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Significance of family history in understanding and subtyping trichotillomania

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ABSTRACT

Background and aims: The existence of subtypes of trichotillomania (TTM) have long been hypothesized, and recent studies have further elucidated characteristic subtypes of TTM and possible ramifications of subtyping for treatment. In clinical applications of subtyping for treatment of TTM, family history (FH) of psychiatric disorders in patients may serve as a tool to differentiate disorder presentations and inform care. We compared prevalence of psychiatric illnesses in first-degree relatives of participants with TTM and healthy controls, respectively, in a large sample, and examined associations between those psychiatric disorders that were significantly different in the FH between groups and measures of disability, severity, and neuropsychological constructs.

Methods: We compared FHs of 152 participants (mean age = 29.9) with TTM and 71 healthy controls (mean age = 29.6), utilizing chi-squared tests to determine which psychiatric illnesses were more prevalent in FHs of participants with TTM. We then used two-tailed *t*-tests to compare TTM participants with those more prevalent FHs to participants without those FHs on measures of disorder severity, disability, and neuropsychological constructs.

Findings: Obsessive-compulsive disorder (OCD), TTM, skin picking disorder (SPD), and major depressive disorder (MDD) were significantly more frequent in first-degree relatives ($p < 0.0033$) of TTM participants than those of healthy controls. TTM participants with a FH of OCD scored significantly higher on measures of impulsivity and lower on measures of distress tolerance. Those with FH of TTM, SPD, and MDD did not differ significantly across measured variables.

Conclusion: OCD, TTM, SPD, and MDD are more prevalent in the FHs of people with TTM, as compared to healthy controls. TTM participants with a family history of OCD may be more likely to demonstrate decreased distress tolerance and increased impulsivity. In all, as understanding of TTM subtypes develops, the FH may prove a useful tool in delineating subtypes and informing care.

1. Introduction

Trichotillomania is an often debilitating psychiatric condition characterized by a recurrent pulling of one's own hair, leading to hair loss and various functional impairments [1–3]. While the behavioral pathology of trichotillomania (TTM) and similar body-focused repetitive behavior disorders (BFRBs) may appear to be simple behaviors upon initial observation, prior investigations have found TTM to be a highly complex and individualized disorder with well-described clinical and neurobiological distinctions between TTM presentations [4–6]. Subsequent research aiming to define distinct subtypes of TTM has explored various aspects of TTM patient presentation, including age of onset [7–9], comorbidities [10–12], and focused vs. automatic hair pulling [13–14]. One recent study of clinically diagnosed cohorts of TTM identified three distinct clusters of adult cases based on lifetime comorbidity [15]. The first cluster consisted of cases without any comorbidity ("simple TTM"), a second cluster presented with comorbid depression only ("depressive TTM"), and a third with multiple comorbid disorders was identified and labeled "complex TTM" [15]. The study also found that there was a significant association between the number of comorbid disorders and depression and TTM symptom severity [15]. Attempting to find subtypes associated with specific treatment

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responses, a recent randomized controlled trial divided participants into "automatic" and "focused" pulling subtypes, and found that "focused" pullers received greater benefit from habit reversal training therapy compared to "automatic" pullers [16]. In all, increasing evidence suggests that subtyping is an important aspect of clinical care for patients with TTM. Given that no uniform standard of care for TTM has been established [17], subtyping may become an important factor in guiding TTM treatment plans.

Within the exploration of TTM subtypes, one aspect of clinical presentation that has been less researched is the possible significance of family history. While many aspects of care move towards a "personalized medicine" model with increasing emphasis on genetic markers, the taking of a family history remains the initial and often only test of a patient's disease genetics [18]. Despite its time consumption and at times disputed utility [19], the family history remains a widely taught and utilized initial assessment of a patient's genetic basis of disease. TTM has long been demonstrated to have a familial basis, with various studies demonstrating elevated rates of TTM in first-degree relatives of probands with TTM [20–23]. Existing twin studies in TTM have suggested that TTM is heritable in additional to being familial [24]. Given the demonstrated heritable and familial nature of TTM and previous research on TTM subtypes, understanding possible relationships between patient family history and TTM presentations may be an important aspect of understanding patient presentation and TTM subtypes.

Previous work exploring family history in small samples of patients with TTM have found increased family history rates of TTM, other BFRBs, and Substance Use Disorders (SUDs) in TTM and BFRB patients [20,23,25]. Another previous study investigating family history in 265 patients with BFRBs found that BFRB patients with a family history of SUD may be associated with a unique clinical and cognitive presentation [23]. While these previous studies have established different rates of psychiatric disorders in family history and possible significance of family history for disease presentation in BFRB and TTM patients, further research is necessary to assess the clinical significance of family history in TTM patients, and assess associations of family history with neuropsychological constructs and psychiatric disorders. This large sample study aims to measure differences in prevalence of family history of various psychiatric disorders between patients with TTM and healthy controls, and assess possible associations between family history and clinical presentations of TTM.

2. Methods

2.1. Participants

Participants included 223 adults recruited from the community and identified as either having TTM (meeting DSM-5 criteria for TTM) or being a healthy control. Recruitment began in October 2017 and ended in March 2019. Inclusion criteria for the clinical sample were: (a) DSM-5 diagnosis of TTM; (b) aged 18–65 years; (c) fluency in English; and (d) being capable of providing informed consent. Inclusion criteria for healthy controls were the same except they could have no current or lifetime history of any DSM-5 psychiatric disorder.

Exclusion criteria for the clinical sample and healthy controls were: current or lifetime diagnosis of any serious medical, neurological, or psychiatric illness that would preclude successful study participation (including any psychotic disorder, active substance use disorder, and bipolar disorder).

Potential participants were screened by the study site coordinator, who then scheduled an interview date. On the day of the assessment, participants met with study staff to complete informed consent. They were given an opportunity to ask questions and were reminded that study participation was voluntary. The primary investigator and/or trained study personnel discussed potential risks of the study prior to obtaining informed consent. After receiving a complete description of the study, participants provided written informed consent. Participants received a cash incentive for participation to reimburse them for their time and transport costs. All procedures were approved by the Institutional Review Board at the University of Chicago.

All participants completed a comprehensive diagnostic interview (Mini International Neuropsychiatric Interview 7.0 (MINI 7.0) [26], TTM diagnostic modules and symptom severity scales, and an evaluation of family history. We undertook the family history method where the proband is asked about psychiatric and substance use problems in their first-degree relatives, despite its methodological limitations [27], as this method aligns most closely with how family history is evaluated clinically. SUDs were defined as the chronic use of drugs or alcohol resulting in either noticeable social and occupational dysfunction or the need for a twelve-step program or formal treatment. When a participant was unsure of a diagnosis, it was not included.

2.2. Data analysis

Utilizing data from self-reported family history, the prevalence of family history of various psychiatric disorders was compared between participants with TTM and healthy controls using chi-squared tests. To account for possible confounding by comorbidity of obsessive-compulsive disorder (OCD) with TTM, family history was also analyzed after excluding participants meeting MINI diagnostic criteria for OCD (Appendix A). Those psychiatric disorders found to be significantly more prevalent in the family histories of participants with TTM versus controls were then each used to categorize participants with TTM into one group with a family history of that disorder, and one group without. These groups were then compared across measures of disorder severity (Massachusetts General Hospital Hairpulling Scale [28]), disability (Sheehan Disability Scale [29]), and neuropsychological constructs (Barratt Impulsiveness Scale [30] and Distress Tolerance Scale [31]). Descriptions of these scales and subscales are included in Appendix B. Measures across these scales were compared between groups with and without the significant family histories using two-tailed *t*-tests. A Bonferroni correction was conducted to correct for multiple comparisons. With fifteen disorders studied in comparing FH prevalence, significance was defined as the Bonferroni adjusted $p < 0.0033$ (Table 1), and with 16 measures of severity, disability, and neuropsychological constructs studied in participants with more prevalent FH, significance was defined as the Bonferroni adjusted $p < 0.0031$ (Table 2). To account for possible confounding resulting from comorbidity of OCD among TTM participants, severity and neuropsychological constructs in these participants were also analyzed after excluding participants meeting MINI diagnostic criteria for OCD (Appendix C). SPSS software version 28 was used for all analyses.

3. Results

3.1. Prevalence of family history

152 participants with TTM (mean age = 29.9) and 71 healthy controls (mean age = 29.6) took part in the study. In comparisons of self-reported family history of TTM participants with controls, family histories of OCD, TTM, skin picking disorder (SPD), and major depressive disorder (MDD) were significantly more reported ($p < 0.0033$) by TTM participants than by healthy controls (Table 1). No psychiatric disorders were significantly more reported in the family histories of healthy controls. 52.0% of TTM participants reported a family history of MDD, compared to 28.2% of healthy controls. 17.1% of TTM participants reported family histories of OCD, TTM, or SPD, compared to 1.4% of healthy controls reporting family histories of these disorders. Of note, while the same numbers of participants in each group reported these family histories, it was not the same participants reporting family history of each. Of the 26 TTM participants with a FH of OCD, one participant met MINI criteria for OCD. Of the 126 TTM participants without a FH of OCD, seven participants met MINI criteria for OCD.

Table 1
Family history prevalence among 152 participants with trichotillomania and 71 controls.

Family History (+, −, %)	+ Control	- Control	% Control	+ TTM	- TTM	% TTM	Odds Ratio	χ^2	p
Tic Disorder	2	69	2.8	8	144	5.3	1.9	0.676	0.411
Obsessive-Compulsive Disorder	1	70	1.4	26	126	17.1	14.4	11.205	<0.001*
Trichotillomania	1	70	1.4	26	126	17.1	14.4	11.205	<0.001*
Skin Picking Disorder	1	70	1.4	26	126	17.1	14.4	11.205	<0.001*
Body Dysmorphia	1	70	1.4	5	147	3.3	2.4	0.654	0.419
Hoarding	3	68	4.2	18	134	11.8	3.0	3.291	0.07
Generalized Anxiety Disorder	11	60	15.5	40	112	26.3	1.9	3.214	0.073
Panic Disorder	3	68	4.2	15	137	9.9	2.5	2.077	0.15
Major Depressive Disorder	20	51	28.2	79	73	52.0	2.8	11.109	<0.001*
Attention Deficit Hyperactivity Disorder	8	63	11.3	26	126	17.1	1.6	1.276	0.259
Alcohol Use Disorder	14	57	19.7	49	103	32.2	1.9	3.742	0.053
Substance Use Disorder	4	67	5.6	26	126	17.1	3.5	5.47	0.019
Anorexia/Bulimia	5	66	7.0	12	140	7.9	1.1	0.05	0.823
Binge Eating Disorder	1	70	1.4	6	146	3.9	2.9	1.026	0.311
Autism Spectrum Disorder	5	66	7.0	10	142	6.6	0.9	0.017	0.898

+Control or + TTM indicates a Control or TTM participant self-reporting family history of disorder. -Control or -TTM indicates a Control or TTM participant not reporting family history of disorder. % Control or %TTM indicates percentage of participants in the group reporting a family history of disorder.
*indicates significance ($p < 0.0033$).

Table 2
Two-tailed T-tests comparing symptom severity, disability, and neuropsychological constructs between trichotillomania participants with family history and without.

	OCD, p (t)	TTM, p (t)	SPD p (t)	MDD p (t)
MGHHS	0.164 (1.4)	0.018 (2.396)	0.929 (0.09)	0.57 (−0.57)
SDS	0.734 (0.341)	0.447 (0.763)	0.005 (2.833)	0.187 (1.326)
BIS, Attention 1st Order	0.352 (0.934)	0.131 (−1.52)	0.472 (0.721)	0.94 (0.076)
BIS, Cognitive Instability 1st Order	***0.002 (3.098)**	0.241 (−1.178)	0.105 (1.632)	0.707 (0.377)
BIS, Motor 1st Order	0.03 (2.200)	0.522 (−0.642)	0.659 (−0.442)	0.253 (−1.149)
BIS, Perseverance 1st Order	0.169 (1.381)	0.697 (0.390)	0.679 (0.414)	0.212 (1.254)
BIS, Self-Control 1st Order	0.392 (0.86)	0.679 (−0.415)	0.987 (0.016)	0.803 (−0.25)
BIS, Cognitive Complexity 1st Order	0.664 (−0.436)	0.095 (−1.683)	0.605 (−0.518)	0.957 (−0.054)
BIS, Attentional 2nd Order	0.047 (2.003)	0.168 (−1.387)	0.248 (1.159)	0.771 (0.291)
BIS, Motor 2nd Order	0.018 (2.392)	0.724 (−0.354)	0.856 (−0.182)	0.696 (−0.392)
BIS, Non-planning 2nd Order	0.874 (0.159)	0.186 (−1.329)	0.851 (−0.189)	0.86 (−0.177)
DTS, Tolerance	0.02 (−2.356)	0.642 (−0.466)	0.331 (−0.975)	0.037 (−2.100)
DTS, Absorption	0.008 (−2.712)	0.589 (−0.542)	0.241 (−1.177)	0.015 (−2.466)
DTS, Appraisal	0.008 (−2.683)	0.29 (1.06)	0.653 (−0.45)	0.015 (−2.454)
DTS, Regulation	0.027 (−2.239)	0.587 (−0.544)	0.732 (−0.343)	0.107 (−1.623)
DTS, Total	***0.003 (−3.080)**	0.997 (0.004)	0.363 (−0.913)	0.018 (−2.404)

All items are p-scores with t-statistic in parentheses. AAQ = Acceptance and Action Questionnaire. MGHHS = Massachusetts General Hospital Hairpulling Scale. SDS = Sheehan Disability Scale. BIS = Barratt Impulsiveness Scale. DTS = Distress Tolerance Scale. Full list of descriptions of scales and scale subscores included in Appendix. Means and standard deviations of scale responses included in Appendix B.
* indicates significance ($p < 0.0031$), significant values bolded.

Analysis of family histories excluding participants with comorbid OCD was consistent with analysis including comorbid OCD participants, finding significantly higher FH rates of OCD, TTM, SPD, and MDD (Appendix A).

3.2. Family history and severity, disability, and neuropsychological constructs

In comparisons of patient questionnaires assessing disorder severity, disability, and neuropsychological constructs between TTM participants with family histories of OCD, TTM, SPD, or MDD versus TTM participants without these family histories, some significant differences emerged (Table 2) (A table of response means and standard deviations is included in Appendix D). TTM participants with family history of OCD scored significantly higher ($p = 0.002$) on a single 1st order factor of the Barratt Impulsiveness Scale (cognitive instability), and significantly lower on the total score of the Distress Tolerance Scale ($p = 0.003$). There were no significant differences in clinical measures of symptom severity or disability. Comparisons conducted with exclusion of participants with comorbid OCD found similarly significant differences in measures of impulsivity and distress tolerance (Appendix C).

TTM participants with a family history of TTM did not score significantly differently from those without a TTM family history on any measure.

TTM participants with a family history of SPD did not score significantly differently from those without a SPD family history on any scale, but did exhibit a trend ($p = 0.005$) towards greater dysfunction (using the SDS).

TTM participants with a family history of MDD did not score significantly differently on any measure.

4. Discussion

This study confirms the increased prevalence of family histories of BFRBs in TTM described in previous studies [20,22–24,32], and supports the depth of literature positing deep links between OCD and TTM [12,21,33–36] by demonstrating increased prevalence of family history of OCD in TTM. These findings also support a previous study [20] that identified an increased prevalence of MDD in TTM family history. Unlike that previous study [20] (22 TTM subjects and 33 controls), however, we did not find a statistically significant difference in rates of substance use disorders in the family history of participants with TTM after correcting for multiple comparisons.

This study also adds to previous work by Gerstenblith et al. that examined associations of TTM with other comorbidities, and found higher comorbidity of TTM with SPD, OCD, mood disorders, among many others [37]. That these diseases occur significantly more in comorbidities and family histories of people with TTM indicates deep

links between these diseases, and supports a common basis in dysregulated cortico-striatal-thalamo-cortical circuitry demonstrated in prior studies [38,39].

4.1. Clinical relevance

Further assessment of disorder severity, disability, and neuropsychological constructs also suggests possible clinical relevance of family history, particularly within the context of TTM subtypes [6]. Participants with a family history of OCD scored significantly higher on a single factor of the BIS (indicating some type of increased impulsivity), and significantly lower on total scores of the DTS (indicating decreased distress tolerance). These differences persisted after controlling for multiple comparisons and possible confounding from OCD comorbidity among participants. These results indicate that a FH of OCD in TTM patients may suggest a more impulsive, less distress tolerant neuropsychological profile. This profile is reminiscent of the "impulsive/perfectionist pullers" previously defined by Grant et al. [6], who pull to control unpleasant feelings and feel unable to resist the urge to pull. These subtypes of pullers may arguably see greater benefit from psychotherapy or pharmacologic treatment tailored towards addressing emotional dysregulation. In all, the data suggests that a FH of OCD in TTM patients may have implications for disease presentation and subtype. These results support the need for increased investigation of TTM subtypes, and suggest that the FH may have clinical relevance in subtyping presentations of TTM.

4.2. Limitations

This study does have several limitations. First, TTM participants were recruited from those who were either already in treatment or responded to advertisements for research, and our sample may not accurately reflect the distribution of disorder characteristics in the population. Additionally, while our sample size was larger than other studies, it still may not have included enough participants to detect significant differences in family history between subjects and controls. This may be particularly true for both Substance Use Disorder and Alcohol Use Disorder, which have been suggested to have increased prevalence in TTM family history by other studies [20,25], but did not reach significance in our study. While our analysis did control for possible confounding by OCD comorbidity, there may also be some potential for confounding not controlled for in this study with regards to the associations of other diseases in family history. Finally, family history data in this study was self-reported by participants, and no interviews with family members were conducted. While this self-reporting reflects how family history is collected clinically, reported rates of family histories in controls and TTM participants may not reflect the true prevalence of disorders in the family history of TTM participants or controls. This may be particularly true for controls who may have not have previously spent as much time as TTM participants reflecting on their family history. Future studies of family history in TTM may address this limitation by incorporating interviews of participant family members.

5. Conclusion

To our knowledge, this is the largest controlled study analyzing the prevalence and significance of family history in TTM. We show that patients with TTM demonstrate increased family history prevalence of OCD, TTM, SPD, and MDD. A family history of OCD may be suggestive of a TTM patient with increased impulsivity and decreased distress tolerance. These findings support the need for further investigation of TTM subtype and ramifications of subtype for treatment, and suggest that the family history remains clinically useful in understanding and guiding care for TTM.

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Declaration of Competing Interest

Mr. Zhang reports no conflicts of interest. Dr. Grant has received research grants from Biohaven and Otsuka Pharmaceuticals. Dr. Grant 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.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.comppsych.2022.152349.

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