Metacognitive functions of patients with trichotillomania and skin picking disorder

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ABSTRACT
Objective: This study aimed to compare the metacognitive functions of patients diagnosed with trichotillomania (TTM) and skin picking disorder (SPD) with those of healthy controls (HCs).
Method: The study was conducted with 125 participants, 32 of whom had TTM, 47 had SPD, and 46 were HCs. A Sociodemographic Data Form, the Metacognition Questionnaire-30 (MCQ-30), Clinical Global Impression (CGI), Beck Depression Inventory (BDI), and Beck Anxiety Inventory (BAI) were administered to the participants.
Results: It was determined that the subscale scores of “uncontrollability and danger” and “need to control thoughts” were significantly higher in patients with TTM and SPD compared with the HCs. There was a positive correlation between the patients’ CGI scores and their MCQ-total scores. A positive and significant relationship was found between BDI and “uncontrollability and danger,” “need to control thoughts,” “cognitive self-consciousness,” and MCQ-total scores. There was a positive correlation between the BAI and other subscales except for “positive beliefs” and MCQ-total scores.
Conclusion: Our study reveals dysfunctional metacognitions in TTM and SPD patient groups. The subdimensions of “uncontrollability and danger” and “need to control thoughts” are dysfunctional metacognitions that are prominent in both patient groups.
Keywords: Automatic type, focused type, metacognition, skin picking disorder, trichotillomania

INTRODUCTION
Trichotillomania (TTM) and skin picking disorder (SPD) are psychiatric disorders that cause hair loss or skin tissue damage, characterized by recurrent hair and skin picking, respectively (1,2). The prevalence of TTM is estimated to be 0.6%–2.4% (3–6) and SPD to be 1.4%–5.4% (7–10). Clinical and phenomenological similarities exist in both diseases, such as sex ratio, age of onset, comorbidities, and psychosocial dysfunction (3,8,11–13).

It has been suggested that TTM and SPD can be divided into two subtypes: automatic and focused (1,14–17). Automatic subtype pulling/picking behavior occurs mostly during sedentary actions; the person enjoys picking and occurs without awareness (18,19). In these cases, they are not aware until the picking behavior continues for some time or is completed (18). However, the pulling/picking behavior usually occurs to cope with emotions, such as anxiety and stress, or in response to an obsession in the focused type with full awareness (1,16,18,19).
Metacognition is a metacognitive system that includes awareness of events and functions in one’s mind and purposefully directing mental events and functions (20,21). In other words, metacognition is one’s knowledge of what one knows, what one thinks about what one thinks, or one’s eye on one’s own cognitive process (22). It has been indicated that the metacognitive system plays a major role in the functional and adaptive functioning of human cognitive processes (22). Therefore, it is thought that any deviation in the metacognitive system would be an important factor in the development and continuation of many psychopathologies (23).

According to this approach, evaluating the meaning of this kind of thinking is more important than the thoughts one has in the formation and maintenance of psychopathology (24).

TTM and SPD are in the category of “Obsessive–compulsive and related disorders” in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) (25). Obsessive–compulsive and related disorders are symptomatically related because they are characterized by repetitive thoughts and behaviors and difficulty in inhibiting behaviors (25). Repetitive pulling/picking behavior is phenomenologically similar to the compulsive behaviors in obsessive–compulsive disorder (OCD), and it is thought that these behaviors result from the lack of inhibition processes (26). Many studies in the literature examine metacognition in OCD (27–37). According to the metacognitive model, individuals’ cognitions about their cognitive processes and metacognitive regulation strategies play an important role in forming and continuing of obsessions and compulsions (38–40). Some people have dysfunctional metacognitions that affect their perspective on events, and these metacognitions cause them to develop dysfunctional reactions (38,40,41). Activating these dysfunctional metacognitive beliefs leads to a negative interpretation of intrusive thoughts, changes in emotion, and activation of ritual-related beliefs to reduce the perceived threat (42).

From all these perspectives, we think that despite the negative consequences of picking behavior in TTM and SPD, it is repetitive and compulsive, and because depression and anxiety often accompany it, metacognitive functions may be impaired. They may affect the severity of the disease. However, as far as we know, there are no studies in the literature examining metacognition in patients with TTM and SPD. The primary aim of our study was to examine the differences in metacognitive functions in patients with TTM and SPD compared with the healthy control (HC) group and determine their relationship with some clinical data. Second, we aimed to examine whether the automatic and focused-type patient groups differed regarding metacognitive characteristics. Finally, we aimed to assess the relationship between metacognition and depression and anxiety.

**METHODS**

**Participants**

Study participants were recruited among the patients who presented to the psychiatry outpatient clinic of Health Sciences University Sisli Hamidiye Etfal Training and Research Hospital between April 2019 and February 2020. Thirty-two patients diagnosed with TTM and 47 with SPD, evaluated by two psychiatrists according to the DSM-5 diagnostic criteria, were included in the study. Seventeen patients with TTM and 12 patients with SPD received psychopharmacological treatment. The remaining patients were newly diagnosed. The inclusion criteria for the study were as follows: diagnosis of TTM or SPD, age 16–70 years, having at least primary school education and agreeing to participate in the study. Sex and education matched forty-six healthy cases with no history of psychiatric disorder were included as a control group. The study's exclusion criteria were as follows: mental retardation, psychotic disorder, bipolar disorder, dementia, major medical illness, head trauma, and psychoactive substance abuse. A Sociodemographic Data Form, the Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), Clinical Global Impression (CGI), and Metacognition Questionnaire-30 (MCQ-30) were administered to the participants. Automatic and focused styles were captured using the Milwaukee Inventory for the Dimensions of Adult Skin Picking (43) and the Milwaukee Inventory for Styles of Trichotillomania-Adult Version (18) scales. Written informed consent was obtained from all participants after explaining the purpose and method of the study. The study was approved by the Health Sciences University Sisli Hamidiye Etfal Training and Research Hospital Ethics Committee (February 22, 2022, number: 3408/2022).

**Assessment Instruments**

- Sociodemographic Data Form
- Sociodemographic and disease status data were obtained using an information form prepared by the
interviewer. The form included information about the participants’ sex, age, education level, employment status, marital status, family history of psychiatric illness, medical illness, drug use, previous treatment attempts, and characteristics of TTM and SPD. This information included questions about the presence of stressors at the onset of the disorder, triggering factors for picking behavior, the frequency of hair/skin picking, how long the picking behavior lasts, and what time of day the hair/skin is pulled.

Beck Depression Inventory
The BDI was developed to determine the presence and severity of depressive symptoms in adults (44). The scale consists of 21 items, and each is scored between 0 and 3. The total score ranges from 0 to 63. The cutoff point of the scale is 17. High total scores obtained from the scale indicate severe depression. A validity and reliability study has been conducted for the Turkish population (45).

Beck Anxiety Inventory
The BAI was developed to determine the frequency of anxiety symptoms in adults (46). It consists of 21 items, each scored between 0 and 3. The highest score that can be obtained from the scale is 63. A high total score indicates a high level of anxiety experienced by the person. The Turkish validity and reliability study has been conducted (47).

Clinic Global Impressions-Severity
The CGI-S scale is used to evaluate the severity of a mental disorder. It is based on a score between 1 and 7, according to the physician’s observation (48). Scoring was performed by considering the frequency of hair/skin pulling, distress caused by the disease and impaired functionality, and the need for social support (49).

Metacognition Questionnaire-30
The scale was developed by Cartwright-Hatton and Wells (41). The same researchers later created the 30-item short form of the scale (MCQ-30) (23). The MCQ-30 consists of five conceptually different factors that relate to one another. These are: (i) positive beliefs, (ii) uncontrollability and danger, (iii) cognitive confidence, (iv) need to control thoughts, and (v) cognitive self-consciousness. The scale consists of 30 questions in total, and each question is scored between 1 and 4. The lowest score that can be obtained from the scale is 30, and the highest score is 120. An increase in the total score obtained from the scale indicates an increase in pathologic and dysfunctional metacognitive activities (36). The Turkish validity and reliability study has been conducted (22).

Statistical Analysis
The SPSS version 20.0 for the Windows software package (SPSS, Inc., Chicago, IL, USA) was used for statistical analysis. Descriptive statistics are given as numbers and percentages for categorical variables, and mean, standard deviation, minimum, and maximum for numerical variables. Demographic characteristics of the groups and MCQ-30 findings were analyzed as follows: Comparisons of numerical variables in more than two groups were made using one-way analysis of variance when the normal distribution condition was met in the groups and with the Kruskal–Wallis test when the normal distribution condition was not met. Subgroup analyses in parametric tests were performed using the Bonferroni test, and subgroup analyses in nonparametric tests were performed using the Mann–Whitney U test and interpreted using Bonferroni correction (p<0.017). The relations between numerical variables were analyzed using Pearson’s correlation analysis when the normal distribution condition was met and Spearman’s correlation analysis when the normal distribution condition was not met. The statistical alpha significance level was accepted as p<0.05.

RESULTS
Demographic Features and Clinical Data of Subjects
The study consisted of 125 participants; 32 with TTM, 47 with SPD, and 46 HCs. There was no statistically significant difference between the patient and control groups regarding age, sex, and years of education, and also between the TTM and SPD groups regarding disease duration, disease type, and CGI scores. Depression and anxiety scores of patients with TTM and SPD were found to be significantly higher than those of the control group (p<0.001 and p=0.001, respectively) (Table 1).

Metacognitive Functions and Clinical Features
The results of the comparison of the metacognition scale and subscales between the TTM, SPD, and control groups are given in Table 2. Accordingly, the MCQ-total score of the TTM group was significantly higher than that in the control group (p=0.015). When
the subscale scores were examined, the TTM and SPD groups’ “uncontrollability and danger” (p=0.001 and p=0.015, respectively) and “need to control thoughts” (p=0.008 and p=0.014, respectively) were found to be significantly higher than those of the control group. There was a statistically significant difference between the patient and control groups in terms of “cognitive confidence” scores (p=0.023). However, after performing Bonferroni correction, no significant difference was detected between the groups. There

Table 1: Demographic and clinical data of participants

<table>
<thead>
<tr>
<th>Variables</th>
<th>TTMa (n=32)</th>
<th>SPDa (n=47)</th>
<th>HCa (n=46)</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>26.5±9.7a</td>
<td>34.8±15.4</td>
<td>28.9±11.2</td>
<td>5.237&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.073</td>
</tr>
<tr>
<td>Sex (female), n (%)</td>
<td>26 (81.3)</td>
<td>38 (80.8)</td>
<td>36 (78.3)</td>
<td>0.139&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.933</td>
</tr>
<tr>
<td>Education (years)</td>
<td>11.8±4</td>
<td>11.2±3.7</td>
<td>12.8±3.5</td>
<td>5.050&lt;sup&gt;h&lt;/sup&gt;</td>
<td>0.080</td>
</tr>
<tr>
<td>Duration of disorder (years)</td>
<td>8.5±6.6</td>
<td>9.6±9.3</td>
<td>–</td>
<td>-1.056&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.822</td>
</tr>
<tr>
<td>Type of disorder (automatic/focused)</td>
<td>19 (59.4)/23(40.6)</td>
<td>22 (46.8)/25 (53.2)</td>
<td>–</td>
<td>1.204&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.272</td>
</tr>
<tr>
<td>CGI-S</td>
<td>4.2±0.9</td>
<td>4±0.7</td>
<td>–</td>
<td>-1.211&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.226</td>
</tr>
<tr>
<td>BDI scale scores</td>
<td>21.7±12.1</td>
<td>20.1±11.8</td>
<td>6.6±6.5</td>
<td>46.322&lt;sup&gt;b&lt;/sup&gt;</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>BAI scale scores</td>
<td>21.4±13.6</td>
<td>20.4±13.7</td>
<td>8.1±6.8</td>
<td>32.462&lt;sup&gt;b&lt;/sup&gt;</td>
<td>&lt;0.001*</td>
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<th>Table 2: MCQ-30 subscale and total scores of the participants</th>
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<tr>
<td>TTM&lt;sup&gt;a&lt;/sup&gt; (n=32)</td>
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<tr>
<td>Positive beliefs</td>
</tr>
<tr>
<td>Uncontrollability and danger</td>
</tr>
<tr>
<td>Cognitive confidence</td>
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<tr>
<td>Need to control thoughts</td>
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<tr>
<td>Cognitive self-consciousness</td>
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<tr>
<td>MCQ-30 total</td>
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<th>Table 3: Comparison of the clinical features and MCQ-30 scores of the automatic and focused type</th>
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<tr>
<td>Automatic&lt;sup&gt;a&lt;/sup&gt; (n=41)</td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>Sex (female), n (%)</td>
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<tr>
<td>Education (years)</td>
</tr>
<tr>
<td>Duration of disorder (years)</td>
</tr>
<tr>
<td>CGI-S</td>
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<tr>
<td>BDI scale scores</td>
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<td>BAI scale scores</td>
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<td>Cognitive self-consciousness</td>
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<td>MCQ-30 total</td>
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BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; CGI-S: Clinic Global Impressions-Severity; HC: Healthy control; SPD: Skin picking disorder; TTM: Trichotillomania; a: Data are expressed as mean±standard deviation; b: Kruskal–Wallis test; c: Chi-squared test; d: One-way analysis of variance test; e: Mann–Whitney U test; *: p<0.001.

BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; CGI-S: Clinic Global Impressions-Severity; MCQ: Metacognition Questionnaire-30; a: Data are expressed as mean±standard deviation; b: Mann–Whitney U test; c: Pearson’s Chi-squared test; d: Student’s t-test.
was no significant difference between the patient and control groups in "positive beliefs" and cognitive self-consciousness' subscale scores (Table 2).

No statistically significant difference was found between the automatic and focused-type groups in demographic data, clinical characteristics, MCQ-total scores, and subscale scores (Table 3).

The relationship between the metacognitive subdimensions of demographic and some clinical data of the patient groups was analyzed using Spearman's correlation test. A negative correlation was found between age and "uncontrollability and danger" (r=-0.254), and a positive correlation was found between age and "cognitive confidence" (r=0.247). There was a significant positive correlation between CGI and MCQ-total scores (r=0.227). A positive and significant correlation was found between the BDI and "uncontrollability and danger" (r=0.428), "need to control thoughts" (r=0.532), "cognitive self-consciousness" (r=0.269), and MCQ-total scores (r=0.431). There was a positive correlation between BAI and MCQ-positive beliefs, as well as other subscales and total scores (range, r=0.22-0.443) (Table 4).

**DISCUSSION**

This study compared the metacognitive functions of patients with TTM and SPD with an HC group. At the same time, the metacognitive characteristics of automatic and focused patient groups were compared. Our study found that patients with TTM had a significantly higher MCQ-total score than the HC group. On the other hand, the MCQ-total scores of patients with SPD were similar to those of the HC group. In addition, a positive and significant correlation was found between the severity of the disease and the total metacognition scores of patients with TTM and SPD.
The high scores of “uncontrollability and danger” in patients with TTM and SPD indicate that they have a high belief that anxiety cannot be controlled and that it is a dangerous situation. Similarly, the high scores of “need to control thoughts” indicate that both patient groups have metacognitions that some thoughts such as punishment, superstition, and being responsible should be controlled and that if they are not controlled, they will be responsible for the harmful consequences that arise and they will be punished. These results show that both patient groups have negative cognitions about worry and dysfunctional metacognitions, believing they need to control their thoughts to prevent this. It also shows that there are similar metacognitive pathologies for both groups. Accordingly, the significant increase in the need for control in both patient groups may be a factor that increases the picking behavior.

It has been suggested that negative beliefs about self, appearance, shame, fear of negative evaluation, having negative emotions, control, coping, and perfectionism (seeking/finding hairs of different colors/shapes) play a role in TTM (4,50–54). Certain cognitions and beliefs have been claimed to be associated with picking attacks, and such cognitions and beliefs can sustain or intensify picking (51). From this point of view, deterioration in metacognitive functions in patients with TTM and SPD may be a factor that triggers the picking behavior. Dysfunctional metacognitions about “uncontrollability and danger” and “need to control thoughts” may increase compulsive picking behavior. In parallel with our findings, we found that there was a positive correlation between the total metacognition scores of patients with TTM and SPD and the severity of the disease (CGI score). This finding shows that the worsening of metacognitive functions increased the severity of the disease in the TTM and SPD groups.

We could not find any study evaluating the metacognitive functions of patients with TTM and SPD in the literature. Much of the metacognitive studies in patients with OCD showed that the subdimensions of uncontrollability and danger and the need to control thoughts were higher than in HCs (27–29,31,34,36,55–57). Our data in these subdimensions are similar to the results of these studies. Based on these data, we showed that patients with TTM and SPD had metacognitive pathologies similar to those with OCD. Uncontrollability, danger, and the need to control thoughts have been strongly associated with OCD symptoms (27). However, it is known that OCD comorbidity is common in patients with TTM and SPD (58–61).

According to our findings, we found positive correlations between the BDI and BAI, uncontrollability and danger, and the need to control thoughts. Severe depression and anxiety symptoms can be interpreted as increasing the severity of dysfunctional metacognitions. Comorbidities of depression and anxiety disorders are observed at a high rate in patients with TTM and SPD. On the one hand, the presence of comorbid conditions in these diseases increases the severity of the disease and worsens the course (62–65). Also, depressive symptoms can reinforce cognitive distortions associated with picking (63,66). Metacognitive functions are known to be pathological in depression and anxiety disorders (67–69). It is unclear whether the metacognitive functions in TTM and SPD are caused by the psychopathology of the disease or by the severity of depression and anxiety. However, considering the impairment in metacognitive functions in TTM and SPD and the adverse effects of disease severity, evaluating patients’ metacognitive beliefs and adding metacognitive therapy practices in some patients may yield good results. Further studies are needed on this subject.

The most important limitation of our study is the small sample size. This situation limits the generalization of our findings for TTM and SPD patients. Further research is needed in larger samples. Another limitation is that the measurement tools used in the assessment are self-reported by the participants. In addition, the fact that we did not exclude comorbidity in the patient groups, and the high anxiety and depression scores may have adversely affected metacognitive functions. This limitation should be taken into account in future studies. Finally, the patients with TTM and SPD in our study are grouped according to focused/automatic subtyping. Recent studies recommended more complex models with exploratory factor analyses rather than the automatic/focused type (2). Future studies would determine and compare subtypes using exploratory analysis in larger samples.

**CONCLUSION**

Our study is the first in the literature to investigate metacognition in patients with TTM and SPD. Our findings revealed that patients with TTM and SPD have more impaired metacognitive functions than
H Cs, but there are no metacognitive differences between the automatic and focused types. Our findings show dysfunctional metacognitions in patients with TTM and SPD and that they adversely affect the severity of the disease. From these metacognitions, the need to control thoughts with uncontrollability and danger is at the forefront. Therefore, in psychotherapeutic approaches, these two subdimensions should be considered in patients with TTM and SPD. Interventions on metacognitive beliefs might be helpful for some patients in this group.

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<tr>
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<td>Data analysis/interpretation</td>
<td>E.P.A.</td>
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<td>Category 2 Drafting manuscript</td>
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<td>Critical revision of manuscript</td>
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<td>Category 3 Final approval and accountability</td>
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<td>Other Technical or materials support</td>
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Ethical Approval: The Health Sciences University, Sidi Hamidiye Etalf Training and Research Hospital Ethics Committee granted approval for this study (date: 22.02.2022, number: 3408/2022).

Informed Consent: Informed consent was obtained from all participants.

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