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The Cost of Illness Associated with Stepped Care for Obsessive-Compulsive Disorder

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Abstract

Stepped care for obsessive-compulsive disorders (OCD) is a promising approach for improving the accessibility and cost-effectiveness of exposure and response prevention (ERP). Previous research has shown that stepped care is less costly compared with standard, therapist-directed ERP, owing largely to the roughly one-third of patients who respond to lower intensity guided self-help (GSH). The aim of this study was to recalculate the costs of treatment in stepped versus standard care when also including the cost of illness; defined as costs related to functional disability in work, school, and home functioning attributed to OCD symptoms. It was found that the cost savings of stepped care was reduced to a moderate effect ($d = 0.66$) when the cost of illness was included. Data also indicated substantial potential cost savings if patient-to-treatment matching variables are identified. Exploratory analyses suggested that problems with attention may be an important variable to investigate as a potential treatment moderator in future GSH treatment outcome research. These data highlight the importance of including the cost of illness in cost-effectiveness analyses, and of identifying predictors that will facilitate matched care and prevent unnecessary treatment delay for the roughly two-thirds of patients who will not respond to GSH for OCD.

Keywords

Obsessive-Compulsive Disorder; Stepped Care; Cost of Illness; Cost Effectiveness; Personalized Medicine

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Contributors Drs. Diefenbach and Tolin designed the study, conducted literature searches, and conducted statistical analyses. Dr. Diefenbach wrote the first draft of the study and Dr. Tolin has contributed to and approved the final manuscript.

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1. Introduction

Increasing dissemination of empirically-supported treatment (ESTs) has been highlighted as a public health priority in recent years (e.g., Kazdin & Blase, 2011). Novel delivery systems are being developed in response to this need. For example, the use of guided self-help (GSH), teletherapy, and technologies (e.g., internet, smartphones) in administering ESTs is increasing (Dimeff, Paves, Skutch, & Woodcock, 2011), and with these developments comes the potential to increase access to ESTs. In addition, meta-analytic reviews have supported the efficacy of these largely self-directed and/or streamlined treatments compared to more costly, traditional, face-to-face psychotherapy (Lewis, Pearce, & Bisson, 2012). However, as argued by Shoham and Insel (2011), less intensive ESTs may not meet the public health need without additional attention to personalizing the treatment process. Specifically, these authors call for research identifying prospective treatment moderators to facilitate patient-to-treatment matching.

Obsessive-compulsive disorder (OCD) is an ideal candidate for a personalized medicine approach to ESTs given its high prevalence (Kessler, Chiu, Demler, & Walters, 2005), debilitating nature (Murray & Lopez, 1996), and empirically-supported psychosocial treatment (e.g., Foa et al., 2005). Research supporting the efficacy of cognitive-behavioral therapy incorporating exposure and response prevention (ERP) is so well established that it is a first-line treatment choice for OCD in expert consensus guidelines (Koran, Hanna, Hollander, Nestadt, & Simpson, 2007; March, Frances, Carpenter, & Kahn, 1997). However, there is limited access to ERP. This treatment is not widely used by mental health practitioners (Goisman et al., 1993; Marques et al., 2010) and many individuals report barriers to participating in ERP such as cost (57%), insurance coverage (38%), and time requirements (31%) (Marques, et al., 2010). Thus, there is a clear need to explore alternative delivery systems of CBT, which can provide the most effective treatment components in a manner that is more accessible, less time-consuming, and less costly.

One promising approach to personalizing OCD treatment is stepped care, wherein every patient starts with a lower intensity treatment and then is transitioned to a higher intensity if treatment response is not achieved. Our research group has developed and tested several iterations of an OCD stepped-care program (Gilliam, Diefenbach, Whiting, & Tolin, 2010; Tolin, Diefenbach, & Gilliam, 2011; Tolin, Diefenbach, Maltby, & Hannan, 2005). The most recent version begins with GSH, and is followed as needed by therapist-administered ERP. Approximately one third of patients completing stepped care respond to GSH, while the remaining two-thirds go on to receive the higher intensity treatment (Gilliam, et al., 2010; Tolin, et al., 2011; Tolin, et al., 2005). Results from a randomized controlled trial (RCT) comparing the stepped care program (n = 18) to a standard treatment condition (n = 12, in which patients enter into therapist-administered ERP right away) found that the two treatments were comparable in terms of efficacy; however, the stepped care program was more cost-effective (Tolin, et al., 2011). These findings were based upon calculation of direct and indirect costs of treatment.

It remains an empirical question, however, whether or not further personalization of this treatment will optimize cost-effectiveness. That is, predicting which patients will benefit from GSH, and which patients should initiate standard treatment without delay. Despite the appeal of stepped care for OCD and the promising pilot results, it is important to recognize that starting with lower-cost treatment options might not always be an optimal strategy. This fact is highlighted in a recent study of stepped-care pharmacotherapy for depression, which found that direct costs of antidepressant therapy were lower for patients receiving stepped care; however, the delay in effective treatment led to higher overall costs (Mark, Gibson, McGuigan, & Chu, 2010).

The aim of the current study was to extend the cost analyses from the aforementioned RCT (Tolin, et al., 2011) to calculate the costs of treatment delay inherent in a stepped care program. To do this we added analyses in the current study using a "cost of illness" variable operationalized as costs related to functional disability in work, school, and home functioning attributed to OCD symptoms. It was hypothesized that the effect size for the cost advantage of stepped care over standard treatment would decrease once accounting for the cost of illness. In addition, we calculated the costs of completing GSH in the stepped care program for GSH responders and nonresponders separately in order to explore the potential costs and benefits of patient-to-treatment matching in a stepped-care program. Finally, we compared GSH responders and nonresponders on pretreatment clinical variables to explore potential treatment moderators.

2. Method

2.1 Participants

Participants were 30 adult (age 18 or older) outpatients who completed at least one treatment session in a randomized controlled trial of stepped-care for OCD (Tolin, et al., 2011). Patients received either stepped care ERP ($n = 18$) or standard ERP ($n = 12$). Included participants presented with OCD as the primary problem, with at least 1 year duration, and at least moderate severity (Yale-Brown Obsessive-Compulsive Scale [Y-BOCS] ≥ 16 and Clinician's Global Impression [CGI] ≥ 4). All enrolled participants were treatment naive to ERP in any format (e.g., therapist-directed, GSH). Patients taking psychotropic medications were stabilized on type and dose for one month prior to enrollment. Exclusionary criteria were severe depression (Beck Depression Inventory-II ≥ 29), serious suicidal or homicidal ideation, substance abuse/dependence, concurrent psychotherapy, or lifetime diagnosis of a psychotic disorder, pervasive developmental disorder, or mental retardation.

2.2 Clinical Measures

2.2.1 Diagnostic status—Diagnostic status was determined using the *Anxiety Disorders Interview Schedule for DSM-IV* (ADIS-IV) (Brown, Di Nardo, Lehman, & Campbell, 2001) and Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II) (First, Spitzer, Gibbon, & Williams, 1997).

2.2.2. Symptom Severity—OCD symptom severity was assessed using the clinician-rated *Yale-Brown Obsessive Compulsive Scale* (Y-BOCS, Goodman, Price, Rasmussen, Mazure, Delgado, et al., 1989; Goodman, Price, Rasmussen, Mazure, Fleischmann, et al., 1989). Global severity of illness was rated using the *Clinical Global Impression Scale* (CGI, Guy, 1976), which ranges from 1 (*normal, not at all ill*) to 7 (*extremely ill*). Genereral psychological distress was measured using the *Depression Anxiety Stress Scale* (DASS, Lovibond & Lovibond, 1995), a 42- item self-report measure that assesses symptoms of depression, anxiety, and stress over the past week.

2.3 Additional Treatment Moderator Variables—Additional exploratory treatment moderator variables were reading ability, treatment expectancies, attention, and motivation. Reading ability was assessed with the *Wechsler Test of Adult Reading* (WTAR, Holdnack, 2001). Patient expectations were assessed using the *Expectancy Rating Form* (ERF, Borkovec & Nau, 1972). Attention problems were assessed using the *ADHD Symptom Scale* adult inattention subscale (ADHDSS; Barkley & Murphy, 1998). Motivation for change was assessed using the *University of Rhode Island Change Assessment* scale (URICA, McConnaughy, Prochaska, & Velicer, 1983).

2.3 Cost Measures

2.3.1. Direct and Indirect Costs—Treatment direct and indirect costs were measured according to current standards in the field of health economics (Drummond, Sculpher, Torrance, O'Brien, & Stoddart, 2005) and are outlined in detail elsewhere (Tolin, et al., 2011). Briefly, direct costs included all deductible and coinsurance payments, costs of therapy visits (valued using Medicare reimbursement rates), and costs of the self-help materials. Indirect costs to patients included the cost of travel (based on mileage to and from therapy from the patient's home address) and lost wages from time spent in treatment [calculated as time spent in activities related to attending treatment multiplied by the median U.S. hourly wage in 2008 of $15.57 (Bureau of Labor Statistics, 2009)]. Indirect costs to providers included labor cost (based on the cost of a portion of a 90806) not reimbursed by insurance.

2.3.2. Cost of Illness—The cost of illness was calculated based upon the total number of days of lost productivity in work, school, and home functioning; an approach which is consistent with standard approaches in health economics (Drummond, et al., 2005). Variables to determine the total number of days of lost productivity were modeled after definitions used in previous epidemiological research (Kessler & Frank, 1997) including "work loss days" and "work cutback days." Work loss days were calculated based upon the self-reported number of days in the previous week that the patient or any other person (parent, spouse, child, friend, etc.) missed ½ day or more from work or school, or was unable to perform housework, due to the patient's OCD. Work cutback days were assessed with the question "During the past week, how often have you accomplished less than you would like as a result of your OCD?" Response choices ranged from "none of the time" to "all of the time." In order to estimate number of days per week, we translated the response choices as follows: None of the time = 0 days per week, A little of the time = 1 day per week, Some of the time = 3 days per week, Most of the time = 5 days per week, All of the time = 7 days/week. The total number of days of lost productivity was calculated as the sum of the reported work loss days plus ½ the sum of the number of work cutback days. The cost of illness was then calculated by multiplying the total number of days of lost productivity by the average daily wage (hourly wage multiplied by 8 hours/day) for all workers in the region in which the study was conducted. Test-retest reliability calculated from pretreatment to session 1 assessments (M = 19.17 days, SD = 11.82) was calculated in the current sample and found to be in the acceptable range (work loss days r = 0.84, work cutback days r = 0.73).

2.4 Study Treatments

Stepped Care—Patients completing stepped care began with bibliotherapy plus counseling (Step 1) over a 6 week period. Patients were given a copy of the book "Stop Obsessing!" (Foa & Wilson, 2001) and met with a therapist 3 times (one 30-40 min visit every 2 weeks). The therapist provided support, motivational interviewing, and suggestions for maximizing the self-directed program; however, no ERP was performed or modeled within these sessions. After Step 1, patients were assessed to determine responder status. For patients who were assessed as responders to Step 1, this was the end of their treatment. Patients who did not meet responder status entered Step 2 of the program. Step 2 entailed therapist-directed ERP (Foa & Kozak, 1997) and consisted of twice weekly 90-120 minute sessions for 17 sessions. ERP consisted of graded exposure combined with strict abstinence from compulsive behavior. *Standard ERP.* Patients assigned to the standard ERP condition received ERP that was as described in Step 2 of the stepped care condition immediately upon entering treatment.

2.5 Procedure

All participants provided written informed consent. An independent evaluator (IE, a Ph.D. clinical psychologist or postdoctoral fellow trained to criterion in the study measures and experienced in the assessment of OCD) completed study assessments. Participants were randomly assigned to either stepped care or standard ERP. Participants were assessed by the IE at pretreatment and posttreatment (post Step1 and/or post Step 2, or post standard treatment as applicable) to determine responder status. Responder status was determined based on clinically significant change (Jacobson & Truax, 1991) in Y-BOCS score (i.e., a decrease of 5 or more and a score ≤ 13). The cost of illness measure was administered at each treatment session during Step 1 (every other week), and at every other session (weekly) during Step 2 and standard treatment. To account for the differences in assessment frequency, each cost of illness assessment in Step 1 was multiplied by two to estimate costs for the previous two weeks. For participants who discontinued treatment before the posttreatment assessment ($n = 3$ in Step 1, $n = 3$ in Step 2, $n = 2$ in Standard Treatment), last observation was carried forward. Participants who discontinued treatment were provided with alternative referral information.

3. Results

3.1 Demographic and Clinical Characteristics

As shown in Table 1, patients in the two treatment conditions did not differ significantly in terms of demographic or clinical characteristics. On average, patients in both groups reported severe OCD symptoms.

3.2 Total Program Costs

Table 2 presents descriptive data for the direct, indirect, and illness costs by treatment group. Total costs for stepped care versus standard treatment were not statistically different [$t(28) = -1.71$, $p = .098$]. There was a moderate effect size for cost savings for stepped care compared to standard treatment (Cohen's $d = -0.66$).

3.3 Step 1 Responders versus Step 1 Nonresponders

3.3.1. Costs—Table 3 displays the costs of participating in an initial GSH treatment for OCD separately for patients who did and did not respond to this treatment step. The total mean cost of delaying treatment for a patient who does not respond to initial GSH was $1,674.84, and the majority of these costs were attributed to the cost of illness. In contrast, cost savings of participating in GSH for those who do respond was estimated by subtracting the cost of participating in Step 1 (GSH) from the cost of participating in standard treatment ($9,540.96- $1,319.44 = $8,221.52). Thus, there is a substantial cost savings for patients who do respond to the initial treatment step of GSH.

3.3.1. Exploratory Treatment Moderators—Nonparametric statistics were used to compare GSH treatment responders ($n = 5$) and nonresponders ($n = 13$) on exploratory clinical moderator variables given the small samples sizes. Participants who did and did not respond to GSH treatment during Step 1 did not differ (all $p > .05$) on OCD severity ($U = 31.5$, $r = 0.02$), global illness severity ($U = 30.00$, $r = 0.06$), depression severity ($U = 31.00$, $r = 0.12$), reading ability ($U = 30.50$, $r = 0.05$), treatment expectancy ($U = 32$, r = 0.01), or motivation ($U = 19.00$, $r = 0.27$). Groups differed significantly on self-reported problems with attention. GSH nonresponders reported significantly more severe problems with attention ($Mdn = 11.04$) than did GSH responders ($Mdn = 5.50$) [$U = 12.50$, $r = .47$, $p < .05$].

4. Discussion

The effect size for cost savings of a stepped care program for OCD was moderate ($d = 0.66$) in the current study. This is in comparison to a large effect size ($d = 0.96$) for cost savings when only direct and indirect costs were taken into account in the previous study (Tolin, et al., 2011). Thus, as predicted, including the cost of illness in calculations reduced the cost-benefit of participating in a stepped care program. While the cost-benefit was reduced, a moderate effect still argues for the potential cost-effectiveness of stepped care for OCD, but also suggests a need to further personalize the program.

In this treatment protocol patients were randomly assigned to treatment condition. It is possible that superior cost savings could be achieved if pretreatment variables are identified which can predict response (or nonresponse) to GSH. Such data would inform which patients would be most likely to benefit from GSH and which should begin more intensive treatment without delay. To explore this issue we calculated the costs of participating in GSH separately for GSH responders and nonresponders. Results showed that the potential cost savings of correctly matching patients with treatment conditions is substantial.

However, in many areas of mental health treatment, including OCD, the relevant variables for patient-treatment matching are as yet unknown. There have been largely inconsistent findings across studies on predictors of ERP for OCD (Keeley, Storch, Merlo, & Geffken, 2008). In exploratory analyses in the current study, self-reported problems with attention was the only clinical variable to differentiate GSH responders and nonreponders. Deficits in executive function have been associated with attenuated CBT outcome for OCD patients in some previous studies (Flessner et al., 2010; Moritz et al., 2005), and self-reported problems with attention have also been associated with poorer compliance and outcome in treatment for compulsive hoarding (Tolin, Frost, & Steketee, 2007). Neurocognitive variables may be especially important in a GSH intervention given the increased initiative, comprehension, and self-regulation required. Additional research with larger samples and more extensive assessment is needed to identify neurocognitive predictors for GSH treatment of OCD.

The study results need to be interpreted within several limitations. Sample sizes were small and unfortunately precluded more sophisticated analyses of potential treatment outcome predictors. Additionally, participants in the current study reported severe OCD on average, which may have inflated the cost of illness. Research on GSH for OCD with larger samples and a wider range of severity (including mild, nonclinical symptoms) is needed. In addition, the cost of illness was based solely upon estimated costs associated with functional impairments. There may be additional costs of illness related to health care utilization, which could have further increased costs of delaying treatment. Future research will need to be conducted with more careful assessment of costs related to health care utilization. Finally, the number of work cutback days was estimated from a likert scale assessment, and it will be important for future research to assess this variable more specifically. While preliminary, these data highlight the importance of including costs of illness in cost-effectiveness analyses, perhaps especially for the plethora of lower intensity CBT treatments being developed currently. These data also demonstrate the importance of developing patient-to-treatment matching algorithms for OCD stepped care. Such algorithms could prevent unnecessary treatment delays for the two-thirds of patients who will not benefit from GSH, thus leading to substantial additional reductions in illness burden and related costs.

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Highlights

- Including the cost of illness decreases the cost savings of stepped care for OCD.
- Additional cost savings may be achieved with patient-to-treatment matching.
- It is important to identify predictors of treatment response in future research.

Table 1

Pretreatment Demographic and Clinical Characteristics

	Stepped Care (n = 18)	Standard ERP (n = 12)	*t* (28)	X^2 (1)
Age	35.00 (15.06)	29.67 (10.37)	1.07	
Female	12 (66.7%)	5 (41.7%)		1.83
White	16 (89.9%)	8 (66.7%)		2.22
Working/Student	16 (88.9%)	11 (91.7%)		0.06
Y-BOCS	24.22 (4.47)	25.58 (3.66)	0.88	
WTAR	114.94 (8.96)	115.92 (7.91)	0.31	
DASS Depression	5.89 (5.58)	11.42 (9.50)	1.82	
DASS Anxiety	5.06 (4.28)	7.92 (4.66)	1.73	
DASS Stress	10.22 (7.41)	16.25 (8.76)	2.03	
CGI	4.78 (0.73)	5.00 (0.85)	0.76	
Work Loss Days	1.06 (1.90)	1.77 (2.31)	0.93	
Work Cutback Days	1.78 (0.89)	2.00 (0.80)	0.67	
Total Days of Lost Productivity	2.84 (2.33)	3.77 (2.57)	1.04	

Note. All p values > .05. For continuous variables, means are shown with standard deviations in parentheses. For categorical variables, frequencies are shown with within-group percentages in parentheses. ERP = Exposure and Response Prevention, Y-BOCS = Yale-Brown Obsessive-Compulsive Scale total score, WTAR = Weschsler Test of Adult Reading, DASS = Depression Anxiety Stress Scale, CGI = Clinical Global Impression-Severity.

Table 2

Treatment Program Costs

	Step 1	Step 2	Stepped Care Total	Standard Care Total	Cohen's d Stepped Care Total vs. Standard Care Total
Direct Costs	292.97 (23.45)	2152.80 (2242.29)	2445.77 (2248.03)	4161.57 (1128.91)	0.96
Indirect Costs	189.10 (65.18)	809.15 (928.82)	998.25 (937.98)	1583.18 (508.83)	0.78
Cost-of-Illness	1094.05 (1142.17)	1519.65 (3308.86)	2522.47 (4323.50)	3796.21 (4450.38)	0.29
Total	1576.12 (1173.93)	4481.60 (5472.28)	5966.49 (6253.35)	9540.96 (4388.23)	0.66

Table 3

Step 1 Costs for Guided Self-Help Responders and Nonresponders

	Responders	**Nonresponders**
Direct Costs	298.50 (0.00)	290.84 (27.60)
Indirect Costs	216.56 (65.04)	178.54 (64.60)
Cost-of-Illness	804.38 (249.71)	1205.46 (1333.76)
Total Costs	1319.44 (232.49)	1674.84 (1377.06)