Hoarding Disorder and a Systematic Review of Treatment with Cognitive Behavioral Therapy

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ABSTRACT
Until recently, compulsive hoarding has been treated as a type of obsessive-compulsive disorder with mixed results. Little research exists on the efficacy of behavioral interventions specifically designed to treat hoarding disorder, and most existing research is limited with regard to the numbers of participants, their ethnic and cultural diversity, and study replication; therefore, the generalizability of findings is limited. This article reviews the prevalence of hoarding disorder, cognitive behavioral therapy treatment approaches, and measurement of symptoms. A systematic review compares the efficacy of various CBT methods, with particular attention to comparing therapy that is traditionally used to treat OCD with those designed specifically to treat hoarding disorder. Only clinical studies using CBT interventions designed to treat hoarding associated with OCD or hoarding disorder were included. Studies included participants of all ages, and articles were published in peer-reviewed journals. Case studies were excluded. After a comprehensive search and removing duplicates from databases and references, 65 articles were reviewed, of which 12 met criteria for review. Preliminary results demonstrate improvement in hoarding symptoms with CBT interventions that are both for OCD and those designed specifically to treat hoarding disorder; however, when compared to each other, the efficacy of these treatments is inconclusive, thus more research is needed.

KEYWORDS
Hoarding disorder; treatment; cognitive behavioral therapy; obsessive-compulsive disorder

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Introduction

Overview of hoarding disorder

Hoarding disorder is characterized by excessive saving behaviors and refusal to discard items, causing significant distress and impairment (DSM-5; American Psychiatric Association [APA], 2013; Frost & Hartl, 1996). Difficulties in social and occupational functioning may occur, as living space can become so cluttered that it hinders activities in rooms for which they were designed (Frost, Steketee, & Williams, 2000; Saxena et al., 2002). This excess clutter often results in both decreased mobility within the home as well as decreased home utility (i.e. showers and ovens are often sacrificed for extra storage space). In more severe
cases, hoarders can risk fires, falling, poor sanitation, inability to eat in the home, and other health risks from infestations (Damecour & Charron, 1998; Mataix-Cols et al., 2010; Steketee & Frost, 2003).

People with hoarding disorder may have a fear of losing items that may be needed later and have exaggerated beliefs about the importance of material possessions. Hallmarks of individuals who hoard typically include an excessive emotional attachment to possessions; difficulties with decision-making, categorization, and organization; perfectionism; and a tendency to engage in both procrastination as well as behavioral avoidance (Frost & Hartl, 1996; Steketee & Frost, 2007). Other symptoms may include excessive shopping or collecting as well as other forms of acquisition (e.g. compulsive saving of postal mail, e-mail, and phone messages).

Traditionally, hoarding has been considered a variant of OCD, but recent research has exposed many important considerations with regard to treatment of individuals with hoarding symptoms. Unlike individuals with OCD, hoarders tend to have few intrusive thoughts about possessions and fewer urges to perform rituals. Further, many are actually content with their surroundings until friends, family, or local authorities attempt to intervene. In other words, distress only becomes prominent when faced with the prospect of losing possessions.

Hoarding has been found to be much more common than previously thought with more than half of those with lifetime OCD endorsing at least some hoarding behaviors in one major epidemiological study (National Comorbidity Survey Replication [NCS-R]; Ruscio, Stein, Chiu, & Kessler, 2010); however, it is not clear whether these behaviors constitute a clinically significant problem in the majority of OCD cases (Mataix-Cols et al., 2010). Previous research demonstrates that patients with OCD accompanied by hoarding symptoms have significantly greater disability in their family relationships, romantic relationships, and friendship domains in comparison to non-hoarding OCD patients and other patients with other anxiety disorders (Frost, Steketee, Williams, & Warren, 2000; Lochner et al., 2005). Furthermore, Saxena et al. (2002) found that hoarders had significantly lower global functioning and greater symptom severity compared to non-hoarding OCD patients.

Such differences led to the reclassification of hoarding as a disorder of its own, subsumed under OCD Related Disorders in the recent DSM-5 (American Psychiatric Association, 2013; Mataix-Cols et al., 2010; Wheaton, Abramowitz, Fabricant, Berman, & Franklin, 2011). Hoarding as a symptom has been most often associated with OCD, although it is also seen in other disorders, including depression, schizophrenia, and anxiety disorders (Damecour & Charron, 1998; Tolin, Meunier, Frost, & Steketee, 2010; Wheaton, Timpano, LaSalle-Ricci, & Murphy, 2008). Because of its historical placement as a subtype of OCD (American Psychiatric Association [APA], 2000) hoarding symptoms are included in several OCD measures and interviews. Although there is a body of research focused exclusively on hoarding, much of what we know about the disorder is through the study of OCD. The purpose of this paper is to review the prevalence of hoarding disorder, measurement of hoarding symptoms, CBT treatment modalities, and efficacy of CBT treatments via systematic review, with an emphasis on comparing treatment approaches developed for OCD to those developed specifically for hoarding disorder.
Prevalence

Since much of what is understood about compulsive hoarding has been in the context of OCD research, the prevalence of hoarding as a separate disorder is still limited; however, it is estimated that hoarding disorder is found in approximately 2–5% of the population (Gilliam & Tolin, 2010; Samuels et al., 2008). Compulsive hoarding is associated with other mental disorders, and estimates of comorbidity with non-hoarding OCD range from 16–30% (Mataix-Cols et al., 2010; Pertusa et al., 2008; Samuels et al., 2008; Wu & Watson, 2005).

As reported in the NCS-R, among those with OCD, 62.3% reported symptoms of hoarding (Table 1). It should be noted, however, that the categories used in the NCS-R were not empirically derived; rather, they represent symptom categories commonly reported by individuals diagnosed with OCD (Ruscio et al., 2010). Further, this study utilized a relatively small OCD sample (n = 73) and lacked a clear categorical distinction between obsessive and compulsive symptoms. In addition, as reported by Ruscio and colleagues, there was a deviation from typical OCD assessment procedures during the administration of the Yale-Brown Obsessive Compulsive Severity Scale (Y-BOCS; Goodman et al., 1989), which was used to assess severity. Some participants were administered only the obsessions or compulsions subscale of the Y-BOCS rather than both. The researchers attempted to correct for this by doubling scores to approximate the results from a full administration; however, this may have had the effect of reducing the accuracy of severity ratings, thus producing more homogeneous category classifications than would have otherwise been found. Given these noted complications, findings from the NCS-R should be interpreted with caution, and it should be noted that overall generalizability may be limited.

Table 1 presents OCD symptom distributions obtained from the DSM-IV Field Trial of 425 patients with OCD (Foa et al., 1995). The data differ considerably from NCS-R findings,
most notably in the categories of hoarding. This may be partially accounted for by differences in study methodology. For one, Ruscio et al. (2010) drew from a community-derived sample whereas Foa and colleagues utilized a clinical sample. Thus, caution must be taken when generalizing from one study to the other, given that the treatment-seeking individuals in the Foa et al. study may not be representative of the afflicted population as a whole. Second, study methodology differed with regard to diagnostic procedures. Ruscio and colleagues utilized the World Health Organization’s Composite International Diagnostic Interview (CIDI 3.0; Kessler & Üstün, 2004), which is intended to be administered by laypersons, whereas Foa and colleagues used the OCD section of the Structured Clinical Interview for DSM-III-R (SCID; First, Spitzer, Gibbon, & Williams, 1997) in conjunction with an expanded version of the Yale-Brown Obsessive Compulsive Scale Symptom Checklist (Y-BOCS-SC; Goodman et al., 1989), both of which were administered by clinicians experienced with OCD. Although previous studies have demonstrated an adequate association between lay-interviewer diagnoses and clinician diagnoses (Haro et al., 2006), some doubt remains as to the accuracy of OCD diagnoses made by untrained examiners (Nestad, Samuels, Romanoski, Folstein, & McHugh, 1994; Stein, Forde, Anderson, & Walker, 1997), and this may be especially likely to occur with a complicated diagnosis such as OCD and related disorders, since these often require substantial probing to make an accurate diagnosis.

Methodological issues notwithstanding, comparison of the data found in the NSC-R and the DSM-IV Field Trial indicate that the incidence of hoarding is considerably greater in the general public than what is seen in specialized treatment facilities, which suggests that hoarders may be less likely to seek treatment for their symptoms. Unlike individuals with OCD, hoarders may not recognize their symptoms as illogical or irrational, which may reduce the amount of discomfort experienced by hoarding. Cognitive-behavioral models of hoarding suggest that symptoms are maintained by mechanisms of both positive and negative reinforcement (Frost & Hartl, 1996). Excessive accumulation of objects may provide a source of positive emotions (Gilliam & Tolin, 2010). Further, collection and saving of items may serve as a mechanism to avoid fear or anxiety that can come with discarding objects (Steketee & Frost, 2007). In the absence of psychological distress, behaviors may not be perceived as problematic, and therefore, individuals may not be prompted to seek treatment. The degree to which hoarding symptoms may be recognized as problematic may also be influenced by the emergence of symptoms early in life, limiting self-awareness and insight. Several studies find that hoarding symptoms begin at around 10 years of age, as compared to OCD without hoarding, which onsets in late teenage years (Samuels et al., 2002; Tolin, Meunier, Frost, & Steketee, 2010).

Classification of hoarding symptoms in the context of OCD

The YBOCS-SC is a comprehensive list of over 50 obsessions and compulsions representing the majority of OCD symptoms observed clinically. Since its development, there have been several attempts to establish an empirically based classification system that corresponds to the symptoms listed in the Y-BOCS-SC. Baer (1994) was the first to conduct a principal components analysis of 13 major symptom categories from the Y-BOCS-SC. He identified a three-factor solution accounting for 48% of the total variance in OC symptomatology: symmetry/hoarding, contamination/checking, and pure obsessions. The pure obsessions category corresponded to individuals with religious, aggressive, and/or sexual obsessions for
whom no overt compulsions were readily distinguishable. Leckman et al. (1997) extended Baer’s work, and found that hoarding accounted for its own dimension, which has been consistently replicated by others, sometimes with symmetry/ordering symptoms and sometimes not (Abramowitz, Franklin, Schwartz, & Furr, 2003; Bloch, Landeros-Weisenberger, Rosario, Pittenger, & Leckman, 2008; Denys, de Geus, van Megen, & Westenberg, 2004; Feinstein, Fallon, Petkova, & Liebowitz, 2003; Mataix-Cols, Rauch, Manzo, Jenike, & Baer, 1999; Pinto et al., 2008; Stein, Andersen, & Overo, 2007; Williams et al., 2011)

Since hoarding disorder itself may have multifaceted symptoms within its presentation, the YBOC-SC may be limited in its ability to provide a detailed understanding of the complexities that may be present.

Cognitive behavioral therapy for hoarding in the context of OCD

Beginning with the work of Meyer in 1966, the treatment for both children and adults with clinically significant hoarding symptoms has generally been the same treatment used for OCD, a specialized form of cognitive behavioral therapy known as Exposure and Ritual Prevention (EX/RP; March, Frances, Kahn, & Carpenter, 1997; NICE., 2006), with the majority of patients showing both substantial short- and long-term symptom reduction (Franklin, Abramowitz, Kozak, & Levitt, 2000). As the name suggests, EX/RP is comprised of two main treatment components: (1) prolonged and repeated exposure to anxiety-provoking thoughts or situations (i.e. exposure), and (2) voluntary abstinence from ritualization (i.e. ritual prevention). Through this process, patients begin to habituate to once-feared stimuli while simultaneously learning new information that helps to alter dysfunctional cognitions and behaviors. In addition to the core components of exposure and ritual prevention, EX/RP programs typically include restructuring of unhelpful cognitive biases, such as thought-action fusion (the belief that a negative thought will result in a negative action), overestimation of threat (the belief that a negative event is especially likely to happen and will be especially disastrous), a heightened sense of responsibility for the welfare of others (the belief that one has the power to cause, and/or the duty to prevent, negative outcomes; Salkovskis, 1989), and the over importance or control of intrusive thoughts (the belief that the mere presence of a thought signifies that the thought is especially important in some way; Obsessive Compulsive Cognitions Working Group [OCCWG], 2003; Rachman, 1998).

EX/RP has been used in a variety of formats, including individual and group treatment, family-based treatment, computer-based treatment, and intensive programs (for a review, see Williams, Powers, & Foa, 2012). According to Foa, Yadin, and Lichner’s (2012) treatment protocol, the recommended EX/RP program for OCD consists of 15–20 therapy sessions, lasting about 90 minutes each. The first two sessions are generally focused on information gathering, with the remaining sessions spent engaged in therapist-assisted exposure exercises. Exposure, in this sense, may be one of two kinds. In vivo (or “in real life”) exposure comprises the cornerstone of EX/RP. During this type of exposure, the patient confronts feared situations with the therapist’s encouragement and coaching, but without the use of rituals or compulsions to decrease anxiety. The goal is for the patient to remain in the situations long enough to experience a natural reduction in anxiety. Exposures typically proceed in a graduated manner so that the patient confronts less distressing situations prior to more distressing ones, and in doing so, is able to continuously build upon a base of success and mastery. Ratings of the patient’s subjective distress are taken before, after,
and during the exposure in order to help quantify his or her level of habituation to the anxiety-provoking stimuli.

For hoarders, stores, markets, and similar venues may easily trigger a desire to compulsively acquire objects. Patients and therapists work together to rank various locations according to the increasing level of temptation evoked by each location. Together, the patient and clinician slowly build toward the patient’s ability to visit sites, hold objects, and then put them back without purchasing. During the exposure, therapists check in with the patient and ask them to rate the level of distress they experience from 0 to 100 (Steketee, 2014). A similar process is used to increase tolerance for discarding hoarded items.

When in vivo exposure is either not possible or not feasible (perhaps because a patient’s feared outcome is in the distant future, etc.), imaginal exposure may be used instead. During imaginal exposure, the patient imagines himself or herself coming into contact with a feared situation. Imaginal scripts are typically devised with the guidance of the therapist, and include detailed descriptions of feared events, as well as the anxiety-provoking thoughts, emotions, and physical sensations the person imagines would result from the situation. Similar to in vivo exposure, the expectation is that the patient will show habituation over successive repetitions; thus, the anxiety and distress associated with the imagery should gradually diminish over time. The use of imaginal exposure as a means of reducing the urge to hoard has been suggested (Tolin, Frost, & Steketee, 2007b), but more research needs to be conducted to establish the utility of this technique. We could find no examples of this being used effectively in literature for hoarding.

From both in vivo and imaginal exposures, the patient learns the following: (1) that anxiety will decrease over time without the use of rituals and, (2) that feared consequences typically do not occur. Importantly, the patient should also gain increased tolerance for anxiety. Other components of a typical EX/RP program include psychoeducation about the nature of symptoms and how they are maintained, self-monitoring of obsessional triggers, modeling of the exposure by the therapist, and the completion of homework between sessions.

**Cognitive behavioral treatment of hoarding disorder**

Cognitive behavioral models for hoarding disorder suggest that hoarding symptoms are related to challenges with information processing, emotional attachment, and overvaluation of objects. Such cognitive deficits can foster the development and sustainment of many irrational beliefs. For example, hoarders may fear that discarding an object will result in forgetting important events associated with an object, or that they may experience harm without the object (Frost & Hartl, 1996; Steketee, Frost, & Kyrios, 2003). Frost and Hartl (1996) suggest that hoarders may engage in complex analysis during decision-making processes, which can result in overanalyzing possessions and assigning an inflated value to objects. Further, people who hoard may develop such extreme emotional attachment to objects that the object is perceived as an extension of the self. As a result of distorted cognitive beliefs, hoarders save items, excessively acquire items, and resist discarding objects. They may experience a sense of safety and security in the presence of hoarded items, and the idea of throwing away objects can be very distressing.

For hoarding specific treatments, exposure and cognitive restructuring are important components of therapy, but emphasis is also placed on motivational interviewing. Since
hoarders typically are not intrinsically motivated by discomfort of symptoms, additional help is needed from the therapist to create goals to facilitate change. To assist with reduction of clutter, CBT for hoarding includes additional attention to the development of skills such as organization, problem solving, and decision-making.

Cognitive patterns associated with hoarding are also addressed with the therapist through exploring beliefs that may promote hoarding. Therapists can discuss motives for acquisition and fears that may be associated with discarding objects. Small experiments can also be performed to test a patient’s beliefs to offer evidence to counter the rationale for hoarding. Patients are also asked to identify stressors that may trigger hoarding and practice using their newly developed skills to manage symptoms and prevent relapse (Steketee, 2014).

Assessment of hoarding disorder

The Y-BOCS-SC only includes two items that are dedicated to hoarding, and the severity scale quantifies the severity of intrusive thoughts and compulsions, which may not be experienced by hoarders. Given these limitations, several specific assessments have been developed to assess and quantify hoarding symptoms. While many validated measures exist, we briefly review the instruments that were used in studies included in our systematic review, as well as a few others that are described in the literature.

The Structured Interview for Hoarding Disorder (SIHD; Nordsletten et al., 2014) is a semi-structured interview that is designed to assess for hoarding disorder, according to the criteria set forth by the new DSM-5. In addition to assessment for the primary aspects of hoarding disorder, the SIHD provides questions to assess for level of insight, as well as assessment to differentiate hoarding disorder from other disorders. The inter-rater reliability for the SIHD has been demonstrated as high for diagnosing hoarding disorder ($K = .87$). The SIHD may be used alone or in conjunction with additional measures for assessment of hoarding.

The Saving Inventory-Revised (SI-R; Frost, Steketee, & Grisham, 2004) is a 26-item self-report measure to assess the severity of hoarding symptoms. Items are rated on a four-point scale, which captures the level of distress and impairment associated with hoarding. Scores are combined to provide an overall total score as well as scores for three specific symptoms of hoarding: “difficulty in discarding,” “clutter,” and “acquisition.” Internal consistency for the SI-R is high for the measure as a whole ($\alpha = .92$), and the sub-scales (discarding, $\alpha = .88$; clutter, $\alpha = .91$; acquisition, $\alpha = .87$).

Similar to the SI-R, the Hoarding Rating Scale (HRS; Steketee, Frost, Tolin, Rasmussen, & Brown, 2010) assesses level of difficulty with discarding, acquiring objects, and clutter, as well as the level of distress and impairment from hoarding symptoms. Five items are rated for severity using an eight-point scale, and yield a total score. Additionally, cut-off scores have been established to determine the clinical significance of hoarding, as well as distinctions to identify hoarding from OCD. Tolin, Frost, and Steketee (2010) reported that the HRS has very high internal consistency when used by clinicians in the office and at the patient’s home ($\alpha = .97$ and $\alpha = .96$, respectively). Additionally, test-retest analysis also yielded high measures of reliability ($r = .95$). The HRS is available as both a structured interview for use by a clinician (HSR-I) and a self-report measure (HSR-SR).

The Clutter Image Rating Scale (CIR; Frost, Steketee, Tolin, & Renaud, 2008) is a pictorial scale that assesses the extent of clutter that is associated with hoarding. A series of nine
pictures depict three main rooms (kitchen, bedroom, and living room) with progressively increasing levels of clutter. The examinee is asked to identify the picture that best reflects the respective rooms in the respondent's home. Responses are combined to give a mean score to represent the severity of clutter in the home. Measures of internal consistency for the CIR are high ($\alpha = .84$).

Some other measures that may be useful in the assessment of hoarding include the UCLA Hoarding Severity Scale (UHSS), which measures both primary and related features of hoarding disorder, and has strong internal consistency ($\alpha = .70$; Saxena, Ayers, Dozier, & Maidment, 2015); the Activities of Daily Living in Hoarding scale (ADL-H) to assess the degree to which hoarding symptoms impair daily life, with examination of psychometric properties demonstrating high internal consistency in populations of self-identified hoarders as well as in individuals who were clinically diagnosed ($\alpha = .91$ and $\alpha = .92$, respectively; Frost, Hristova, Steketee, & Tolin, 2013); and the Compulsive Acquisition Scale (CAS), which assesses excessive acquisition according to two subscales: CAS-buy, which measures consequences of excessive purchasing, and CAS-free, which measures collection of free objects. Both subscales have demonstrated high internal consistency ($\alpha = .94$ and $\alpha = .87$, respectively; Frost, Steketee, & Williams, 2002).

**Systematic review of CBT studies**

**Methods**

**Eligibility criteria**

Clinical trials that implemented CBT designed to treat individuals diagnosed with hoarding disorder were included for review. No restrictions with regard to language or publication date were implemented; however, all studies were published in peer-reviewed journals and available in full-text either online or in print. No dissertations or unpublished manuscripts were included. Participants of any age with a diagnosis of hoarding disorder were considered, and clinical trials that utilized interventions to indirectly treat hoarders (e.g. therapies for family members) were excluded. Case studies were also excluded. All studies included for consideration used primary outcome measures that assessed the reduction in hoarding symptoms, such as clutter, saving, and acquisition of new items. Efficacy of treatment was assessed using Cohen's $d$ by comparing pre- and post-test scores on hoarding measures, when $d$ was provided or data were available to compute $d$.

**Information sources**

Studies were identified by searching electronic databases and reviewing references of related research articles. This search was applied to Medline, PsychINFO, and PsychARTICLES. The last search was run on 24 February 2015. Articles were reviewed according to the inclusion criteria and duplicate articles were removed.

**Search and study selection**

We used the following search terms to search all databases: hoarding disorder treatment, cognitive behavioral therapy, and clinical trials. Eligibility for inclusion was reviewed by two authors. There were no disagreements between reviewers during the process; however, disagreements would have been resolved by a cooperative review of the study and consultation.
with another expert. After removing duplicate studies, 64 articles were reviewed and 12 studies met criteria for review, with many articles being excluded because they were case studies.

**Results**

In our review, we found two primary treatments for hoarding: traditional cognitive behavioral therapy for OCD (EX/RP) and hoarding specific cognitive behavioral therapy. We will first discuss the studies that used traditional OCD treatment and then we will review the studies that used interventions that were specifically designed to treat hoarding disorder. These results are summarized in Table 3.

**Treatment of hoarding disorder with EX/RP for OCD**

In a study of 38 individuals with OCD, administered either CBT or medication, Black et al. (1998) found that as compared to other OCD symptoms, hoarding was a significant predictor for negative treatment outcome, as the hoarding group had the largest percentage of non-responders. Despite the low response rate, the hoarders who responded to treatment demonstrated improvement in symptoms similar to responders with other OCD symptoms.

In a study comparing EX/RP outcome in treatment-seeking participants from two specialty clinics, Abramowitz et al. (2003) found that the mean post-treatment scores on the Y-BOCS were significantly higher for individuals in the hoarding cluster as compared to those in the harming, contamination, and unacceptable thoughts clusters. More specifically, while 70% of patients with contamination concerns improved significantly, only 31% of hoarders showed the same type of improvement. It is of note that while hoarders demonstrated the lowest percentage of clinically significant improvement, effect sizes of the treatment were large as compared to other groups ($d = 2.34$).

In an open-clinic study of OCD patients receiving standard treatment (in this case, all received EX/RP with some also receiving medication; Saxena et al., 2002), all patients, including hoarders, significantly improved; however, among hoarders, the mean post-treatment Y-BOCS score was higher (19.9 vs. 15.6) and fewer hoarding patients were considered treatment responders (45% vs. 63%). Similar to prior studies, Rufer and colleagues (2006) reported patients with hoarding symptoms to be significantly less likely to become treatment responders as compared to other OCD patients (36.8% vs. 62.7%). Also similar, participants with hoarding symptoms, who were considered responders to treatment, demonstrated significant improvement in symptoms.

Williams et al. (2014) analyzed the effectiveness of EX/RP by OCD symptom dimension, inclusive of hoarding obsessions and compulsions. The results showed a significant reduction in the mean post-treatment Y-BOCS scores across all symptom dimensions, including hoarding. Patients with hoarding obsessions and compulsions reported approximately a one-third reduction in mean scores ($d = .55$ for obsessions; $d = .40$ for compulsions). While the data suggest that hoarding symptoms respond favorably to EX/RP, hoarders experienced some of the smallest percentage of gains in symptom improvement as compared to other dimensions of OCD.

Greist et al. (2002) examined treatment outcomes by comparing computerized treatment programs with clinician-guided treatment for OCD. Results showed that in the group
**Table 3.** CBT Outcome studies for hoarding disorder by treatment type.

<table>
<thead>
<tr>
<th>Study</th>
<th>Participants (N)</th>
<th>Treatment</th>
<th>Outcome measures</th>
<th>Results</th>
<th>Effect size (d)</th>
<th>Important findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatments for hoarding in OCD</td>
<td></td>
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<tr>
<td>Black et al. (1998)</td>
<td>N = 38</td>
<td>EX/RP, paroxetine, placebo</td>
<td>Y-BOCS CGI</td>
<td>Responders with hoarding symptoms: 17.6% Non-responders with hoarding symptoms: 66.7% 0% of hoarders responded to treatment goals (cleaning-39%, checking-19%, &amp; ordering-8% responded)</td>
<td></td>
<td>Most non-responders were hoarders, but hoarders who responded to treatment demonstrated similar gains as non-hoarders. Hoarding was the only group that was not responsive to computer-based therapy.</td>
</tr>
<tr>
<td>Greist et al. (2002)</td>
<td>N = 218</td>
<td>Computer-guided behavioral therapy (n = 74), Clinician-guided behavior therapy (n = 69), and Audio-guided relaxation therapy (n = 75)</td>
<td>Y-BOCS CGI</td>
<td>Responders with hoarding symptoms: 25% Responders without hoarding symptoms: 48%</td>
<td></td>
<td>Hoarders were most likely to drop out of treatment; Hoarders who responded to treatment had at least a 40% reduction in Y-BOCS scores</td>
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<tr>
<td>Mataix-Cols et al. (2002)</td>
<td>N = 153 (hoarding n = 52); n = 78 (those completing ERP and used to determine “responder” status)</td>
<td>Computer-guided behavioral therapy and Clinician-guided behavioral therapy</td>
<td>Y-BOCS</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Saxena et al. (2002)</td>
<td>N = 190 (hoarding n = 20)</td>
<td>CBT and medication</td>
<td>Y-BOCS</td>
<td>45% of those with hoarding symptoms responded to treatment</td>
<td></td>
<td>Hoarders demonstrated clinically significant reductions in hoarding symptoms; post-treatment scores remained clinically elevated Though the hoarders experienced less gains in treatment, effect size for the hoarding group was large as compared to other dimensions. Presence of hoarding symptoms significantly hindered response to CBT; In the group of responders, symptoms were reduced by at least 35%. Hoarders responded to EX/RP and showed a significant decline in symptoms, but experienced significantly less gains as compared to non-hoarders</td>
</tr>
<tr>
<td>Abramowitz et al. (2003)</td>
<td>N = 132 (hoarding n = 16)</td>
<td>EX/RP</td>
<td>Y-BOCS</td>
<td>Mean (SD) pre/post-test: Pre-test: 25.94 (4.20) Post-test: 15.50 (4.70)</td>
<td>d = 2.34</td>
<td></td>
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<tr>
<td>Rufer et al. (2006)</td>
<td>N = 94 (hoarding n = 19)</td>
<td>CBT (70% were also taking medication)</td>
<td>Y-BOCS</td>
<td>36.8% of those with hoarding symptoms responded to treatment</td>
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</tr>
<tr>
<td>Williams et al. (2014)</td>
<td>N = 87</td>
<td>EX/RP (79% also were taking medication)</td>
<td>Y-BOCS</td>
<td>The mean Y-BOCS scores were significantly reduced in non-hoarders</td>
<td>d = .55 (obsessions) d = .40 (compulsions)</td>
<td></td>
</tr>
<tr>
<td>Specialized treatment for hoarding Steketee et al. (2000)</td>
<td>N = 6**</td>
<td>Specialized therapy treatment for hoarding</td>
<td>Y-BOCS</td>
<td>Mean (SD) pre/post-test: Y-BOCS Pre-test: 22.3 (4.7) Y-BOCS Post-test: 18.7 (5.2)</td>
<td>d = .73</td>
<td>A mean reduction in hoarding symptoms was found; however post-treatment mean remained in the clinically elevated range after 20 weeks of treatment. Findings are very limited by the small sample size.</td>
</tr>
</tbody>
</table>
There were two studies conducted, this data represents study 2, as it used a more realistic participant make up and used both self-report and clinician report for outcome measures. Study 1 only used self-report measures; therefore, results may have been artificially inflated.

The original study included 7 participants; however, one participant did not return required follow-up measures and could not be included in data analysis.

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Treatment</th>
<th>Outcome measures</th>
<th>Effect size</th>
<th>Important findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tolin, Frost, &amp; Steketee</td>
<td>10</td>
<td>Specialized therapy treatment for hoarding</td>
<td>SI-R, CIR, CGI Mean (SD) pre/post-test: SI-R Pre-test: 67.00 (11.41), CIR Pre-test: 48.40 (11.74), CGI Pre-test: 2.80 (1.40). CGI scores not significant</td>
<td></td>
<td></td>
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<tr>
<td>Muroff et al.</td>
<td>106</td>
<td>Web-based group for hoarding; Group CBT specialized for hoarding</td>
<td>SI-R, CIR, CGI Effect sizes increased across all groups after longer treatment. CGI scores were not significantly changed with long-term members.</td>
<td>d (SI-R) = 1.63, d (CIR) = 0.62, d (CGI) = 0.79</td>
<td>6-months Recent Members: d (SI-R) = 0.85, d (CIR) = 0.64, d (CGI) = 1.03. Long-term Members: d (SI-R) = 0.47, d (CIR) = 0.35. CGI: not significant.</td>
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<tr>
<td>Steketee et al.</td>
<td>46</td>
<td>Specialized therapy treatment for hoarding</td>
<td>SI-R Mean (SD) pre/post-test: SI-R Pre-test: 61.69 (15.49), CIR Pre-test: 44.77 (18.59), CGI Pre-test: 2.64 (0.69). CIR Post-test: 2.06 (0.73). CGI Post-test: 3.30 (0.90). CGI Post-test: 3.20 (2.00).</td>
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<tr>
<td>Frost et al.</td>
<td>11</td>
<td>Support-group therapy and self-help book, <em>Buried in Treasures: Help for Compulsive Acquiring, Saving, and Hoarding</em></td>
<td>SI-R, CIR, CGI Mean (SD) pre/post-test: SI-R Pre-test: 56.30 (12.60), CIR Pre-test: 44.80 (7.30), CGI Pre-test: 4.10 (1.40). CIR Post-test: 3.30 (1.90). CGI Post-test: 3.20 (2.00).</td>
<td>d (SI-R) = 1.80, d (CIR) = 1.57, d (CGI) = 0.79</td>
<td>As compared to a waitlist, specialized CBT was significantly effective in reducing hoarding symptoms. Treatment refusal was high - 44% of eligible participants refused treatment. Group-run bibliotherapy may offer a cost-efficient alternative for hoarding disorder. Further research is needed in this area, as sample was small and may limit findings considerably.</td>
</tr>
</tbody>
</table>

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*Yale-brown obsessive compulsive scale

*Clinician global impression

*Saving inventory-revised

*Cluttering image rating.

*There were two studies conducted, this data represents study 2, as it used a more realistic participant make up and used both self-report and clinician report for outcome measures. Study 1 only used self-report measures; therefore, results may have been artificially inflated.

**The original study included 7 participants; however, one participant did not return required follow-up measures and could not be included in data analysis.
receiving computerized intervention, the goal of “no discomfort” or “slight discomfort” was achieved 39% of the time for cleaning rituals but was never achieved for hoarding rituals. Data analysis suggested that in general, participants responded better to treatment administered by a clinician; however, results were not reported by symptom dimension, so it is not clear how only the hoarders responded to the treatment administered by a clinician. In a follow-up study by Mataix-Cols, Marks, Greist, Kobak, and Baer (2002), hoarders were also found to be significantly more likely to drop out of treatment. Of the 20 intent-to-treat patients with hoarding symptoms, only 5 (25%) were responders, compared to 48% of patients without hoarding, although this trend was only marginally significant (Mataix-Cols et al., 2002).

Treatments designed specifically for hoarding disorder

Steketee, Frost, Wincze, Greene, and Douglass (2000) developed a specialized treatment for compulsive hoarding, which was used in an initial pilot study of seven individuals with hoarding disorder. The study was designed to provide intensive group therapy for hoarding for 20 weeks, followed by individual therapy. Of the seven original participants, only six completed all necessary measures for analysis. After 20 weeks of group therapy, about half of the participants continued with individual therapy, while the other half dropped out. Of those who completed the full treatment, symptoms of hoarding were reduced after 20 weeks of group therapy and again after individual therapy.

The specialized treatment was extended to an open trial for individual therapy. Treatment involved motivational interviewing, 26 individual sessions of CBT, and frequent home visits over the span of 7–12 months—a much longer course than traditional EX/RP for OCD. The initial phase of specialized treatment consisted of between three and five sessions in a clinician’s office, and was devoted to the assessment of symptoms, case conceptualization, and treatment planning. Subsequent sessions were held weekly either in-home, in a therapy office, or on-sites that may trigger hoarding behaviors (e.g., flea markets). Interventions used during treatment were designed to target an individual’s difficulty in organization, compulsive acquisition, and challenges with discarding objects. Therapists assigned weekly homework, and they used motivational interviewing when participants demonstrated poor compliance with homework assignments. The final two sessions were dedicated to relapse prevention (Tolin et al., 2007b).

Of the 10 completers (four participants dropped during treatment), half were “much improved” or “very much improved,” according to clinician-administered CGI-Improvement ratings, by the end of treatment (d = .69) (Tolin et al., 2007b). In a larger, wait-list controlled trial with the same specialized treatment protocol, patients showed similar rates of improvement, with approximately 41% of completers considered significantly improved at post-treatment (Steketee et al., 2010).

Specialized treatments for hoarding can be very intensive, requiring considerable amounts of time and money for effective treatment (Steketee, 2014). Thus, Frost, Pekareva-Kochergina, and Maxner (2011) explored facilitated support group therapy, structured by the self-help book, Buried in Treasures: Help for Compulsive Acquiring (Tolin, Frost, & Steketee, 2007a). Attendance of 13 weekly support-group sessions demonstrated significant reduction in hoarding symptoms, according to self-report measures and clinical observation. Scores on the Saving Inventory-Revised (SI-R) were significantly improved in about half of the participants; however, scores remained in the clinically elevated range.
Similarly, Muroff, Steketee, Rasmussen, et al. (2009) reported improvements in clutter and saving symptoms associated with hoarding after 16 weekly sessions of group-lead structured, manualized CBT for hoarding, in addition to two 90 min home visits after 3 and 12 weeks of treatment. One group in the study was treated with CBT that included formalized materials, such as a CBT manual and workbook. Members of all groups reported significant reduction in overall mean scores on the SR-I and the CIR. Group-led CBT for hoarding was shown to be more effective in the group with more structured interventions. While the results of the study show promise for reducing hoarding symptoms, results should be interpreted with caution, as the groups were small and many participants did not return completed measures.

In addition to in-person group therapy for hoarding, preliminary research has been conducted on web-based group therapy interventions for hoarding. Muroff, Steketee, Himle, and Frost (2009) pioneered research in web-based group treatment for hoarding, or, the “delivery of internet therapy for compulsive hoarding” (DITCH). In a quasi-experimental design, participants who met criteria for compulsive hoarding disorder were assigned to a web-based support group, and overflow participants were put on a waitlist. Participants were added from the waitlist to treatment every 3 months for 15 months as members dropped out of the original group. Participation in the group was monitored by peers, who were in frequent contact with licensed mental health professionals, specializing in the treatment of hoarding or OCD. Members of the group followed a delineated treatment plan specific to hoarding, which included posting personal goals, strategies for reducing clutter, and access to psychoeducational materials with cognitive behavioral techniques for hoarding.

Data were analyzed after 6 months of treatment and after the full treatment at 15 months. Participant data were divided in two groups: “recent” members, both original and waitlist members, and “long-term” members, who had participated for the entire duration of the 15 month study. Results for DITCH were encouraging, but they produced modest results. Data from long-term members showed less consistency. Analysis of six months showed that moderately significant improvements were demonstrated, as well as small effect sizes, on the CIR ($d = .26$) and on the total score for the SI-R ($d = .19$). No significant improvements were found in the Clinical Global Impressions rating. Similarly, after 15 months, results showed mixed improvement, but with greater effect sizes. The SI-R ($d = .47$) was significantly improved, while CIR ($d = .35$) improvement was moderate. Again, the Clinical Global Rating showed no significant improvement. In addition to improvements in the treatment groups, significant improvement was also found in the waitlist group for the SI-R total scores ($d = .43$), which is suspected to be the result of waitlist participants seeking outside treatment.

**Discussion**

Many studies have been conducted to better understand OCD-related disorders, such as hoarding disorder, with initial work based largely on factor analytic studies of the Y-BOCS-SC. As a result of both new research and a review of the historical understanding of hoarding symptoms, sufficient evidence was presented to classify hoarding as a separate disorder. Therefore, it is not surprising that interventions specifically designed to treat hoarding may be necessary for the most effective treatment. Across studies, hoarding symptoms were found to be difficult to treat. Dropout rates were high, and motivation to participate in treatment was low. Hoarding seems to be more resistant to conventional CBT
treatment than OCD. That is, EX/RP appears to be helpful, but only partially so, as many hoarders were not responders. For hoarders who were considered responsive to treatment, traditional EX/RP produced significant reduction in symptoms with large effect sizes.

Specialized treatment for hoarding also demonstrates some improvement in hoarding symptoms, though not all improvements were clinically significant and most effect sizes were modest. Hoarding-specific interventions are typically longer in duration than EX/RP that has been designed to treat OCD (approximately 26 sessions for hoarding), and may direct particular attention to techniques for increasing patient motivation (Muroff, Steketee, Rasmussen, et al. 2009). Since research in hoarding-specific treatment is nascent, it is not yet clear if these are any more effective than traditional EX/RP. Thus, while such new interventions seem promising, more research is needed before any firm conclusions can be drawn.

Comparing the efficacy of traditional EX/RP with therapy designed for hoarding disorder is further complicated because different outcome measures are used by each treatment approach. Studies that implement EX/RP evaluate symptom severity and change in the context of OCD using the Y-BOCS severity scale, while hoarding-specific treatments typically use measures that are designed to specifically assess hoarding disorder. In order to gain a true basis for treatment comparison, it is recommended that future research on hoarding incorporate both the Y-BOCS and hoarding-specific measures in the analysis of treatment outcome.

There are limitations with regard to interpreting the data found in our review. In treatment studies for hoarding disorder, different measures were used to assess criteria for clinically significant hoarding of the participants included in the studies. Most studies attempted to recruit participants outside of OCD clinics, and while all participants met criteria for clinically significant hoarding, the context by which the symptoms were related to OCD is unknown. Therefore, it is possible that some participants had hoarding disorder while others had OCD with hoarding symptoms.

Conclusion

Consistent and systematic research has helped to develop excellent CBT treatments for OCD; however, additional work is needed to ensure that there are maximally effective treatments for hoarding disorder as well. In many cases, it may simply be a matter of building enough tools into existing treatment protocols so that clinicians can choose from among several empirically supported techniques. Alternatively, it could be that completely new treatment protocols are required. At the very least, more research is needed to identify which CBT techniques are most effective and how to best tailor treatments to each patient’s unique symptom profile (Williams, Mugno, Franklin, & Faber, 2013).

As new assessment measures are being developed to better understand hoarding disorder, it is important that development include validation of outcome measures across diverse populations. Thus far, measures used to evaluate hoarding, both directly and as a component of OCD, have been normed primarily with Europeans or European Americans, which limits the generalizability of research findings. Prior research has demonstrated that clinical cut-off scores and clinical presentation of OCD can differ across ethnic groups (Williams, Wetterneck, Thibodeau, & Duque, 2013). Therefore, future research should be more inclusive to better validate measures of hoarding and to ensure treatments are acceptable and effective across cultural groups. Consequently, it is recommended that sociocultural
influences, such as ethnic identity, are further explored in order to understand the impact that this may have on symptom presentation, diagnostic criteria, and treatment of hoarding disorder.

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