Comprehensive Psychiatry 116 (2022) 152317

Contents lists available at ScienceDirect

Comprehensive Psychiatry

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

Comorbid trichotillomania and attention-deficit hyperactivity disorder in adults

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ARTICLE INFO

Keywords:
Trichotillomania
ADHD
Comorbidity
Impulsivity
Stimulant medications

ABSTRACT

Background: Individuals with trichotillomania (TTM), a disorder characterized by repetitive pulling out of one's own hair, often have co-occurring ADHD, but little is known about this comorbidity. Additionally, there have been intimations in the literature that treatment of ADHD with stimulants may worsen TTM symptoms. This study aims to examine clinical aspects of individuals with TTM and co-occurring ADHD.

Methods: 308 adults with a current diagnosis of TTM were assessed for ADHD using the Mini International Neuropsychiatric Interview 7.0.2 and Adult ADHD Self Report Scale. Participants also completed clinical measures related to TTM severity, impulsivity, quality of life, and psychosocial dysfunction. A series of analyses of variance were used to calculate differences in scale scores among subjects with and without co-occurring ADHD.

Results: Of the 308 participants, 47 (15.3%) met the clinical threshold for ADHD. Participants with ADHD reported significantly higher scores in all first and second factor traits of impulsivity, including attentional impulsiveness ($p < .0001$), motor impulsiveness ($p < .0001$), and non-planning impulsiveness ($p < .0001$). Interestingly, participants with ADHD did not report significant differences in TTM severity, perceived quality of life, or functional impairment, regardless of medication status.

Discussion: The data suggest that ADHD is common in adults with TTM, and the comorbidity is associated with heightened impulsivity. The co-occurrence of ADHD does not affect individuals' quality of life, symptom severity, or functionality. Taking stimulant medications for ADHD also did not appear to affect TTM severity, despite past case reports suggesting these medications may lead to onset or worsening of TTM.

1. Introduction

Trichotillomania (TTM) is a mental health disorder characterized by repetitive pulling out of one's own hair accompanied by high levels of distress and/or functional impairment [1]. Although TTM is estimated to affect 1.7% to 3.4% of the general US population, there are still many gaps in our understanding of the disorder [2–4].

Previous research has suggested that most individuals with TTM have one or more comorbid mental health disorders [2,5,6]. In their early study of 60 chronic hair pullers, Christenson and colleagues found that 49 of the 60 (81.7%) participants met criteria for a co-occurring current or lifetime psychiatric disorder [6]. A recent survey of 175 adults with TTM found that 53% of respondents with TTM had a comorbid anxiety disorder, 45% had comorbid depression, and 29% had comorbid ADHD [2]. While it is evident that TTM often co-occurs with other psychiatric disorders, it is still largely unknown how the presence of comorbid disorders may affect symptom severity, functional impairment, quality of life, and the overall clinical picture of TTM.

In research on other psychiatric disorders, there is evidence that individuals with comorbid mental illnesses are at an elevated risk for developing more severe psychiatric symptoms, and higher levels of distress and functional impairment. In the National Comorbidity Survey Replication (NCS-R) of 9282 English-speaking adults, Kessler and colleagues discovered that of the 26.2% meeting DSM-IV criteria for any psychiatric disorder, over 40% met criteria for at least one other disorder [7]. Illness severity was found to be strongly correlated with presence of comorbidity, as the most serious cases of mental illness were concentrated among a small portion of individuals with high levels of comorbidity [7]. Individuals with psychiatric comorbidity may also experience barriers in access to care and poorer outcomes with typical standard-of-care treatments, necessitating more specialized–and often more expensive–treatments [8,9].

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https://doi.org/10.1016/j.comppsych.2022.152317

Available online 28 April 2022

In line after depression and anxiety, one of the most commonly reported comorbid disorders in individuals with TTM is attention-deficit hyperactivity disorder (ADHD), a disorder comprising a variety of symptoms including impulsivity, inattention, and hyperactivity [10]. While ADHD affects approximately 2.5% of the general adult population [11], the rates in TTM appear to be up to ten times higher. Standard-of-care treatment for ADHD consists of a combination of behavioral therapy and stimulant medications [12]. Previous research on co-occurring ADHD in other psychiatric disorders suggests that the presence of comorbid ADHD leads to worse impairment, greater treatment resistance, and poorer clinical outcomes due to the additive clinical effects of comorbidity [13]. In addition to the high rates of ADHD among those with TTM [2,6], this comorbidity raises important clinical issues. According to multiple case reports, ADHD stimulant medications have been observed to induce or worsen TTM symptoms. In their 2010 report, Hamalian and Citrome described a case of a 26-year-old man with ADHD who experienced severe TTM symptoms after taking a regimen of methylphenidate, amphetamine/dextroamphetamine, and lisdexamfetamine. The researchers theorized that because stimulants have facilitative effects on dopamine and serotonin neurotransmission, stimulant-induced TTM may be the result of stimulant medication unmasking a latent neurobiological vulnerability to TTM [14]. As is the case with much of the existing literature on ADHD, most case reports of stimulants inducing or exacerbating TTM symptoms have focused on pediatric patients. These reports include three boys who reported significantly increased pulling behavior within 6 months of starting treatment with methylphenidate, as well as TTM onset following initiation of 10 mg/day of long-acting amphetamine/dextroamphetamine in a 12-year-old girl with ADHD [15,16]. These case reports put forth the hypothesis that using stimulant medications to treat ADHD may trigger TTM onset, or worsen TTM severity [14–16]. To the contrary, a preliminary report of nine children with comorbid ADHD and TTM reported significant reduction in ADHD symptoms without significant increases in hair pulling when taking methylphenidate [17]. Interestingly, two single case reports also reported improvement in skin picking disorder (a disorder closely linked phenomenologically with TTM) symptoms while taking stimulant medications [18,19].

Against this background, we explored TTM symptom severity, impulsivity, quality of life, and psychosocial functioning in adults with TTM plus comorbid ADHD compared to those with TTM without comorbid ADHD. We also aimed to uncover if taking stimulant medication to treat ADHD worsened TTM symptom severity. We hypothesized that subjects with TTM and comorbid ADHD would have higher levels of impulsivity and functional impairment, worse TTM symptom severity, and potentially lower quality of life.

2. Methods

2.1. Subjects

Adults (n = 308; 275 [89.3%] females), ages 18–65 years, with a current, primary Diagnostic and Statistical Manual Version 5 (DSM-5) diagnosis of trichotillomania were included in the analysis. Participants included in the analysis were recruited from phenomenological, neuroimaging, and treatment studies carried out at the University of Chicago from 2014 to 2022. Participants were recruited for these studies using flyers, online advertisements, and physician referrals from the Chicagoland area. Participants were excluded if they reported any unstable or uncontrolled medical condition, or if they met DSM-5 criteria for lifetime history of bipolar disorder, schizophrenia, or psychosis, or current substance use disorder. Comorbid diagnoses were confirmed by the Mini International Neuropsychiatric Interview (MINI), conducted by a trained clinician.

Participants provided written informed consent following a thorough explanation of study procedures and the opportunity to have any questions answered by the principal investigator. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures involving human subjects/patients were approved by the University of Chicago Institutional Review Board.

2.2. Assessments

2.2.1. Mini International Neuropsychiatric Interview 7.0.2 (MINI)

The MINI [20] is a clinician-rated, structured diagnostic interview assessing DSM-5 criteria for the most common disorders in mental health, including ADHD. An additional module for TTM was added

2.2.2. Adult ADHD Self-Report Scale (AASRS)

The AASRS [21] is an 18-item self-report screening tool for ADHD in adult patients. Each item is scored on a 5-point scale ranging from 0 = never to 5 = very often. Four or more marks in one the darkly shaded boxes (indicating a strong level of agreement with the question) within Part A (questions 1–6) indicate symptoms highly consistent with ADHD in adults. Part B (questions 7–18) provide additional cues for assessing patient symptoms. The ASSRS showed good internal consistency in the present study ($\alpha = 0.84$)

2.2.3. Massachusetts General Hospital Hair Pulling Scale (MGH-HPS)

The MGH-HPS [22] is a 7-item self-report scale evaluating a subject's urge to pull, actual hair pulling, and consequences of hair pulling. Each item is scored on a 5-point scale ranging from 0 = no symptoms to 4 = severe symptoms. The items are scored to produce a total score (0–28). The MGH-HPS showed strong internal consistency in the current analysis ($\alpha = 0.83$)

2.2.4. Clinician Global Impressions Severity Scale (CGI-S)

The CGI-S [23] is a single-item, clinician-rated assessment of severity of psychopathology. The severity score ranges from 1 = not ill at all to 7 = among the most severe cases

2.2.5. Quality of Life Inventory (QOLI)

The QOLI [24] is an empirically validated self-report scale assessing importance and satisfaction regarding 16 domains of life including health, self-esteem, and goals and values. Participants are asked to rate the importance of each domain on a 3-point scale ranging from 1 = not important to 3 = very important, and to rate how satisfied they are with each domain on a 6-point scale, ranging from −3 = very dissatisfied to +3 = very satisfied. Weighted satisfaction scores are summed and divided by the number of domains that were rated as important or very important to produce a raw score, which is then converted to a t-score. The t-score provides a proxy measurement for perceived quality of life, ranging from very low perceived quality of life (0–36) to high perceived quality of life (58–77). The QOLI had good internal consistency in the present study ($\alpha = 0.82$)

2.2.6. Barratt Impulsiveness Scale (BIS)

The BIS [25] is a 30-item self-report questionnaire measuring impulsive behaviors and preferences. Each item is scored on a 4-point scale ranging from 1 = rarely/never to 4 = almost always/always. These items are summed to compose 3 s-order factor scores (attentional, motor, and nonplanning) and 6 first-order factor scores (attention, motor, self-control, cognitive complexity, perseverance, and cognitive instability). The BIS had strong internal consistency in the present study ($\alpha = 0.85$)

2.2.7. Sheehan Disability Scale (SDS)

The SDS [26] is a self-report measure of disability and functional impairment. The SDS is composed of 3 items to measure the extent to which work/school, social life, and family life/home responsibilities have been functionally impaired by psychiatric symptoms within the

past week. Each item is scored on a 10-point scale ranging from 0 = not at all to 10 = extremely. These items are then summed to give a total functional impairment score (0−30). In the present study, the SDS showed acceptable internal consistency (α = 0.74)

2.3. Data analysis

Shapiro-Wilk tests performed on outcome measures and visual examination of histograms did not show evidence of non-normal distribution ($p > .05$), therefore two-way and one-way analyses of variance (ANOVA) were chosen as statistical tests. One-way ANOVA was used to calculate differences in all assessment scores between the TTM (with no comorbid ADHD) group, and the comorbid TTM/ADHD group. Differences between subjects with TTM (with no comorbid ADHD), subjects with ADHD taking stimulant medications, and subjects with ADHD not taking stimulant medications were also calculated using two-way ANOVA. Due to multiple comparisons, we used a Bonferroni correction and set the level of significance for all tests at 0.008. Statistical analyses were conducted using SPSS Version 26 (IBM)

3. Results

In total, 308 adults with DSM-5 TTM (275 female, 89.3%; mean age = 31.11, *SD* = 10.29) were included in the analysis. The majority of participants were Caucasian (85.7%) and had some amount of college education (82.8%). Of the 308 subjects, 47 (15.3%) met the clinical threshold for current ADHD as per the AASRS (44 female, 93.6%; mean age = 29.30, *SD* = 8.88). Those with and without ADHD did not significantly differ in terms of age, gender, race/ethnicity, or education. Of the participants with current ADHD, 16 (36.4%) were currently taking a stimulant ADHD medication (15 female, 93.7%; mean age = 33.44, *SD* = 10.94). These medications included amphetamine/dextroamphetamine ($n = 12$, doses ranging from 10 mg–40 mg), long-acting methylphenidate ($n = 2$, both 50 mg), methylphenidate ($n = 1$, 5 mg), and dextroamphetamine ($n = 1$, 10 mg)

Clinical measures are presented in Table 1. The mean scores on the MGH-HPS and CGI-S reflected moderate global severity of TTM. Adults in the TTM/ADHD group reported statistically significantly higher scores on all subscales on the BIS: attentional impulsivity ($F(1, 136) = 22.58$, $p < .001$); motor impulsivity ($F(1, 137) = 10.76$, $p = .001$); non-planning impulsivity ($F(1, 135) = 20.66$, $p < .001$). Analysis of variance revealed no statistically significant differences in TTM severity scores between the TTM group and the TTM/ADHD group: MGH-HPS ($F(1,302) = 64.04$, $p = .089$); CGI-S ($F(1, 304) = 2.08$, $p = .151$), although the TTM/ADHD group showed slightly higher average severity on both scales. Analysis also showed no significant differences between groups in perceived quality of life scores as per the QOLI ($F(1, 296) = 0.92$, $p = .338$) or functional impairment as per the SDS ($F(1, 287) = 2.34$, $p = .127$)

Two-way analysis showed no significant differences in TTM severity, BIS, QOLI, or SDS scores between subjects with ADHD currently taking stimulant medications and subjects with ADHD not taking stimulant medications

Table 1
Clinical characteristics of TTM participants with and without ADHD[a].

Characteristic	TTM ($n = 261$)	TTM/ADHD ($n = 47$)	*F*	*p*
Age, mean *(SD)*	31.43 (10.51)	29.30 (8.88)	1.72	0.191
Gender			1.33	0.247
Woman	231 (88.51)	44 (93.62)		
Man	26 (9.96)	3 (6.38)		
Other	4 (1.53)	0 (0)		
Race/Ethnicity			3.19	0.075
White, non-Hispanic	225 (86.21)	39 (82.98)		
Black	10 (3.83)	0 (0)		
Latinx/Hispanic	9 (3.45)	1 (2.13)		
Asian	3 (1.15)	2 (4.26)		
Other	3 (1.15)	1 (2.13)		
Not reported	7 (2.68)	4 (8.51)		
Education			0.07	0.790
Less than high school	12 (4.60)	0 (0)		
High school graduate	34 (13.03)	7 (14.89)		
Some college	39 (14.94)	8 (17.02)		
College graduate	94 (36.02)	18 (38.30)		
Graduate school or more	73 (27.97)	13 (27.66)		
Not reported	9 (3.45)	1 (2.13)		
MGH-HPS total, mean (*SD*)	16.64 (4.78)	17.93 (4.14)	2.91	0.089
CGI-S score, mean (*SD*)	4.40 (0.86)	4.60 (0.88)	2.08	0.151
SDS total, mean (*SD*)	9.15 (6.66)	10.85 (6.21)	2.34	0.127
QOLI t-score, mean (*SD*)	44.25 (12.03)	42.40 (11.43)	0.92	0.338
Any comorbidity based on the MINI	135 (51.72)	31 (65.96)	4.84*	0.029
Depression	76 (29.12)	26 (55.32)	12.49**	0.000
Anxiety	57 (21.8)	18 (38.30)	6.26*	0.013
OCD	16 (6.13)	5 (10.64)	1.24	0.267
Mild SUD/AUD	7 (2.68)	3 (6.38)	1.78	0.183
PTSD	9 (3.45)	5 (10.64)	4.68*	0.031
Panic Disorder	6 (2.30)	2 (4.26)	0.68	0.412
Binge Eating Disorder	6 (2.30)	1 (2.13)	0,00	0.950
Body Dysmorphic Disorder	4 (1.54)	1 (2.13)	0.09	0.766
Personality Disorder	3 (1.15)	0 (0)	0.54	0.462
BIS factor scores, mean (*SD*)				
Attentional Impulsivity	16.31 (3.87)	20.28 (4.96)	22.58**	0.000
Attention	10.06 (2.81)	12.97 (3.35)	24.10**	0.000
Cognitive Instability	6.21 (1.69)	7.31 (2.33)	8.67**	0.004
Motor Impulsivity	20.41 (3.62)	22.84 (3.89)	10.76**	0.001
Motor	13.58 (3.06)	14.88 (3.13)	4.37*	0.039
Perseverance	6.82 (1.56)	7.97 (1.80)	12.31**	0.001
Nonplanning Impulsivity	22.21 (4.75)	26.65 (4.90)	20.66**	0.000
Self-Control	11.64 (3.23)	14.41 (3.11)	18.39**	0.000
Cognitive Complexity	10.58 (2.39)	12.32 (2.84)	11.73**	0.001

[a] Data are presented as number (percentage) of participants unless otherwise indicated.
* Indicates $p < .05$.
** Indicates $p < .008$.

4. Discussion

The results of the current study suggest that ADHD is more common in adults with TTM compared to the general population (15.3% compared to 2.5%), which aligns with, albeit slightly less than (29%), that seen in previous research on comorbidity in TTM [2]. Early research in TTM failed to examine ADHD as it was often not included in structured interviews used for adults [6]. The awareness of this comorbidity, however, may have potential clinical and research importance. These data further suggest that adults with TTM and ADHD are significantly more impulsive, across multiple domains, than adults with only TTM. The impulsivity does not seem linked to other co-occurring disorders, as comorbidity with other impulsive disorders did not significantly differ between groups. TTM has historically eluded robust treatment approaches with no clear first-line therapy, or any FDA approved medication. This subgroup of people with TTM plus ADHD may reflect a distinct behavioral phenotype of TTM that necessitates a specifically tailored treatment to account for increased impulsivity

As a cross-sectional study, these data examining comorbidity cannot answer the directionality of the relationship between TTM and ADHD, or even if there is in fact a clear relationship. Attentional issues may lead to hair pulling as a way to focus the individual; however, the almost dissociative quality of hair pulling could lead to inattention. Given the elevated levels of impulsivity seen in the comorbid group, it is also possible to posit an explanation that impulsivity itself drives the symptoms of both TTM and ADHD in some individuals. While our data cannot address causality, future treatment studies may want to examine whether treating one or the other disorder could possibly reduce the risk of developing the other. For example, untreated ADHD in early life could

be an indicator of future TTM symptoms

Interestingly, the fact that those with ADHD taking stimulants did not significantly differ from those not on stimulants raises interesting treatment implications. First, it seems as if the worsening of TTM due to simulant medications may be a lesser concern that initially thought. Of course, it is possible given the cross-sectional nature of this study that subjects taking stimulants had a less severe form of TTM prior to starting those medications. However, this seems unlikely as the participants in this study denied any subjective TTM worsening after starting stimulants. Second, the fact that those taking stimulants did not report less severe TTM further suggests that treating ADHD may have little if any effect on TTM. Notwithstanding the fact that a few case reports suggest the beneficial use of stimulants for this comorbidity [17–19], our current data would suggest that TTM severity was unaffected by stimulant medication. Treatment approaches, therapy and/or medications, to this comorbidity might therefore consider focusing on the underlying impulsivity seen in both disorders

4.1. Limitations

This study suffers from a few limitations that need to be acknowledged. First, the current sample was largely Caucasian and female despite previous research indicating that the prevalence of TTM is generally consistent across different gender and racial/ethnic groups [2]. Future research should strive to more effectively capture the diversity of the TTM population, as this may help to improve generalizability of results

Second, the study sample is small, and so how these findings generalize to large groups of people with TTM remains unclear. Finally, the cross-sectional study design does not allow us to see the effect of stimulant medication on TTM symptoms at the time the medication was started (e.g., it is possible the subjects taking medication had more severe TTM symptoms before starting the medication). Prospective studies could provide greater insight into the effects of stimulants, both acutely and long-term, on TTM severity

Lastly, while the AASRS is a valuable screening tool with good sensitivity and specificity, it is not the same as a formal clinical diagnosis of ADHD. While the MINI and patient-reported psychiatric history were also used to assess ADHD symptoms, future research should continue to investigate this comorbidity in formally diagnosed patients

4.2. Conclusion

The results of this study provide greater insight into an under-researched, yet common, comorbidity. Subjects with comorbid TTM and ADHD showed higher levels of impulsivity, but comparable TTM severity to those without comorbid ADHD. Additionally, the use of stimulant medications to treat ADHD had no significant effect on TTM severity

These results provide valuable information to clinicians treating patients with ADHD. Clinicians may worry that stimulant medications could incite or worsen TTM symptoms, but the results of this study provide new evidence suggesting that this is not necessarily the case. These results may allow clinicians to feel comfortable providing appropriate standard-of-care treatment to ADHD patients with TTM

Many clinicians treat patients with ADHD but may not be familiar with TTM due to the lack of available literature on the topic. However, considering the present findings that ADHD is far more common in the TTM population than in the general population, clinicians should be mindful of this comorbidity when treating patients with ADHD. Having greater awareness of this comorbidity in the field may lead to better outcomes for patients, as clinicians can develop treatment that address both the impulsive symptoms of ADHD and the compulsive symptoms of TTM. Future research should continue to investigate effective ways of treating comorbid TTM and ADHD

Due to the greater availability of ADHD research in pediatric populations, researchers may also want to further investigate comorbid TTM and ADHD in children and compare and contrast their findings to the present study's findings on comorbid TTM and ADHD in adults. This research may allow for a better understanding of differences in impulsive and compulsive symptomatology across the lifespan

Funding

This study was funded by internal funds. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors

Availability of data and material

Data not available without a data sharing agreement due to confidentiality

Disclosures

JEG has received research grants from Otsuka and Biohaven Pharmaceuticals. He receives yearly compensation from Springer Publishing for acting as Editor-in-Chief of the Journal of Gambling Studies and has received royalties from Oxford University Press, American Psychiatric Publishing, Inc., Norton Press, and McGraw Hill. EKC and SV report no disclosures

Acknowledgments

The authors would like to thank Jonathan Hoerner for assisting in the preparation of this manuscript

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