limiting generalizability of findings. The participating sites were also experienced in prescribing LAIs; therefore, less experienced clinical sites and HCPs may have encountered greater barriers in providing patient care and utilizing telepsychiatry during the pandemic. Further, the number of sites within key subgroups was often too small to provide interpretable patterns of data. For example, very few sites were from rural areas or were hospital networks, which limited the ability to interpret data or generalize to other sites with differing characteristics.

Another limitation of this study was that data were self-reported. Despite participants being practitioners with many years of experience at their respective sites, no objective data were collected that might have provided more accurate information to help verify self-reported changes (eg, records of telepsychiatry expenditures or of reimbursement rates by visit type). It was also the case that, for approximately half of the sites that participated in the follow-up survey, the

participant was not the same individual who completed the initial survey. While the surveys' focus was on site operations that would optimally be independent of characteristics specific to the reporting individual, different initial and follow-up survey participants limit the consistency of responses across the two surveys and prevent attempts to link responses and examine changes in these responses over time. Lastly, 60% of the initial survey participants responded to the follow-up survey. Data were not collected on COVID-19-, operational-, or staffing-related differences amongst responding and non-responding sites.

Conclusion

The COVID-19 pandemic has greatly impacted the practice of health care for patients with schizophrenia, including those treated with LAIs. Results of these two surveys found that telepsychiatry was widely used to overcome obstacles introduced by the pandemic, which limited in-person communications between patients and their HCPs. Participants found telepsychiatry to be effective for most aspects of patient care. Almost all participating clinicians thought that the use of telepsychiatry services will continue, even after the pandemic has ended, in a hybrid manner that combines telepsychiatry and in-person office visits. Participating clinicians thus support the use of telepsychiatry in this manner for continuing care of patients with schizophrenia treated with LAIs, both during and after the COVID-19 pandemic. For this to occur, it is essential that patients are provided with equitable access to and support for relevant technologies and equipment to ensure that they can access and benefit from telepsychiatry post-pandemic. Establishing an infrastructure for LAI treatment and administration will be critical to support patient care. Future research on establishing standard practices and guidelines on the use of telepsychiatry is warranted.

Abbreviations

CMHC, Community mental health clinics; COVID-19, Coronavirus disease 2019; HCP, Health care provider; IRB, Institutional Review Board; LAI, Long-acting injectable; OAP, Oral antipsychotic; OASIS-MAPS, Observational Study of LAIs in Schizophrenia: Impact of COVID-19 Pandemic on Outpatient LAI Management and Use of Telepsychiatry for Patients with Schizophrenia; PI, Principal investigator; PPE, Personal protective equipment; SD, Standard deviation; SMI, Serious mental illness; US, United States.

Data Sharing Statement

Data will not be made available because the informed consent forms stated that participants' individual data would not be shared.

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Disclosure

Batool Haider, James McGrory, and Elizabeth Keane are employees of Alkermes, Inc., a pharmaceutical company which manufactures products including antipsychotic medications for people with schizophrenia and bipolar I disorder. These authors may be shareholders. Amy K. O'Sullivan, Leona Bessonova, Amy Claxton, Tiffany Polak, and Wahidullah Noori were employees of Alkermes, Inc. at the time this study was conducted. Asia Sikora Kessler and Aaron Yarlus were employees of QualityMetric Incorporated, LLC, a consulting company specializing in health measurement solutions, which was paid by Alkermes, Inc. for assistance in study design, analyses, and manuscript development, at the time this study was conducted. Eric Achtyes has consulted or served on advisory boards for Alkermes Inc., and has received research grants and/personal fees from Alkermes, Inc, Biogen, Boehringer Ingelheim, Janssen, Neurocrine Biosciences, Takeda, Atheneum, Karuna, Lundbeck, Otsuka, Sunovion, Teva; briefly owned stock from AstraZeneca, Johnson and Johnson, Moderna, and Pfizer, outside the submitted work. Philip D. Harvey, John M. Kane, Stephen R. Saklad, and Dawn Velligan have served as paid consultants for Alkermes, Inc. Philip D. Harvey reports personal fees from Bioexcel, Boehringer Ingelheim, Karuna Pharma, Merck Pharma, Minerva Pharma, Roche Pharma, Sunovion Pharma, principal investigator for iFunction, royalties from WCG Verasci, payment for grant reviews from Alkermes, outside the submitted work. John M. Kane reports personal fees from Alkermes, Allergan, Boehringer Ingelheim, Indivior, Intracellular Therapies, Johnson & Johnson, Merck, Minerva, Neurocrine, HLS, HealthRhythms; personal fees from and shareholder of LB Pharmaceuticals, Vanguard Research Group, North Shore Therapeutics; grants and personal fees from Janssen Pharmaceutical, Sunovion; personal fees from and advisory board of Newron, Novartis, Otsuka, Teva, Click Therapeutics, Cerevel, Dainippon Sumitomo, H. Lundbeck; royalties from UpToDate, outside the submitted work. Dawn Velligan reports grants and/or personal fees from Alkermes, Indivior, Otsuka, Karuna, and Janssen, during the conduct of the study. Jeffrey Trotter is an employee of Worldwide Clinical Trials, a clinical research vendor paid by Alkermes, Inc. The authors report no other conflicts of interest in this work.

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