

## **Trichotillomania and Co-occurring Anxiety**

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## **Abstract**

*Background:* Trichotillomania appears to be a fairly common disorder, with high rates of co-occurring anxiety disorders. Many individuals with trichotillomania also report that pulling worsens during periods of increased anxiety. Even with these clinical links to anxiety, little research has explored whether trichotillomania with co-occurring anxiety is a meaningful subtype.

*Methods:* 165 adults with trichotillomania were examined on a variety of clinical measures including symptom severity, functioning, and comorbidity. Participants also underwent cognitive testing assessing motor inhibition and cognitive flexibility. Clinical features and cognitive functioning were compared between those with current co-occurring anxiety disorders (i.e. social anxiety, generalized anxiety disorder, panic disorder, and anxiety disorder NOS) (n=38) and those with no anxiety disorder (n=127).

*Results:* Participants with trichotillomania and co-occurring anxiety reported significantly worse hair pulling symptoms, were more likely to have co-occurring depression, and were more likely to have a first-degree relative with obsessive compulsive disorder. Those with anxiety disorders also exhibited significantly worse motor inhibitory performance on a task of motor inhibition (stop-signal task).

*Conclusions:* This study suggests that anxiety disorders affect the clinical presentation of hair pulling behavior. Further research is needed to validate our findings and to consider whether treatments should be specially tailored differently for adults with trichotillomania who have co-occurring anxiety disorders, or more pronounced cognitive impairment.

**Keywords:** trichotillomania; anxiety; comorbidity; cognition

## **Introduction**

Trichotillomania is characterized by repetitive pulling out of one's hair, leading to significant functional impairment (APA, 2013). With a lifetime prevalence estimated between 1% and 3% (Christenson et al., 1991), trichotillomania is common and is frequently associated with significant psychosocial impairment (Woods et al., 2006). Adults with trichotillomania have elevated rates of co-occurring disorders, most commonly depression (52% to 60%) (Christen et al., 1991; Hand et al., 1996; Houghton et al., 2016) and anxiety disorders (60%) (Hand et al., 1996). Among children with trichotillomania, anxiety disorders are arguably the most common co-occurring mental health issue (24% to 30%) (Tolin et al., 2007; Franklin et al., 2008).

Trichotillomania's functional impairment has often been attributed, in substantial part, to, associated anxiety, but the directional relationship of trichotillomania to anxiety is still unsettled (Neal-Barnett et al., 2011). In fact, one study of 894 individuals with trichotillomania found that 83% reported anxiety associated with pulling (Woods et al., 2006). One explanation for its association with anxiety is that trichotillomania is simply a behavioral response to anxiety. Research suggests that trichotillomania generally begins at an earlier age than co-occurring anxiety disorders (Grant et al., 2015), and that hair pulling in some individuals seems to regulate unpleasant or aversive feelings (Woods et al., 2006). Adults with trichotillomania frequently report that their pulling worsens during periods of heightened anxiety (Neal-Barnett et al., 2011). Alternatively, hair pulling for many adults leads to avoidance of social activities and results in anxiety during intimate situations (Christenson and Mansueto, 1999; Diefenbach et al., 2005; Duke et al., 2010). Not mutually exclusively, hair pulling which results in alopecia may

increase social anxiety which can lead to further pulling (Diefenbach et al., 2002). Of course not all studies have found an association between anxiety disorders and hair pulling severity (Houghton et al., 2016).

By examining anxiety disorders within a large sample of adults with trichotillomania who had been systematically evaluated, we hoped to finally determine whether anxiety disorders influence the clinical presentation of trichotillomania and are associated with a unique cognitive presentation.

## **Methods**

### *Subjects*

The study included 165 adults (152 [92.1%] females; mean age =  $32.0 \pm 10.9$  years) with current trichotillomania. Subjects were recruited for treatment, neuroimaging, genetic or neurocognitive studies at the University of Minnesota and the University of Chicago from 2007-2016. All participants had a primary diagnosis of trichotillomania based on expert clinical assessment. As is customary in trichotillomania research, prior to 2013, the diagnosis was based on DSM-IV criteria with or without the endorsement of increasing and decreasing tension associated with pulling (criteria B and C). After 2013, all subjects met the DSM-5 criteria for trichotillomania. Other inclusion criteria included age 18 or older and the ability to be interviewed in person. The only exclusion criterion was the presence of an organic mental disorder or inability to understand and consent to the study.

All study procedures were carried out in accordance with the Declaration of Helsinki. The Institutional Review Boards of the University of Minnesota and of the

University of Chicago approved the procedures and the accompanying consent forms. After all procedures were explained, subjects provided informed written consent.

### *Assessments*

165 adults with a primary diagnosis of trichotillomania were examined using a semi-structured interview focusing on clinical features of trichotillomania. Each participant was evaluated for co-occurring psychiatric disorders using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID) (First et al., 1995). In addition, each subject underwent a semi-structured interview to examine psychiatric disorders in first-degree relatives. No relatives were interviewed directly.

The following measures were used to assess severity of trichotillomania symptoms: *Massachusetts General Hospital Hair Pulling Scale (MGH-HPS)* (Keuthen et al., 1995). The MGH-HPS is a valid and reliable, 7-item, self-report scale that rates urges to pull hair, actual amount of pulling, perceived control over behavior, and distress associated with hair pulling over the preceding 7 days. Analysis of the MGH-HPS has demonstrated two separate factors with acceptable reliability for both: “severity” and “resistance and control” (Keuthen et al. 2007).

*NIMH Trichotillomania Severity Scale (NIMH-TSS)* (Swedo et al. 1989). The NIMH scale is a five-item, clinician-administered scale that rates hair-pulling symptoms during the past week. The items assess pulling frequency (both on the previous day and during the past week), urge intensity, urge resistance, subjective distress, and interference with daily activities.

Psychosocial functioning and quality of life were assessed with the following: *Sheehan Disability Scale* (Sheehan 1983). The Sheehan Disability Scale is a valid and reliable, 3-item, self-report scale that assesses psychosocial functioning in 3 areas of life: work, social or leisure activities, and home/family life. Scores on the scale range from 0 to 30.

*Quality of Life Inventory* (Frisch et al.1993). The Quality of Life Inventory is a valid and reliable 16-item, self-report positive psychology scale that assesses areas of life such as health, love, work, recreation, home, friendships, self-esteem, and standard of living.

*Cognitive functioning.* Participants completed two neuropsychological tasks in a quiet testing room, using a touch-screen computer, measuring response inhibition and cognitive flexibility respectively. Our rationale for selecting these two tests was that they were used in earlier research to explore cognition in trichotillomania and how it compares to OCD (e.g. Chamberlain et al., 2006).

#### *Data Analysis*

Participants with trichotillomania and a current anxiety disorder (generalized anxiety disorder, panic disorder, social phobia, anxiety disorder NOS) were compared to trichotillomania subjects without a current anxiety disorder, on measures of current symptoms, psychosocial functioning, and cognition. Between-group differences were tested using ANOVA, or equivalent non-parametric tests as explicitly indicated in the text. All tests of hypotheses were performed using a two-sided significance level of .05.

## **Results**

Of all participants, 38 (23.0%) had at least one current co-occurring anxiety disorder. Those with anxiety disorders did not differ significantly from those without on demographic variables of interest (Table 1).

There were several significant clinical differences in people with trichotillomania based on anxiety disorders. Those with anxiety disorder had more severe trichotillomania symptoms based on both self-report (MGH-HPS) and clinician-administered instruments (NIMH-TSS) assessing past-week symptoms (Table 1). Those with anxiety disorders also showed relative impairment in the ability to suppress pre-potent motor responses, as measured using the Stop-Signal Task.

Rates of current psychiatric comorbidity generally did not differ based on anxiety disorders although major depressive disorder was more common among those with an anxiety disorder (Table 2). Further examination of participants without anxiety disorders who did and did not have current depression failed to show any clinical differences, and therefore these findings suggest that the anxiety disorder associations are not due to having comorbid depression. A family history of OCD was more common in those who had an anxiety disorder (Table 2).

## **Discussion**

In this study, we determined clinical and cognitive associations with anxiety disorders in individuals with a primary diagnosis of trichotillomania. In this large study of adults with trichotillomania, 23% had a co-occurring anxiety disorder. This rate of comorbidity is consistent with rates of anxiety disorders found in many other studies of trichotillomania (Panza et al., 2013; Keuthen et al., 2014).

In terms of clinical variables, this study demonstrated that adults with anxiety disorders and trichotillomania reported more severe pulling behavior than trichotillomania participants without anxiety disorders. In the only other study examining the clinical associations of comorbidity, anxiety disorders were not associated with any specific clinical findings regarding hair pulling (Houghton et al., 2016). Given that many people report pulling more when under stress, this finding is consistent with these anecdotal reports. Pulling may serve to reduce anxiety in some self-soothing fashion. Alternatively, after severe pulling, many report that they are embarrassed by the alopecia and more anxious in social situations. Our study did not examine the cause or effect nature of this comorbidity.

The finding that anxiety disorders were positively associated with trichotillomania severity is clinically important, and clinicians treating adults with trichotillomania should screen for anxiety disorders and may consider offering therapy focusing on the comorbid condition. Treatment of either the trichotillomania or the anxiety disorder could be complicated or even compromised by the presence of the other untreated condition. Treating one disorder alone may not be effective if a comorbid disorder is exerting a causal or maintaining influence on the treated condition. Psychological therapies should address anxiety while identifying reasons for pulling or for worsening of pulling. Relaxation techniques and alternative ways to deal with anxiety (other than pulling) might be useful. Furthermore, adults with trichotillomania and co-occurring anxiety disorders may require more intensive treatment services. To our knowledge, no research has been conducted regarding the treatment of comorbid anxiety disorders in adults with trichotillomania or the treatment of trichotillomania in adults with anxiety disorders.

One important clinical difference between those with and without anxiety disorder was that depression was more common in those with anxiety disorders. Anxiety and depression are commonly associated and so this finding is in part expected. Depression by itself did not result in differences in trichotillomania symptomatology and so it seems that it is the anxiety that is the driving force behind when trichotillomania and anxiety disorders resulted in greater hair pulling severity. It is even possible that depression is a secondary phenomenon – that is, as anxiety drives the hair pulling and depression results from the alopecia.

This study observed a positive association between motor impulsivity as indexed by the stop signal task and the presence of comorbid anxiety disorders. Trichotillomania without anxiety disorders has been associated with impaired performance on the stop signal task (Chamberlain et al., 2006; Odlaug et al., 2014). In the case of trichotillomania, why would co-occurring anxiety disorders be associated with more impairment in this cognitive domain? Comorbid anxiety disorders in depression (Lyche et al., 2010) and in alcohol use disorders (Sjoerds et al., 2014) did not appear to worsen performance on the stop signal task. In a healthy volunteer study, people with worse inhibitory control on a stop-signal task showed larger increased in anxiety following anxious mood induction using autobiographical memories (Tang & Schmeichel, 2014). Thus one possible explanation for the current finding on the stop-signal task is that relative *baseline* stop-signal impairment in trichotillomania, irrespective of cause, then leads to more pronounced anxiety responses to stressful stimuli over time, which might then lead to a formal anxiety disorder.

This study has several limitations. First, because a clinical sample was used, it is unclear how generalizable our results are to individuals with trichotillomania in the community. Second, although subjects were asked extensively about family history, no interviews were conducted with family members and no non-trichotillomania control groups were used. Third, this research used a cross-sectional analysis and, therefore, causal relationships cannot be confirmed; however, the analysis provides reliable measures of association. Despite these limitations, the study sample was relatively large, the inclusion/exclusion were fairly broad (inclusion of those who did or did not meet criteria for treatment studies) and the study used both self-report and interviewer-administered measures with strong psychometric properties. Lastly, statistical power would have been limited to detect more subtle clinical differences, i.e. group differences with smaller effect sizes. Detection of more subtle group differences would require a larger sample size, and this should be addressed in larger follow-up studies.

In conclusion, these results suggest that adults with trichotillomania and co-occurring anxiety disorders exhibit unique clinical differences. These clinical differences that exist, however, have treatment implications. Large studies examining the neurobiological differences in those with anxiety disorders are needed to fully understand the role of comorbidity in this disorder. Future research should also be directed at potential factors that may contribute differently to the etiology and pathophysiology of trichotillomania when comorbidity exists. Also greatly needed are treatment studies to identify whether evidence-based interventions should be tailored differently for those with trichotillomania and co-occurring anxiety disorders, or worse cognitive dysfunction.

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**Table 1. Demographic, Clinical, and Cognitive Characteristics of Trichotillomania With and Without Anxiety Disorders**

	<b>Anxiety Disorder n=38</b>	<b>No Anxiety Disorder n=127</b>	<b>F</b>	<b>p-value</b>
<b>Demographics</b>				
<b>Age, years</b>	30.7 (11.4)	32.4 (10.8)	.767	.383
<b>Female, n (%)</b>	36 [94.7%]	116 [91.3%]	fet	0.734
<b>Ethnicity, n (%)</b>			lr	0.747
Caucasian	34 [89.5%]	115 [90.6%]		
African-American	1 [2.6%]	3 [2.4%]		
Other	1 [2.6%]	2 [1.6%]		
<b>Education, n (%)</b>			lr	0.615
0	8 [21.1%]	28 [22.0%]		
1 High School or less	7 [18.4%]	14 [11.0%]		
2 At least some college	15 [39.5%]	47 [37.0%]		
3 Post-college degree	7 [18.4%]	32 [25.2%]		
<b>Marital Status, n (%)</b>			lr	0.119
0	26 [68.4%]	66 [52.0%]		
1	8 [21.1%]	50 [39.4%]		
3	2 [5.3%]	7 [5.5%]		
4	2 [5.3%]	2 [1.6%]		
<b>Clinical Characteristics</b>				
<b>Age at onset of trichotillomania, years</b>	13.5 (7.8)	12.7 (6.0)	.387	.535
<b>NIMH-TSS total</b>	13.5 (3.8)	11.4 (3.8)	5.866	.017
<b>MGH-HPS total</b>	18.8 (3.9)	16.9 (4.5)	4.967	.027
Severity	10.1 (3.0)	9.3 (3.0)	2.131	.146
Resistance and Control	8.6 (1.7)	7.6 (2.1)	5.967	.016
<b>QOLI t-score</b>	40.8 (11.5)	44.0 (11.9)	2.082	.151
<b>Sheehan Disability Scale</b>	11.8 (7.7)	9.9 (6.3)	2.175	.142
<b>Cognitive Tasks</b>				
<b>IED total Errors</b>	18.087 (16.757)	23.442 (24.259)	.978	.325
<b>IED Block 8</b>	6.826 (8.332)	9.714 (10.281)	1.514	.221
<b>SST SSRT</b>	205.859 (75.258)	177.273 (45.140)	4.828	.030

NIMH-TSS= NIMH Trichotillomania Severity Scale

MGH-HPS= Massachusetts General Hospital Hair Pulling Scale

QOLI=Quality of Life Inventory

All values are Mean ( $\pm$  SD) unless otherwise stated; F=ANOVA; df=1

fet = Fisher's exact test; lr = likelihood ratio test.

**Table 2. Comorbidity and Family History in Trichotillomania With and Without Anxiety Disorders**

	<b>Anxiety Disorder <i>n</i>=38</b>	<b>No Anxiety Disorder <i>n</i>=127</b>	<b>p-value, Fisher's exact test</b>
<b>Current comorbid psychiatric disorder</b>			
Current major depressive disorder	24 [63.2%]	27 [21.3%]	<0.001
Current skin picking disorder	14 [36.8%]	32 [25.2%]	0.306
Current obsessive compulsive disorder	1 [2.6%]	7 [5.5%]	0.683
Current substance use disorder	0 [0%]	4 [3.1%]	0.575
<b>Family history</b>			
<b>Subjects with at least one first-degree relative with the following psychiatric disorders, <i>n</i> (%)</b>			
Trichotillomania	4 [10.5%]	19 [15.0%]	0.600
Obsessive compulsive disorder	7 [18.4%]	4 [3.1%]	0.003
Any substance use disorder	7 [18.4%]	32 [25.2%]	0.515