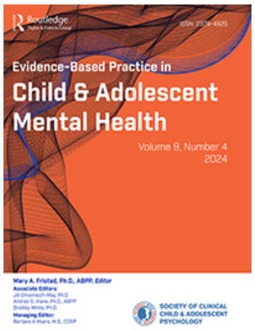

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Predictors of Treatment Outcome and Length of Stay in a Partial Hospital Program for Pediatric Obsessive-Compulsive Disorder

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ABSTRACT

Partial hospital programs (PHPs) represent an important part of the continuum of care for youth with severe and/or refractory OCD, yet little is known about clinical or utilization outcomes in this setting. The current study aimed to characterize symptom improvement and length of stay (LOS) among 185 youth with OCD treated in a PHP setting and to identify demographic, clinical, and treatment characteristics that predict these outcomes. Results demonstrate a 77.3% treatment response rate and a median LOS of 52 days. Holding other predictors constant, less symptom improvement was observed for youth with lower symptom severity at admission, in a racial or ethnic minoritized group, without comorbid anxiety, and receiving more treatment hours per day. Shorter LOS was observed among youth with public (vs. commercial) insurance, receiving more hours of treatment per day, and not taking a serotonin reuptake inhibitor (SRI). Clinical implications and directions for future research are discussed, including a critical need to understand and improve outcomes for minoritized youth.

Obsessive-compulsive disorder (OCD) is an impairing illness experienced by 2–3% of children and adolescents (Fontenelle et al., 2006). Symptoms may wax and wane but often become chronic (Mancebo et al., 2014) and are associated with a cascade of delayed developmental milestones and functional impairments across domains. If left untreated, OCD can also increase the risk of psychiatric illness and result in costly disability (including depression, substance abuse, and suicide attempts; Piacentini et al., 2003). Exposure with response prevention (ERP) and pharmacological treatment with serotonin reuptake inhibitors (SRIs) are efficacious treatments either alone or in combination; just over 50% of patients will achieve clinical remission with combined treatment (Franklin et al., 2011; POTS team, 2004).

Despite ample evidence supporting the efficacy of ERP, most youth have difficulty accessing this first-line treatment (APA, 2007; Wolitzky-Taylor et al., 2015). Mental health providers report infrequent use of exposure-based treatments (Pittig & Hoyer, 2017) and review of medical records also indicates that exposure is not often used in community practice settings (Becker et al., 2004; Marcks et al., 2009). Furthermore, even when ERP is utilized, it is often less prolonged and intense than recommended by treatment developers (Hipol & Deacon, 2013; McLeod et al., 2013). These obstacles to ERP access and quality are exacerbated for minoritized youth with OCD, who are even less likely to receive effective care (Katz et al., 2020). Given these problems with access to high-quality ERP, it seems unlikely that youth seeking care in practice settings will experience the same rates of treatment response that have been reported in the context of clinical trials. Moreover, even with access to appropriate care, a significant proportion of youth with OCD do not experience a clinically meaningful reduction of symptoms. Although reasons for inadequate response are not fully understood, studies suggest that older youth and those with higher symptom severity are less likely to improve (Ost, 2016; Turner et al., 2018). The

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presence of comorbid conditions is thought to complicate treatment efforts, yet comorbidity has inconsistently predicted ERP outcomes. Some studies show improved outcomes for youth with comorbid anxiety disorders (McGuire et al., 2015; Öst et al., 2016) and for youth with tic disorders (McGuire et al., 2015), while others show attenuated outcomes with the presence of externalizing symptoms or with any comorbidity (Turner et al., 2018). Promisingly, a higher number of treatment hours and lower attrition rates have predicted improved ERP outcomes (McGuire et al., 2015), suggesting that a higher "dose" may be more effective for some youth.

Researchers and practitioners have increasingly looked toward the development of innovative service models to improve ERP access, quality, dose, and outcomes. Observational studies suggest that outpatient programs which increase ERP intensity (e.g., using daily sessions of 1–2 h) can significantly reduce OCD symptoms in youth who have not had an adequate response to prior outpatient treatment (Storch et al., 2010; Whiteside & Jacobsen, 2010). Focusing specifically on youth with severe and/or refractory symptoms, other models for intensive ERP delivery have leveraged common levels of care in the youth mental health system, including residential models (i.e., in a 24-h facility not licensed as an inpatient program and offering treatment for severe mental health symptoms; Tuma, 1989) and partial hospital programs (PHPs, i.e., comprehensive daily intensive treatment focused on stabilization of acute symptoms and/or prevention of full hospitalization, Khawaja & Westermeyer, 2010; The National Association of Private Psychiatric Hospitals and the American Association for Partial Hospitalization [NAPPH], 1990). These programs provide ERP, medication management, and other therapy or supportive services in a hospital-based setting, using an interdisciplinary team-based service model that includes licensed therapists (psychologists and/or social workers), psychiatrists, and unlicensed bachelor's level therapists. Within a given hospital, youth in PHP typically attend the same treatment components as those in residential, but do not sleep in the treatment facility or receive other treatment-related support during evening/weekend hours (e.g., controlled access to materials for ritualizing or homework support). There are little data available about the outcomes of these programs, with the exception of the Rogers Memorial Hospital residential treatment program, where youth experienced significant decreases in OCD and depression severity from intake to discharge (Leonard et al., 2016), and multiple predictors (e.g., severity and comorbidity) did not relate to treatment response (Højgaard et al., 2020).

Importantly, each of these programs includes the use of bachelor's-level staff to support exposure work. Kazdin (2017) argues that the current standard delivery model of most evidence-based mental health practices is unable to match the current need for services. Unlike traditional models of outpatient care that require licensed providers to deliver one-on-one care, including bachelor's level staff as closely supervised provider "extenders" has the potential to increase capacity and reduce cost – thereby enhancing sustainable access to care for youth with severe and/or refractory OCD. Said another way, this model can expand the existing footprint of licensed ERP specialists, allowing them to treat more patients in the same amount of time (e.g., less than half of the time required per patient when compared with traditional treatment models; Freeman et al., under review). This "task sharing" approach (i.e., one that involves professionals working collaboratively with less specialized health workers) has improved treatment access while reducing disease burden; it has also facilitated significant reductions in targeted mental health symptoms across several large clinical trials (Singla et al., 2017).

Despite the promise of this approach, several key barriers remain that may impede access and/or outcomes for some youth. First, residential and PHP programs primarily provide ERP in a hospital setting. By contrast, home-based services allow exposures to situations that are difficult to replicate in the office, increase patient ability to complete exposures at home, and result in sustained remission of symptoms (Boschen & Drummond, 2012; Rowa et al., 2007). Home-based exposures may also reduce access barriers for patients who have symptoms that interfere with treatment attendance. Accordingly, clinical guidelines recommend exposure delivery using a home-based approach for adults with OCD and

Panic Disorder who have not responded to traditional outpatient services (American Psychiatric Association [APA], 2007). Moreover, home- and community-based exposure could be a better match for the needs of families in some minoritized communities (e.g., by enabling involvement of extended family or other community members in treatment). Second, many ERP-based intensive programs for youth with OCD accept limited types of insurance or require self-pay. This is a significant access barrier for most families and is generally not representative of other residential and PHP programs nationally. Programs that accept a range of insurance types (i.e., public and commercially funded) must be designed to accommodate *utilization management* – a cost containment approach used by third-party payers in the U.S.A. to influence the use of health-care services, which emphasizes less costly care settings and reducing length of stay (LOS; Memel, 2012; Wickizer & Lessler, 2002). As part of this process, payers regularly review medical records and speak with providers to determine whether coverage will be authorized. Working with payers in this way is critically important for improving patient access, yet it is likely to fundamentally influence the context of ERP-based intensive programs (e.g., due to the influence of the insurance review process or to differences in patient or provider characteristics).

To our knowledge there are no published reports of outcomes for youth with OCD who were treated in a PHP program nor for any ERP-based programs (outpatient, PHP, or residential) that incorporate home-based treatment and work with most major insurance providers. Moreover, no studies to date have examined LOS, an outcome of key importance to payers, families, and government agencies (Carranza Navarro et al., 2021). Finally, very little is known about predictors of clinical outcome or LOS for youth with OCD in ERP-based intensive settings. This study aimed to address these gaps. Specifically, we aimed to characterize treatment response rate and examine changes in OCD symptoms from treatment admission to treatment discharge in the context of an ERP-based PHP program that incorporates home-based treatment and accepts most major insurances (Aim 1). We also aimed to examine demographic, clinical, and treatment characteristics that predict OCD symptom reduction (Aim 2) and length of stay (LOS; Aim 3) in this PHP setting.

Method

Participants

This study was approved by the Lifespan IRB (Protocol # 443733); caregivers (for youth ages 6–17) or patients (for youth age 18) provided written consent; youth ages 8–17 also provided assent. Participants were 185 youth admitted to the Pediatric Anxiety Research Center PHP for treatment of OCD between April 2013 and April 2022. Inclusion criteria were designed to capture the full range of youth admitted for OCD treatment in this setting. Inclusion criteria were as follows: 1) age 6–18, 2) primary or co-primary diagnosis of OCD documented in the electronic medical record (EMR), and 3) at least moderate OCD symptom severity as indicated by a Children's Yale-Brown Obsessive Compulsive Disorder Scale (CY-BOCS) score ≥16. The study's consent procedures required at least one English-speaking parent or guardian; otherwise, youth and family members speaking primary languages other than English were able to participate. Youth were excluded from the present study if they attended treatment primarily via telehealth, while in-person treatment was unavailable during the COVID-19 pandemic ($N = 28$ consented between April 2020 and August 2021). We excluded these youth given the limited number of treated youth that could be consented and limited data that could be collected during that time, as well as the likelihood that findings would be affected by changes in treatment delivery (i.e., telehealth) and/or the larger context of the rapidly evolving pandemic. We also excluded youth with missing CY-BOCS data ($N = 151$), which was necessary for evaluating inclusion criteria and a primary outcome of interest in the present study. Youth excluded for missing CYBOCS data did not differ from included youth on any demographic or other study variables of interest ($ps > .05$).

The final sample included male and female participants equally (50.3% female), and participants predominantly identified as White (89.7%) and non-Latinx (92.9%; Table 1). Most were covered by commercial insurance (85.4%), followed by public insurance (11.9%) or other forms of

Table 1. Descriptive statistics for study variables.

Variable	M (SD) or %
Age	12.2 (3.3)
Biological sex	Female (50.3%)
	Male (49.7%)
Race	White (89.7%)
	Black (1.6%)
	Asian (2.2%)
	Other (3.2%)
	More than one race (2.2%)
	Declined (1.1%)
Ethnicity	Latinx (3.2%)
	Not Latinx (92.9%)
	Declined (3.8%)
Insurance type	Commercial (85.4%)
	Public (11.9%)
	Military (1.6%)
	None/Self-pay (1.1%)
Comorbidity	Anxiety disorder (38.9%)
	Attention deficit hyperactivity disorder (37.7%)
	Mood disorder (32.8%)
	Autism spectrum disorder (10.4%)
	Tic disorder (11.4%)
PHP Track	6-hour track (54.1%)
	4-hour track (45.9%)
Medication during admission	SRI (86.9%)
	Benzodiazepine (22.2%)
	Stimulant (34.7%)
	Antipsychotic (31.6%)
LOS	56.9 (27.9)
CY-BOCS Severity (admission)	28.9 (4.6)
CY-BOCS Severity (discharge)	18.3 (5.6)
CY-BOCS % Change	36.0(18.8)
CGI-I (discharge)	2.2 (0.7)

reimbursement (e.g., military insurance, self-pay; 2.7%). Most (78.4%) participants had comorbid conditions, the most common of which were anxiety disorders (38.9%), attention deficit hyperactivity disorder (37.7%), mood disorders (32.8%), autism spectrum disorder (10.4%), and tic disorders (11.4%). Almost all (94.2%) had received previous mental health treatment. Most reported outpatient treatment as the highest level of care previously received (65.0%), with a subset reporting prior inpatient (19.6%) or PHP (11.0%) treatment. Many (68.4%) had previously been treated with an SRI, yet few had any prior exposure therapy (36.8%). The average CY-BOCS severity score at admission was 28.9 (SD = 4.6), indicating severe OCD symptoms.

Measures

Electronic medical record (EMR) review

We extracted demographic, clinical, and treatment information from the EMR. Demographic variables of interest included age, gender, race, ethnicity, and insurance type. Clinical variables of interest included primary and secondary psychiatric diagnoses (other than OCD), which were assessed by licensed program clinicians (Psychologists or Psychiatrists) using unstructured clinical interviews within the first week of treatment. Treatment variables of interest included psychiatric treatment history (prior care settings, receipt of psychotherapy, exposure therapy, and/or medications), medications received during admission, and LOS (number of calendar days from admission to discharge).

Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS; Scahill et al., 1997). The CY-BOCS is the "gold-standard" measure of OCD diagnosis and symptom severity in youth, demonstrating excellent psychometric properties (Rapp et al., 2016; Storch et al., 2004). Total scores range from 0 to 40, with higher scores indicating greater symptom severity. The CY-BOCS also captures categories of severity as follows: "subclinical" (0 to 7), "mild" (8 to 15) "moderate" (16 to 23), "severe" (24 to 31), and "extreme" (32 to 40). CY-BOCS scores >16 indicate a diagnosis of OCD and this cutoff is commonly used as an inclusion criterion in clinical trials.

Clinical global impression – improvement scale (CGI-I) (Busner & Targum, 2007; Guy, 1976)

The CGI-I is a brief clinician-rated measure of global improvement in treatment for children and adults, with scores ranging from 1 (very much improved) to 7 (very much worse). The CGI-I has good psychometric properties, including sensitivity to change in treatment, and is commonly used as an index of treatment response in clinical trials for youth with OCD (Freeman et al., 2014).

Procedure

Setting and admission procedures

This study was conducted in the PHP at the Pediatric Anxiety Research Center (PARC PHP), located within Bradley Hospital, a children's psychiatric hospital in the U.S. northeast. Referrals are typically made by pediatricians, outpatient mental health providers, local urgent care services, or family self-referrals. Families contacting the program for treatment completed a brief initial screen via telephone to assess whether 1) exposure-based treatment would be an appropriate match for reported symptoms and 2) symptoms met criteria for PHP treatment. To meet criteria for this level of care, youth must be experiencing significant levels of impairment in daily functioning (e.g., difficulty completing activities of daily living and school refusal) and/or have not responded to prior treatment. Immediately before admission, prior authorization for services was obtained from payers. PARC PHP accepts virtually all public and private insurance types (including through single case agreements where required). With the use of the screening procedures described above, denial of authorization at this point was rare (<5 youth since 2013). Patients and caregivers completed clinical interviews at admission and discharge (unstructured diagnostic interview, CY-BOCS, and CGI-I) with a licensed program provider. All licensed program providers were trained on criteria to complete the CY-BOCS and CGI using training manuals and procedures from prior large trials for pediatric OCD (Franklin et al., 2011; Freeman et al., 2014). Training procedures included observation followed by guided and then independent practice with supervision by a trained rater.

Service model and treatment

Patients were admitted to one of two tracks in the PARC PHP: 4-h level care or 6-h level of care. Patients admitted to the 6-h track received 6 h of treatment each weekday and did not attend school. Patients admitted to the 4-h track received 4 h of treatment each weekday after school. For each patient, the appropriate track was determined collaboratively by families and the treatment team based on the urgency of the need for treatment (e.g., compromised nutritional status) and/or the level of impairment (e.g., not attending school) and relevant family barriers (e.g., work schedule and access to transportation). Patients also had the option to switch tracks if clinically indicated (e.g., "step-down" if symptoms improve or "step-up" if symptoms worsen). For the purposes of this study, youth who received any treatment in the 6-h track were classified with the 6-h track for analysis. Each week, patients in both tracks received the following: daily milieu-based group therapy facilitated by Bachelor's-level staff ("exposure coaches"), two individual treatment sessions with a psychologist, one family treatment session with a psychologist and a psychiatrist, and two (4-h track) or five (6-h track) individual sessions conducted in the home or in the community by exposure coaches. Youth were also asked to complete homework daily outside of program time. Patients were typically admitted for a total of 6–8 weeks (Median = 52.0, range of 5–220 days). Discharge dates were determined collaboratively by clinicians and families considering degree of impairment, pace of treatment response, treatment engagement, and insurance coverage.

The primary treatment delivered through each of the above services was ERP, along with other support designed to improve ERP engagement and outcomes (e.g., reward systems, addressing family accommodation). Although different in format due to the nature of the PHP setting, treatment procedures followed the ERP content outlined in published manuals for youth with OCD (Franklin et al., 2019). It is estimated that most youth engaged in exposure tasks for three (4-h track) to five (6-h track) hours per day, 50–75% of which was staff-supported. Additional psychosocial interventions (e.g., behavioral activation for depressive symptoms, behavior plans for ADHD or ASD, CBIT for tics) were often used to address comorbid symptoms. Patients also received medication management with a psychiatrist 1–2 times per week (or more often, as needed). The most commonly prescribed medications during treatment included SRIs (86.9% of patients), stimulants (34.7%), antipsychotics (31.6%), and benzodiazepines (22.2%).

Exposure coach training and supervision

All exposure coaches received 2 weeks of initial training that included didactic instructions related to general job responsibilities (e.g., documentation, procedures for home visits) as well as ERP principles and procedures (e.g., using functional assessment, providing psychoeducation, building a hierarchy, conducting exposures). Consistent with best practices for therapist training (Frank et al., 2020), initial training also incorporated active learning strategies, including live observation of trained exposure coaches and live guided practice with trained coaches and/or licensed clinicians.

Following initial training, exposure coaches received 30–60 min of daily group supervision through team "rounds." During this time, licensed clinicians provided supervision related to case conceptualization, hierarchy development, exposure selection and related problem-solving, and contextual factors relevant for each patient (e.g., family dynamics and comorbidity).

Data analytic plan

Analyses were conducted using SPSS (Version 26). Sample characteristics and other study variables were characterized using descriptive statistics. When preliminary inspection of variables and/or model plots overlaying individual points revealed deviations from homoscedasticity or normality, we applied square root transformations until deviations were corrected (variables that were transformed are noted as such in the results). Missing data were handled using listwise deletion, given that all included participants had complete data for primary outcomes (CY-BOCS and LOS) and a very low rate of missing data among predictor variables (≤5%). In addition to being less computationally demanding, listwise deletion can be less biased than alternate methods (e.g., multiple imputation and maximum likelihood) when data are missing for predictor variables (rather than for outcomes) in multiple regression (Allison, 2001). Analyses for Aim 1 used descriptive statistics to characterize the rate of treatment response, defined as a score of "much improved" or "very much improved" on the CGI-I (consistent with recommendations for determining treatment response in prior studies, Farhat et al., 2021) and paired samples t-test (examining change in OCD severity from admission to discharge as indicated by CY-BOCS total scores). For aim two and three analyses, we conducted hierarchical regression, which facilitates examination of 1) the added variance explained by groups of predictors entered in successive "steps," and 2) unique contribution of individual predictors when holding other predictors constant. Variables were selected a priori for each regression step based on prior literature and theory, as follows: Step 1: OCD severity (CYBOCS) at admission, the most consistent predictor of outcome in prior studies (Turner et al., 2018; Ost, 2016); Step 2: demographic predictors, including biological sex, age in years, membership in a minoritized racial and/or ethnic group (yes/no), and insurance type (commercial or public); Step 3: presence of comorbidities (yes/no for each of the following: anxiety, mood, ASD, ADHD, tics); Step 4: treatment factors, including track (4 or 6 h) and medications received (yes/no for each of the following: SRI, stimulant, antipsychotic, and benzodiazepine). We tested two models using the steps and predictors described earlier; one predicting change in OCD symptom severity (percent change in CYBOCS from admission to discharge, the most commonly used continuous outcome variable in clinical trials (Farhat et al., 2021); Aim 2) and one predicting LOS (calendar days from admission to discharge; Aim 3).

Power analysis

A post-hoc power analysis was conducted using G*Power 3.1. With a significance level of .05 and power of .80, using multiple regression with 15 predictors and sample size of 185, analyses were powered to detect small-to-medium effects ($f^2 = .11$ for detecting R^2 deviation from zero).

Results

Aim 1: clinical outcomes

Descriptive statistics for all study variables are presented in Table 1. Some youth (*N* = 35, 18.9%) were missing CGI-I data. Using a conservative approach that considers youth with missing data to be non-responders, a majority (62.7%) met criteria for demonstrating treatment response (i.e., rated as "much" or "very much" improved on the CGI-I). When youth with missing data were excluded, 77.3% met criteria for treatment response. OCD symptom severity decreased significantly from admission (*M* = 28.9 [4.6], indicating severe symptoms) to discharge (*M* = 18.3 [5.7], indicating moderate symptoms, t(1,184) = 24.3, *p* = .000).

Aim 2: predictors of OCD symptom reduction

Correlations among all study variables are presented in Table 2. Analyses predicting OCD symptom change showed that OCD severity at admission predicted 2.5% of the variance, *F*(1, 159) = 4.10, *p* = .04.

Table 2. Correlations among study variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(1) OCD Severity Admission		0.04	0.02	0.04	0.03	0.01	−0.01	−0.10	0.13	−0.07	**0.31**	0.11	−0.06	**−0.27**	0.07	**0.18**	**0.29**
(2) Age			0.00	**0.18**	0.04	0.14	**0.30**	**−0.15**	0.03	0.01	0.14	**0.26**	**−0.28**	**−0.20**	0.13	−0.01	**0.18**
(3) Sex[a]				0.00	0.08	0.11	0.10	−0.08	**−0.16**	−0.14	−0.03	0.12	−0.04	0.10	0.02	−0.02	0.01
(4) Minority Status[b]					−0.09	0.08	0.02	−0.02	−0.01	−0.01	0.04	−0.02	−0.07	0.01	0.07	**−0.17**	−0.06
(5) Insurance type[c]						−0.02	**0.16**	−0.07	−0.04	0.03	−0.01	0.05	−0.08	−0.03	0.00	−0.03	**0.16**
(6) Anxiety[d]							0.11	−0.03	−0.05	0.04	0.05	0.06	**−0.21**	0.03	0.02	0.14	0.01
(7) Mood[d]								−0.11	−0.09	−0.05	0.08	0.10	−0.11	−0.09	0.04	0.04	0.05
(8) ADHD[d]									0.14	**0.18**	0.06	−0.11	0.06	0.06	**−0.67**	0.00	−0.13
(9) ASD[d]										0.07	**0.21**	0.03	0.09	−0.08	**−0.15**	0.02	0.00
(10) Tics[d]											0.05	−0.12	**−0.17**	−0.02	**−0.19**	0.05	0.07
(11) Track (4 or 6 hr)[e]												0.01	−0.07	−0.13	0.13	−0.12	0.02
(12) SRI[f]													−0.04	−0.08	−0.04	−0.02	**0.24**
(13) Benzo[f]														0.05	−0.10	0.05	**−0.21**
(14) Antipsychotic[f]															−0.13	−0.01	**−0.30**
(15) Stimulant[f]																−0.04	0.09
(16) CYBOCS % Δ																	0.03
(17) LOS[g]																	

***p* < .05**.

[a]Sex: 0 = male, 1 = female; [b]Minority Status: 0 = not minority, 1 = minority; [c]Insurance type: 0 = public, 1 = commercial; [d]Comorbidity: 0 = not present, 1 = present; [e]Track: 0 = 4-hour, 1 = 6-hour; [f]Medications: 0 = not taking, 1 = taking; [g]square-root transformed.

In Step 2, demographic variables explained an additional 4.5% of the variance, $F(1, 155) = 1.90$, $p = .11$. In Step 3, comorbidities explained an additional 5.1% of the variance, $F(1, 150) = 1.74$, $p = .13$. In step 4, treatment factors explained an additional 5.9% of the variance, $F(1, 145) = 2.10$, $p = .06$. Tolerance (range = 0.4 to 1.0) and VIF (range = 1.0 to 2.2) did not indicate the presence of significant multicollinearity. In the full regression model, the following variables remained significant predictors: admission OCD severity, such that patients with greater OCD severity exhibited greater symptom reduction ($\beta = .27$, $p = .00$); minority status such that youth identifying as a member of a racial or ethnic minority group ($N = 20$, 10.8%) experienced less symptom reduction ($\beta = -.23$, $p = .00$); comorbid anxiety, such that youth with anxiety experienced greater symptom reduction ($\beta = .21$, $p = .01$); PHP track such that youth admitted to the 4-h track experienced more symptom reduction than those in the 6-h track ($\beta = -.22$, $p = .01$). Full results for all predictors are presented in Table 3.

Aim 3: predictors of LOS

LOS was square-root transformed. Analyses predicting LOS showed that OCD severity at admission predicted 6.0% of the variance, $F(1, 159) = 10.14$, $p = .00$. In Step 2, demographic variables explained an additional 7.7% of the variance, $F(1, 155) = 3.45$, $p = .01$. In Step 3, comorbidities explained an additional 1.7% of the variance, $F(1, 150) = 0.59$, $p = .71$. In step 4, treatment factors explained an additional 8.8% of the variance, $F(1, 145) = 3.38$, $p = .01$. Tolerance (range = 0.4 to 1.0) and VIF (range = 1.0 to 2.2) did not indicate the presence of significant multicollinearity. In the full regression model, the following variables remained significant predictors: admission OCD severity, such that patients with greater OCD severity experienced longer LOS ($\beta = 0.22$, $p = .01$); insurance status such that youth with commercial insurance experienced longer LOS ($\beta = .15$, $p = .04$); PHP track, such that youth in the 4-h track experienced longer LOS ($\beta = -.16$, $p = .04$); and SRI use, such that youth taking an SRI experienced longer LOS ($\beta = .20$, $p = .01$). Full results for all predictors are presented in Table 3.

Discussion

ERP-based PHP is a novel service approach that offers multimodal treatment in hospital, home, and community settings for youth with severe and/or refractory OCD. Results suggest that this model is effective for these youth, who exhibited significant symptom reduction over the course of treatment. On average, OCD symptoms were “severe” at admission and “moderate” at discharge. This is consistent with common treatment goals for this level of care, which emphasize rapid improvement in functioning until patients can step down to outpatient care. About three-quarters of youth were

Table 3. Hierarchical regression models predicting symptom reduction and LOS.

	% CYBOCS change				LOS*			
Predictor	B	*β*	*t*	*p*	B	*β*	*t*	*p*
Step 1: Admission Severity (CYBOCS)	**1.16**	**0.27**	**3.16**	**0.00**	**0.08**	**0.22**	**2.67**	**0.01**
Step 2: Demographic								
Age	0.33	0.06	0.67	0.50	0.05	0.11	1.26	0.21
Sex[a]	−1.18	−0.03	−0.40	0.69	0.19	0.06	0.79	0.43
Minority Status[b]	**−13.61**	**−0.23**	**−2.94**	**0.00**	−0.09	−0.02	−0.24	0.81
Insurance type[c]	−3.89	−0.07	−0.90	0.37	**0.68**	**0.15**	**1.97**	**0.05**
Step 3: Comorbidity[d]								
Anxiety	**8.23**	**0.21**	**2.71**	**0.01**	−0.14	−0.04	−0.57	0.57
Mood	3.28	0.08	1.00	0.32	0.12	0.04	0.45	0.65
ADHD	−1.73	−0.04	−0.40	0.69	0.29	0.09	0.82	0.41
ASD	0.30	0.00	0.06	0.95	0.36	0.06	0.84	0.40
Tics	4.56	0.08	0.99	0.32	0.71	0.15	1.92	0.06
Step 4: Treatment Features								
Track (4 or 6 hr)[e]	**−8.34**	**−0.22**	**−2.61**	**0.01**	**−0.51**	**−0.16**	**−1.99**	**0.04**
SRI[f]	−4.10	−0.08	−0.94	0.35	**0.89**	**0.20**	**2.56**	**0.01**
Benzodiazepine[f]	−4.06	−0.09	−1.11	0.27	0.34	0.09	1.14	0.26
Antipsychotic[f]	−4.03	−0.10	−1.20	0.23	0.45	0.13	1.69	0.09
Stimulant[f]	−0.02	−0.00	−0.00	0.99	−0.58	−0.18	−1.60	0.11

*square-root transformed; results not interpretable in original units.

$p > .05$.

[a]Sex: 0 = male, 1 = female; [b]Minority Status: 0 = not minority, 1 = minority; [c]Insurance type: 0 = public, 1 = commercial; [d]Comorbidity: 0 = not present, 1 = present; [e]Track: 0 = 4-hour, 1 = 6-hour; [f]Medications: 0 = not taking, 1 = taking.

considered treatment responders at discharge, which is similar to rates reported in clinical trials of outpatient ERP with or without SRI (57.1–68.6%; Franklin et al., 2011; Storch et al., 2013). This is notable given that most youth presenting for treatment in this setting had a high degree of impairment and/or history of inadequate response to treatment and is consistent with prior work suggesting that these youth can benefit from existing treatments at a higher "dose."

Although a large majority of youth in this sample had a history of prior treatment with medication and/or psychotherapy, most (63%) had never before received ERP. This differs from reports among adults receiving intensive residential therapy for OCD, where 70% had previously tried CBT (Stewart et al., 2006). This may reflect an age difference (i.e., adults are more likely to have tried ERP) but likely reflect differences in assessment methods across studies (e.g., asking about prior CBT vs. prior exposure specifically); therapists in community practice settings report using exposure at much lower rates than other CBT components (e.g., relaxation) (Whiteside et al., 2016). Exposure is the primary component of CBT packages for youth with OCD, and evidence shows that exposure-based CBT outperforms packages with other components alone (e.g., relaxation) (Freeman et al., 2014). Our finding is consistent with prior research showing that the majority of children and adults with OCD or anxiety are unable to access exposure therapy (Wolitzky-Taylor et al., 2015) and that exposure is not often used in community practice settings (Becker et al., 2004; Hipol & Deacon, 2013; Whiteside et al., 2016). PARC PHP was the first point of ERP access for most youth in this sample, suggesting that an exposure-based PHP treatment model is one way that some youth are able to access ERP. Nevertheless, there are a large number of complex barriers to ERP access, and a variety of implementation strategies will be needed to address this public health crisis. These strategies might include innovative outpatient service models (e.g., team-based treatment using Bachelor's-level staff to extend the reach of licensed ERP providers), reimbursement models that support sustainable use of ERP (e.g., higher negotiated rates for providers who complete ERP training to criterion), development and dissemination of training opportunities (e.g., technology-assisted training), or non-traditional service settings (e.g., ERP delivery in primary care).

Youth with higher OCD severity at admission experienced greater symptom improvement. This contrasts with results from multiple prior studies, where lower baseline severity predicted better outcomes for adults in outpatient and intensive settings (e.g., Stewart et al., 2006; Veale et al., 2016) and for youth in outpatient settings (e.g., Öst et al., 2016; Turner et al., 2018). However, nearly all of those studies were conducted in the context of clinical trial treatment with a fixed duration. Variable treatment duration is a rule rather than an exception in practice and is particularly relevant for understanding outcomes in intensive treatment where readiness for discharge is linked to major functional outcomes (e.g., ability to attend school, maintain nutrition, or participate in outpatient treatment) rather than to a specific number of weeks or sessions. In prior studies of intensive OCD treatment with varying LOS, higher symptom severity predicted a greater likelihood of treatment response (Brennan et al., 2014) or was not a significant predictor (Højgaard et al., 2020). Importantly, higher admission severity also predicted longer LOS in the current sample – suggesting that youth with more severe symptoms may have experienced additional improvement because they received longer courses of treatment. Previous studies have not specifically examined predictors of LOS in PHP or other intensive settings for OCD, and our findings underscore the possibility that youth with severe symptoms could benefit equally from existing treatments but require a longer course of treatment. However, we note that this study did not use an experimental design, and future studies will be needed to establish a causal relationship and determine the optimal length of treatment for different subgroups of youth with OCD, including those with more severe symptoms.

Youth who identified as a member of a minoritized racial or ethnic group were, on average, older than those who did not. Our sample also had a disproportionately smaller number of minoritized youth compared to state census data (i.e., 71.4% White, non-Latinx; United States Census Bureau, 2022) and OCD prevalence nationwide (Himle et al., 2008; Kessler et al., 2005b). This suggests that these youth experience disproportionate barriers to access (e.g., due to delayed diagnosis or referral, insurance type, language barriers, or other barriers to attendance even if accurately identified and referred). Although some studies suggest that income and insurance type does not explain disparities in mental health care for minoritized youth (Marrast et al., 2016), the literature supports additional potential reasons for this. Clinicians, particularly those who are not racially and ethnically representative of the patients they treat, can have biases about minoritized patients that lead to under-diagnosis of mood, anxiety, and other internalizing disorders like OCD (Chapman et al., 2014). Some minoritized youth with OCD carry a high comorbidity burden (Himle et al., 2008; Williams, Sawyer et al., 2017), which may lead clinicians to focus on treating other comorbid disorders even when OCD is the dominant driver of impairment (Williams et al., 2012). General and OCD-specific mental health literacy is also lower in minoritized populations and could contribute to families being unaware of OCD as a disorder and the treatment options for it (Turner et al., 2018; Williams, Taylor et al., 2017). Minoritized families' experiences of stigmatization and discrimination can also lead to delayed treatment-seeking for fear of being further stigmatized (Williams et al., 2012). Family burden in the PARC PHP is high given the need for caregivers to provide transportation, participate in regular home or community visits, and attend weekly family therapy sessions. Although family involvement in treatment has produced better outcomes (including in one trial for minoritized youth in particular, e.g., (Peris et al., 2020)) requiring families to participate in daily treatment may have contributed to inequitable access given that these families are more likely to experience economic and other societal stressors (e.g., underemployment and inflexible work hours).

Our data also showed that minoritized youth experienced less symptom reduction despite having comparable LOS. Model estimates indicated that reduction in symptom severity (measured with CYBOCS percent change) was attenuated by nearly 14% points for minoritized youth when holding other factors constant (e.g., insurance type, age, severity, medication, and comorbidity). For example, when referenced against non-minoritized youth who experienced a 35% reduction in symptom severity (the cutoff for treatment response in pediatric OCD; Farhat et al., 2021), minoritized youth with similar characteristics might expect only a 21% reduction. This is a notable difference, and further investigation is critically important to understand factors that contribute to inequity in outcomes. Efficacy studies of ERP and CBT have been conducted with disproportionately White, non-Latinx samples and virtually no prior studies have examined differences in treatment outcomes among racial and ethnic minoritized youth (Freeman et al., 2018). Similar to national rates among mental health providers (United States Bureau of Labor Statistics, 2019), licensed clinicians in PARC PHP were disproportionately White and non-Latinx. This could have increased the likelihood of negative bias toward racial and ethnic minoritized families as described above (although we note that Bachelor's-level staff in this setting were more representative than the licensed clinicians). Similarly, culturally non-dominant symptom presentations may not have been as effectively recognized and addressed by culturally dominant clinicians (Williams et al., 2020). Additionally, ERP effects could have been attenuated (Williams, Sawyer et al., 2017) if families felt misunderstood by clinicians or did not believe in the treatment and/or the treatment team, if clinicians did not routinely involve culturally important community members other than primary caregivers in treatment (e.g., faith leaders and extended family members), or if racial discrimination and related chronic stress (Williams, Taylor et al., 2017) contributed to overall severity (which would not be expected to respond to ERP alone). There is a critical need to improve representation in studies of OCD treatment effectiveness and to increase access to culturally responsive, evidence-based diagnosis and intensive treatment services for these youth (Williams et al., 2020). An additional method that shows promise is the community-based participatory research (CBRP) approach that leverages the assets of community-academic partnerships to help build strong community ties and increase research participation of minoritized groups with OCD while directly improving patient care through capacity building and engaging stakeholders (e.g., caregivers and community providers) (Viswanathan et al., 2004).

Interestingly, youth in the 4-h track had a longer LOS relative to youth in the 6-h track (holding OCD severity and other study variables constant). This may relate to differences in insurance authorization practices across tracks (i.e., more days covered due to lower cost per day for the 4-h track). It may also be that lower treatment burden in the 4-h track reduced some common barriers to longer admission (e.g., treatment fatigue, competing demands for family time, pressure to return to school). Given that youth in the 4-h track received less concentrated treatment (i.e., fewer hours per day), they may have required a longer course of treatment before reaching functional goals/readiness for discharge. However, it is important to note that these youth also exhibited *more* symptom reduction than their counterparts in the 6-h track. It is possible that they had more opportunities for independent practice during typical daily activities (e.g., at school), which might have improved clinical outcomes via enhanced mastery of skills, generalization of exposure learning, or some other factor. Comorbid anxiety also predicted greater reduction in OCD symptoms, which is consistent with the findings of prior studies using clinical trial data at the outpatient level of care (McGuire et al., 2015). This may relate to shared underlying deficits in OCD and anxiety (e.g., deficits in fear extinction learning) that are targeted by exposure-based CBT. Future studies will be needed to understand which specific factors underlie improved outcomes for youth with comorbid anxiety and for those in the 4-h program.

Youth taking an SRI during admission had longer LOS – but similar levels of symptom reduction – compared with those that did not receive an SRI. Given that analyses accounted for several other potentially related variables (e.g., admission severity and comorbidities), one possible explanation for this finding is that youth exhibiting a robust response early in treatment may have been less likely to receive an SRI. This finding could also relate to utilization management procedures for authorization of payment for PHP services. In PHPs, payers regularly review medical records and speak with providers to determine whether continued coverage will be authorized. Our experience suggests that payers prioritize evidence-based care; given that SRIs are a first-line treatment for pediatric OCD (Geller & March, 2012), they may be less likely to authorize continued care when youth are not receiving an SRI. Nevertheless, SRI initiation may be difficult and/or have low acceptability for some (e.g., those with fears related to medication use, younger children; Lewin et al., 2014). It will be critically important for future studies to focus on "what works, for whom" to build an evidence base that can guide individualized treatment tailoring for these youth (Freeman et al., 2018). Youth with public insurance also experienced shorter LOS – but similar levels of symptom reduction – compared with those who had commercial insurance. This may relate to coverage differences in public vs. commercial insurance (e.g., public insurers may be less likely to authorize continued care), although it is important to note that all types of payers authorize initial admission at very high rates. Families with public insurance may also be more likely to encounter barriers that influence LOS in a PHP setting (e.g., limited access to daily transportation, conflicting parent work schedules, and other economic stressors). It may be that these youth experience similar improvement with shorter LOS if families and/or the treatment team perceive a need to quickly tackle difficult work (e.g., take on very hard exposures early in treatment). Unfortunately, we did not directly assess factors such as the pace of exposure work, family/staff perceptions about treatment length, or attendance barriers that might have influenced LOS. Future studies will be needed to understand how these might relate to PHP outcomes.

Limitations

This study has several limitations. First, patients with missing CY-BOCS data were not included in the analyses. Although they did not differ from included youth in terms of demographics, comorbidity, or other study variables, it is possible that they differed in some other way that was not measured. Second, a large majority of youth in the present sample identified as White and non-Latinx. While this is consistent with the demographics of other partial hospitalization programs nationally (e.g., Alegria et al., 2010; Gudiño et al., 2009), it differs from state census data (i.e., 71.4% White, non-Latinx; United States Census Bureau) and from estimates of the prevalence of OCD in youth nationwide (Himle et al., 2008; Kessler et al., 2005a; Williams et al., 2012). This further underscores the need to improve PHP access for racial and ethnic minoritized youth and to ensure they are well-represented in future treatment studies. Similarly, a relatively low proportion of youth in this sample had public insurance, which could relate to bias in the referral process (e.g., if referring providers are unaware that public insurance can be accepted), and/or other barriers faced by families with public insurance (e.g., related to inflexible work schedule, transportation problems, or lack of trust in psychiatric hospital settings). Third, this study did not use an experimental design and significant relationships among study variables should not be interpreted as causal. Similarly, clinical measures were rated by treatment providers rather than by masked evaluators and may have been influenced by provider knowledge about treatment process or other relevant factors. Comorbidity was assessed using unstructured clinical interviews and clinician reliability was not assessed given the limited resources available for doing so in a busy clinical setting – factors that may have impacted assessment accuracy. Finally, interpretation of findings related to LOS is challenging because reasons for ending treatment vary in practice settings (e.g., due to symptom improvement/reaching functional goals, symptom worsening, treatment non-engagement, or other barriers to treatment participation). As such, shorter LOS is not always desirable, and LOS findings are best understood alongside other clinical outcomes. Nevertheless, LOS is an outcome of key importance for some stakeholders (e.g., payers, families, government agencies; Carranza Navarro et al., 2021), and this study is the first to examine it in a PHP setting for youth with OCD.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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