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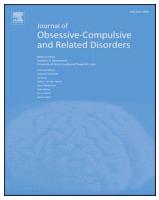

Efficacy of intensive CBT telehealth for obsessive-compulsive disorder during the COVID-19 pandemic

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ABSTRACT

Despite evidence for the effectiveness of cognitive behavioral therapy (CBT) for obsessive-compulsive disorder (OCD), many individuals with OCD lack access to needed behavioral health treatment. Although some literature suggests that virtual modes of treatment for OCD are effective, it remains unclear whether intensive programs like partial hospitalization and intensive outpatient programs (PHP and IOPs) can be delivered effectively over telehealth (TH) and within the context of a global pandemic. Limited extant research suggests that clinicians perceive attenuated treatment response during the pandemic. The trajectory and outcomes of two matched samples were compared using linear mixed modeling: a pre-COVID in-person (IP) sample (n = 239) and COVID TH sample (n = 239). Findings suggested that both modalities are effective at treating OCD and depressive symptoms, although the pandemic TH group required an additional 2.6 treatment days. The current study provides evidence that PHP and IOP treatment delivered via TH during the COVID-19 pandemic is approximately as effective as pre-pandemic IP treatment and provides promising findings for the future that individuals with complicated OCD who do not have access to IP treatment can still experience significant improvement in symptoms through TH PHP and IOP treatment during and potentially after the pandemic.

1. Introduction

COVID-19, a highly contagious upper-respiratory virus, was labeled a worldwide pandemic by the World Health Organization (WHO) in mid-March 2020 due to its contagiousness, severity of illness, and lack of containment across the globe (Cucinotta & Vanelli, 2020). To slow the spread of the virus, many non-essential workplaces throughout the United States converted to virtual work-from-home formats when possible, and outpatient mental health treatment was encouraged to be provided via telehealth (TH). TH delivery of outpatient mental health treatment has been studied frequently over the past decade, particularly in Veteran's Administration hospitals where the availability of TH allows for greater contact with veterans who live in more remote and/or rural locations (Myers, Birks, Grubaugh, & Axon, 2021). Research is lacking, however, on the delivery of TH in intensive format, such as through partial hospitalization and intensive outpatient programs (PHPs and IOPs). Moreover, compared to other specialized treatment programs (e.g., posttraumatic stress disorder; Morland et al., 2020), little is known about the efficacy of delivering specialized TH treatment for obsessive-compulsive disorder (OCD), and, although previous research has considered different levels of treatment (e.g., Aboujaoude, 2017; Sheu, McKay, & Storch, 2020; Yasinski, C., & Rauch, 2018), extant research seems primarily focused on standard outpatient delivery before the onset of the COVID-19 pandemic.

Conclusions regarding the impact of the COVID-19 pandemic on individuals with OCD have been mixed, likely reflective of the idiosyncratic nature of the disorder. Most of the emerging literature has found that individuals with OCD appear to be impacted about the same if not less than their non-clinical peers (Benatti et al., 2020; Kuckertz et al., 2020; Pan et al., 2021; Pinciotti, Piacsek, Kay, Bailey, & Riemann, 2021; Sharma et al., 2020), although other literature has found an increase in OCD severity particularly among those with contamination concerns (Davide et al., 2020; Kuckertz et al., 2020). It appears that while about two-thirds of individuals with OCD have reported stable or improved OCD symptoms since COVID-19 onset, approximately one-third have experienced worsening symptoms (Benatti et al., 2020). Thus, research examining more novel treatment modalities for OCD during the COVID-19 pandemic is needed, particularly for the subset of individuals who have incurred adverse effects from the pandemic.

Despite consistent literature supporting the use of cognitive

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behavioral therapy (CBT) with exposure and response prevention (ERP) as the gold-standard treatment for OCD (e.g., Abramowitz, 2006), as many as 60% of individuals with OCD remain untreated (Kohn, Saxena, Levav, & Saraceno, 2004). This treatment gap is due to several barriers, including limited resources (e.g., financial), lack of access to clinicians trained to treat OCD, geographic limitations, and stigma (Baer & Minichiello, 2008; Belloch, Valle, Morillo, Carrió, & Cabedo, 2009; Glazier, Wetterneck, Singh, & Williams, 2015; Goodwin, Koenen, Hellman, Guardino, & Struening, 2002; Marques et al., 2010; Wetterneck, Singh, & Hart, 2014). Among those who do seek treatment for OCD, sufferers wait an average of 11 years due to misconceptions of OCD, and many do not receive empirically supported treatment or do not receive sufficient dosing in part due to the aforementioned barriers (Pinto, Mancebo, Eisen, Pagano, & Rasmussen, 2006; Stobie, Taylor, Quigley, Ewing, & Salkovskis, 2007). TH has become a necessity due to the COVID-19 pandemic, however continued availability of TH treatment post-pandemic for those who experience treatment barriers may increase the reach of empirically supported services, particularly among individuals who suffer from complicated cases of OCD.

Although TH is new to many providers and organizations during the pandemic, there is considerable research on pre-pandemic TH treatments and efficacy. Factors critical to treatment outcome, such as rapport and therapeutic alliance, are similar for TH and in-person (IP) services (Bisseling et al., 2019; Goldstein & Glueck, 2016), but other factors, such as group cohesion in group therapy, may suffer (Lopez, Rothberg, Reaser, Schwenk, & Griffin, 2020). Group cohesion may be particularly relevant for PHPs and IOPs which, unlike standard weekly outpatient treatment, are more likely to include daily group therapies and other opportunities for interactions with peers. However, this deficiency may be outweighed by the increased convenience and availability of TH. Patients receiving TH for substance abuse generally report high satisfaction with their treatment, often crediting convenience (Jiang, Wu, & Gao, 2017). Additionally, patient retention in TH is similar or superior to IP programs, particularly for rural participants who may struggle to travel to IP programs (Lister, Weaver, Ellis, Himle, & Ledgerwood, 2020), and attendance was higher in a group TH program than in a similar IP program (Lopez et al., 2020).

Modes of TH treatments differ in many ways, such as whether they are delivered in a higher dose in real time (e.g., via teleconferencing) or are brief, lower dose, and sometimes without real-time meetings with a clinician (e.g., internet-based CBT). Notably, dosage in remote treatment is often nebulous and can involve more than one factor (e.g., time with therapist, number of sessions, number of minutes using an online service). For example, Metcalfe, Matulis, Cheng, and Stormshak (2021) defined dosage using both minutes engaging with a therapeutic coach and minutes engaging with an online intervention without a therapist coach.

Among the lower-dose treatment options, therapist-guided internet-based CBT for OCD with no face-to-face contact between therapists and patients has been found to be superior to an internet-based non-directive supportive therapy, and gains were maintained at 4-, 7-, 12-, and 24-month post-treatment follow-ups (Andersson et al., 2012; Andersson et al., 2014; for a review, see Stefanopoulou, Lewis, Taylor, Broscombe, & Larkin, 2019). Similarly, internet-based CBT for OCD is superior to waitlist control at post-treatment and 3-, 4-, 6-, and 24-month post-treatment follow-ups (Andersson et al., 2012, Herbst et al., 2014; Mahoney, Mackenzie, Williams, Smith, & Andrews, 2014; Wootton, Dear, Johnston, Terides & Titov, 2013, 2015). CBT delivered via teleconferencing has evidenced equivalent outcomes as IP treatment for other psychiatric conditions (e.g., panic disorder; Bouchard et al., 2004) and for OCD has evidenced large between-group effects when compared to waitlist controls (Storch et al., 2011; Vogel et al., 2014, Comer et al. (2017). A meta-analysis of four studies on a variety of remote CBT treatments for OCD found no meaningful difference in treatment effectiveness between remote CBT and IP CBT ($k = 4$; $g = -0.21$; 95% CI: −0.43–0.02; Wootton, 2016). When examined more specifically, differences in effect size between high-dose and low-dose OCD remote treatments were not statistically significant. It is relevant to note that in a separate review of 11 randomized control trials of TH treatment modalities for children, adolescents, and adults with OCD, it was found that the best-supported modality was CBT delivered over computerized, online, or virtual reality platforms in cases of mild to moderate OCD (Aboujaoude, 2017).

Taken together, findings suggest that the intensity of TH treatments may not differentially impact outcomes in what may be considered a more typical outpatient presentation of mild to moderate OCD, yet it remains unclear to what extent individuals with complicated OCD may benefit from TH CBT at higher levels of care, nor is it clear to what extent TH delivery of ERP may be effective during the COVID-19 pandemic. Notably, approximately half of adults with OCD report serious functional impairment (Kessler, Chiu, Demler, Merikangas, & Walters, 2005). Patients enrolled in PHPs and IOPs tend to suffer from more severe clinical presentations as the primary aim for higher levels of care is to provide added, more structured support for those who need it. Individuals in need of more intensive IOP or PHP treatment may be more less able to fully engage with standard outpatient treatment because they are stuck engaging in rituals (e.g., unable to make appointments on time because they are in the shower for several hours each morning), have complicated and severe comorbidities (e.g., mood or personality disorders), or whose symptom acuity exceeds the capacity of an individual outpatient therapist to treat. Yet TH modalities may limit the ability for providers to interrupt these avoidance patterns or effectively treat comorbid conditions that may have only exacerbated since the start of the pandemic.

Further, recommendations from the World Health Organization and the U.S. Centers for Disease Control intended to reduce the spread of the virus have led to important changes within the context of treating OCD with ERP, particularly for those who have contamination-related concerns (see Sheu et al., 2020 and Storch, Schneider, Guzick, McKay, & Goodman, 2020). As a result, many ERP clinicians perceive that their patients with OCD have experienced attenuated treatment progress, with 47% reporting that their patients' symptoms have been stagnant since the onset of the pandemic despite participating in ERP (Storch et al., 2021). It is unclear, however, how many of these clinicians were implementing ERP via TH and to what extent the TH modality may be a contributing factor to their perceptions of attenuated treatment response. Thus, examination of outcomes for patients with complicated OCD receiving intensive treatment during the COVID-19 pandemic is warranted to determine if this population can also benefit from structured TH treatment despite the challenges associated with stay-at-home mandates and sanitizing guidelines.

The current study sought to examine the effectiveness of intensive TH treatment for OCD during the COVID-19 pandemic compared to an intensive IP treatment sample who sought treatment prior to the onset of the pandemic. Importantly, the current study does not seek to compare the effectiveness of TH and IP treatment for OCD broadly as findings would be confounded by the COVID-19 pandemic. Instead, this study offers a unique opportunity to examine whether TH treatment may be effective for severe and complicated OCD even within the context of a global pandemic and may provide promising evidence for the continued use of TH treatment once the pandemic has ended. Although previous research suggests that TH and IP treatments for OCD yield similar outcomes and that the pandemic may be negatively impacting only a subgroup of those with OCD, we hypothesize that the complications of having to deliver TH treatment to those in need of higher levels of care (i.e., PHP and IOP) and within the constraints mandated to reduce the spread of the virus will reduce the effectiveness of TH treatment compared to pre-pandemic IP treatment, consistent with ERP clinician perceptions reported by Storch et al. (2021).

2. Methods

2.1. Participants and procedure

Participants included 468 patients diagnosed with OCD and enrolled in partial hospitalization and intensive outpatient treatment programs (PHPs and IOPs) for OCD and anxiety at Rogers Behavioral Health between January 3, 2019, and January 28, 2021. IP patients received treatment between January 3, 2019, and August 1, 2019 ($n = 234$), and TH patients received treatment between June 4, 2020, and February 1, 2021 ($n = 234$). In order to obtain subsample as proximal as possible while still clearly differentiated into timeframe categories, participants were selected based on their most recent encounter with the hospital. Thus, participants who stepped down following successful completion of each successive level of care were represented in the category from their most recent encounter, which is most typically their lowest level of care. Participants ranged in age from 18 to 75 years ($M = 29.9$, $SD = 11.7$); identified their race as 73.5% White ($n = 344$), 3.0% Asian ($n = 14$), and 0.6% Other ($n = 3$; 22.9% of participants did not provide or did not know their race [$n = 107$]); identified their ethnicity as 4.5% Hispanic or Latin/x ($n = 21$); and were 51.3% assigned female at birth ($n = 240$). Of the participants who identified their gender, 47.4% were cisgender male ($n = 145$), 51.6% were cisgender female ($n = 158$), and 1.0% were transgender/non-binary ($n = 3$); 34.6% of participants did not identify their gender ($n = 162$). Patients receiving TH during the pandemic were more likely to be diagnosed with generalized anxiety and mood disorders compared to those receiving pre-pandemic IP treatment. See Table 1 for comorbidities across treatment modality groups.

OCRDs = obsessive-compulsive related disorders. Other anxiety disorders include agoraphobia, panic, phobia, other specified anxiety disorders, and anxiety disorders, unspecified. In addition, due to low frequencies the following diagnoses are not represented in the table: one patient had a diagnosis of kleptomania; one patient had a diagnosis of primary insomnia; one patient had a diagnosis of nightmare disorder, one patient had a diagnosis of 'mood disorder due to known physiological condition, unspecified' and one patient had a diagnosis of 'other specified mental disorders due to known physiological condition'.

Participants who provided informed consent to have their data used for research, were 18 years or older, and were diagnosed with OCD were included in the current study. Prior to treatment admission, all patients completed a telephone interview assessing symptoms of OCD and anxiety. Licensed psychiatrists and/or psychologists with training and expertise in OCD and anxiety reviewed all potential admissions screens and determined whether the patient was appropriate for admission to a specialty OCD and anxiety treatment program, including which level of care best fit the severity and needs of the patient.

The PHP and IOP treatment programs involve multidisciplinary care in the form of individual, group, and family therapy, and medication management by psychiatrists, and the primary mode of treatment is CBT + ERP with ancillary treatments such as dialectical behavioral therapy, cognitive restructuring, and recreational therapy. PHPs involve 6 h of treatment five days a week and IOPs involve 3 h of treatment four or five days a week, depending on location, and patients meet with treatment teams every day while in programming and are expected to complete homework assignments outside of treatment. Upon admission, each patient completed a diagnostic evaluation with a psychiatrist to confirm the diagnosis of OCD and any co-occurring diagnoses based on the Diagnostic and Statistical Manual-5th Edition (DSM-5; American Psychiatric Association, 2013), as well as the Yale Brown Obsessive-Compulsive Scale – Self-Report (Steketee, Frost, & Bogart, 1996). All patients completed self-report assessments at admission, discharge, and every two weeks during the course of treatment. Because PHPs and IOPs are a higher level of care than traditional outpatient treatment, discharge occurs not when the OCD symptoms reach subclinical level but rather when the individual is no longer needing the level of treatment intensity provided in PHP or IOP level of care. It is expected that most patients discharging from PHP or IOP will progressively step down into lower levels of care, including ongoing maintenance with an outpatient provider.

Although both IP and TH treatment centered on CBT + ERP with aforementioned ancillary treatments provided as needed, the mode of treatment in the current sample differed in several ways. IP treatment, provided before the COVID-19 pandemic, also included opportunities for community-based exposures, treatment-based outings, and more strict enforcement of response prevention. For example, a patient with contamination concerns would be asked to track the number of times per day they submitted to an urge to handwash with the ultimate goal of reducing and perhaps overcorrecting by eliminating handwashing altogether. During TH treatment, however, these aspects of treatment were required to change to adhere to guidance from the U.S. Centers for Disease Control with respect to social distancing, staying at home when possible, and cleaning and washing hands regularly. In addition, TH treatment was provided over the Microsoft Teams platform, often accessed within the patient's home, whereas IP treatment occurred on site with direct supervision by treatment providers.

Table 1
Comorbid psychiatric conditions across diagnostic groups.

	IP (n = 234)	TH (n = 234)	Total (n = 468)	χ^2 (1)	*p*
Comorbid Conditions	% within diagnostic group (n)				
Feeding/eating	5.1% (12)	6.0% (14)	5.6% (26)	.04	.84
Generalized anxiety	29.9% (70)	44.4% (104)	37.2% (174)	7.77	.01**
Mood	57.7% (135)	67.1% (157)	62.4% (292)	4.02	.05*
Neurodevelopmental	12.8% (30)	15.8% (37)	14.3% (67)	.63	.43
OCRDs/Tics	4.3% (10)	5.1% (12)	4.7% (22)	.05	.83
Other anxiety disorders	11.1% (26)	13.2% (31)	12.2% (57)	.32	.57
Personality	2.1% (5)	4.3% (10)	3.2% (15)	1.10	.29
Social anxiety	14.5% (34)	13.2% (31)	13.9% (65)	.07	.79
Substance use/ addictions	3.0% (7)	7.3% (17)	5.1% (24)	3.56	.06†
Trauma/stressor	7.3% (17)	5.6% (13)	6.4% (30)	.32	.57

Note. ***p < .001, **p < .01, *p < .05, †p < .10.

2.2. Measures

2.2.1. Quality of life enjoyment & satisfaction – short form (QLESQ)

The QLESQ-Short Form is a 16-item questionnaire based on the original QLESQ (Endicott, Nee, Harrison, & Blumenthal, 1993), assessing the degree of enjoyment and satisfaction in daily functioning and life. Items are rated on a five-point Likert scale with higher scores indicating better enjoyment and satisfaction with life. The first 14 items are summed to yield a total score that ranges from 14 to 70 and is expressed as a percentage of the items completed (0–100). The last two items about medication and overall contentment were added to the short form for clinical reasons and are scored separately, though they were not used in the current study (Stevanovic, 2011). A score between 70 and 100 is classically used as the 'normative' cutoff for good quality of life (Endicott, Harrison, & Blumenthal, 1993). Internal consistency for the QLESQ at outcome in this sample was adequate ($\alpha = 0.70$).

2.2.2. Quick inventory of depressive symptoms (QIDS)

The QIDS is a 16-item self-report measure of depressive symptoms over the past seven days. Items are summed and the total score can range from 0 to 27, with a higher score indicating more severe depressive

symptoms. A cutoff of 16 has been suggested for severe depression (Brown et al., 2008). Based on this cutoff, 21.97% (n = 105) of the sample reported severe depression at admission and 8.16% (n = 39) reported severe depression at discharge. Internal consistency for the QIDS in this sample was adequate (α = 0.73).

2.2.3. Yale Brown Obsessive-Compulsive Scale—Self-report (Y-BOCS-SR)

The Y-BOCS-SR is a self-report scale of OCD symptom severity with five questions each on a 0–4 scale for obsessions and compulsions (Steketee et al., 1996). Questions are summed for a total score that can range from 0 to 40, with higher scores indicating more severe OCD symptoms. Scores above 16 indicate a moderate level of OCD severity. At admission, 76.99% (n = 368) of the sample met this cutoff, and 43.51% met this cutoff at discharge (n = 208). Internal consistency for the Y-BOCS-SR in this sample was adequate (α = 0.86).

2.2.4. Covariates

Demographic variables and comorbid conditions were extracted from patient charts for inclusion as potential covariates. Covariates for this study included level of care (IOP = 53.21%, n = 249; PHP = 46.79%, n = 219), number of diagnoses (range: 1–7 diagnoses, M = 2.76, SD = 1.29), and length of stay (range: 2–60 days, M = 24.51, SD = 11.15). Further, we also included diagnosis of generalized anxiety disorder (GAD) or a mood-related disorder (coded = 1 for either of these), as the TH group had a higher proportion of patients with these two diagnoses (Table 1).

3. Results

Prior to matching, the Y-BOCS-SR scores for IP and TH groups were not significantly different (t[462] = −1.64, p = .10), suggesting that the pandemic did not significantly impact OCD severity. For further analyses, the IP and TH patient groups were matched for admission scores on the Y-BOCS-SR, QIDS, and QLESQ to ensure that differences during treatment across groups are not attributable to differences in pre-treatment covariates. All datapoints from the TH group were retained in the matching; the IP group was trimmed to meet the sample size of the TH group.

There was a significant difference in length of stay comparing IP and TH groups (t[465] = −2.51, p < .05), such that the IP group stayed on average 23.22 days and the TH group stayed on average of 25.79 days. There were no significant differences comparing PHP and IOP groups at discharge for any of the YBOCS-SR, QIDS, or QLESQ (see Table 2). Cohen's D effect sizes were calculated using admission and discharge scores for each of the three assessments. Overall change in Y-BOCS-SR yielded a large effect size for the IP PHP and TH PHP groups; and moderate effect size for IP IOP and TH IOP groups. Change in QIDS yielded a large effect size for IP PHP only; a moderate effect size for TH PHP, IP IOP, and TH IOP. QLESQ scores yielded moderate effect sizes for IP PHP, TH PHP, and IP IOP, and a small effect size for TH IOP.

We quantified response to treatment as greater than or equal to a 35% reduction in symptom severity as measured by the Y-BOCS-SR. There was no significant difference in treatment response between IP and TH groups, where 37.61% of the IP group fit this criterion and 34.62% of the TH group fit this criterion.

To analyze the repeated-measures progress data over the course of treatment, a linear mixed model was used. Models were created for each of the assessments where progress measure data was available: Y-BOCS-SR and QIDS. Covariates were regressed (e.g., level of care, length of stay, diagnosis count, GAD or mood-related disorder) in addition to each time point. Model selection was based on restricted maximum likelihood. Fixed effects included the progress timepoint (i.e., admission, week 2, week 4, week 6, week 8, and discharge), diagnosis count, length of stay (in patient days), GAD diagnosis, mood-related diagnosis, and treatment modality (IP versus TH), as well as the interaction between progress timepoint and treatment modality, where a significant interaction would indicate whether any effect of treatment modality was modulated by time. Random slopes and intercepts were included for every patient and by treatment modality; patients with missing progress measure data were omitted from these analyses (see Tables 3 and 4, and Figs. 1 and 2). Non-significant effects and interactions were trimmed from the final model. For both Y-BOCS-SR and QIDS models, treatment modality was removed due to non-significance.

For Y-BOCS-SR scores, there were significant effects of time at each progress measure timepoint, suggesting that, for both groups, symptoms

Table 3
Estimated fixed effects of predictors of Y-BOCS-SR scores.

Parameter	Estimate	SE	*df*	*t*	*p*
Intercept	16.21	0.72	776	22.40	<.001***
Week 2	−2.84	0.26	776	−11.12	<.001***
Week 4	−4.25	0.31	776	−13.82	<.001***
Week 6	−5.78	0.40	776	−14.40	<.001***
Week 8	−6.46	0.62	776	−10.42	<.001***
Length of stay	0.17	0.02	464	7.18	<.001***
Mood	1.14	0.54	464	2.10	.04*

Note. ***p < .001, **p < .01, *p < .05, $^{\dagger}p$ < .10.

Table 2
Descriptive statistics and effect size for paired primary variables.

IP (n = 234)							TH (n = 234)					
PHP (n = 109)							PHP (n = 110)					
		Mean (SD)						Mean (SD)				
	N	Admission	Discharge	Avg. Change	% Responders	*D*	N	Admission	Discharge	Avg. Change	% Responders	*D*
Y-BOCS-SR	108	23.82 (6.33)	16.35 (6.79)	7.52	40.37%	1.14	109	24.77 (6.54)	17.94 (7.28)	6.84	40.0%	0.99
QIDS	108	13.15 (5.07)	8.12 (4.89)	4.96	–	1.01	109	13.03 (4.95)	9.16 (5.19)	4.00	–	0.76
QLESQ	101	48.00 (17.56)	60.61 (16.66)	12.31	–	0.74	109	48.43 (16.39)	59.70 (18.05)	9.93	–	0.65
Diagnosis count	109	2.91 (1.29)	–	–	–	–	110	3.13 (1.33)	–	–	–	–
IOP (n = 125)							**IOP (n = 124)**					
Y-BOCS-SR	122	17.82 (6.18)	13.91 (5.46)	4.07	29.60%	0.67	124	18.98 (5.72)	15.15 (6.32)	4.07	25.81%	0.64
QIDS	124	9.31 (4.82)	6.27 (3.57)	2.95	–	0.72	123	9.47 (4.80)	7.00 (4.38)	2.70	–	0.54
QLESQ	123	58.51 (15.23)	65.73 (13.20)	6.95	–	0.51	122	59.88 (15.21)	66.73 (15.50)	6.48	–	0.45
Diagnosis count Δ	125	2.34 (1.23)	–	–	–	–	124	2.74 (1.22)	–	–	–	–

Note. IP = in person; TH = telehealth; PHP = partial hospitalization program; IOP = intensive outpatient program; D = Cohen's D effect sizes; Δ = significantly different comparing IP and TH groups.

Table 4
Estimated fixed effects of predictors of QIDS scores.

Parameter	Estimate	SE	*df*	*t*	*p*
Intercept	6.08	0.62	776	9.87	<.001***
Week 2	−1.76	0.19	776	−9.41	<.001***
Week 4	−2.49	0.23	776	−11.05	<.001***
Week 6	−3.27	0.29	776	−11.13	<.001***
Week 8	−3.22	0.45	776	−7.10	<.001***
Diagnosis count	0.58	0.18	464	3.26	.001**
Length of stay	0.08	0.02	464	4.36	<.001***
Mood	2.38	0.47	464	5.08	<.001***

Note. ***$p < .001$, **$p < .01$, *$p < .05$, $^{\dagger}p < .10$.

reduced significantly from one treatment time point to the next (see Table 3 and Fig. 1). There was no significant main effect of treatment modality. Length of stay was a significant covariate in the final model, suggesting that in the absence of a significant effect of treatment modality and despite differences in length of stay, patients still experienced symptom reduction regardless of whether treatment was IP or TH. A co-occurring mood-related disorder was also a significant predictor of higher Y-BOCS-SR score. None of the interactions between treatment modality and progress timepoint were significant.

For QIDS scores, there were significant effects of time at all progress intervals (see Table 4 and Fig. 2). This is consistent with the Y-BOCS-SR results, where regardless of treatment modality, both groups experienced significant reduction in symptoms from admission to discharge

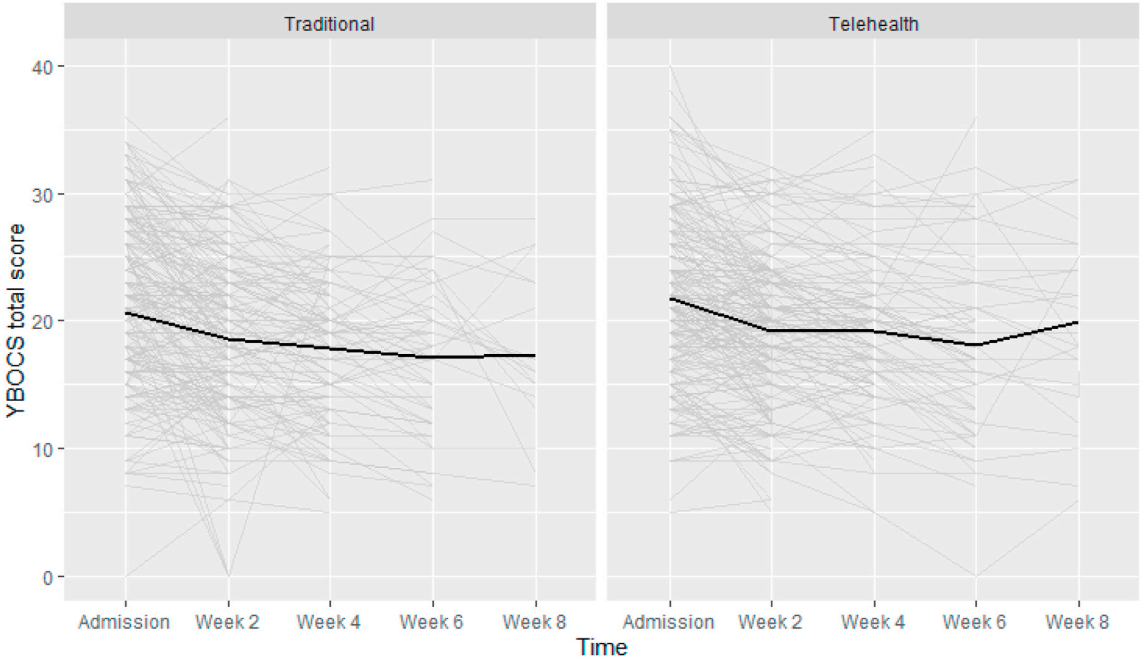

Fig. 1. Y-BOCS-SR scores by treatment modality over time.

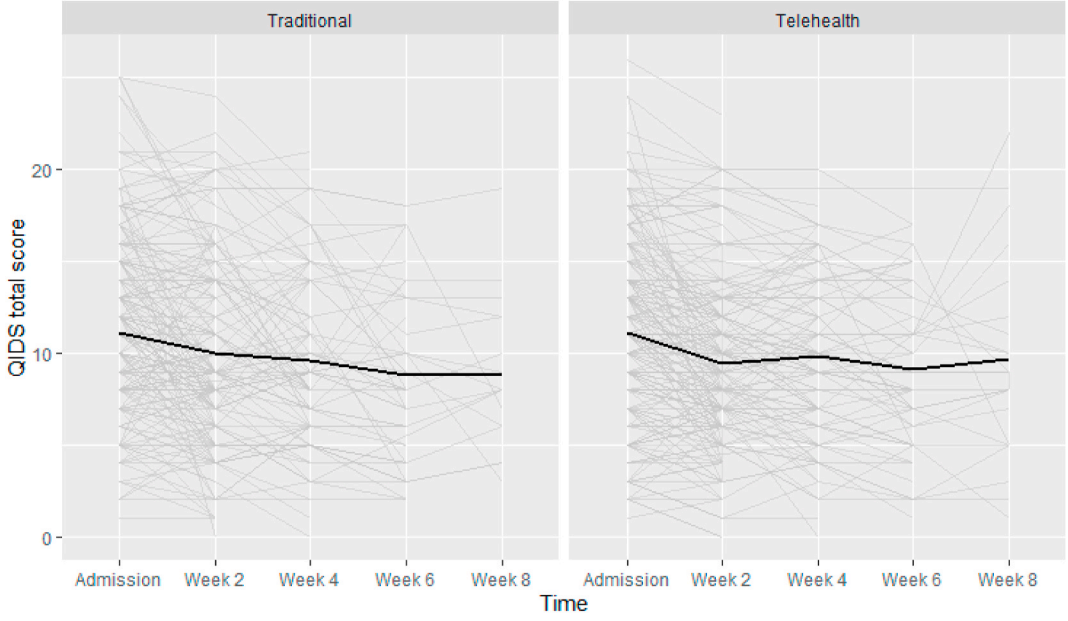

Fig. 2. QIDS scores by treatment modality over time.

and this progress was significantly greater than at the last measurement point throughout treatment. Diagnosis count and length of stay were also significant predictors, such that a longer length of stay and higher diagnosis count both predicted higher QIDS score. The significant effect of diagnosis count provides nuance to the descriptive difference reported above (Table 2), such that despite the pandemic TH group having a slightly higher average diagnosis count, both groups improved in their depression symptoms controlling for this variable. This variable was not significant in the Y-BOCS-SR analysis. Finally, a co-occurring mood-related diagnosis significantly predicted a higher QIDS score.

Overall, findings support no influence of treatment modality on symptom reduction in patients with OCD. Namely, both pre-pandemic IP and pandemic TH groups experienced symptom reduction throughout the course of treatment. No significant interactions with time suggest that treatment trajectories for pre-pandemic IP and pandemic TH groups were not statistically different.

4. Discussion

Pre-pandemic TH treatment has proven to be an effective alternative for IP mental health services for a variety of concerns, including post-traumatic stress disorder, panic disorder, and OCD (Aboujaoude, 2017; Andersson et al., 2012; Andersson et al., 2014; Bouchard et al., 2004; Herbst et al., 2014; Mahoney et al., 2014; Morland et al., 2020; Storch et al., 2011; Vogel et al., 2014; Wootton, 2016; Wootton et al., 2013; Wootton et al., 2015; for a review, see Stefanopoulou et al., 2019). Accessing specialized treatment, regardless of pandemic, may be preferable in some instances given the noteworthy barriers to accessing empirically supported treatment for OCD (Baer & Minichiello, 2008; Belloch et al., 2009; Glazier & McGinn, 2015; Glazier et al., 2013, 2015; Goodwin et al., 2002; Kohn et al., 2004; Marques et al., 2010; Pinto et al., 2006; Stobie et al., 2007; Wetterneck et al., 2014). The COVID-19 pandemic rendered the availability of TH treatment a necessity, potentially improving access to specialized mental health services for some individuals who may otherwise have been unable to access them. Continued post-pandemic availability of TH treatment would benefit those who experience barriers to OCD treatment, yet literature supporting the effectiveness of TH treatment for OCD is limited in that it does not include evidence for intensive, structured programs like PHP and IOP which at times are necessary to treat more severe cases of OCD. Further, it is not clear to what extent the COVID-19 pandemic may mitigate the effectiveness of TH treatment for OCD given stay-at-home orders and sanitizing guidelines that inherently limit the delivery of ERP (Storch et al., 2021). To address this gap, the current study examined the efficacy of intensive TH treatment for individuals with complicated OCD during the COVID-19 pandemic.

Using a sample of patients diagnosed with OCD and matched on three self-report measures at admission, no group differences were found on any of the assessments comparing IP PHP to TH PHP and IP IOP to TH IOP, suggesting that the effectiveness of pre-pandemic IP treatment and TH treatment during the COVID-19 pandemic was not significantly different, contrary to hypotheses and clinician's perceptions reported in previous literature (Storch et al., 2021). No differences in treatment response, defined as greater than or equal to a 35% reduction in Y-BOCS-SR scores, were found between pre-pandemic IP and pandemic TH treatment groups. Of note, the proportion of participants who evidenced Y-BOCS-SR treatment response in the current study, regardless of pandemic, is lower than is typically reported in other studies using the same treatment program (e.g., Chase, Wetterneck, Bartsch, Leonard, & Riemann, 2015) because the current sample was filtered based on most recent encounter. This filter, while providing a more proximal subsample comparison, may artificially suppress treatment effectiveness in cases where an individual made more significant gains in higher levels of care and then experienced a more gradual reduction of less severe OCD symptoms in their lowest level of care. Despite this filter, with respect to change in symptoms, a large effect size was found for overall change in Y-BOCS-SR in the IP PHP and TH PHP groups, and a moderate effect size was found for IP IOP and TH IOP groups. Change in QIDS yielded a large effect size for IP PHP, and a moderate effect size for all other groups. QLESQ scores showed moderate effect sizes for IP PHP, TH PHP, and IP IOP, and a small effect size for TH IOP. The only notable treatment difference found between the two treatment modalities across pandemic time points was that patients receiving TH treatment during the COVID-19 pandemic had longer average lengths of stay compared to those who received IP treatment prior to the COVID-19 pandemic. Findings suggest that, although TH PHP and IOP treatment during the pandemic has evidenced similar treatment outcomes, it appears that patients require approximately 2.6 additional days of treatment to achieve the same benefit.

Linear mixed models provided more in-depth analysis of the trajectory of symptom change across treatment. Findings from linear mixed models provided further evidence that the trajectory of symptom reduction across treatment modalities was approximately the same. Interestingly, for Y-BOCS-SR and QIDS scores, the slopes depicting trajectory of symptoms evidenced a visually steeper slope with less between-subject, within-group variability, indicating trajectories were more consistent and less variable in pre-pandemic IP treatment relative to TH treatment during COVID-19, whose increased variability in slopes suggested somewhat more unpredictable trajectories. Although results of the linear mixed model suggest that with an additional 2.6 days, individuals receiving TH treatment during the pandemic were able to experience approximately the same benefit from treatment as those who completed IP treatment prior to the pandemic, slopes suggest that there may be somewhat more variability in the trajectory of symptom reduction given the expected complications of delivering TH treatment during a pandemic. TH treatment may involve more barriers, such as issues with technology (e.g., internet connectivity) or privacy if living in a shared home. TH treatment may also present unique challenges with patients who evidence less straight-forward clinical cases, such as those with comorbidities or treatment-interfering avoidance behaviors (e.g., excessive bathroom rituals leading to tardiness or absence, distractibility during sessions). Such patients may potentially benefit more from IP treatment to reduce the availability of avoidance-enabling stimuli (e.g., having to use a shared public restroom instead of one's home restroom) and promote more active treatment engagement that is harder to attain when sitting in front of a computer screen several hours at a time. Future research examining clinical presentation and treatment modality interactions would provide further evidence for this interpretation and would help identify specific profiles of symptoms that are more amenable to TH versus IP treatment, both during as well as after the COVID-19 pandemic.

A similar pattern was found for QIDS scores wherein both treatment modality groups evidenced similar reduction in QIDS scores. Findings regarding depressive symptoms are surprising given that depression is driven in large part by behavioral inaction (Depue & Iacono, 1989; Kasch, Rottenberg, Arnow, & Gotlib, 2002) and quarantine represents fewer opportunities to behaviorally engage for those who are depressed. Some research suggests that the pandemic has led to increased mental health concerns in individuals without diagnosed psychiatric conditions, yet slight decreases in symptoms among those with diagnosed depressive, anxiety, or obsessive-compulsive disorders (Pan et al., 2021). Patients receiving intensive treatment for OCD in residential, partial hospitalization, and intensive outpatient programs did indeed report less COVID-related impact and impairment compared to their treatment providers (Pinciotti et al., 2021). Perhaps individuals receiving TH treatment for OCD during the pandemic experience the same decrease in depressive symptoms compared to pre-pandemic IP treatment because they feel a sense of shared emotional toll of the pandemic and therefore feel less alone or stigmatized for their mental health struggles.

The current study has several limitations to acknowledge, most notably, that findings regarding differences between IP and TH treatment are confounded by the COVID-19 pandemic. Because all TH data

was collected during the pandemic, it is impossible to parse apart treatment modality differences from the impact of the pandemic as well as from differences in the delivery and implementation of treatment. For example, TH treatment was conducted with limited access to community-based exposure and diluted response prevention for some rituals (e.g., handwashing) in order to follow U.S. Centers for Disease Control guidelines regarding social distancing and sanitizing. Thus, findings from the current study may not be generalizable to post-COVID pandemic IP versus TH comparisons. However, findings illustrate that TH treatment may be effective even for patients seeking treatment for severe and complicated cases of OCD during the COVID-19 pandemic. Future research examining pre- or post-COVID samples may provide more nuanced understanding of the comparative effectiveness of treatment modalities outside of a COVID-19 context. Similarly, to provide subsamples that are as proximal as possible while still allowing for a clear pandemic timeframe differentiation, participants were filtered based on their most recent encounter with the hospital system. Because of this, effect sizes for all groups may be artificially suppressed because subsamples include participants who made more significant gains at higher levels of care but discharged at a lower level of care wherein less symptom improvement was possible or needed. While this filtering method allowed for the cleanest comparison across timeframes, it is limited in that findings do not reflect the most accurate measure of overall treatment effectiveness for participants receiving treatment through the continuum of care at Rogers Behavioral Health. Previous studies reporting pre-pandemic treatment effectiveness within these programs may be consulted for this information (e.g., Chase et al., 2015).

Findings are limited by the study's reliance on self-report measures, which may not accurately reflect the symptom severity of the sample. The sample was also demographically homogenous which limits generalizability to other populations, such as individuals with OCD who are people of color or gender minorities. In addition, the sample size increasingly reduced over time due to natural attrition of cases stemming from patients discharging from treatment, so it is unclear whether the same pattern of findings would hold up with a stable sample. Although the analyses appropriately handled missingness of data and the regression remained robust and converged, attrition of cases over the duration of treatment in many cases is naturally due to an improvement in symptoms (and therefore, no longer a need for the particular level of care), so the sample of patients in the latter weeks of treatment may be somewhat biased by ongoing treatment challenges. A controlled experimental study could tease out how differences emerge in populations where group membership and length of stay are fixed regardless of individual case symptom improvement. Further, it is not known whether the maintenance of treatment outcomes over time will differ as a function of treatment modality or pandemic; future studies may consider using longer term follow-up to examine whether differences emerge. However, findings still provide understanding of the trajectory of symptoms in a naturalistic treatment-seeking sample.

Despite limitations, the current study provides evidence for the effectiveness of intensive PHP and IOP TH treatment for OCD during the COVID-19 pandemic, adding to existing literature on pre-pandemic TH treatment for less severe and complicated cases of OCD (Wootton, 2016) and countering clinicians' perceptions of attenuated ERP treatment response during the COVID-19 pandemic (Storch et al., 2021). Individuals with complicated OCD largely still benefitted from TH treatment when it was required during the pandemic. For many, IP treatment may remain the preferred mode of treatment for OCD when possible, especially in cases where a variety of domains of functioning are negatively impacting one's quality of life, however the current study suggests that individuals with complicated OCD who do not have access to IP treatment can still experience significant improvement in symptoms through TH treatment even within the context of a global pandemic.

Author statement

Caitlin Pinciotti: Conceptualization; project administration; writing-original draft; writing-review & editing. **Nyssa Bulkes:** Conceptualization; data curation; formal analysis; writing-original draft; writing-review & editing. **Gregor Horvath:** Conceptualization; data curation; formal analysis; writing-original draft; writing-review & editing. **Bradley Riemann:** Conceptualization; supervision; writing-review & editing.

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