Treatment outcomes and patient satisfaction of a virtual partial hospital program: A mixed-method study

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Abstract

Objective: Despite a proliferation in virtual partial hospital programs (PHP) during the COVID-19 pandemic, there is a dearth of research on such programs. In the current study, we compared treatment outcomes and patient satisfaction between an in-person and a virtual PHP. Further, we examined patients' qualitative feedback about the virtual PHP.

Method: Participants included 282 patients attending a virtual PHP during the COVID-19 pandemic and 470 patients attending an in-person PHP one year prior. Patients completed daily measures of symptom severity, and post-treatment measures of patient satisfaction and treatment outcomes. Patients in the virtual PHP provided feedback about virtual care. Quantitative data were analyzed using multilevel modeling, and qualitative data were analyzed using the principles of inductive analysis.

Results: Patients experienced a reduction in depression (b = -.28, p < .001) and anxiety symptoms (b = -.25, p < .001) over time and reported high satisfaction in both the in-person and virtual PHPs. There were no significant differences across programs. Virtual PHP patients identified unique advantages and disadvantages of virtual care.

Conclusion: Our results suggest that virtual PHPs should be explored as an ongoing model of care that may help to systematically reduce barriers to accessing mental health services.

Keywords: Partial hospital, telehealth, treatment outcomes, patient satisfaction, mixed methods

Clinical significance of this article: Our results suggest that a virtual partial hospital program resulted in favorable treatment outcomes and patient satisfaction levels that did not differ from those seen following an in-person partial hospital program. Further, patients identified several unique advantages of virtual care that may improve access to services. As such, virtual partial hospital programs should be explored as an ongoing model of care that may help to systematically reduce barriers to accessing mental health services.

The COVID-19 pandemic has prompted mental health programs across the globe to offer services via virtual platforms. This change was supported by robust meta-analytic evidence that suggests that outpatient individual cognitive-behavioral therapy (CBT) is equally efficacious when delivered in-person or virtually (e.g., Andrews et al., 2018; Fernandez et al., 2021). Further, patients report being satisfied with virtual programs (Andrews et al., 2018), suggesting that the pandemic-induced shift from in-person to virtual outpatient care would be acceptable to patients and effective. However, prior to the COVID-19 pandemic, virtual platforms were rarely (if ever) used to facilitate more intensive treatment programs (ITPs), and consequently, there is a dearth of research examining treatment outcomes and patient experiences in these settings.

ITPs (e.g., partial hospital programs [PHPs], day programs, intensive outpatient programs) offer a critical level of care between inpatient hospitalization and traditional outpatient treatment that generally consist of multiple days of treatment per week without a residential requirement. ITPs are intended for people with moderate to severe mental illness who are unable to benefit from outpatient therapy, as an alternative to inpatient hospitalization, or as a step down from inpatient hospitalization (Beard et al., 2016a). ITPs are thought to be well suited for this acute population because they offer a larger "dose" of therapeutic treatment compared to outpatient treatments, along with a psychosocial treatment milieu (Neuhaus, 2006). Treatment outcome research suggests that ITPs result in significant reductions in symptom severity and suicidal behaviours (e.g., Bateman & Fonagy, 1999; Beard et al., 2016a; Granello et al., 1999; Lothes et al., 2014). To continue to provide these essential services during the pandemic without compromising the physical health of patients and staff, many ITPs across the world began offering treatment virtually (see Childs et al., 2020; Hom et al., 2020; Romani et al., 2021; Sequeira et al., 2020 for descriptions of virtual ITPs).

To date, only two studies have examined treatment outcomes from virtual ITPs. The first study included 76 patients who attended a group-based intensive outpatient program for patients at risk of psychiatric hospitalization (Puspitasari et al., 2021). Patients received three CBT group therapy sessions per day, as well as individual therapy and medication management as needed. The program was delivered five days per week, three hours per day, with patients attending on average 14.4 days (*SD* = 1.42). Compared to symptoms at admission, patients reported improvements in depression (*d* = 0.77), anxiety (*d* = 0.74), suicidal ideation severity (*d* = 0.41), and overall mental health at discharge (*d* = 0.39). A second study compared treatment outcomes of patients who attended a virtual PHP (*n* = 207) to patients who attended an in-person PHP one year prior (*n* = 207; Zimmerman et al., 2021b). In this study, the in-person PHP consisted of four acceptance and commitment therapy (ACT) groups per day, daily individual therapy, and daily individual medication management appointments. The virtual PHP retained all aspects of the in-person PHP but reduced the daily number of groups to three. On average, patients attended the virtual PHP longer than the in-person PHP (virtual: *M* = 13.5 days, *SD* = 8.1; in-person: *M* = 8.5 days, *SD* = 5.0). Both the in-person and virtual PHP demonstrated significant improvements in depression (*d* = 1.42 and 1.20, respectively), anxiety (*d* = 1.16 and 1.14), anger (*d* = 0.94 and 0.93), physical pain (0.62 and 0.47), positive mental health (*d* = 1.09 and 0.90), functioning (*d* = 0.89 and 0.92), coping skills (*d* = 1.18 and 1.09), and well-being (*d* = 1.17 and 1.03) from admission to discharge. The authors did not investigate whether the magnitude of change differed across groups. Taken together, these results suggest that virtual adaptations of ITPs are associated with improvements in symptoms and overall functioning.

An emerging body of literature also suggests that patients find the virtual ITPs acceptable. Patients in both a virtual and in-person PHP reported being "*very satisfied*" or "*extremely satisfied*" with all components of the treatment program (Zimmerman et al., 2021a). Further,

attendance for virtual ITP for high-risk adults and adolescents was higher than attendance for the in-person PHP offered one year prior (Childs et al., 2021), suggesting that patients may find it more feasible to engage with virtual ITPs compared to in-person ITPs.

In sum, a preliminary body of research suggests that virtual ITPs produce favorable treatment outcomes. Nevertheless, several critical gaps remain in the literature. First, studies have exclusively examined changes in symptoms from admission to discharge of virtual ITPs, rather than examining symptom trajectories, which can highlight response patterns pertinent to outcomes that may be missed by pre-post study designs (e.g., Lewis et al., 2012). Second, researchers have not statistically compared the magnitude of symptom change between in-person and virtual ITPs, and consequently, it remains unclear whether virtual ITPs are more or less effective at reducing symptoms compared to in-person ITPs. Finally, although preliminary research suggests that patients find virtual ITPs satisfactory, we have little understanding as to why. Prior research suggests that virtual care can be convenient, reduce barriers, and facilitate access to care (Cox et al., 2017; Orlando et al., 2019; Petersen et al., 2020; Sugarman et al., 2021). Yet, it's unclear whether these findings extend to ITPs.

In the current study, we aimed to address these gaps in the literature. Using a mixed-methods design, we examined treatment outcomes and patient perceptions of a virtual PHP in an acute transdiagnostic sample during the COVID-19 pandemic. First, we examined whether the daily depression and anxiety symptom trajectories of patients who attended the virtual PHP differed from those of patients who attended an in-person PHP one year prior. Second, we compared the subjective metrics of patient satisfaction between patients who attended the virtual PHP to those who attended the in-person PHP. Third and finally, we examined qualitative responses from patients about their experience in the virtual PHP to identify common themes

about advantages and disadvantages of receiving intensive partial hospital level of virtual care. These aims were exploratory and thus, we did not have a priori hypotheses.

Method

Participants

The sample consisted of 752 patients receiving partial hospital level care in an in-person (n = 470) or virtual (n = 282) format at the Behavioral Health Partial Hospital Program (BHP) in Belmont, MA. The virtual PHP data collection occurred from April 2020 through December 2020. The in-person comparison sample was selected from the data collected one year prior (April 2019 through December 2019). All patients admitted to the PHP during these periods who completed at least one daily assessment of symptom severity were included in the current study. Patients ranged from 18-79 years old (M = 34.8, SD = 14.1). Patients who attended the virtual PHP (M = 36.31, SD = 14.42) were significantly older than patients who attended the in-person PHP (M = 33.87, SD = 13.78), $t(750) = 2.31$, $p = .02$. Of the total sample, 59.0% of patients identified as female, 38.4% male, and 1.9% transgender or gender nonbinary. A further 0.7% did not disclose their gender. The gender of patients approached a statistical difference across in-person and virtual treatment programs, $\chi^2(2) = 6.00$, $p = .05$. Follow-up analyses revelated that a significantly smaller proportion of patients were male in the virtual PHP (33.9%) compared to the in-person PHP (58.5%), $\chi^2(1) = 4.28$, $p = .04$. There were no statistical differences in the portion of patients who identified as female or transgender/non-binary across programs, $\chi^2(1) < 2.65$, $p > .10$. Across samples, the majority of participants identified as Non-Hispanic White (82.4%), followed by Asian (5.1%), Hispanic/Latinx (3.5%), Multiracial (2.9%), and Black or African American (2.7%). An additional 1.3% of patients did not disclose their race and 1.2% reported not knowing their race. There were no differences in race across groups, $\chi^2(1) > 1.37$, $p < .24$. Approximately half (46.7%) of patients were not employed over the past 30 days, 39.0% of

patients had full-time employment, and 14.3% of patients had part-time employment. There were no statistically significant differences in employment across groups, $\chi^2(2) = 5.29$, $p = .09$. The largest proportion of the sample reported that their highest education was a 4-year college degree (32.2%), followed by some college/an associate degree/trade school (31.5%), post-college education (30.7%), high school graduate/GED (5.2%), and some high school (0.4%). There were no differences in education across groups, $\chi^2(4) = 3.05$, $p = .55$.

Over three-fourths of the in-person sample (81.3%; $n = 382$) and approximately half of the virtual sample (56.7%; n = 160) completed the Mini-International Neuropsychiatric Interview, a semi-structured clinical interview to assist with treatment planning.[1] Of the subsample that completed the MINI, patients met diagnostic criteria for the following psychological conditions: major depressive episode (93.2%), generalized anxiety disorder (51.0%), social anxiety disorder (24.1%), panic disorder (24.1%), a substance use disorder (22.9%), alcohol use disorder (21.7%), manic episode (19.0%), obsessive compulsive disorder (16.6%), agoraphobia (11.3%), a mood disorder with psychotic features (10.0%), a psychotic disorder (7.4%), and hypomanic episode (2.5%). A substantial proportion of patients met diagnostic criteria for more than one comorbid condition (75.6%). A significantly greater proportion of patients with social anxiety disorder attended the in-person PHP (26.6%) compared to the virtual PHP (17.7%), $\chi^2(1) = 4.03$, $p = .04$. There were no other significant differences in the prevalence of psychological conditions across groups, $\chi^2(1) < 2.84$, $p > .09$.

Measures

Mini-International Neuropsychiatric Interview

[1] Fewer patients completed the MINI in the virtual PHP due to delays with migrating the interview to a virtual format. Further, approximately 20% of patients in both programs did not complete the MINI interview because it was not clinically indicated (e.g., due to psychiatric concerns that warranted immediate intervention). Nevertheless, we report on data from the subsample that completed the MINI to help characterize the current sample.

The Mini-International Neuropsychiatric Interview (MINI; Sheehan, 2016) is a brief structured diagnostic assessment of the most prevalent disorders in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013). The MINI interview has demonstrated strong reliability and validity (Lecrubier et al., 1997).

Patient Health Questionnaire-9

The Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) is a nine-item screening tool for depression (e.g., "*Feeling down, depressed, or hopeless*"). We employed a modified version of the PHQ-9 to assess depressive symptoms over the past 24 hours. Patients responded on a 4-point Likert-type scale (0 = "*not at all*" to 3 = "*nearly every day*"). In the current study, the PHQ-9 demonstrated strong internal consistency (α = .87). The PHQ-9 has been validated for use in acute psychiatric samples (Beard et al., 2016b).

Generalized Anxiety Disorder 7-item Scale

The Generalized Anxiety Disorder 7-item Scale (GAD-7; Spitzer et al., 2006) is a seven-item screening tool to assess symptoms of generalized anxiety disorder (e.g., "*Not being able to stop or control worrying*"). We employed a modified version of the GAD-7 to assess anxiety symptoms over the past 24 hours. Patients responded on a 4-point Likert-type scale (0 = "*not at all*" to 3 = "*nearly every day*"). The GAD-7 has demonstrated good construct validity (Kertz et al., 2013) and demonstrated strong internal consistency in the current sample (α = .89).

Clinical Global Impressions Scale-Improvement

Patients completed a self-report version of the single-item Clinical Global Impressions Scale-Improvement (CGI-I; Guy, 1976) to assess perceptions of the degree to which their mental health improved over the course of treatment. Patients rate how they felt at discharge compared to how they felt at admission on a 7-point Likert-type (1 = "*very much improved*" to 7 = "*very*

much worse"). The CGI-I has demonstrated construct validity in acute psychiatric samples and is sensitive to change over time (Berk et al., 2008; Masand et al., 2011).

Perceptions of Care Survey

The perceptions of care survey (Eisen et al., 2002) is an 18-item assessment of patient satisfaction with treatment. Response options for each question vary (see Tables 3 and 4 for item and response options). This scale has demonstrated good convergent and external validity in acute psychiatric samples (Ortiz & Schacht, 2012). Items are intended for individual use, and as such, internal consistency statistics are not available.

Qualitative Questions

Patients who participated in the virtual PHP were asked three qualitative questions about their experience in treatment on their final day in the program: *What, if anything, was positive about attending a virtual partial hospital program? What, if anything, was negative about attending a virtual partial hospital program? Is there anything else you would like to tell us about your experience attending our virtual partial hospital program?* These items were developed to facilitate evaluation of the virtual PHP.

Procedure

In-Person PHP.

Prior to March 2020, all services at the BHP were provided in person. In-person treatment occurred between 9am and 3pm from Monday through Friday. Patients were assigned a treatment team composed of a case manager, an individual therapist, and a psychiatrist. Patients participated in up to five 50-minute groups per day facilitated by community residence counselors, advanced clinical psychology doctoral students, postdoctoral fellows, and/or staff psychologists. Groups were focused on psychoeducation or specific skills derived from CBT (Beck, 2011), ACT (Hayes et al., 2012), or dialectical behavior therapy (DBT; Linehan, 2015).

Patients additionally met individually with a case manager (three times per week), individual therapist (three times per week), and psychiatrist (two to three times per week). Patients also had the opportunity to meet with a vocational counselor, and to participate in a family meeting. The in-person PHP maintained a daily census of approximately 25 to 30 patients. For further information on the format and structure of the in-person PHP, see Beard & Björgvinsson, 2013.

Virtual PHP.

Following the onset of the COVID-19 pandemic in March 2020, in-person services at the BHP were discontinued and the program transitioned to a fully remote, virtual PHP (see Hom et al., 2020). The virtual PHP functioned similarly to the in-person PHP, except that all treatment services were conducted virtually on a HIPAA-compliant version of Zoom. Further, patients were assigned three groups per day, rather than five, to minimize "Zoom fatigue" (i.e., feeling exhausted after videoconferencing; Bailenson, 2021). The virtual PHP began April 2020 with a daily census of 10 patients and gradually increased to up to 25 patients per day.

Data Collection.

All patients completed self-report measures of depression and anxiety symptoms every morning before treatment began on a hospital-provided computer (in-person PHP) or their own personal device (virtual PHP) using Research Electronic Data Capture (REDCap), a secure web-based platform for managing online surveys (Harris et al., 2009). Diagnostic interviews were conducted on the second day of the program. On their final day of the program, all patients completed the CGI-I and the perceptions of care survey on REDCap. Patients attending the virtual PHP also answered open-ended questions about their experience with the virtual aspect of the program via REDCap. These data were used to inform patient care and internal program evaluation. A de-identified dataset was obtained for the current study and deemed exempt by the Partners Health Care and McLean Hospital Institutional Review Board.

Data Analysis

Program characteristics and baseline symptoms were compared across the in-person and virtual PHP samples using Pearson chi-square analyses and independent sample *t*-tests. To examine symptom trajectories, we conducted two series of multilevel models using the lme4 package for R (Bates et al., 2015) to examine the effect of time and program (in-person vs. virtual) on depression and anxiety symptoms. Time was measured by the number of days patients were enrolled in the treatment program. The first measurement time point was coded as day '0'; thus, time was centered on its natural metric. Program was dummy coded (i.e., 0 = in-person; 1 = virtual), and depression and anxiety scores were group-mean centered. Due to missing data and different lengths of stay in both the in-person and virtual PHPs, participants varied in their number of assessment timepoints (i.e., 1 to 15); multilevel modelling is well-equipped to handle this unbalanced data (Field et al., 2012). We modeled random intercepts and slopes because patients vary in their level of symptom severity at admission (intercepts) and rates of change over time (slope). Visual inspection of the raw data (see Figure 1) suggested that symptom trajectories followed a linear pattern; thus, only linear models are presented.

For both depression and anxiety symptoms, we tested four separate models. In Model 1, we specified the unconditional means model (or intercept-only model), which does not include predictors and establishes whether there is systematic variation in the outcomes worth exploring. The intraclass correlation coefficient (ICC) was calculated by dividing the random effect variance by the total variance to determine the proportion of variance explained by between-person differences. In Model 2, we specified an unconditional growth model, which includes time but not program to assess how much of the within-person variability can be attributed to systematic changes over time. In Model 3, we included all predictors of interest without the interaction variable to assess main effects. Finally, in Model 4, we added our interaction term (i.e., time by

program) to assess whether symptom trajectories differed across treatment programs. Because the program samples differed in terms of age, gender, and prevalence of social anxiety disorder, these variables were introduced as covariates in each model. The pattern of the result did not change with the inclusion of covariates in any of the models, and thus the parsimonious analyses without covariates are reported. Models with the covariates included, de-identified data, and syntax is available at https://osf.io/de3ry. Finally, to examine group differences in patient satisfaction, we conducted nine independent sample *t*-tests and ten Pearson chi-square analyses. We used Bonferroni correction to account for multiple comparisons (*p*-value = .05/19 = .002).

Qualitative Responses

Qualitative data analysis was based on best practice guidelines using the principles of inductive analysis (Miles, 2014; Thomas, 2006). Specifically, two authors (C.H. and S.M.) independently read all responses several times and identified themes. Although both authors attempted to derive themes from the data, we recognize that prior experience with the phenomena under study can influence judgements. C.H. had experience conducting both group and individual therapy in the virtual PHP, which may have introduced bias. Therefore, S.M. was selected to assist with this process because she had no prior experience with virtual or in-person PHPs. The two authors met to discuss identified themes and agreed upon a final coding scheme (see supplementary materials). Both authors then independently coded all responses and were attentive to whether responses were being captured by the defined coding scheme. All responses were adequately captured, which suggested that all major themes had been identified.

Responses to the open-ended question, "*What, if anything, was positive about attending a virtual PHP?*", were categorized as positive aspects of the virtual PHP. Responses to the second open-ended question, "*What, if anything, was negative about attending a virtual PHP?*", were categorized as negative aspects of the virtual PHP. Coders independently determined whether

responses to the third open-ended question, "*Is there anything else you would like to tell us about your experience attending our virtual PHP?*", were categorized as positive or negative. The average percent agreement across variables was 96.1% (range: 90–100%) and interrater reliability was strong (Cohen's $\kappa = .81$). Discrepancies in coding were discussed and consensus was achieved for all responses. We complied with best practice guidelines for reporting qualitative research (Levitt et al., 2018).

Results

Comparison of Program and Patient Characteristics

Across both programs, most patients were referred by outpatient treatment providers (66%) followed by inpatient treatment providers (27.4%), and residential or partial hospital treatment providers (5.5%). A very small proportion of our sample were self-referred (0.8%) or referred by emergency room personnel (0.4%). There were no differences in the referral sources between programs, $\chi^2(4) = 4.29$, $p = .51$. Approximately one-fifth of the full sample had attended our PHP at another point in time (19.7%); again, there were no differences across programs, $\chi^2(1) = 1.55$, $p = .21$. Patients attended the virtual PHP for an average of 10.02 days ($SD = 3.06$; median = 9), which was significantly longer than patients attended the in-person PHP ($M = 7.94$ days; $SD = 2.53$; median = 9), $t(750) = 9.98$, $p < .001$. The difference may be partially attributed to absences; patients in the in-person PHP were absent from the program significantly more than patients in the virtual PHP (in-person: $M_{days} = 0.72$, $SD = 1.09$; virtual: $M_{days} = 0.33$, $SD = 0.77$), $t(750) = 5.23$, $p < .001$. Across both programs, most patients were discharged to home (94.4%), followed by an emergency room (3.9%), inpatient hospitalization (1.6%), or residential treatment (0.1%). There were no differences in discharge disposition across programs, $\chi^2(3) = 2.75$, $p = .43$. Patients in the in-person PHP completed a greater proportion of daily symptom assessments

(completion rate: M = 95.67%, SD = 13.28%) than patients in the virtual PHP (M = 86.82%, SD = 21.11%), $t(750) = 7.05$, $p < .001$.

On average, patients in both the in-person and virtual PHPs began treatment in the *Moderate* range of depressive symptoms on the PHQ-9 (in-person: M = 10.68, SD = 6.25; virtual: M = 10.26, SD = 6.07) and *Mild* range of anxiety symptoms on the GAD-7 (in-person: M = 8.80, SD = 5.38; virtual: M = 8.24, SD = 4.95). There were no statistical difference in baseline depression ($t[746] = 0.91$, p = .36) or anxiety symptoms ($t[748] = 1.44$, p = .15) across programs.

Symptom Trajectories

Variables were assessed for normality and outliers. All variables were within normal ranges of skewness and kurtosis, and no individual scores were identified as outliers.

Depression Symptoms. Results of each of the four depression models are presented in Table 1. Based on Model 1, the ICC for depressive symptoms was .74, suggesting that 74% of the variance in depressive symptoms was explained by between-person differences. Model 2 had significantly better model fit than Model 1, $\chi^2(3) = 884.04$ p < .001. As seen in Table 1, patients across both treatment programs reported lower levels of depressive symptoms over the course of treatment. On average, patients began treatment in the *Moderate* range of the PHQ-9 (M = 10.51; SD = 6.19) and were discharged from treatment in the *Mild* range (M = 8.33; SD = 5.91).

Model 3 tested the unique contribution of the program after controlling for the effect of time. As seen in Table 1, the main effect of program was not significant, which indicates that there was no difference in depressive symptoms between patients in the in-person compared to the virtual PHP. Compared to Model 2, Model 3 did not provide a significant improvement in model fit, $\chi^2(1) = 0.13$, $p = .72$. Finally, Model 4 tested whether the effect of time differed between patients who attended the in-person vs. virtual PHP. As indicated in Table 1, the interaction between time and program was not significant. Model 4 did not provide a significant

improvement in model fit when compared to Model 2 or 3, $\chi^2(1) < 1.97$, $p > .18$.

Anxiety Symptoms. Results of each of the four anxiety models are presented in Table 2. Based on Model 1, the ICC for anxiety symptoms was .75, suggesting that 75% of the variance in anxiety symptoms was explained by between-person differences. Model 2 had significantly better model fit than Model 1, $\chi^2(3) = 812.28$, $p < .001$. As seen in Table 2, patients across treatment programs reported lower levels of anxiety symptoms over the course of treatment. On average, patients began treatment in the *Mild* range of the GAD-7 ($M = 8.59$; $SD = 5.23$) and were discharged from treatment in the *Mild* range ($M = 6.48$; $SD = 5.11$).

The results of Model 3 suggest that the main effect of program was not significant, which indicates that there was no difference in anxiety symptoms between patients in the in-person compared to the virtual PHP. Compared to Model 2, Model 3 did not provide a significant improvement in model fit, $\chi^2(1) = 0.22$, $p = .64$. Finally, the results of Model 4 illustrate that the interaction between time and program was not significant. Model 4 did not provide a significant improvement in model fit compared to Model 2 or 3, $\chi^2(1) < 3.42$, $p > .07$.

Subjective Metrics of Patient Satisfaction and Treatment Outcomes

Comparisons of subjective metrics of patient satisfaction and treatment outcomes for patients who attended the in-person and virtual PHPs are presented in Tables 3 and 4. There were no statistical differences between in-person or virtual patient satisfaction on each of the items of the perceptions of care and CGI-I scales. Across both PHPs, the majority of patients reported feeling informed about aspects of their care and included in their patient care team. On average, patients attending both the in-person and virtual PHPs reported feeling "*much improved*," "*quite a bit*" helped, and would recommend the program to a loved one.

Qualitative Statements about the Virtual PHP

Approximately two-thirds of the virtual sample (n = 198; 66.89%) provided qualitative comments about their experience in the program. Patients who provided qualitative feedback did not differ from those who did not provide feedback in terms of gender ($\chi^2[2] = 4.52$, $p = .10$), age ($t[294] = 0.68$, $p = .50$), or ethnicity, ($\chi^2[1] < 3.17$, $p > .08$). Patients who provided qualitative feedback had significantly lower depression and anxiety symptom severity on their last day of the program compared to patients who did not provide feedback ($t[279] > 2.33$, $p < 02$), but there were no differences in symptoms on their first day of the program ($t[272] < 1.49$, $p > .14$).

Patients identified several positive and negative aspects to the virtual PHP that were unique to this setting (see Table 5 for qualitative themes and representative quotes). Unique advantages included the convenience of staying at home, feeling a sense of comfort at home, reduced barriers to accessing care, connection with others, access to care despite public health regulations, and access to technology that facilitated therapy. Unique disadvantages to the virtual PHP included feeling disconnected from others, finding the home environment distracting, technological issues, challenges participating remotely, and challenges creating a therapeutic environment in the home. Finally, patients also identified positive and negative aspects of the virtual PHP that were not unique to this setting (see Table 6), which included the treatment team, program content, program organization, and connection with other group participants.

Discussion

The current study compared symptom severity trajectories and perceptions of care between patients who attended an in-person vs. virtual PHP. Further, we examined qualitative feedback about what patients liked or disliked about the virtual PHP. This information is crucial to determine whether virtual PHPs are meeting the needs of the public and offering unique advantages, which will help to determine whether they should continue long term.

We found no differences between the depression and anxiety symptom trajectories of patients who completed the in-person and virtual PHPs; patients experienced a similar rate of symptom reduction in both the in-person and virtual treatment formats. Of note, there was no difference in the baseline symptom severity, suggesting that the samples had comparable levels of symptom severity at the initiation of treatment. The current study therefore replicates the findings of previous studies suggesting that virtual PHPs are effective at reducing symptoms of depression and anxiety (Puspitasari et al., 2021; Zimmerman et al., 2021b). Further, this study is the first to investigate and directly compare the symptom trajectories of patients who attended in-person and virtual PHPs. We found that patients' anxiety and depression symptoms followed a linear trajectory, such that symptoms gradually improved over the course of both in-person and virtual PHPs, and there were no statistical differences between programs. It is important to note that this study was not designed to accept the null hypothesis, and we therefore cannot conclude that the programs are equivalent. Nevertheless, the results of the current study suggest that virtual PHPs are a promising treatment format. Given that virtual therapy has already demonstrated advantages independent of symptom reduction (e.g., decreased geographical barriers; Orlando et al., 2019), programs may benefit from continuing to offer virtual levels of care outside the context of the COVID-19 pandemic.

In addition, subjective metrics of patient satisfaction were remarkably similar across in-person and virtual PHPs. In both programs, patients reported being informed and treated with respect. On average, patients in both PHPs reported that they were "*much improved*," "*quite a bit*" helped, and would recommend the program to a loved one. These results suggest that our virtual PHP maintains the exceptional patient experience that is achieved in our in-person PHP.

Taken together, our study adds to an emerging body of literature to suggest that virtual PHPs produce favorable treatment outcomes and are viewed positively by patients with acute

psychiatric conditions. Indeed, patients who attended both the in-person and virtual PHPs presented with severe and complex psychopathology and were at high risk for worsening symptoms; approximately three-fourths of our sample presented with psychiatric comorbidities, one in five had a history of a suicide attempt (22.3%), over a third of patients had been hospitalized for a psychiatric problem over the last 6 months (37.3%), and over half reported thoughts of death or hurting themselves at some point during treatment (58.98%).[2] PHPs offer a critical level of care for these acute psychiatric patients that bridges outpatient and inpatient treatments and has demonstrated a wide range of therapeutic benefits (Horvitz-Lennon et al., 2001; Marshall et al., 2011). Our results suggest that virtual PHPs offer a promising way to deliver intensive treatment that may facilitate greater access to this critical level of care.

We also provide the first qualitative analysis of patients' experience in a virtual PHP, which sheds light on *why* virtual PHPs are viewed favorably by patients. Some of the themes that emerged about our virtual PHP are consistent with the themes that emerged from patients' perception of our in-person PHP (Hom et al., in preparation*)*. Other themes reflected *unique* advantages of virtual treatment. Consistent with prior research (Cox et al., 2017; Orlando et al., 2019; Petersen et al., 2020; Sugarman et al, 2021), many of these unique advantages reduced barriers to care. Of note, the virtual PHP reduced typical barriers to treatment for nearly half of respondents, and 13 patients reported that they may not have received treatment if not for the virtual format. Hence, the virtual format may be the only feasible option for some people seeking treatment. Our study suggests that the benefits of virtual care extend to patients with severe and complex mental illness with high risk for worsening or relapse of acute symptoms.

At the same time, there were unique challenges with the virtual PHP format. The most common issue was difficulty connecting with other patients in the virtual PHP. Whereas the in-

[2]These rates did not differ across in-person and virtual PHPs, $\chi^2(1) < 0.99$, $p > .32$.

person format would have allowed patients to socialize before and after scheduled meetings, patients in the virtual PHP had no means by which to interact with other patients except through Zoom groups, which were only open when staff were present and at predetermined times. Hence, the sense of solidarity or shared understanding might have been compromised in the virtual PHP. This disadvantage to virtual treatment may be unique to PHPs where the psychosocial milieu is considered a critical aspect to treatment (Neuhaus, 2006). Other patient-reported disadvantages of the virtual PHP, such as challenges with technology and difficulties creating a therapeutic environment in one's home, were consistent with previously documented disadvantages of telehealth care. For example, technology literacy and technology issues are often reported as a barrier to telehealth use across healthcare fields (e.g., Cox et al., 2017; Petersen et al., 2020).

Notably, most features of the virtual PHP simultaneously functioned as strengths and weaknesses. For instance, the convenience of receiving treatment at home was coupled with more distractions in the home environment. The increased accessibility and technological advantages of virtual groups was accompanied by difficulties knowing when to participate and Zoom fatigue. Thus, it is important for treatment providers to weigh the advantages and disadvantages of virtual PHPs relative to patient needs and preferences. Additionally, hybrid models may prove to facilitate the greatest access to care. For example, patients who are less comfortable seeking care may begin virtually and then transition to in-person treatment, while other patients may benefit from a stepped down approach where they transition from in-person to virtual care before being discharged. The field would benefit from research investigating the individual characteristics that predict differential response to in-person and virtual care, and the effectiveness of hybrid models.

Finally, although not the primary aim of the study, our results highlight several important differences between the in-person and virtual PHPs. Patients who attended the virtual PHP were engaged in fewer treatment groups per day (i.e., 3 vs 5) for a longer duration (i.e., an average of

10.0 days vs 7.9 days) than patients who attended in the in-person PHP. Patient length of stay is negotiated among the patient, treatment team, and insurance providers and is determined based on the patients' symptom severity, whether they are benefiting from the program, and whether appropriate aftercare plan is in place. As such, the longer length of stay in the virtual PHP compared to the in-person PHP may reflect several differences between cohorts. There were also fewer patients who attended the virtual PHP compared to the in-person PHP. The in-person PHP maintained a daily census of approximately 25 to 30 patients, whereas the virtual PHP began April 2020 with a daily census of 10 patients and gradually increased to up to 25 patients per day. This reduced patient load helped to facilitate the transition to the virtual setting; however, because of the group-based nature of the program, it may have also impacted treatment outcomes. Finally, the virtual PHP admitted fewer patients with social anxiety disorder. The reason for this difference remains unclear. It may be that patients with social anxiety disorder self-selected out of the virtual PHP because of concerns about being on camera. It may also be that the modified admission criteria for the virtual PHP inadvertently screened out patients with these presenting concerns (see Hom et al., 2020 for description of inclusion criteria). Future research is needed to understand whether each of these differences impact treatment outcomes or patient experience.

The results of the current study should be interpreted in the context of the following limitations. First, data for each format were collected a year apart, and cohort effects may be a confounding variable. After all, COVID-19 was a significant global event that likely affected each participant. As a result, our findings may not generalize to other periods because of the unique stressors associated with the pandemic. Second, both our in-person and virtual samples were limited in terms of sociodemographic diversity, and our virtual sample was restricted to those who had the means to participate virtually (e.g., had access to the internet and a computer, smartphone, or tablet). As such, the results may not generalize to more diverse populations.

Third, not all patients provided qualitative feedback about their experience in the program, and patients who provided feedback were more likely to have lower levels of symptomatology at discharge. As such, our qualitative analyses may not reflect the experiences of all patients.

Fourth, the procedures used to collect data differed across samples. Patients who attended the virtual PHP completed the daily self-report questionnaires from the privacy of their home, whereas patients who attended the in-person PHP completed their questionnaires at the hospital. Although every effort was made to ensure privacy and confidentiality, these procedural differences may have systematically impacted patients' response styles. Further, significantly more of the in-person PHP patients completed daily measures of symptom severity compared to the virtual PHP patients. We suspect that this difference can be attributed to the different procedures used across treatment programs (e.g., patients could be approached face-to-face to fill out the questionnaires during the in-person PHP but could only receive email reminders in the virtual PHP). Nonetheless, it possible that different response rates could have systematically influenced the results of the study. Fifth, our study used a naturalistic study design and relied on existing program evaluation measures. This design ensures that our results reflect real-world experiences of patients but limits our ability to draw causal inferences. As such, future randomized controlled research is needed that matches in-person and virtual treatment characteristics to facilitate a direct comparison across treatment modalities.

In summary, we found that the symptom trajectories of patients who attended an in-person vs. virtual PHPs were not statistically different, and results suggested favorable treatment outcomes in both groups. Qualitative feedback indicated that the virtual PHP offered greater convenience and comfort, but impeded patients’ ability to connect with other patients. Taken together, our results suggest that virtual treatment should be explored as a permanent model of care that could help systematically reduce barriers to accessing lifesaving mental health services.

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Table 1.

Multilevel Models Predicting Depression Symptoms

	Model 1: Intercept Only				Model 2: Unconditional Growth Model				Model 3: Slopes Model without Interaction				Model 4: Slopes Model with Interaction			
Fixed Effects	*b*	*t*	(df)	*p*	*b*	*t*	(df)	*p*	*b*	*t*	(df)	*p*	*b*	*t*	(df)	*p*
Intercept	9.14	46.8	740	<.001	10.27	47.29	744	<.001	10.33	38.96	805	<.001	10.42	37.95	745	<.001
Time					-0.28	12.94	608	<.001	-0.28	12.93	608	<.001	-0.30	10.89	655	<.001
Program									-0.15	0.36	736	.72	-0.40	0.89	741	.38
Time*Program													0.06	1.33	584	.18
Random Effects	Var	χ^2	(df)	*p*	Var	χ^2	(df)	*p*	Var	χ^2	(df)	*p*	Var	χ^2	(df)	*p*
Between-Person Variance	27.07	5536	1	<.001	32.19				32.21				32.19			
Time					0.20	457	2	<.001	0.20	457	2	<.001	0.20	455	2	<.001
Residual	9.45				6.94				6.94				6.94			

Note: Var = Variance.

Table 2.

Multilevel Models Predicting Anxiety Symptoms

	Model 1: Intercept Only				Model 2: Unconditional Growth Model				Model 3: Slopes Model without Interaction				Model 4: Slopes Model with Interaction			
Fixed Effects	*b*	*t*	(df)	*p*	*b*	*t*	(df)	*p*	*b*	*t*	(df)	*p*	*b*	*t*	(df)	*p*
Intercept	7.32	43.2	739	<.001	8.30	45.26	742	<.001	8.36	37.10	793	<.001	8.47	36.49	743	<.001
Time					-0.25	13.89	594	<.001	-0.25	13.88	594	<.001	-0.28	11.93	647	<.001
Program									-0.17	0.47	738	.64	-0.43	1.14	739	.26
Time*Program													0.07	1.85	570	.07
Random Effects	Var	χ^2	(df)	*p*	Var	χ^2	(df)	*p*	Var	χ^2	(df)	*p*	Var	χ^2	(df)	*p*
Between-Person																
Variance	20.45	5743	1	<.001	22.96				22.96				22.95			
Time					0.13	418	2	<.001	0.13	418	2	<.001	0.13	402	2	<.001
Residual	6.84				5.14				5.14				5.14			

Note: Var = Variance.

Table 3.

Categorical Perception of Care Questions Stratified by Treatment Program

	In-Person	Virtual			
	% Yes		χ^2	*df*	*p*
Perceptions of Care					
Did the staff give you information about the rules and policies of the program?[1]	99.16	100	1.98	1	.16
Did the staff give you information about your rights?[1]	94.40	93.99	0.43	1	.84
Did the staff tell you what your medicine was for and its possible side effects?[1]	84.07	91.15	5.97	1	.02
How much did the staff involve your family in your treatment?[2]	—	—	3.37	3	.34
Did the staff review with you the plans for your continued treatment after you leave the program?[3]	83.99	91.85	8.15	2	.02
Were you given instructions on what to do if you need help or have a crisis after discharge from the hospital?[3]	73.03	81.03	5.41	2	.07
Did the staff tell you about self-help or support groups?[1]	94.63	93.19	0.53	1	.47
Did the staff give you information about how to reduce the chances of a relapse?[1]	83.62	81.58	0.40	1	.53
Would you recommend this facility to someone else who needed mental health or substance abuse treatment?[3]	94.97	94.85	1.44	2	.49

[1]1 = Yes, 2 = No

[2]1 = More than I wanted, 2 = Less than I wanted, 3 = About the right amount, 4 = No involvement, which is what I wanted

[3]1 = Yes, 2 = Unsure, 3 = No

Table 4.

Continuous Perception of Care Questions Stratified by Treatment Program

	In-Person		Virtual				
	M	***SD***	***M***	***SD***	***t***	***df***	***p***
Perceptions of Care							
Did the staff explain things in a way you could understand?[1]	3.61	0.67	3.64	0.68	0.57	590	.57
Were you involved as much as you wanted in decisions about your treatment?[1]	3.20	0.62	3.26	0.57	1.18	589	.24
Did the staff listen carefully to you?[1]	3.74	0.50	3.79	0.48	1.16	590	.25
Did the staff who treated you work well together as a team?[1]	3.77	0.52	3.80	0.42	0.78	589	.44
Did the staff spend enough time with you?[1]	3.56	0.69	3.64	0.58	1.50	587	.14
Did the staff treat you with respect and dignity?[1]	3.90	0.31	3.89	0.34	0.12	589	.91
Did the staff give you reassurance and support?[1]	3.82	0.46	3.84	0.41	0.75	585	.45
How much were you helped by the care you received?[2]	3.19	0.78	3.28	0.76	1.40	588	.16
Using a number from 1 to 10, what is your overall rating of the care you received in the program?	8.59	1.36	8.74	1.36	1.30	589	.20
Clinical Global Impressions Scale-Improvement							
"Compared with how I felt before beginning this latest treatment, I now am…"[3]	2.36	1.03	2.27	0.88	1.06	593	.29

[1]1 = Never, 2 = Sometimes, 3 = Usually, 4 = Always

[2]1 = Not at all, 2 = Somewhat, 3 = Quite a bit, 4 = A great deal

[3]1 = Very much improved, 2 = Much improved, 3 = Minimally improved, 4 = Unchanged, 5 = Minimally worse, 6 = Much worse, 7 = Very much worse

Table 5.

Qualitative Themes and Representative Quotes from Patients About Unique Elements of the Virtual PHP (n = 198)

Theme	n	Definition	Representative Quote
Positive	182		
Convenient	83	Found it easy and convenient to engage in virtual care	*"Convenience - Not having to leave the house. Transportation was not an issue."* *"Had control per my 'space'; Could leave for a 'pause' easy if needed."*
Comfort and safety	47	Helped patients feel safe, comfortable, and in control of treatment	*"I had a lot of fears about group therapy (I feel uncomfortable talking about mental health topics), but the sessions being virtual eliminated a lot of them."* *"Being in an environment that was comfortable was really nice … it helped me feel comfortable about sharing what I am going through."*
Reduced barriers	15	Virtual treatment removed actual or perceived barriers to treatment	*"It was easier to participate virtually with my disability."* *"Made it much easier for me to decide to get treatment, as someone without a car who hoped to continue working remotely during the program."* *"[The virtual nature of the program] made me more willing to try it."*
Connection	15	Helpful to connect virtually with others	*"I felt like it was easy to connect even though we were on Zoom."* *"Got to see others' thoughts and felt I wasn't the only one going through this..."*
Access despite COVID-19	13	Ability to engage in treatment despite COVID-19 restrictions	*"Ability to still receive PHP level of care during the COVID-19 epidemic."* *"I was still able to get the help I needed despite COVID-19 restrictions."*
Technology	9	Specific aspect of technology facilitated treatment	*"Nice to see everyone at once."* *"PowerPoints were useful; downloading worksheets made it easier to organize."*

Table 5. (continued)

Theme	*n*	**Definition**	Representative Quotes
Negative	134		
Disconnected	67	Found it difficult to connect or bond with other patients virtually	*"Not being able to have conversations about the material with other patients."* *"I missed the opportunity to connect on a deeper level with other participants, through hallway conversations or over lunch."*
Distractions	27	Hard to focus, concentrate, or stay engaged in virtual care due to distractions or zoom fatigue	*"It was easier to get distracted and play on my phone during groups."* *"The amount of background noise in my environment was distracting."* *"I had to intentionally think about not lying down in bed so much."*
Technology	17	Specific aspect of technology made engaging in the program difficult	*"Connection quality was not always good."* *"Occasional blips in technology, like frozen video or a pause in audio … could be distracting."*
Challenging to participate	13	Challenging to participate in virtual groups	*"I can be less likely to speak up in a virtual setting than an in-person setting."* *"Missing out on participation that might have been encouraged by being in person."*
Therapeutic Environment	10	Challenges in creating a therapeutic environment at home	*"Hard to get into a new headspace when sitting at my workstation."* *"You lose a sense of structure when you're doing it all in your own home."* *"Needing to be very deliberate about what parts of my home was occupied to ensure privacy."*

Table 6.

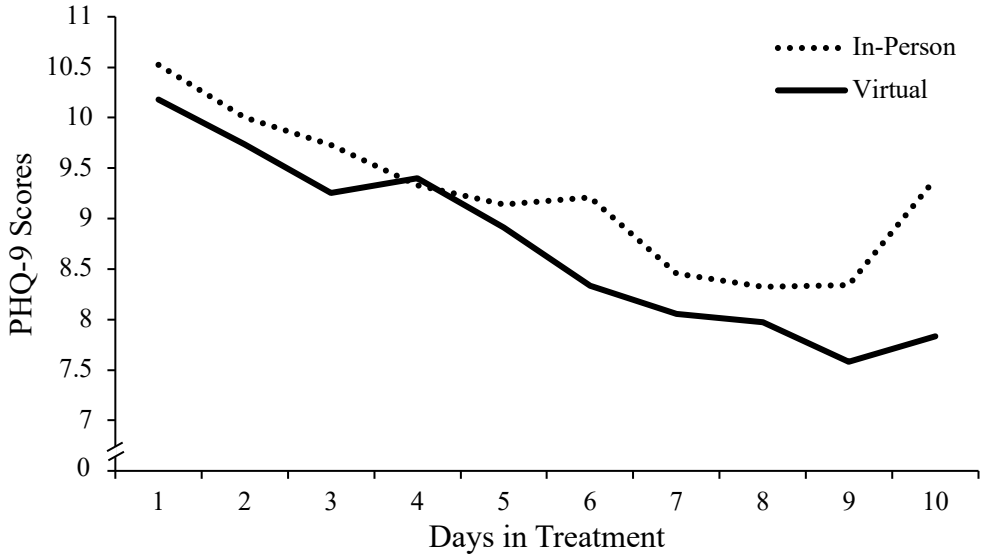
Qualitative Themes and Representative Quotes from Patients About General Elements of Virtual PHP (n = 198)

Theme	n	Definition	Representative Quotes
Positive	117		
Treatment team	59	*Had a positive experience with a member of the treatment team*	*"Every provider was professional, knowledgeable, and helpful. They create an inclusive environment, show no judgment, and maintain calm, friendly demeanor."* *"My treatment team made the entire virtual program worthwhile. … They made it easy to talk about difficult things, provide feedback, be open and honest, and see things in a completely different light."*
Program content	39	*Benefitted from the program content (e.g., skills, insights into symptoms, medication changes)*	*"I learned many things about how to cope and also things about myself."* *"The program offered materials and skills to help with aftercare life."* *"Learning skills and techniques to prevent a relapse."*
Program organization	19	*Found organization/structure of program helpful*	*"The group setting and structure was amazing and refreshing."* *"I really enjoyed having a schedule and discussing things in a group setting."*
Negative	53		
Treatment team	8	*Had a negative experience with a member of the treatment team*	*"My case manager was not very good."* *"Some [group leaders] were more engaged/easier to understand than others."*
Program content	14	*Did not benefit from the program content*	*"Had trouble seeing the application to my particular situation/problems."* *"[Content was] repetitive."*
Program organization	31	*Had difficulties with the program organization/structure*	*"[It felt] like we were rushing through material."* *"I think that more time with individual therapists would be helpful."*

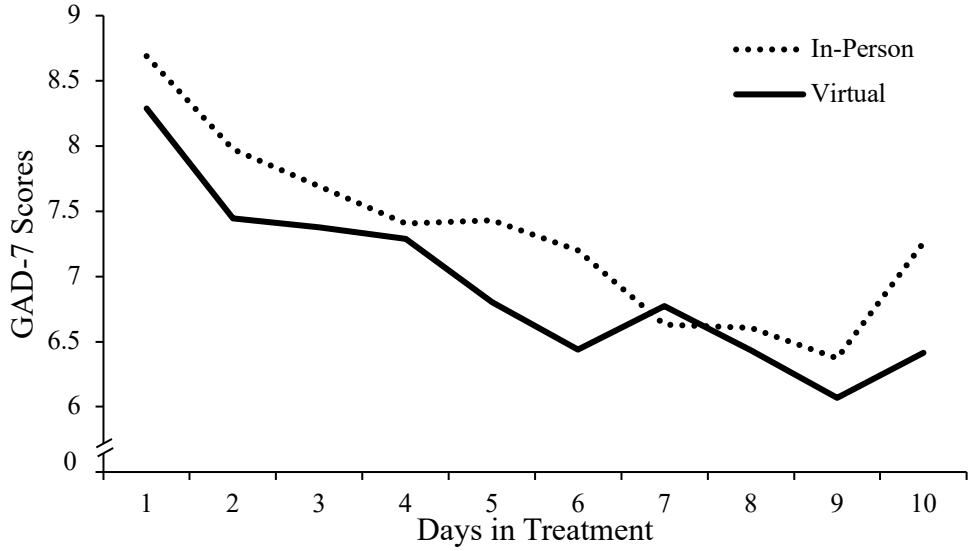
Figure 1.

Symptom severity over ten days of partial hospital treatment by in-person vs. virtual formats.

a)



b)



Note. These figures depict symptom trajectories over the typical length of stay in the PHPs. Additional days are not depicted because they represent a small number of patients with the most severe psychopathology who required a longer duration of treatment than average, and therefore are not representative of most patients who attended the PHPs. After correcting for multiple comparisons, there were no statistical differences in the PHQ-9 scores ($t < 2.15$, $p > .04$) or GAD-7 scores ($t < 1.68$, $p > .10$) of patients who attended the in-person or virtual PHPs at any timepoint.