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Short communication

Factor analysis of the Massachusetts General Hospital Hairpulling Scale

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Abstract

Objective: We explored the factor structure of the Massachusetts General Hospital Hairpulling Scale (MGH-HPS), a self-report measure for trichotillomania (TTM). **Methods:** Self-reported hairpullers who responded to an Internet-based survey (N=990) completed the MGH-HPS, demographic items, and other survey instruments. Principal axis exploratory factor analysis with Promax rotation of scores was conducted. **Results:** A two-factor solution was revealed, with "Severity" and "Resistance and Control" as separate factors. **Conclusion:** The MGH-HPS consists of two separate factors. Factor scores can be utilized to track naturalistic TTM symptom changes, improve patient characterization and treatment matching, and clarify the timing and mechanism of action for different treatment modalities.

Keywords: Factor analysis; Hairpulling; Self-report scale; Trichotillomania

Introduction

Despite evidence documenting the significant prevalence and psychosocial impact of trichotillomania (TTM), the literature suffers from a paucity of well-studied assessment instruments. There exist only two paper-and-pencil patient-rated instruments for the assessment of TTM severity in adults [1,2]. Of these, the Massachusetts General Hospital Hairpulling Scale (MGH-HPS) [1] is preferred given its more sophisticated psychometric development, fewer scale items, and psychometric properties similar to those of other self-report scales [3].

The MGH-HPS is a homogeneous scale with good internal consistency [1,3], excellent test–retest reliability [4], strong convergent validity [3,4], and good divergent validity [4]. The development of the MGH-HPS involved the adoption of relevant items from the Yale–Brown Obsessive Compulsive Scale, substituting "hairpulling" for

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"compulsion" [1]. Items assessing urges replaced items assessing obsessions. The final instrument consists of seven items with adequate internal consistency. An "actual pulling" subscale of the MGH-HPS was scored in one study [5], although factor-analytic investigation is still lacking.

Methods

Participants

Study participants were self-reported hairpullers enrolled in an Internet-based research study, the Trichotillomania Impact Project (TIP) [6]. Of 2558 survey responses received, 990 respondents were ≥18 years of age and endorsed the following questions assessing *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*) TTM diagnostic criteria: (1) hairpulling resulting in noticeable hair loss; (2) increased physical tension or an "urge" immediately before pulling or when trying to resist pulling at least "a little of the time" (i.e., 11–29%); (3) pleasure, gratification, or relief after pulling at least "a little of the time" (i.e., 11–29%); (4) "never/almost never" pulling hair (0–10% of the time) in response to voices others may not hear or due to beliefs that bugs/insects were crawling on the skin; and (5) experiencing at least "moderate" impairment (a score of ≥5 on a 9-point Likert scale) in day-to-day personal, social, occupational, or academic functioning.

Our sample was 93.7% female (n=928), with a mean age of 30.8 years (S.D.=9.78, range=18–67). Fifty-five percent (n=544) was single/never married, and 34.9% (n=346) was married. Participants were predominantly Caucasian (87.4%; n=864). Six hundred thirty-seven (64.3%) participants reported a prior diagnosis of TTM. Significant differences ($P \leq .05$) in gender and ethnicity occurred between those with prior TTM diagnoses and those without prior TTM diagnoses; proportionately more females and more Caucasian participants had prior TTM diagnoses.

Trichotillomania Impact Survey (TIS)

Participants completed the TIS, an anonymous online survey that assessed demographics, TTM phenomenology and psychosocial impact, and treatment history, and included several self-report scales [6]. Participants were informed in writing of the study requirements and were told that survey submission indicated formal consent to participate. Institutional Review Board approval was obtained for this study.

Data analysis

Principal axis factor analysis was conducted on scores for all seven items of the MGH-HPS. Exploratory factor analysis was chosen in the absence of consensus regarding a hypothesized scale factor structure and the possibility of changes in TTM characteristics since initial scale development over a decade ago.

The cumulative amount of score variance accounted for by different factors and scree plot were utilized to determine the factor solution adopted. Promax rotation with Kaiser normalization (assuming correlated scale factors) was performed. The factor matrix was examined to identify the constructs represented by each factor. Pearson Product–Moment Correlation Coefficients were computed between survey items and MGH-HPS factors. Internal consistency coefficients (Cronbach's α) were obtained to assess reliability.

Results

Exploratory factor analysis

A two-factor solution was identified, and a scree plot of eigenvalues indicated that it was acceptable. Factor 1 "Severity" consisted of four items with the following Factor 1 structure coefficients: .920 (urge frequency), .808 (urge severity), .691 (hairpulling frequency), and .589 (distress). Factor 2 structure coefficients for these four items ranged from −.093 to .173. Factor 1 had an eigenvalue of 3.73 and accounted for 53.2% of scale score variance.

Factor 2 "Resistance and Control" consisted of three items with the following Factor 2 structure coefficients: .801 (control over hairpulling), .775 (resistance to hairpulling), and .725 (control over urges). Factor 1 structure coefficients for these three items ranged from −.215 to .127. Factor 2 had an eigenvalue of 1.26 and accounted for 17.9% of the variance in scale scores.

Factor analysis on a larger sample (N=1697) that included these participants and other hairpullers who satisfied more liberal diagnostic criteria also generated a two-factor solution with similar factor loadings. These results are available upon request from the first author.

Internal consistency

Cronbach's α scores for the total scale, Factor 1, and Factor 2 were .846, .832, and .805, respectively. Internal consistency coefficients for scale items (α scores with the item deleted) are .858 (distress), .822 (hairpulling resistance), .751 (hairpulling frequency), .749 (urge severity), .726 (urge frequency), .700 (control over hairpulling), and .665 (control over urges).

Mean scale scores and correlations

The mean total score for Factor 1 ("Severity") was 9.53 (S.D.=3.36). The mean total score for Factor 2 ("Resistance and Control") was 7.72 (S.D.=2.46). The mean total MGH-HPS score was 17.25 (S.D.=5.07). Pearson Product–

Moment Correlation Coefficients between both factors (r=.504, P=.000), and each factor with the total scale (Factor 1: r=.907, P=.000; Factor 2: r=.821, P=.000) were all highly significant.

Pearson correlations were computed for MGH-HPS factors with survey variables, including Depression and Anxiety Stress Scale scores (19), total Sheehan Disability Scale (SDS) scores (20), time spent resisting pulling, and amount of time and money spent on camouflaging hair loss. All survey variables were significantly correlated with both Factor 1 and Factor 2 scale scores, with few exceptions. The SDS total score significantly correlated with Factor 1 (r=.228, P<.0001) but not with Factor 2 (r=.049, P=.138). Time spent covering up also correlated significantly with Factor 1 (r=.084, P=.011) but not with Factor 2 (r=.007, P=.837). Time spent resisting pulling correlated positively with Factor 1 (r=.218, P<.0001) but correlated negatively with Factor 2 (r=−.100, P=.011).

Discussion

The results of our exploratory factor analysis and internal consistency calculations suggest that the MGH-HPS consists of two separate factors ("Severity" and "Resistance and Control"), with acceptable reliability for both factors and the entire 7-item scale. Significant correlation between the two factors indicates that they are not totally independent of what they measure. In addition, weak correlations (albeit significant due to large sample size) between scale factors and other survey items again reflect lack of equivalence in measured constructs.

The use of subscale scores to longitudinally track TTM symptoms may elucidate naturalistic changes in symptom profile, as well as temporal relationships between symptom severity and symptom reduction efforts without treatment. MGH-HPS subscale scores may also enhance patient characterization and patient–treatment matching. For example, high scores on the "Resistance and Control" factor (indicating limited resistance and poor control) may warrant motivational strategies to improve compliance with cognitive–behavioral treatment (CBT) or, alternatively, pharmacological interventions as first-line or concurrent treatment. Tracking subscale scores during the course of treatment could also highlight treatment mechanisms (i.e., whether different treatments differentially impact symptom severity or resistance and control over time). One might anticipate that change attributable to CBT would be more immediately reflected in improved scores on the "Resistance and Control" versus "Severity" subscales. Conversely, change attributable to medications may not occur as rapidly and would more likely be reflected initially in improved scores on the "Severity" subscale.

Our large sample size is a noteworthy strength of this study. Methodological limitations exist, though, including our inability to confirm that respondents satisfied *DSM-IV* TTM criteria. Existing research, however, increasingly supports the comparability of results with Internet assessments and more traditional clinical interviews [7,8]. In addition, our TTM diagnostic criteria did not specifically assess for hairpulling secondary to dermatological conditions, and we lack knowledge of comorbid psychiatric disorders. It is possible that our sample of hairpullers may not be representative of those seeking outpatient treatment; however, no difference in baseline total MGH-HPS scores exists between our sample and a clinic-based TTM study cohort [9]. Lastly, we lacked sufficient data to conduct validation studies.

Future studies should utilize confirmatory factor analysis to replicate these factor structure findings in a large sample of hairpullers. Participants in a replication analysis should undergo face-to-face diagnostic ascertainment to evaluate *DSM-IV* TTM criteria (including the absence of related dermatological conditions) and to assess comorbid disorders. Lastly, such studies should include assessment of other clinical variables to examine the validity of scale factors.

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