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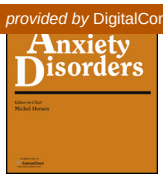

Review

Dropout rates in exposure with response prevention for obsessive-compulsive disorder: What do the data really say?

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ABSTRACT

The purposes of this review were to: 1) determine the attrition rates for exposure with response prevention (ERP) for obsessive-compulsive disorder (OCD), 2) compare them to those in other treatments for OCD, and 3) identify predictors of ERP attrition. A systematic literature search of randomized controlled trials for ERP for OCD yielded 21 studies, representing 1400 participants. Attrition data were extracted for individual treatment conditions. The weighted mean dropout rate for ERP was 14.7% (95% CI [11.4%, 18.4%]). This figure was not statistically different from that of comparison conditions (e.g., cognitive therapy; OR = 0.67–2.22, all *ps* > 0.15). Only two studies reported refusal rates for ERP (weighted mean = 4.0%; 95% CI [0.7%, 9.2%]), which precluded calculation of a reliable refusal rate for ERP. Based on these figures, we estimated an overall attrition rate of 18.7% for ERP. Treatment experience, therapist qualification, and number of treatment sessions did not significantly predict dropout rate. Our review indicates that ERP may have treatment dropout rates similar to other treatments for OCD.

Contents

Obsessive-compulsive disorder (OCD) was once considered challenging to treat. Fortunately, exposure with response prevention (ERP), cognitive-behavioral therapy (CBT) more broadly, anti-depressants, and a combination of the two have been found to be effective in treating this disorder (O'Connor et al., 2005). To date, ERP and CBT are the most supported psychotherapy treatments for OCD. ERP—the gold standard treatment—consists of gradual exposure to anxiety-inducing obsessions and prevention or restriction of engagement in anxiety-reducing rituals (Olatunji, Davis et al., 2013). Meta-analyses have found similarly large effect sizes when comparing ERP, cognitive restructuring (CR), and ERP plus CR (Abramowitz, Franklin & Foa, 2002; Rosa-Alcázar, Sánchez-Meca, Gómez-Conesa, & Marín-Martínez, 2008). Olatunji, Davis et al. (2013) recently conducted a meta-analysis of 16 randomized controlled trials that included participants with a DSM-IV or DSM-IV-TR diagnosis of OCD, a control group, and more than one single session of CBT. Results showed that ERP (also called CBT) had larger

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effect sizes on primary outcome measures compared to control conditions. In addition, some evidence suggests that ERP may be more effective than cognitive therapy in the treatment of OCD (Olatunji, Rosenfield et al., 2013).

Despite research supporting the efficacy of exposure therapy, pervasive negative beliefs about exposure exist for therapists and clients alike (e.g., Olatunji, Deacon, & Abramowitz, 2009; Zoellner et al., 2011). Specifically, research has shown that therapists believe that the clients' anxiety symptoms will increase with exposure (Cook, Schnurr, & Foa, 2004) and that clients will drop out or decompensate during difficult exposure tasks (Deacon, Lickel, Farrell, Kemp, & Hipol, 2013). Negative beliefs about exposure appear to impede the dissemination of exposure-based CBT. A recent survey conducted on therapists in a community setting revealed that practitioners use several CBT techniques with anxious clients but very few utilize exposure techniques (Hipol & Deacon, 2013). These findings are consistent with an early survey study showing that exposure was under-utilized and often used in conjunction with anxiety reduction techniques (Freiheit, Vye, Swan & Cady, 2004). Overall, it appears that the practice and dissemination of exposure therapy are challenged by therapists' negative beliefs about the treatment. One of these beliefs is that ERP suffers from notable attrition (refusal prior to the start of treatment or dropout following the start of treatment) rates. In other words, therapists may be prematurely discouraged by potential attrition and elect not to utilize ERP. As a result, patients with OCD may not be presented with the best available treatment options, which has serious implications for treatment outcomes. Thus, a key question for addressing therapist barriers to using ERP is whether treatment attrition rates really are especially high for ERP, as well as how ERP attrition rates compare to those observed in other interventions for OCD, such as cognitive therapy.

At first glance, the dropout and refusal rates for ERP cited in studies are not reassuring, which would be consistent with common therapist concerns. One study estimated that 25% refuse to start behavioral therapy for OCD and nearly 20% more drop out prematurely after starting treatment (Schruers, Koning, Haack, Luermans & Griez, 2005). Another study estimated that 25% of participants refuse treatment due to beliefs about the difficulty of ERP (Franklin & Foa, 2007), whereas Abramowitz, Taylor, and McKay (2009) cited a 25% dropout rate for ERP in their review on OCD. These articles described attrition rates for ERP broadly, but most of them based their estimates on only one or two studies, which is not sufficient to make such generalizations. Furthermore, the rates were not determined or reported systematically, and operationalizations of attrition might have varied across studies, making it difficult to synthesize or compare rates as they have been presented. For example, Schruers et al. (2005) distinguished between dropout and refusal, whereas Franklin, Abramowitz, Kozak, Levitt, and Foa (2000) used attrition and dropout synonymously. Inconsistency in reported data on treatment attrition rates for OCD treatment trials has led researchers to suggest that the rates provided in the current literature are speculative and inconclusive (Santana, Fontenelle, Yücel & Fontenelle, 2013).

To our knowledge, no systematic analysis of attrition rates of ERP for OCD has been conducted. Empirically derived estimates of weighted mean dropout and refusal rates for ERP across treatment studies would give researchers and clinicians a better sense of the acceptability of ERP to patients with OCD. Given the number of published RCTs comparing ERP to other treatments for OCD, there is now the opportunity for such a review to compare the rates of dropout between ERP and other approaches to see if they are especially elevated with ERP. This information can then be used to inform therapist beliefs about ERP, and ultimately, its dissemination.

The purpose of this study was to conduct a meta-analysis of the existing research on attrition (treatment dropout and refusal) rates in randomized controlled trials (RCTs) of ERP for OCD. Results of this evaluation will help the field determine if we have sufficient data to report on attrition rates, and if we do, how they compare to other treatment conditions.

1. Method

1.1. Literature search

A systematic search of the literature was conducted on PsycINFO and PubMed, using the key words *exposure and response prevention* and *obsessive-compulsive disorder*. Further manual searches were conducted by examining the references of all available meta-analyses and reviews. This process continued until no new relevant articles were found.

To be included in the meta-analysis, studies needed to: (a) randomly assign participants to treatment conditions; (b) contain at least one ERP alone treatment condition; (c) use a face-to-face individual psychotherapy format; (c) include participants who received diagnoses of OCD based on clinical assessment; (d) use an adult sample; and (e) be available in English. The search for relevant studies was restricted to RCTs to facilitate the comparison of attrition rates across conditions. Studies that (a) involved residential treatment; or (b) did not provide sufficient information on dropout and refusal rate for individual treatment conditions (i.e., only provided study-level data) were excluded from the current meta-analysis. Of the 579 articles found in the database searches, 28 studies published between 1980 and 2015 met initial inclusion criteria. For articles that did not include information on dropout or refusal rates by treatment condition, study authors were contacted with requests for the relevant data. Five studies were subsequently excluded because they failed to report enough information to calculate either a dropout or refusal rate for individual conditions in the original article, and authors either were unable to provide the data (e.g., because data had been destroyed due to the age of the study) or did not respond to our request for data. One study was excluded because it contained an inpatient phase of treatment. Another study was excluded because it reanalyzed data from an already included study. This resulted in a total of 21 studies for final analyses.

1.2. Data abstraction

To analyze participant flow of ERP compared to other treatments, data from each condition of the RCTs were collected separately and assigned to one of the following groups: ERP, ERP + other psychotherapies (e.g., motivational interviewing), ERP + technology (e.g., telephone-administered ERP), ERP + medications, cognitive therapy (CT), CT + medications, behavior therapy (BT), CBT, CBT + medications, medications only, active control (e.g., stress management), inactive control (e.g., waitlist), and group interventions (e.g., group format CBT). In the present study, ERP or standard ERP was defined as individual face-to-face ERP.

Among the 21 studies, a wide variety of time points (e.g., "participants that were randomized," "participants that started treatment," and "participants that completed baseline") related to participant recruitment, allocation, and attrition were reported. There was an overall lack of standardization in the methods of reporting participant flow. Therefore, the exact rates reported in the original studies or rates calculated from clearly defined data were extracted to determine dropout and refusal rates. For one of the studies, refusal rate was obtained from a subsequent article (Olatunji, Rosenfield et al., 2013) that reanalyzed the original data.

We defined dropout as attrition following the start of treatment; attrition prior to the start of treatment was considered refusal. Dropout and refusal data were determined for each individual condition based on these operationalizations. The second author initially scored all studies. The third and fifth authors each independently rescored all studies and any discrepancies were clarified among the authors.

1.3. Analyses

The purposes of this study were to determine the attrition rates (i.e., treatment dropout and refusal) of ERP for OCD in RCTs, to compare attrition rates across treatment conditions, and to identify significant predictors of attrition rate in ERP. Because this study focused on attrition in ERP exclusively and not the treatment of OCD generally, only studies that reported data on an ERP alone condition were included. The main outcome variable was percentage of dropout; we were unable to calculate a reliable overall refusal rate due to insufficient data. In line with recommendations for conducting meta-analyses of proportion data, we transformed the data using the Freeman-Tukey double arcsine transformation (Barendregt, Doi, Lee, Norman, & Vos, 2013; Freeman & Tukey, 1950). The double arcsine transformation is recommended over the logit transformation (another way to transform proportion data) because it more effectively addresses variance instability for estimates close to 0 or 1 (Barendregt et al., 2013). In addition, due to anticipated heterogeneity across studies, random-effects models were used to estimate dropout and refusal rates. Heterogeneity was assessed with the Cochran's Q test and the I^2 test statistic (Hedges & Olkin, 1985; Higgins, Thompson, Deeks, & Altman, 2003). Separate analyses were conducted for continuous and categorical predictors of interest. A meta-regression was used to evaluate the continuous predictor of dropout, whereas random effects models with Q-tests based on analysis of variance were used to compare differences in dropout rate across levels of the categorical predictors (Borenstein, Hedges, Higgins, & Rothstein, 2009). All analyses were performed using the metafor package in R and Comprehensive Meta-analysis, a statistical program designed for meta-analyses (Borenstein, Hedges, Higgins, & Rothstein, 2005; R Core Team, 2015; Viechtbauer, 2010).

Initial descriptive analyses examined the types of comparison treatment conditions included in the studies, the rate with which studies reported dropout and refusal rates, as well as the reported reason for dropout. Primary analyses calculated the inverse variance-weighted rates and confidence intervals for treatment dropout by treatment condition, as well as compared dropout rates between ERP and other conditions using odds ratios. Of note, weighted estimates were close to the mean and median values for treatment dropout and refusal for all included studies.

Based on Borenstein et al.'s (2009) sample size recommendation of 10 studies to one covariate for meta-regression, we determined that our analyses were sufficiently powered to detect a predictor effect if it existed. Potential predictors of dropout were discussed among the authors, and only relevant variables for which sufficient data were provided were included in the analyses. They included: treatment delivery experience for the therapist, therapist qualification, and number of treatment sessions. The first two variables were coded independently by the first and fourth authors, and discrepancies were resolved through discussion. Treatment experience was categorized as (a) no professional experience (e.g., graduate students), (b) professional experience not specific to CBT, or (c) professional experience with or expertise in CBT. Therapist qualification was classified as (a) student, (b) non-psychologist professional or therapist, or (c) doctoral-level therapist or psychologist. The authors coded these qualitative variables conservatively, assigning higher codes (e.g., expertise in CBT) only when there was sufficient information to indicate so. The number of therapy sessions was determined by the figure indicated in the study treatment protocol; if the number of sessions varied across participants, the mean (as reported by the study authors) was used.

2. Results

2.1. Descriptive information

A total of 21 studies that had ERP alone as a treatment condition were included in the analyses, with publication years between 1991 and 2014. These studies represented a total of 1400 participants. There were 10 comparison conditions utilized in these studies (conditions are followed by their number of times represented): ERP + other psychotherapies = 1 (motivational interviewing); ERP + technology = 2 (self-administered bibliotherapy, telephone-administered); ERP + medication = 4 (clomipramine, fluvoxamine); CT = 7; CT + medication = 1 (fluvoxamine); BT = 1 (satiation therapy); CBT = 2; active control = 2 (stress management, progressive muscle relaxation); inactive control = 2 (waitlist); and group interventions = 3 (group CBT, group ERP). The majority of the studies compared two conditions (k = 17), three compared three, and one compared five. Characteristics of included studies are summarized in Table 1.

All 21 studies provided data for dropout rates by treatment condition. Of the 21 studies included in the final analysis, only 7 offered data on reasons for dropout. These data on reasons for dropout are limited because only four provide these data for each treatment condition; the remaining are presented across all conditions at the study level. In terms of refusal rates, only 11 of 21 (52.4%) provided sufficient data to calculate a treatment refusal rate based on the definition used in this review (attrition prior to starting treatment). However, our review indicated that calculating an overall refusal rate for ERP would be difficult, as only 2 of the 11 studies that reported refusal rate did so for each individual treatment condition (or 9.5% of the total sample). Instead, most studies only provided data on treatment refusal at the study level.

2.2. Dropout rates

The number of conditions as well as the dropout mean and range for each treatment type are depicted graphically in Fig. 1. The weighted mean dropout rate for ERP was 14.7% (95% CI [11.4%, 18.4%]). Table 2 provides a summary of refusal and dropout rates for both ERP only and study-level data, along with model statistics.

2.3. Refusal rates

Only two studies reported refusal rates (after condition assignment) for ERP, rendering a meta-analysis with those data untenable. However, the specific refusal rates for ERP from both studies were 4.8% and 3.6%, which yielded a weighted mean of 4.0% (95% CI [0.7%, 9.2%]). These two studies included comparison conditions: a CBT condition reported a refusal rate of 7.3%, and an active control condition reported a refusal rate of 1.8%. These data are limited in determining actual refusal rates for ERP and how they compare to other treatments. However, 11 studies offered refusal rates at the study level. The average refusal rate across studies was 12.0% (95% CI [3.4%, 24.3%]), and rates ranged from 0 to 76.6%. These data are likely to be more useful in gauging refusal rates for psychotherapy randomized controlled trials for OCD, as they are not specific to ERP.

Table 1
Study characteristics.

Author(s) and Year	Sample Size	Study Therapist(s)	Therapist Training/Experience	Supervision	ERP Description	Session Number	Frequency	Exposure Homework
Emmelkamp & Beens (1991)	21	Clinical psychology students	Extensive course in behavior therapy, training in CBT with OCD patients	Twice-weekly group sessions, supervised by senior author	Self-controlled exposure in vivo and self-imposed response prevention (Emmelkamp, 1982)	6	1–2 times weekly	Yes
Fals-Stewart, Marks, & Schafer (1993)	93	Psychiatric social workers	At least 1 year of experience conducting behavior therapy interventions for OCD	Not described	In vivo exposure and/or imaginal flooding with response prevention	24	Twice weekly	Yes
van Oppen et al. (1995)	71	Clinical psychologists	Versed in behavior therapy, experience with behavioral treatment of OCD, training in CT for OCD	Weekly group sessions during which partial audiotaped recordings of therapy sessions were overheard	Self-controlled exposure in vivo and self-imposed response prevention (Emmelkamp, 1982)	16	Once weekly	Yes
van Balkom et al. (1998)	117	Psychologists	Experience with behavioral treatment for OCD, training in CT	Not described	Gradual self-controlled exposure in vivo with gradual self-imposed response prevention (Hoogduin and Hoogduin, 1984)	18	1–2 times weekly	Yes
Kozak, Liebowitz, & Foa (2000)	97	Cognitive behavioral therapists	Training in the treatment protocol, observed experts conducting treatment, performed a supervised intensive CBT with at least one patient	Continuing supervision with a licensed psychologist, sessions were videotaped and discussed with therapists several times a week, periodical therapist meetings for supervised review of tapes and therapy procedures	Graded in vivo and imaginal exposure with response prevention	17	Every weekday for 3 weeks, then 2 consecutive days in the fourth week	Yes
Cottraux et al. (2001)	65	Psychologists	CBT diploma, additional 20 h of training	Supervision in the case of significant clinical problems	Therapist-aided in vivo and imaginal exposure with response prevention (Foa and Wilson, 1991; Marks, 1987)	14	Twice weekly for 4 weeks, then once biweekly for 12 weeks	Yes
Abramowitz, Foa, & Franklin (2003)	40	Doctoral-level therapists	Training involved didactics, observing treatment as a cotherapist, and conducting individual therapy under close supervision by an ERP expert; 1–16 years of experience with ERP	Weekly group supervision meetings, nonlicensed therapists received additional individual supervision on a weekly basis	Therapist-supervised in vivo and imaginal exposure with ritual prevention, and self-monitoring (Kozak and Foa, 1997)	15	(a) Every weekday over 3 weeks (b) Twice weekly over 8 weeks	Yes
Krochmalik et al. (2004)	22	Psychologists	Not described	Not described	Graded exposure to internal and external OC triggers with response prevention (Andrews, Crino, Hunt, Lampe, & Page, 1994)	12	Once weekly	Yes

Table 1 (*Continued*)

Author(s) and Year	Sample Size	Study Therapist(s)	Therapist Training/Experience	Supervision	ERP Description	Session Number	Frequency	Exposure Homework
Foa et al. (2005)	149	ERP therapists	Training included observing experts who conducted ERP and completing at least one training case of ERP	Ongoing weekly supervision	In vivo and imaginal exposure with ritual prevention, discussion of OCD-related beliefs and disconfirmatory evidence provided by exposure exercises (Kozak and Foa, 1997)	23	Every weekday for 3 weeks, then once weekly for 8 weeks	Yes
O'Connor et al. (2005)	44	Therapists	Skilled in either 1 or a combination of the study treatments	Not described	Supervised and self-controlled in vivo exposure with response prevention, obsessional beliefs were not addressed (Steketee, 1993, 1999)	20	Once weekly	Not described
Whittal, Thordarson, & McLean (2005)	83	Licensed clinical psychologists, psychology interns	Experience with treating OCD (psychologists)	Supervision of interns via audiotape review or cotherapy	In-session graduated exposure and response prevention, cognitive elements were not addressed (McLean et al., 2001; Van Noppen, Steketee, McCorkle, & Pato, 1997)	12	Once weekly	Yes
Lovell et al. (2006)	86	Cognitive behavioral therapists	Trained and experienced, training days every four months during the first year of the study	Fortnightly supervision	Graded exposure and response prevention	10	Once weekly	Yes
Anderson & Rees (2007)	63	Postgraduate-level clinical psychology students	Trained	Treatment sessions were videotaped and reviewed in regular supervision with a clinical psychologist experienced in the treatment of OCD	Cognitive restructuring integrated into exposure exercises (Rees and Nathan, 2001)	10	Once weekly	Yes
Rowa et al. (2007)	28	Therapists	At least one year of experience treating OCD with ERP	Regular supervision meetings with senior therapists	Exposure and response prevention adapted from ERP treatment protocols (e.g., Foa and Franklin, 2001; Steketee, 1993)	14	Once weekly for the first and last two sessions, twice weekly for all other sessions	Yes
Tolin et al. (2007)	41	Doctoral-level psychologist or postdoctoral fellow	Experienced	Not described	Gradual in vivo and imaginal exposure with response prevention (Foa, Steketee, Grayson, Turner, & Latimer, 1984)	15	Twice weekly	Not described
Simpson et al. (2008)	134	Psychologists	Training included manual review and completion of at least one training case of each type under supervision	Weekly group supervision included review of audio or video recordings	In vivo and imaginal exposures with response prevention, formal cognitive techniques were not used (Kozak and Foa, 1997)	17	Twice weekly	Yes
Wilhelm et al. (2008)	23	Therapists	Not described	Supervision by clinicians specializing in OCD	Exposure and response prevention, formal cognitive restructuring was not part of the protocol (Kozak and Foa, 1997)	10	Twice weekly	Yes

Table 1 (*Continued*)

Author(s) and Year	Sample Size	Study Therapist(s)	Therapist Training/Experience	Supervision	ERP Description	Session Number	Frequency	Exposure Homework
Khodarahimi (2009)	60	Clinical psychologist	Not described	Not described	In vivo and imaginal exposure with response prevention (Salkovskis and Kirk, 1989)	12	Twice weekly	Yes
Solem, Håland, Vogel, Hansen, & Wells (2009)	83	Graduate psychology students, psychologists	Not described	Not described for individual treatment therapists	Exposure and response prevention, the majority of therapy sessions did not use cognitive techniques (Kozak and Foa, 1997)	15.88 (mean)	Twice weekly	Not described
Simpson et al. (2010)	30	Doctoral-level therapists	Expertise in ERP, served as ERP therapists on other NIMH-funded clinical trials	Weekly group ERP phone supervision	In vivo and imaginal exposures with response prevention (Kozak and Foa, 1997)	18	Twice weekly	Yes
Vaccaro, Jones, Menzies, & Wootton (2013)	50	Clinical psychologist	Experience with treating patients with OCD using the ERP study protocol	Ongoing supervision provided as required, weekly meetings	In vivo exposure and response prevention, cognitive components were not addressed (Andrews, Crino, Lampe, Hunt, & Page, 2002)	14	Once weekly	Yes

Note: ERP = exposure with response prevention; CBT = cognitive behavioral therapy; OCD = obsessive-compulsive disorder; CT = cognitive therapy; NIMH = National Institute of Mental Health.

Table 2
Dropout and refusal rates for ERP and study-level data.

Condition (k)	Rate (%)	95% CI (%)	I^2	Q	p
Dropout					
ERP (21)	14.7	11.4, 18.4	20.77	24.44	0.22
Study-level (21)	15.0	11.1, 19.4	75.96	91.06	<0.001
Refusal					
ERP (2)	4.0	0.7, 9.2	0.00	0.10	0.75
Study-level (11)	12.0	3.4, 24.3	96.42	697.04	<0.001
Attrition[a]					
ERP	18.7				
Study level	27.0				

Note: CI = confidence interval; ERP = exposure with response prevention.
[a] Calculated by adding up weighted average dropout and refusal rates.

Table 3
Dropout rates of ERP vs. other conditions.

Comparison condition (k)	OR	95% CI	p
Other[a] (23)	1.04	0.73, 1.49	0.83
Non-ERP (15)	1.27	0.82, 1.97	0.29
CT[b] (7)	1.06	0.58, 1.94	0.84
CT/CBT[b] (9)	1.26	0.78, 2.04	0.34
Other ERP[c] (8)	0.67	0.38, 1.18	0.17
Control[d] (3)	1.04	0.40, 2.67	0.94
Group[e] (3)	2.22	0.71, 6.96	0.17

Note: ERP = exposure with response prevention; OR = odds ratio; CI = confidence intervals; CT = cognitive therapy; CBT = cognitive behavioral therapy. The Khodarahimi (2009) study was not included in these comparison analyses due to zero dropout across all conditions.
[a] Included ERP conditions that incorporated technology, medication, or other psychotherapies (motivational interviewing).
[b] Did not include psychotherapy plus medication conditions.
[c] These ERP conditions incorporated technology, medication, or other psychotherapies (motivational interviewing).
[d] Included active control (stress management, progressive relaxation) and waitlist conditions.
[e] Included group CBT and group ERP conditions.

2.4. Comparison across conditions

Comparison analyses for dropout rates revealed no difference between standard ERP and all other conditions (OR = 1.04, 95% CI [0.73, 1.49], $p = 0.83$). When ERP dropout rates were compared to those of other non-ERP conditions (i.e., other conditions excluding ERP + other psychotherapies, ERP + technology, ERP + medication, and group ERP), there were still no significant differences (OR = 1.27, 95% CI [0.82, 1.97], $p = 0.29$). Table 3 and Fig. 2 provide an overview of the dropout rates of ERP relative to other treatment conditions. The limited number of studies reporting refusal rates for ERP precluded a comparison of refusal rates across conditions.

2.5. Predictors of dropout

Treatment experience (Q[2] = 0.23, $p = 0.89$), therapist qualification (Q[2] = 0.49, $p = 0.78$), and number of treatment sessions (estimate = −0.02, Z = −0.61, $p = 0.54$) did not significantly predict dropout rate in ERP.

2.6. Publication bias

A funnel plot was used to evaluate publication bias. The slight asymmetry of the funnel plot indicated possible publication bias in the direction of excluding studies with higher ERP dropout rates (see Fig. 3). However, the trim and fill method yielded a robust effect size estimate.

3. Discussion

The initial goal of this review was to determine the attrition rate of ERP based on the literature to date, and to compare that rate to attrition rates in other treatment modalities. For the purpose of this paper, attrition was defined as the combination of those

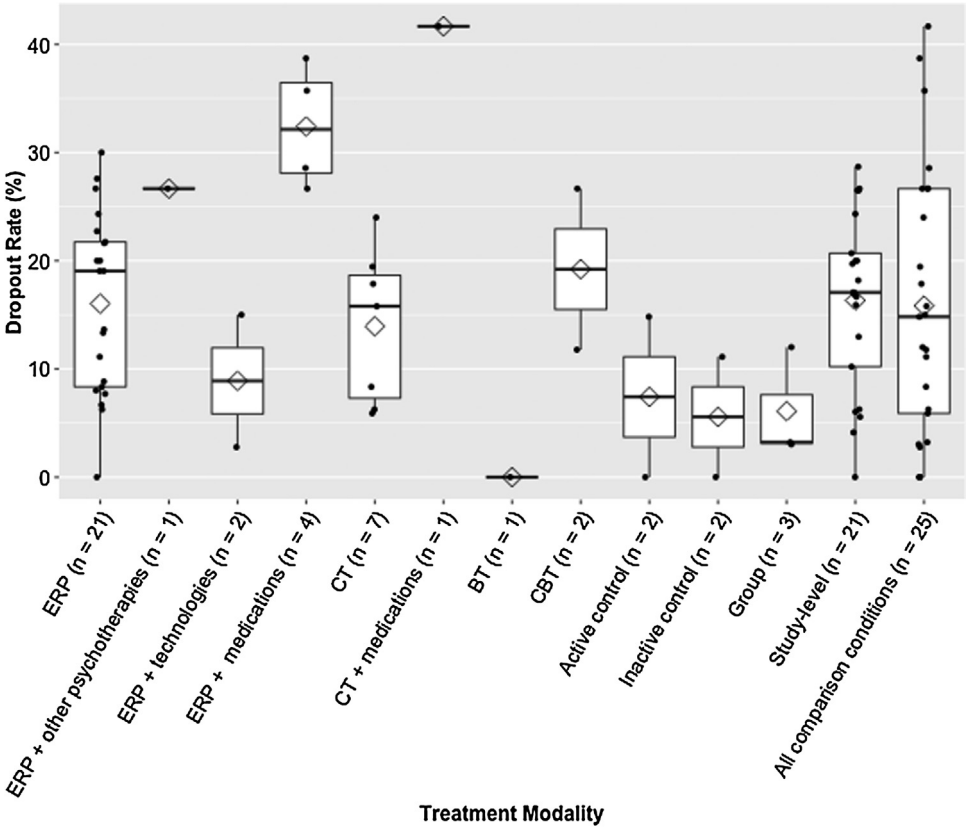

Fig. 1. Dropout rates by treatment modality. *Note*: ERP = exposure with response prevention; CT = cognitive therapy; BT = behavior therapy; CBT = cognitive behavioral therapy.

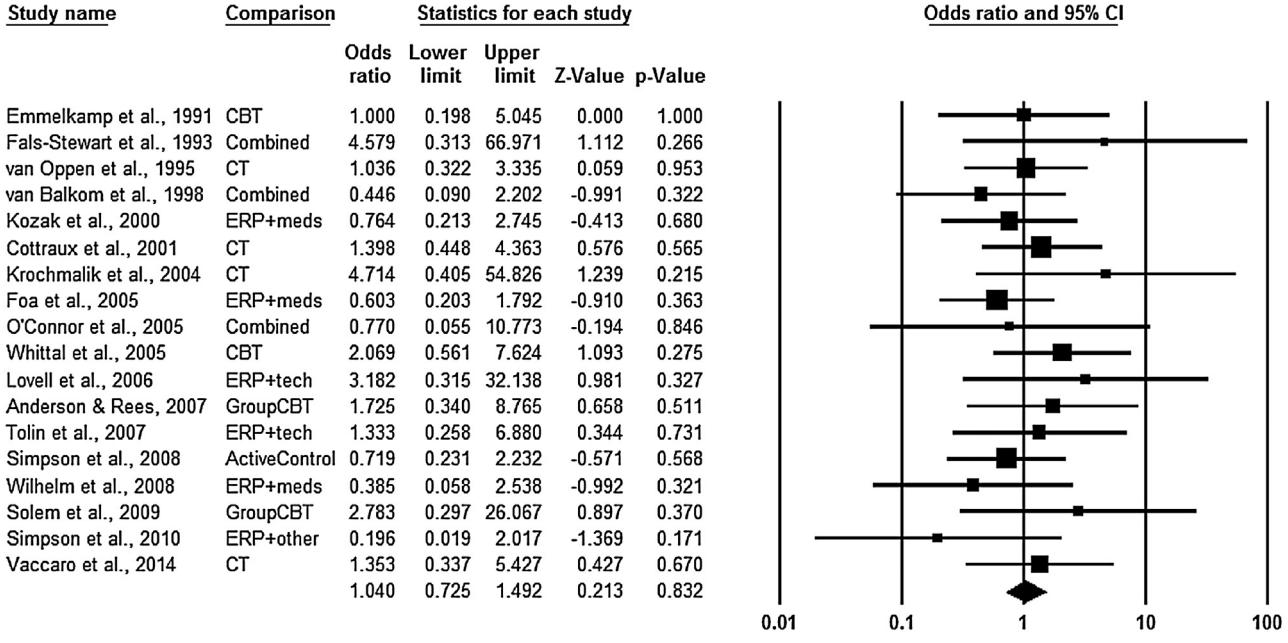

Fig. 2. Forest plot for dropout rates of ERP vs. other conditions. *Note*: Higher odds ratios indicate greater likelihood of dropout in the ERP condition relative to the comparison condition.

who refused treatment and those who dropped out of treatment. Because of the limited data on refusal rates, we could not determine the attrition rate of ERP. Only 52.4% of included studies reported any refusal rate, with 9.5% reporting refusal rates for individual treatment conditions. Analyzing the available data from 2 out of 21 studies yielded a 4.0% refusal rate for ERP (95% CI [0.7%, 9.2%]). More commonly, refusal rate was reported at the study level (i.e., collapsed across conditions), resulting in a 12.0% overall refusal rate. In contrast, more consistent reporting of dropout data allowed us to calculate a more robust estimate of dropout rate in ERP.

The weighted mean dropout rate for ERP of 14.7% was lower than rates reported in previous studies; rates closer to 25% have

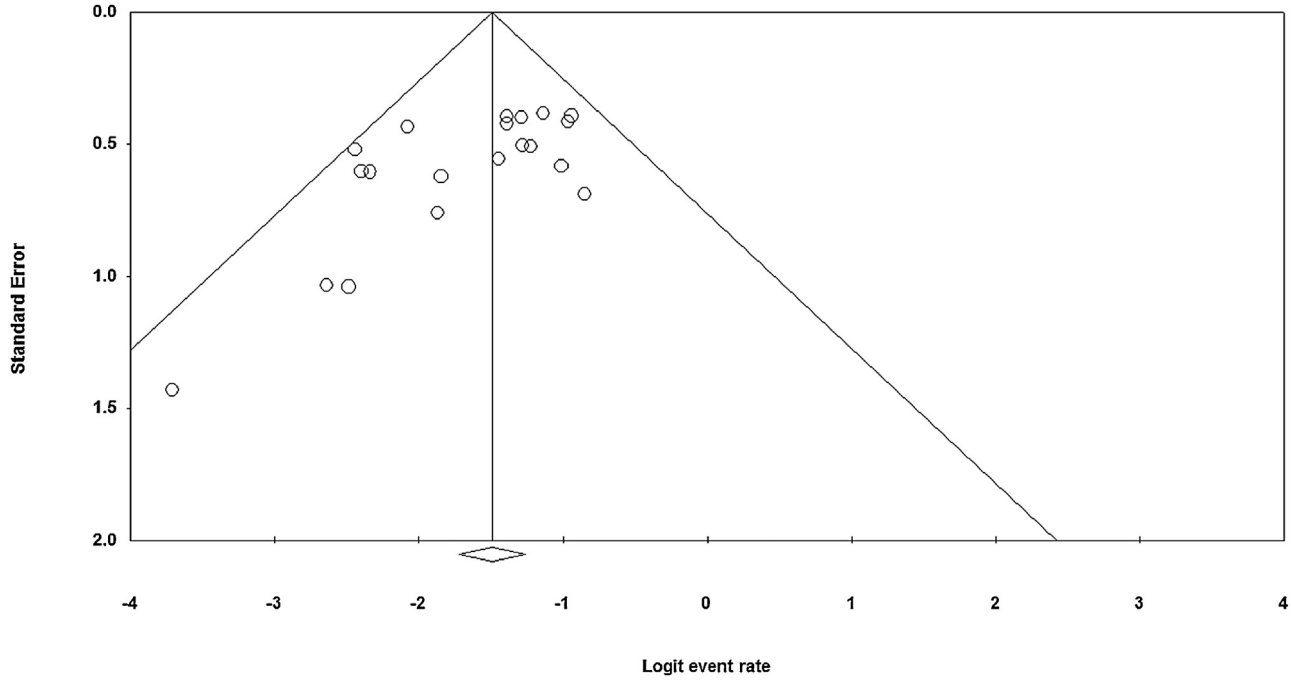

Fig. 3. Funnel plot of standard error by logit event rate.

been commonly suggested (Abramowitz et al., 2009; Schruers et al., 2005). It is worth noting that unlike previous estimates, the average dropout rate presented here was based on a standardized definition of dropout and systematically aggregated data across 21 studies, allowing us to have more confidence in its accuracy. There were no statistically significant differences in dropout rate between ERP and other treatment conditions. In addition, the rates in ERP for OCD are comparable to what has been reported for other emotional disorders. For example, similar dropout rates were found for patients receiving treatment for PTSD (18.3%; Imel, Laska, Jakupcak, & Simpson, 2013) as well as patients receiving individual psychotherapy for major depression (17.5%; Cooper & Conklin, 2015). The rates for ERP are also less than that for outpatient CBT for unipolar depression (24.6%; Hans & Hiller, 2013) and for CBT across mental disorders (26.2%; Fernandez, Salem, Swift, & Ramtahal, 2015). In the larger research context, current findings based on the 21 included RCTs suggest that ERP as a treatment for OCD is not uniquely difficult for clients to complete and any perceived resistance to ERP may be more anticipated than real. Yet, ERP has faced an uphill battle to be accepted and utilized by clients and therapists alike. Still, given the small number of studies included in the present review, a more comprehensive examination of dropout in exposure-based therapies is of paramount importance to our field. Of note, the lack of data on refusal opens up the possibility that attrition rates for ERP are much higher than our estimated dropout rates. Inclusion of studies that did not use randomization may yield more accurate estimates of attrition rates in ERP for OCD.

Despite decades of research on ERP for OCD, little is known about treatment refusal, mainly because those numbers are less commonly reported, and even when reported, not for individual treatment conditions. Hence, any conclusions regarding the average refusal rate for ERP would be premature. We did find that the overall refusal rate for treatment of OCD was 12.0%. This is notable as it is different from what was found for an outpatient anxiety disorders clinic where the pretreatment attrition rate was 30.4% and the dropout rate was 10.3% (Issakidis & Andrews, 2004). Still, the combination of refusal and dropout rates in this study suggests an approximate attrition rate of 18.7% and 27.0% for ERP and all conditions, respectively. Regardless of whether this number is higher or lower than expected, as a field we would like it to be as low as possible. Thus, future research should continue to examine the impact of negative beliefs about exposure therapy in relation to attrition rates as well as to reasons for dropout. With an estimated attrition rate of 18.7% for one of the most effective treatments for OCD, there is room for improvement.

Treatment experience, therapist qualification, and number of sessions were not found to be significant predictors of dropout from ERP in the present review. Our results are somewhat consistent with previous meta-analyses that examined predictors of dropout rates. For example, Cooper and Conklin (2015) reported that therapist credentials did not significantly predict dropout from individual psychotherapy for major depression. However, treatment duration was a marginally significant predictor of dropout in their meta-analysis (Cooper & Conklin, 2015). Furthermore, Imel et al. (2013) found that number of sessions significantly predicted dropout in treatments for PTSD. The discrepancy between our and existing findings on the predictive utility of number of sessions could be due to the limited heterogeneity in ERP dropout rates as well as the relatively small number of studies included ($k = 21$), making it more difficult to detect smaller effects. Indeed, the standardized regression coefficient of number of sessions in Imel et al.'s (2013) meta-regression was 0.01. It is unclear if similar results would be obtained in a larger sample of studies with greater variability in dropout rate, and our findings must be considered in the context of the abovementioned limitations. To be explicit, our results do not indicate that treatment experience, therapist qualification, and number of treatment sessions have no impact on dropout; rather, they suggest that there is no evidence that they do.

This review also offers some suggestions to researchers. As a field, we need to collect refusal and dropout numbers in all studies; however, this can be particularly cumbersome during intake. Alternative procedures should be used to track the actual rate of enrollment from likely eligible participants. Reasons for refusal

should be tracked as they can inform us about perceptions of treatment. Similarly, care should be taken to confirm enrollment after screening for the study. A dropout that occurs prior to treatment assignment may be coded differently from one that occurs after condition assignment. Dropouts that occur after condition assignment, but prior to the start of treatment may also be coded differently from those that occur after many treatment sessions. Such distinctions are important given that strategies used to retain participants may be contingent on the stage at which participants drop out of treatment. As such, the point at which dropouts occur are just as important as participants' reported reasons for dropping out, and both types of data can be used in combination to facilitate improvement of treatment acceptability and participant/client retention. In general, refusal and dropout data are valuable sources of information, and should be handled like data on other dependent variables in outcome studies. Guidelines for tracking these data are described in the Consolidated Standards of Reporting Trials (CONSORT) statement (e.g., Schulz, Altman, & Moher, 2010). In addition, given the inconsistencies and ambiguity in how potential predictors of dropout were described in the reviewed studies, we recommend more detailed reporting of such variables (e.g., level of supervision, symptom severity of sample) to facilitate coding in future meta-analytic research.

There are limitations to consider in interpreting present findings. This study only examined ERP for OCD. We did not review other types of psychotherapy or pharmacotherapy unless they were the comparison condition because we were specifically interested in attrition rates for ERP and how they compared to other treatment approaches in RCTs. While comparisons across types of trials might be interesting, this route was not within the scope of our research objectives. Furthermore, the inclusion of treatment dropout and refusal of other psychotherapeutic and pharmaceutical treatment modalities were beyond the scope of this review. Notably, individuals in medication trials for OCD may drop out or refuse treatment due to side effects or prior medical conditions, complicating direct comparisons to psychotherapy dropout. Given that participants in the trials included in this review were aware of the psychotherapy condition, dropout across conditions was more comparable.

Another limitation is the exclusion of unpublished papers, which might have produced a biased sample of studies. However, in formulating the boundaries of our inclusion criteria, we elected to be conservative, and restricted the review to published articles for two reasons. First, unpublished studies have not undergone the rigorous process of peer review, and could have methodological weaknesses that compromise the quality of data. Second, until a study has been published, its data can be analyzed in different ways, leading to final products that potentially diverge from unpublished forms. Furthermore, a visual inspection of the funnel plot for dropout rates in ERP suggests only slight publication bias (see Fig. 3).

There was also the possibility of incorrectly reported data, making it difficult to determine attrition estimates at times. Nonetheless, we felt it was important to include all randomized treatment studies to provide the most complete picture possible. Reporting standards now exist and most researchers are using them to track participants, resulting in more accurate numbers, which may benefit future meta-analytic efforts. Finally, this study only offers information on the rate with which these data are reported and the rates of refusal and dropout that can be calculated. The reasons for excluding refusal and dropout rates were not assessed in this study. Given the interest in attrition for ERP for OCD and the effect of assumptions about the high dropout rate of ERP on utilization of ERP, having accurate estimates is important. This review may serve as a benchmark against which to compare the acceptability of future treatment studies for OCD.

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