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Post-acute college student satisfaction with telepsychiatry during the COVID-19 pandemic[☆]

Timothy I. Michaels^{a,b,*}, Sonali Singal^b, Patricia Marcy^c, Marta Hauser^c, Laura Braider^{a,b}, Daniel Guinart^{a,b,d,e}, John M. Kane^{a,b,d}

^a Department of Psychiatry, The Zucker Hillside Hospital, Northwell Health, Glen Oaks, NY, USA

^b The Donald and Barbara Zucker School of Medicine, Hofstra/Northwell, Hempstead, NY, USA

^c Vanguard Research Group, Glen Oaks, NY, USA

^d Center for Psychiatric Neuroscience, Feinstein Institute for Medical Research, Manhasset, NY, USA

^e Centro de Investigación Biomédica en Red de Salud Mental (CIBERSAM), Institut de Neuropsiquiatria i Addiccions (INAD), Hospital del Mar, Institut Hospital del Mar d'Investigacions Mèdiques (IMIM), Barcelona, Spain

ARTICLE INFO

Keywords:

Telehealth
College students
Mental health
COVID-19
Digital health

ABSTRACT

Objectives: Patient satisfaction with telepsychiatry during the COVID-19 pandemic has generally been positive, but few studies have compared patient experiences across settings, and no study to date has investigated the experience of college students receiving post-acute mental health treatment in an outpatient setting.

Participants: The current study surveyed college student outpatients (n = 101) to understand their experiences using telehealth during the COVID-19 pandemic.

Methods: An anonymous survey was delivered electronically and included questions regarding patients' age, treatment length, telehealth use, and their experience and satisfaction with telepsychiatry. A mixed-methods approach was used to analyze responses between groups through Chi-Square, Kruskal-Wallis, or Mann-Whitney tests, and qualitatively to understand themes across items related to the benefits and challenges of telehealth.

Results: College students were more likely to utilize video-based telehealth and preferred video-based care. College students receiving medication management were much more likely to endorse telehealth being as helpful as in-person treatment. Several challenges associated with telehealth were raised in both groups.

Conclusions: Understanding the benefits and challenges of telepsychiatry in this high-risk college population may help enhance access to care during a critical period of development in which most psychopathology emerges.

1. Introduction

The Coronavirus Disease 2019 (COVID-19) pandemic has required mental health providers to shift their services to digital spaces through the use of video- or telephone-based care (Severe et al., 2020). Telepsychiatry provides important opportunities for reducing barriers to accessing treatment (García-Lizana and Muñoz-Mayorga, 2010), and previous research provides strong support for its treatment efficacy (Guaiana et al., 2021). Most patients report equal or greater satisfaction with telehealth compared to in-person treatment (Kruse et al., 2017;

Polinski et al., 2016; Ruskin et al., 2004), and many patient intend to continue telehealth (Guinart et al., 2020) well into the future. Despite the increasing role of telehealth in mental healthcare, critical questions remain regarding its implementation, use, and adaption, especially in populations with more severe psychopathology and higher acuity mental healthcare needs.

While previous studies of telehealth in post-acute settings have largely focused on medical monitoring (Davis et al., 2015; Kitsiou et al., 2015), there is some support (Childs et al., 2021) for telehealth increasing intensive outpatient treatment engagement.

[☆] The current study utilizes a subset of data that was part of a larger dataset including in a previous publication on patient experience with telepsychiatry. This research did not receive any specific grant from funding agencies in the public, commercial, or non-for-profit sectors. All authors contributed in a significant way to the manuscript and all authors have read and approved the final manuscript.

* Corresponding author. 75-59 263rd Street Queens, NY, 11004, USA.

E-mail address: TMichaels1@northwell.edu (T.I. Michaels).

College students represent an especially vulnerable population during the COVID-19 pandemic, as the majority of psychopathology develops during adolescence and young adulthood (Castellanos-Ryan et al., 2016; Solmi et al., 2021). University and college students reported a significant increase in symptoms of depression (Kim et al., 2021) and suicidality (Wang et al., 2020) during the pandemic, compounding a pre-existing college mental health crisis in the United States (Watkins et al., 2012). Required to utilize digital tools for both mental healthcare and remote learning (Conrad et al., 2021), college students are an especially important population for better understanding differences in satisfaction, use, and adoption of telehealth. Given the increasing diversity in American higher education (Espinosa et al., 2019), college students also provide an opportunity to further examine sociodemographic factors that might impact patient experience and access to care, as previous research suggests that racial, ethnic, and socioeconomic factors may impact telehealth use in high acuity outpatient settings (Childs et al., 2021).

College students generally report similar levels of satisfaction with telehealth compared to in-person treatment (Hadler et al., 2021), and many report a strong preference using telehealth in the future (Schuh, 2021). However, previous research has been primarily composed of students with milder forms of psychopathology (e.g., anxiety, depression without suicidal thoughts) or surveyed college patients in either a general outpatient setting or those receiving services on campus counseling centers. Few studies have compared college students' telehealth experiences to other outpatient samples or sought to understand demographic differences that may contribute to the challenges and advantages of digitally based psychiatric services.

The present study sought to investigate patient satisfaction with telehealth in a post-acute outpatient program for college students who had required psychiatric hospitalization (Braider et al., 2019). Specifically, this study sought to understand patients' experience receiving mental health treatment through telepsychiatry over video or telephone. Furthermore, it sought to understand whether demographic differences, including sex, race, and ethnicity, contributed to patient report on the challenges, advantages, and overall satisfaction with telehealth.

2. Methods

2.1. Study recruitment

All study procedures were reviewed and deemed exempt by the local Institutional Review Board (IRB # 20-0397). The current study represents a subset of data from a larger survey on telepsychiatry completed in collaboration with the Vanguard Research Group (VRG), a research consortium specializing in behavioral health. The original 11-item, anonymous, telehealth survey was administered to patients using telepsychiatry in 18 hospital and community mental health centers located in 11 US states (Connecticut, Florida, Maine, Michigan, New Hampshire, New York, Oregon, Rhode Island, South Carolina, Texas, and Utah). The results of that study have been reported elsewhere (Guinart et al., 2020), including the full list of survey items. For all participants, surveys were distributed through email or embedded into the telehealth video platform and were completed by patients electronically on computers, tablets, or smartphones.

2.2. College patient survey

Several questions were added to the original survey in order to tailor the survey to a college outpatient sample. The modified survey (Appendix A) was also deemed exempt and approved by the local IRB prior to distribution. The additional questions included sociodemographic items regarding participants' sex, gender, race, and ethnicity, as well as questions about patients' status in college, their length of treatment, and the format of their academic coursework (e.g., virtual, in-person, or hybrid).

2.3. Participants

The college sample reflects patients from an outpatient mental health clinic at a local psychiatric hospital that provides specialized post-acute services to college students who recently experienced a psychiatric hospitalization (Braider et al., 2019). Although all of the patients were recruited from a single outpatient clinic, the sample represents students from a wide range of college settings, including public and private universities, four-year institutions, and community colleges from across the metropolitan region. This sample included patients who were receiving both individual psychotherapy and medication management (referred to herein as the College Therapy Medication (CTM) group, $n = 79$) and patients who were only receiving medication management services (herein referred to as the College Medication Only (CMO) group, $n = 23$). The total sample of 101 patients represent a response rate of approximately 33% of the entire outpatient clinic population.

2.4. Data analysis

Survey data were cleaned and coded in Microsoft Excel (Seattle, WA) and imported into RStudio (RStudio Team, 2015) for statistical analysis. All responses were reviewed according to the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) (Eysenbach, 2004). In the BNCH group, four responses were removed ($n = 296$) prior to data analysis due to survey respondents reporting being the guardian of a patient who is a minor (rather than responded regarding their own experience with telehealth). In the CTM group, one response was removed prior to data analysis ($n = 101$) due to a spurious response time (6 s) that was well below the mean (184.3 s).

Analysis of between-group differences was conducted through a chi-square test for nominal or categorical dependent variables. A Monte Carlo simulation ($B = 2000$) was utilized for chi-square tests in which any cell of the dependent variables was 0 or more than 20% of the cells had a value of less than 5. Ordinal dependent variables were analyzed by either a Mann-Whitney test for comparing two groups, or a Kruskal-Wallis H test for comparing groups with either ordinal or non-normal (skew or kurtosis greater than ± 2) dependent variables. Likert-scale responses (e.g., Strongly Disagree, Disagree, Neutral, Agree, or Strongly Agree) were treated as ordinal dependent variables (Kero and Lee, 2016). A post hoc unpaired Wilcoxon test or Dunn's Test (Dinno, 2015) was performed with Bonferroni correction for multiple comparisons to determine the specific contrasts underlying main effects. An independent samples T-test was performed for comparing continuous dependent variables between-groups.

A qualitative analysis approach (Silverstein et al., 2006) was used to analyze results from two questions related to the opportunities ("What were some of the advantages of telehealth that you experience? (check all that apply)") and challenges ("What were some of the challenges you experience? (check all that apply)") associated with telehealth services. Respondents were permitted to select multiple answers and add write-in responses. Each unique response was categorized into themes by two independent raters. Any disagreements between the two were resolved by consensus through discussion with a third rater. A Kappa coefficient of 0.88 demonstrates strong inter-rater reliability. Each response (include write-in comments) was categorized according to four final categories ("Quality", "Comfort", "Practical", and "Technical"). The percentage of participants who endorsed responses in each category were qualitatively compared across each group in order to determine similarities and differences in their experiences of telehealth.

3. Results

3.1. Patient characteristics

Demographic differences were compared between the CTM and CM groups (Table 1). There were no group differences in age ($p = .23$), sex

Table 1
Demographic characteristics of college population.

Baseline Characteristics	College Therapy and Medication (CTM) Group (n = 78)		College Medication Only (CMO) Group (n = 23)		Full College Sample (n = 101)		p Value
	n/M ^a	%/SD ^b	n/M ^a	%/SD ^b	n/M ^a	%/SD ^b	
Age (Years)	22.3	2.7	23.2	3.1	22.5	2.8	0.23
Sex							0.78
Female	56	72.7	18	78.3	72	74.5	
Male	20	26.0	5	21.7	25	24.5	
Not Reported	1	1.3	0	0.0	1	0.2	
Gender							0.24
Cisgender Female	46	61.3	12	63.2	58	62.5	
Cisgender Male	19	25.3	3	15.8	22	22.9	
Third Gender/Nonbinary	7	9.3	1	5.3	8	8.3	
Not Reported	3	4.0	3	15.8	6	6.3	
Race							0.05
Asian	17	22.7	7	30.4	24	25.2	
Black	14	18.7	0	0.0	14	14.1	
Hispanic/Latinx	9	12.0	6	26.1	15	15.2	
Multiracial	4	5.3	5	21.7	9	8.0	
Non-Hispanic White	30	40.0	5	21.7	35	35.4	
Not Reported	1	1.3	0	0.0	1	1.0	
Years in Treatment							0.02
Less than six months	28	36.8	3	13	31	31.3	
One to two years	18	23.7	3	13	21	20.6	
Two to five years	16	21.1	5	21.7	21	20.6	
More than five years	12	15.8	11	47.8	23	24.5	
Not reported	2	2.6	1	4.3	3	2.9	
Academic Standing							0.79
Undergraduate	51	68	16	80	67	70.5	
Graduate	4	5.3	0	0.0	4	4.2	
On leave of absence	15	20	3	15.0	18	18.9	
Not enrolled in school	5	6.7	1	5.0	6	6.3	

^a Represents either count (n) for categorical variables or the mean (M) for continuous variables.

^b Represents either percentage (%) for categorical variables or the standard deviation (SD) for continuous variables.

($p = .78$), gender ($p = .24$), or academic standing ($p = .79$). There was a trend toward a significant difference for race ($p = .02$), with the CTM group being comprised of a larger proportion of Black (CTM = 19%; CM = 0%) and White (CTM = 40%; CM = 22%) participants (Table 1). There was a significant group difference in the length of treatment ($p = .04$); a larger percentage of the CTM group (37%) reported receiving services for less than six months compared to the CM group (13%), while almost half (48%) of the CM group reported being in treatment for more than five years, compared to only 16% in the CTM group.

The majority of patients in both college samples reported their coursework being either completely virtual (CTM group = 42%; CMO group = 43%) or a hybrid in-person/virtual format (CTM group = 18%; CMO group = 30%). Only five participants (6.33%) in the CTM group and none of the CMO participants reporting their school being completely in-person. Notably, 30% of participants in the CTM group and 22% of participants in the CMO group reported either not being enrolled in a college/university program or being on academic or medical leave at the time of the survey.

3.2. Group-based differences

There was no between-group difference in the method of telehealth ($\chi^2(1, N = 101) = 8.73, p = .16$), as the majority of patients in both the CTM (81%) and CMO (74%) group reporting almost exclusively using video over telephone or combined telephone/video telehealth services. There was also no between-group difference in the preferences for telehealth methods, ($H(1) = 0.46, p = .49$), with the majority of the CTM group (81%) and CMO group (87%) reporting a strong preference for video format (Fig. 1). Post hoc tests indicate no differences in method preference between the two college groups ($p = .98$).

There were was a significant between-group difference in the quality of patients' experience using telephone-based telehealth ($H(1) = 4.22, p = .03$), with a larger proportion of the CTM group (75%) reporting their experience as either good or excellent compared to the CMO group

Group Differences in Telehealth Method Preference

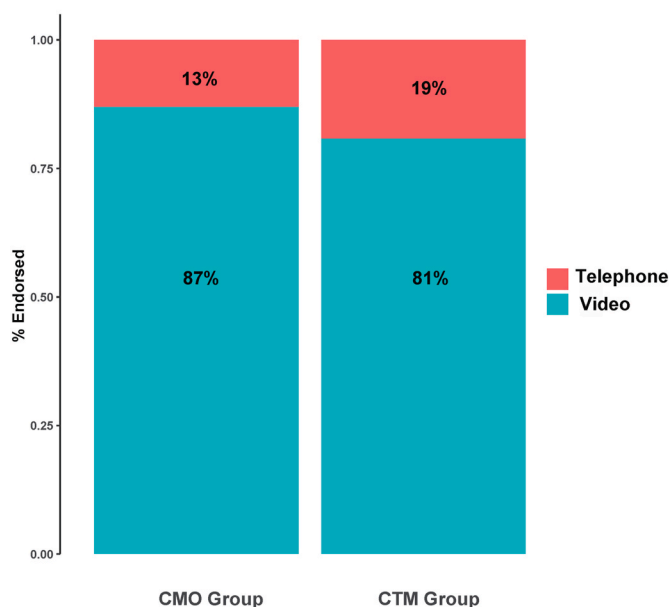


Fig. 1. Patients in the CMO and CTM Group were equally likely to prefer video-based telehealth methods compared to telephone-based services.

(56%). However, there was no difference in patient satisfaction using video ($H(1) = 2.46, p = .12$), with the majority of patients (CTM = 89.6%; CMO = 69.3%) describing their experience as either good or excellent.

Patient groups also differed regarding the extent to which they

agreed with a statement indicating that telehealth-based services were as helpful as in-person services ($H(1) = 8.94, p < .01$). While the majority (78%) of CMO patients agreed or strongly agreed with the statement (Fig. 2), this differed from the response pattern in the CTM group ($p < .01$). In the CTM group, 30% of patients reported being neutral compared to 32% of patients agreeing with the statement.

There were no group differences in the likelihood that patients would utilize telehealth services in the future ($H(1) = 0.99, p = .31$). The majority of patients (CTM = 57%; CMO = 70%) agreed or strongly agreed that they would utilize telehealth-based mental healthcare in the future.

3.3. Qualitative results

Across both groups, the most common responses regarding challenges with telehealth were related to the theme of Comfort (Table 2). Although Comfort items were the most prevalent challenge across each group, these items were endorsed by 65% of the CTM group, compared to 48% of the CMO group. Patients endorsed challenges related to Quality (CTM = 43%; CMO = 39%) at comparable rates, reporting that telehealth may decreased the quality of care received (e.g., “I am concerned that my provider might miss something” and “I do not feel my provider is as engaged in the conversation”).

Practical concerns were also highly endorsed in both groups (CTM = 44%; CMO = 48%), including concerns related to confidentiality, privacy, finding a physical space for psychotherapy, and completing tasks in session (Table 2). A similar pattern emerged regarding Technical difficulties; with a third of each college sample (CTM = 33%; CMO = 35%) endorsed difficulties related to technology during telehealth sessions such as internet connection difficulties and challenges streaming video.

With respect to the advantages of telehealth, none of the patients endorsed or provided free text responses that were coded in the Technical theme. The vast majority of patients endorsed advantages of telehealth that were coded as Practical benefits (CTM = 94%; CMO = 96%). These included items such as “Flexible Scheduling/Rescheduling,” “I am less likely to miss appointments,” and “I like not having to commute to the clinic.” A minority of patients also endorsed advantages related to Comfort, with the highest endorsement being within the CMO group (43%) compared to 28% in the CTM group. Overall, patients endorsed benefits that were associated with the convenience of telepsychiatry, although some also endorsed being more comfortable in a virtual setting compare to in-person treatment.

Table 2

Samples items of responses categorized into four themes for qualitative analysis and the percentage of participants who endorsed items in each theme across both groups. CTM= College Therapy and Medication Group; CMO= College Medication Only Group.

Theme	Challenges of Telehealth (Example)	% Endorsed		Advantages of Telehealth (Example)	% Endorsed	
		CTM	CMO		CTM	CMO
Comfort	I miss visiting the clinic/hospital and feeling connected to it	48%	65%	I feel more confident/ comfortable than in person	28%	43%
Quality	I do not feel as connected to my doctor/nurse/ therapist	43%	39%	More hands-on help implementing skills	0%	0%
Practical	I am concerned about confidentiality/ privacy	44%	48%	Flexible Scheduling/ Rescheduling	94%	96%
Technical	I have had technical problems establishing/ maintaining the connection	33%	35%	NA	NA	NA

3.4. Sociodemographic differences

A Chi-Square, Mann-Whitney *U* Test, or Kruskal-Wallis test was used to determine whether there were any race-based, sex-based, or gender-based differences in college student (the combined CTM and CMO groups) satisfaction with telehealth. Overall, there were no race-based differences in preferred telehealth method ($p = .21$), experiences using telephone ($p = .29$) or video ($p = .99$), or whether patients would use telehealth in the future ($p = .15$). Similarly, there were no gender-based differences in preferred telehealth method ($p = .64$), experiences using telephone ($p = .63$) or video ($p = .53$), whether patients would use telehealth in the future ($p = .52$), or if telehealth was as helpful as in-person treatment ($p = .13$). There were also no sex-based differences in preferred telehealth method ($p = .67$), experiences using telephone ($p = .92$) or video ($p = .58$), whether patients would use telehealth in the future ($p = .11$), or if telehealth was as helpful as in-person treatment ($p = .38$).

4. Discussion

The present study sought to understand the use, satisfaction, and

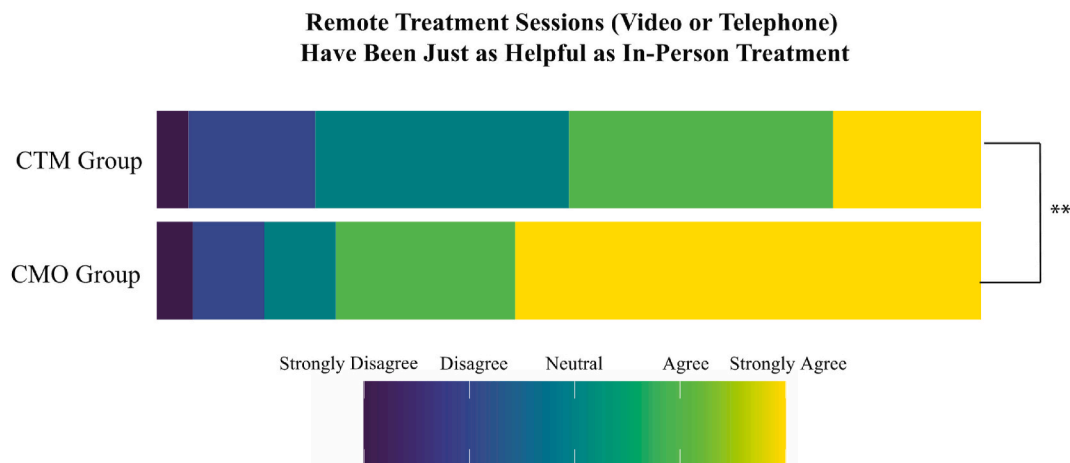


Fig. 2. Patients in the CMO Group were significantly more likely to strongly agree with the statement that “Remote treatment sessions have been just as helpful as in-person treatment” compared to both the CTM Group ($p < .01$). ** = p is less than 0.01.

experience of using telehealth among college students receiving post-acute mental health services in an outpatient setting. It sought to understand whether treatment format (e.g., medication only or medication and psychotherapy) or demographic variables impacted patient telehealth experience. Consistent with previous literature (Hadler et al., 2021; Polinski et al., 2016; Schuh, 2021), both groups agreed or strongly agreed that telehealth services were comparable to in-person treatment and reported a preference for utilizing telehealth services in the future. Both groups endorsed similar challenges related to the comfort of telehealth and rates were also comparable regarding challenges related to the quality of care. Advantages endorsed by both groups primarily related to the practical aspects to telehealth, such as the ease of use.

Several results suggest that the post-acute college students utilize telehealth differently based on the type of services they received. The CTM group reported greater satisfaction with telephone-based services, however the CMO group reported the highest levels of satisfaction with telehealth services overall. This finding may highlight aspects of teletherapy that differentially impact psychotherapy compare to medication management, such as rapport-building, therapeutic alliance, and discussing confidential information. Telehealth may lend itself more easily to medication management appointments, given patients' reported concerns of finding a private space, and not feeling as connected to their provider compared to in-person treatment (Guinart et al., 2020). The content of the patient-provider interaction may have a direct influence on patients' comfort and satisfaction with having services provided via telehealth. Overall, the college sample reported a strong preference for video-based telehealth sessions. One reason for this may be that many college students were required to transition to video-based technology for remote learning during the pandemic, increasing their familiarity with video-based interactions. In employment-based settings, there is more variability in the use of either video or telephone to attend their remote meetings (Standaert et al., 2021).

It was predicted that college students would endorse many practical benefits associated with telehealth, as it allows for more flexibility around rigid class and work schedules, and reduces the costs and time required to travel to a physical office. In contrast, college patients reported substantial concerns related to confidentiality, and difficulty finding a private space for psychotherapy. This finding may be driven by factors specific to navigating telehealth during the pandemic, such as the increased likelihood of patients living at home, although notably these concerns might also present for students living in with roommates in dormitories or apartments. Given the post-acute nature of this college outpatient clinic, the content of psychotherapy (e.g., suicidality, self-harm, depression), may have also elevated practical concerns. Future studies should inquire about the setting in which college patients are conducting telehealth to determine if this factor is contributing to privacy concerns.

Almost a third of each college sample endorsed challenges related to technology. It is unclear if this result is due to the college patients experiencing more technical difficulties (e.g., poorer internet connection) or they are more easily frustrated when such challenges inevitably occur. It may be that college patients, being more comfortable with technology, are more easily frustrated with minor interruptions in the quality of the audio, video, or the internet connection. The high reliance on technology among college students may increase their vulnerability to being upset by difficulties. Given the high prevalence of personality disorders in the broader college sample population, it may also be the case that patients recently discharged from a psychiatric hospitalization are struggling to cope effectively with minor disruptions. Future studies should collect information regarding the specific types of telehealth software or the quality of patients' internet connection and devices in order to better assess the factors driving these challenges and to provide more clarity around these challenges. In line with previous literature (Kruse et al., 2017), all three samples endorsed convenience as one of the largest advantages of telehealth, including more flexibility with scheduling and less time spent commuting. Indeed, one participant

wrote "I feel more comfortable talking about my problems because I am in the comfort of my own house." Future studies should explore specifically what aspects of the home environment contribute to the comfort of telehealth.

Overall, there were no between-group differences in telehealth preference, satisfaction, or other items based on sex, gender, race, or ethnicity within the combined college sample. Some studies (Childs et al., 2021) have demonstrated demographic-based differences in telehealth engagement and attendance, however the present study may have been underpowered to detect these effects. Future survey-based studies of telehealth, especially large web-based studies, should include demographic variables in order to better understand how these factors impact patient telehealth satisfaction and to identify potential inequities in the current digital health landscape.

The present study has several limitations. The survey was distributed to a single site in the Northeast. COVID-19 conditions, perceptions, and region regulations may differ, and similarly the need and attitudes towards telehealth may differ across regions (Parsons Leigh et al., 2020). Another limitation involves the time point in which the study was conducted. The survey was administered several months into the pandemic and after telehealth had been regularly used for all clinical activities for several months, rather than at the start of the transition to telehealth. Attitudes and perceptions towards COVID-19 may have changed as a function of time and many college participants may have become better acclimated to telehealth as a result of (potentially) longer usage. While this may explain some group differences, the similarities across groups on other items suggests that the post-acute setting and college sample are likely a better explanation of the present findings. Unfortunately, patient satisfaction data were not collected prior to the pandemic, which would have allowed for a comparison with overall patient satisfaction with services during a time in which delivery was almost entirely face-to-face. The fast paced and inconsistent environment of college may also increase college students' likelihood of being more receptive to change and adapting to new situations. Similarly, the college samples may have adjusted to new telehealth practices quicker than a non-college population, and therefore may have endorsed more comfort with telehealth. Other limitations of this study include the omission of additional questions which may have further clarified patients' responses, such as the type of telehealth software used, level of access to private spaces, and place of domicile. The present survey did not inquire about differences in the use of telehealth for group versus individual therapy, nor inquire about the format of therapy being received. Despite these limitations, the present study provides an important data point on patient satisfaction with telepsychiatry services in a post-acute outpatient mental health sample.

Although many studies (Andrews et al., 2020; Ramaswamy et al., 2020) report overall high levels of satisfaction with telehealth services, consistent with the present study's findings, it remains unclear whether evaluating patient satisfaction is a sufficient assessment of whether telemedicine fully meets patients' healthcare needs (Johnson 2019). In some settings, lower satisfaction with telehealth is not associated with differences in the quality of care (Futerman et al., 2021), while in other settings, higher patient satisfaction with telepsychiatry services is actually associated with lower satisfaction with patient-provider relationships (Torales et al., 2022). The present study did not formally assess how telehealth impacted the quality of service delivery, however the qualitative results do suggest that some post-acute patients are concerned about the impact of telepsychiatry on the patient-provider relationship, confidentiality, and the broader milieu of the clinical treatment setting. Future studies should develop questionnaires that further distinguish patient satisfaction with the method of service delivery from patient satisfaction with the quality of treatment received.

While the proliferation of telehealth may have been expedited by the COVID-19 pandemic, its future use in psychiatry is guaranteed to continue well beyond the period of recovery. Indeed, the rapid shift to telehealth during the pandemic has prompted concerns that

teleconsultations will completely replace face-to-face visits in the future (Andrews et al., 2020), especially given the high rates of patient satisfaction (Ramaswamy et al., 2020). Within the mental health field, the quick ability to shift the majority of patient-provider interactions and session activities to a virtual format has led some to question whether there will no longer be a need for in-person treatment. To date, there is little evidence to support that telepsychiatry has completely replaced face-to-face visits; in fact, as COVID-19 rates have improved, some insurance companies have stopped reimbursing out of state telemedicine visits (Matthews and Whelan 2020) and many providers have started to re-introduce face-to-face visits (Jabbarpour et al., 2021). While not completely replacing in-person treatment, it is clear that telepsychiatry will represent a much larger portion of patient interactions with providers compared to pre-pandemic levels. It is therefore even more important to better understand differences in service delivery, user satisfaction, and whether services are improved when delivered via telehealth (both from patients and provider perspectives). The present study suggests that while the transition to telehealth was easily adopted, there remain challenges for its continued use in a post-acute college outpatient setting.

To our knowledge, this was the first study to examine patient satisfaction with telepsychiatry among post-acute college students compared to same-aged peers. Overall, telehealth is a strongly preferred method of treatment for both college and non-college populations. Current challenges include translating the rapport and safe environment of psychotherapy to the digital space and addressing the technical challenges that may interfere with service delivery. Amid on-going discussion (Watkins et al., 2012) about the need to increase access to psychological and psychiatric services for college students, telehealth and other digital tools may offer opportunities for care that will have a meaningful impact on addressing the college mental health crisis.

Open practice statement

The experiment reported in this article was not formally preregistered. Neither the data nor the materials have been made available on a permanent third-party archive; requests for the data or materials can be sent via email to the lead author at TMichaels1@northwell.edu.

Declaration of competing interest

The authors declare the following conflicts of interest: Ms. Marcy has been a consultant to Otsuka and has received research funding from Alkermes, Boehringer-Ingelheim, Janssen, Lundbeck, NeuroRx, Otsuka, Takeda, and Roche. Dr. Guinart has been a consultant for and/or has received speaker honoraria from Otsuka America Pharmaceuticals and Janssen Pharmaceuticals. Dr. Kane has been a consultant and/or advisor for or has received honoraria from Alkermes, Allergan, LB Pharmaceuticals, H. Lundbeck, Intracellular Therapies, Janssen Pharmaceuticals, Johnson and Johnson, Merck, Minerva, Neurocrine, Newron, Otsuka, Pierre Fabre, Reviva, Roche, Sumitomo Dainippon, Sunovion, Takeda, Teva and UpToDate and is a shareholder in LB Pharmaceuticals and Vanguard Research Group.

Acknowledgements

The authors would like to acknowledge the research participants and research visiting scholar Emily Stone for her assistance with the project.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jpsychires.2022.03.035>.

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