Journal of Obsessive-Compulsive and Related Disorders 4 (2015) 37–46

Contents lists available at ScienceDirect

Journal of Obsessive-Compulsive and Related Disorders

journal homepage: www.elsevier.com/locate/jocrd

Hoarding in attention deficit hyperactivity disorder: Understanding the comorbidity

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ARTICLE INFO

Article history:
Received 6 August 2014
Received in revised form
26 November 2014
Accepted 1 December 2014
Available online 10 December 2014

Keywords:
ADHD
Hoarding
Comorbidity

ABSTRACT

Hoarding disorder has a frequent co-occurrence with attention-deficit/hyperactivity disorder (ADHD). An accurate understanding of the comorbidity between hoarding disorder and ADHD remains unclear but is essential to inform appropriate assessment, prevention and treatment approaches. This paper will provide a review of potential comorbidity models and aetiological mechanisms implicated in both disorders in order to inform understanding of the nature of the comorbidity between hoarding disorder and ADHD. A correlated liabilities model is identified that implicates genetic, neurological, and executive functioning factors in the development and maintenance of hoarding symptoms in individuals with ADHD.

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1. Introduction

Although ADHD and hoarding disorder commonly co-occur, relatively little is known about the aetiology of this comorbidity. Hoarding disorder is a new addition to the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (*DSM-5*; American Psychiatric Association, 2013) and is defined as the difficulty discarding items due to urges to save possessions or distress when discarding; accumulation of items and cluttering of living spaces; and significant distress or impairment caused by these symptoms. Prior to its addition in the *DSM-5*, various terms were used to define hoarding disorder, such as compulsive hoarding (Frost & Hartl, 1996). However, the present paper will use the term 'hoarding disorder' to reflect the

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http://dx.doi.org/10.1016/j.jocrd.2014.12.001
2211-3649/

current DSM-5 designation but will note any important differences in individual studies' definitions of hoarding disorder.

Among the 2.3% of adults with hoarding disorder (Iervolino et al., 2009), approximately 28% have comorbid ADHD (Frost, Steketee, & Tolin, 2011). This population appears to experience greater deficits in functioning than those with hoarding disorder alone (Hall, Tolin, Frost, & Steketee, 2013), including more difficulties in activities of daily living, increased stress, and higher levels of domestic squalor (Hall et al., 2013). These deficits occur in addition to the hoarding-related impairments of compromised safety (Frost, Steketee, & Williams, 2000), reduced quality of life (Palermo et al., 2011), increased employment and housing difficulties (Saxena et al., 2011), and severe medical issues, including higher risk of arthritis, diabetes, obesity, and stroke compared to individuals without hoarding disorder (Tolin, Frost, Steketee, Gray, & Fitch, 2008).

The severe potential consequences of comorbid hoarding disorder in individuals with ADHD and the high association between the two disorders point to the importance of developing a greater understanding of the features involved in the co-occurrence of these disorders, particularly the causal and maintenance factors. It has recently been suggested that shared executive functioning deficits may explain the comorbidity between ADHD and hoarding disorder (Fullana et al., 2013; Hall et al., 2013). However, to date, no study has investigated this possibility in a sample of individuals with ADHD with comorbid hoarding disorder. The potential role of executive functioning as a mechanism linking ADHD and hoarding disorder therefore remains unknown.

The present review aims to synthesise the current literature to develop a model that may be used to understand the comorbidity between hoarding disorder and ADHD. To do this, several potential comorbidity models will be explored. The correlated liabilities model will be evaluated by providing a critical analysis of possible evidence of a shared genetic, neurological, and executive functioning aetiology of hoarding disorder among adults with ADHD. Such an analysis may inform understanding of the mechanisms of hoarding symptoms in this population and may highlight clinical implications, including prevention and treatment approaches.

2. Overlap between ADHD and hoarding disorder

There is substantial evidence for an association between ADHD and hoarding disorder. For example, in an assessment of comorbidity in adults with hoarding disorder, 27.8% were found to have comorbid inattentive ADHD, while 13.7% had hyperactive ADHD (Frost et al., 2011). Furthermore, Sheppard et al. (2010) found that 21.9% of adults with hoarding disorder had comorbid ADHD. In contrast, it appears from a meta-analysis of prevalence rates of ADHD using DSM-IV diagnostic criteria that ADHD only affects approximately 5% of the general adult population (Wilcutt, 2012). A further study using retrospective data indicated that a higher proportion of individuals with childhood ADHD later developed hoarding symptoms in comparison to those without childhood ADHD (Fullana et al., 2013). Other studies also suggest an association between the specific symptoms of ADHD and core hoarding symptoms. In particular, inattention appears to be a strong predictor of hoarding symptoms across the lifespan (Hacker et al., 2012; Tolin & Villavicencio, 2011), while hyperactivity/impulsivity appears to be associated with hoarding symptoms in childhood (Fitch & Cougle, 2013; Hacker et al., 2012).

Despite developing evidence of a frequent co-occurrence between ADHD and hoarding disorder, an accurate understanding of the mechanisms explaining this comorbidity remains unclear. Neale and Kendler (1995) propose several general comorbidity models that may be used to explain the co-existence of hoarding disorder and ADHD. As used previously by Schmitt and Weidinger (2014) in a study of dermatological comorbidities, Table 1 summarises these models in relation to existing knowledge regarding the association between hoarding disorder and ADHD. It is crucial that research is undertaken to establish a valid model of comorbidity that enables accurate diagnosis of comorbidity, as well as differential diagnosis between ADHD and hoarding disorder (Achenbach, 1995). Moreover, research is needed to gain an understanding of the aetiological mechanisms of ADHD and hoarding disorder in order to inform treatment decisions such as identifying specific treatment targets and determining whether the two disorders should be treated sequentially or in parallel (Achenbach, 1995).

On the basis of Neale and Kendler's (1995) framework and the current understanding of ADHD and hoarding disorder, the comorbidity between the two disorders may be explained by several alternate models, including alternate forms, random multiformity, three independent disorders, correlated liabilities, and the causal models. The alternate forms model would apply if both ADHD and hoarding disorder result from a single underlying liability. Given that no single cause has been identified for either disorder, this model cannot yet be rejected. However, our current understanding of hoarding disorder and ADHD suggests that several different aetiological factors may contribute to the occurrence of each disorder. It is therefore unlikely that the comorbid condition results from a single cause. The aetiological factors will therefore be discussed as they contribute to the correlated liabilities model. The random multiformity model is also plausible, whereby the comorbid condition represents an epiphenomenon of hoarding disorder in those with ADHD.

According to the three independent disorders model, individuals with ADHD plus hoarding disorder may have a disorder qualitatively and aetiologically distinct from ADHD and hoarding disorders. There would therefore be two possibilities for the comorbid condition: those with ADHD and hoarding disorder who are above the threshold for the liability of each disorder; and those with the distinct disorder of ADHD plus hoarding disorder. Given that the precise aetiology of hoarding disorder and ADHD is unknown, it remains a possibility that some cases of the comorbid condition could be an independent disorder that arises from a third aetiological mechanism. Very little is known about the nature of hoarding symptoms in those with ADHD, and further qualitative explorations and genetic studies of the comorbid condition are essential to explore these models.

Alternatively, the co-occurrence of ADHD and hoarding symptoms may be conceptualised using the Research Domain Criteria, which focuses on dimensional aspects of behavioural and neural circuits in the development and classification of mental disorders (National Institute of Mental Health, 2008). For example, ADHD and hoarding symptoms could be conceptualised as interrelated constructs, or behavioural dimensions, of the broader domain of Cognitive Systems, that co-vary with different degrees of damage to shared neural circuits, genetic, and behavioural factors (Cuthbert & Kozak, 2013; Morris & Cuthbert, 2012). Although these models cannot be rejected, the existing literature on these concepts is not yet established enough to warrant inclusion in the present review. It is also possible that hoarding disorder is directly caused by ADHD in a subgroup of those with hoarding disorder. Although this is also unable to be rejected as a possibility, reciprocal causation seems unlikely given the current indications that the development of hoarding symptoms begin after the onset of ADHD.

The inability to reject the alternate forms, random multiformity, causal and three independent disorder models as explanations for the comorbidity between ADHD and hoarding disorder highlights the need for further empirical investigation of these models. However, recent interest from researchers in the correlated liabilities model suggests its potential in explaining the comorbidity between ADHD and hoarding disorder. On the basis of the current interest in