Pulling Sites in Trichotillomania: Exploring Differences in Characteristics, Phenomenology, and Contextual Variables

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Abstract

**Introduction:** Trichotillomania is a heterogeneous disorder with a wide range of presentations. Past studies have described the phenomenology of trichotillomania, but individual differences based on the body site from which hair is pulled have not been thoroughly explored. Contextual variables relevant to pulling (e.g., settings, tool use) may vary as a function of pulling site. We constructed a detailed profile of individual and clinical characteristics based on pulling site and describe contextual factors associated with different pulling sites. **Methods:** Data were drawn from two randomized control trials of psychotherapy for trichotillomania. Participants included treatment-seeking adults with trichotillomania (*N=*153; 89% women; *M*age=33.41) who took part in either a face-to-face (*n=*92) or an online (*n=*61) trial. Study 1 explored differences in age, gender, trichotillomania symptom severity, and levels of automatic and focused pulling as a function of pulling site. Study 2 included a subset of Study 1 participants (*n=*65) and examined pulling site differences for relevant contextual variables. **Results:** Study 1 revealed differences in age, gender, and level of automatic vs. focused pulling based on pulling site. Study 2 showed that pulling from different bodily sites was more likely to occur in specific settings and with certain tools. **Discussion:** These results reflect considerable variability in the phenomenology of trichotillomania across pulling sites and contribute to the overall understanding of trichotillomania. A clearer picture of contextual cues and clinical characteristics for different hair pulling sites has treatment implications. Clinical applications and future research directions are discussed.

*Keywords*: trichotillomania, hair pulling, body-focused repetitive behaviors, phenomenology

Pulling Sites in Trichotillomania: Exploring Differences in Characteristics, Phenomenology, and Contextual Variables

Trichotillomania is characterized by repetitive hair pulling that results in hair loss and significant distress (American Psychiatric Association [APA], 2022). Trichotillomania can lead to a range of social, psychological, and physical impairments (Grant et al., 2016; Houghton & Woods, 2017; Tung et al., 2015) and has been linked to lower quality of life (Valle & Grant, 2022). It is estimated that trichotillomania affects between 1.1-1.8% of adults in the general population, with similar prevalence rates in men and women (Grant et al., 2020; Thomson et al., 2022). Trichotillomania is commonly comorbid with other mental health conditions, including anxiety disorders, depression, OCD, ADHD, and other body-focused repetitive behaviors (e.g., skin picking; Grant et al., 2020; Lochner et al., 2019). Despite its prevalence and potential negative consequences, the disorder is still not well understood.

Trichotillomania is heterogeneous in its presentation, with significant phenomenological differences across individuals. Hair-pulling can occur from any region of the body, and studies found that most individuals with trichotillomania pull from more than one site (Christenson et al., 1991; Christenson et al., 1993; Walther et al., 2014). Commonly reported pulling sites in both clinical (Bottesi et al., 2016; du Toit et al., 2001; Lochner et al., 2010) and non-clinical (Duke et al., 2009a; Duke et al., 2009b; Ghisi et al., 2013; Stanley et al., 1994) samples include the scalp, eyebrows, and eyelashes. Other involved areas often include the pubic region, underarms, mustache/beard area, and limbs. Internet-based studies of individuals with self-reported trichotillomania found higher rates of pulling from the pubic region compared to studies conducted in person or with non-clinical samples (Bottesi et al., 2016; Flessner et al., 2009; Wetterneck et al., 2020; Woods et al., 2006). Although less common, studies have also found that individuals with trichotillomania pull from their stomach, chest, back, chin, nose, hands/fingers, and feet/toes (Bottesi et al., 2016; du Toit et al., 2001; Lochner et al., 2010; Woods et al., 2006). Some pull hair from pets or other people, although this is relatively rare (Christenson et al., 1991; Woods et al., 2006).

Certain contextual variables can play a role in trichotillomania symptom expression (Christenson et al., 1993; Duke et al., 2010; Mansueto et al., 1999). Pulling occurs more often under specific external conditions (Roberts et al., 2013), including environments, settings, and activities (Diefenbach et al., 2000; Mansueto et al., 1997). Studies examining environmental pulling triggers have shown that common settings for pulling include the bedroom, bathroom, at work, and in school classrooms (Christenson et al., 1993; Duke et al., 2009b). Hair pulling often occurs while reading, driving, watching TV, sitting in class, and studying (Duke et al., 2009a; Mansueto et al., 1997). Additionally, the availability of tools such as mirrors, tweezers, or needles may facilitate hair pulling (Christenson et al., 1993). Almost half (43%) of an outpatient trichotillomania sample endorsed using tweezers to pull (Christenson et al., 1991), and two non-clinical studies found that 33% of community adults (Duke et al., 2009a) and 21% of undergraduates (Duke et al., 2009b) used mirrors when pulling.

Prior research has provided valuable information about the phenomenology of hair-pulling and related contextual factors, but questions remain. First, it is not clear how the clinical presentation of trichotillomania may vary as a function of hair pulling site. Certain contextual variables (e.g., setting, activity, tools) in trichotillomania might be more or less relevant based on pulling site. For example, an individual may be more likely to pull hair from their scalp while in some locations, but more likely to pull from their eyebrows under different circumstances. Similarly, someone might use tools when pulling from certain sites on their body, but not other sites. As treatments for trichotillomania are enhanced when they effectively target the specific variables involved in an individual’s unique hair-pulling experience (Falkenstein et al., 2016), it is essential to determine whether factors that trigger and maintain pulling differ based on pulling site.

Second, while research indicates that most individuals with trichotillomania pull from more than one site, it is unclear whether connections exist between specific sites. For example, it is unknown whether someone who pulls from their eyebrows is more or less likely to also pull from their scalp. Such information could provide a more detailed profile of trichotillomania symptoms and potentially reveal clinically relevant patterns.

Third, the association between pulling site and patient characteristics, such as gender and age, deserves further study. Prior research showed that men were more likely to pull from the mustache/beard area, chest, stomach, and back (du Toit et al., 2001; Duke et al., 2009a; Ghisi et al., 2013; Lochner et al., 2010). Similarly, Lochner et al. (2010) found that women were more likely to pull from the scalp or eyelashes, but other studies failed to replicate this finding (du Toit et al., 2001; Duke et al., 2009a; Ghisi et al., 2013; Lochner et al., 2010).

Research likewise suggests age-related differences in trichotillomania based on pulling site. In a sample of women with trichotillomania aged 10 to 69, all age cohorts reported pulling from the scalp, eyelashes, eyebrows, and pubic area most frequently, but the presence or absence of age differences was not reported by pulling site (Flessner et al., 2009). Other features of trichotillomania presentation have been linked to age, such as total number of pulling sites and level of automatic and focused pulling, so it is plausible that there could be age-related differences for pulling sites (Flessner et al., 2009).

Fourth, it is possible that clinical characteristics vary between individuals who pull from one site versus another. For instance, results from a large online trichotillomania survey indicated that respondents who were categorized as having a “high” score (i.e., greater than one standard deviation above the sample mean) on the Massachusetts General Hospital Hairpulling Scale (MGH-HS) were more likely to pull from their scalp, limbs, and armpits (Woods et al., 2006). Likewise, Lochner et al. (2010) found that those who pulled from their scalp also reported higher functional impairment. Determining whether treatment-seeking patients who pull from certain sites differ in symptom severity could help clinicians more effectively sequence treatment.

Finally, research suggests that pulling sites might be related to different levels of automatic and focused pulling. Automatic pulling refers to hair pulling that occurs outside of immediate awareness or while engaged in another activity (Duke et al., 2010; Grant & Chamberlain, 2021). Focused pulling is intentional, occupies attention, and is thought to be driven by negative thoughts and emotions (Flessner et al., 2008; Roberts et al., 2013; Siwiec & McBride, 2016). In a non-clinical sample of college students, Duke et al. (2009b) examined whether automatic and focused pullers were more likely to pull from different bodily sites. Focused pullers were more likely to pull from their eyelashes than automatic pullers. Evaluating whether pulling from certain bodily sites is related to differing degrees of automatic and focused pulling is important, as matching treatment to pulling style may lead to more effective treatment (Franklin et al., 2006; McGuire et al., 2020).

In summary, examining differences in trichotillomania as a function of pulling sites could inform treatment for the disorder and improve our overall understanding of trichotillomania phenomenology. Toward this aim, we sought to construct a nuanced profile of characteristics and contextual factors associated with different hair pulling sites in clinically identified, treatment-seeking adults with trichotillomania.

**Study 1 Methods**

**Participants**

Study 1 included participants from a face-to-face randomized treatment trial and from a study testing the efficacy of an online treatment program for trichotillomania.

***Face-to-Face Group***

Data for the face-to-face group were collected from 2013–2014 as part of an in-person randomized clinical trial (RCT) comparing ACT-Enhanced Behavior Therapy for Trichotillomania (AEBT; Woods & Twohig, 2008) to psychoeducation and supportive therapy for adults with trichotillomania (Woods et al., 2022). Participants were recruited via standard flow in a specialty trichotillomania clinic, print and radio advertisements, solicitations to local physicians, psychiatrists, dermatologists, and hairdressers, and assistance from the Trichotillomania Learning Center (TLC) Foundation for Body-Focused Repetitive Behaviors. For full information about recruitment practices for the trial, see Neal-Barnett et al. (2019). Inclusion criteria for the RCT included: (1) a current Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; DSM-IV-TR; APA, 2000) diagnosis of trichotillomania; (2) a Massachusetts General Hospital Hairpulling Scale (MGH-HS; Keuthen et al., 1995b; O'Sullivan et al., 1995) score of 12 or higher; (3) a Wechsler Test of Adult Reading (WTAR; Wechsler, 2001) score of 85 or higher; (4) age 18-65; (5) English language fluency; (6) outpatient status; (7) no initiation or change in psychotropic medication up to eight weeks prior to participating in the study or during the course of the study; and (8) not currently receiving psychotherapy for trichotillomania or another disorder. Exclusion criteria included: (1) diagnosis of bipolar disorder, psychotic disorder, current substance dependence, or pervasive developmental disorder; or (2) severe depression or anxiety with current suicide risk. Active risk was assessed by the assessing clinician and confirmed by the clinical trial’s principal investigator, a licensed clinical psychologist (Neal-Barnett et al., 2019; Woods et al., 2022).

This group included 92 adults with trichotillomania who completed baseline assessments for the RCT. Demographic data on this sample are presented in Table 1. As part of face-to-face baseline assessments, participants completed the MGH-HS and Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A; Flessner et al., 2007), and reported the bodily sites from where they pulled hair.

***Online Group***

Participants in the online group took part in a study examining the efficacy of an eight-module online treatment program for trichotillomania developed from the AEBT-trichotillomania protocol (Woods & Twohig, 2008). For full details on this study, see Capel et al. (2023). Data were collected from 2021–2022. Participants were recruited via online advertisements, Facebook trichotillomania groups, and Reddit trichotillomania pages. Inclusion criteria for this study included: (1) a current Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; APA, 2013) diagnosis of trichotillomania; (2) age 18 or older; (3) English language fluency; and (4) seeking trichotillomania treatment. Exclusion criteria included: (1) starting or modifying psychotropic medication; (2) current residency outside of the United States; (3) age younger than 18; and (4) not meeting DSM-5 criteria for trichotillomania at the time of intake.

The online group included 61 adults with trichotillomania who participated in the web-based AEBT-trichotillomania treatment program. Demographic data for this sample are reported in Table 1. Measures used in this study included the MGH-HS and MIST-A. As part of the second module of the AEBT-trichotillomania program, participants were asked to endorse all bodily sites from which they pulled hair.

**Measures**

***Massachusetts General Hospital Hairpulling Scale***

The Massachusetts General Hospital Hairpulling Scale (MGH-HS; Keuthen et al., 1995a; O'Sullivan et al., 1995) was used to measure hair-pulling severity over the previous week. The MGH-HS is a self-report measure consisting of seven items that are each rated on a Likert-type scale from 0 to 4, with 0 indicating the absence of symptoms and 4 indicating more severe symptoms. Items are summed to produce a total severity score (range = 0–28), where higher scores represent higher total symptom severity. In past psychometric studies, the MGH-HS has shown good internal consistency and construct validity (Barber et al., 2023; Diefenbach et al., 2005).

***Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version***

The Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A; Flessner et al., 2007) is a self-report scale designed to measure the extent of automatic and/or focused hair pulling engaged in by an individual. The questionnaire comprises a 10-item “focused” subscale and a five-item “automatic” subscale. Each item is rated on a Likert-type scale ranging from 0 (“not true for any of my pulling”) to 9 (“true for all of my pulling”). The scale produces a total score of 0-90 for the “focused” subscale and a score of 0-45 for the “automatic” subscale, with higher scores indicating a higher degree of that type of pulling. The MIST-A has demonstrated acceptable reliability and validity in previous research (Flessner et al., 2008).

**Data Analysis**

Preliminary comparisons were performed between the two groups on demographics and study variables. In addition to different recruitment and data collection methods, the time points of data collection for the two groups were approximately eight years apart. Additionally, participants for the face-to-face group were located in a large Midwestern city, whereas the online group included participants from across the United States. Independent samples t-tests were used to analyze differences between the two groups on MIST-A Automatic and MIST-A Focused scales. Independent-Samples Mann-Whitney U Tests were used to examine sample differences on non-normally distributed variables (MGH-HS, age, and total pulling sites). Chi-square tests of independence were used to examine if pulling sites differed between the face-to-face and online groups.

One-way ANCOVAs were conducted to examine whether individuals who reported pulling from a certain bodily site (i.e., scalp, eyebrows, eyelashes, and pubic area) differed from those who did not report pulling from that site on the MIST-A Automatic and MIST-A Focused scales. Group (face-to-face vs. online) was included as a covariate. Nonparametric ANCOVAs were conducted to examine differences in age, total number of pulling sites, and MGH-HS as these variables were not normally distributed. Chi-square tests were used to examine differences in gender distributions for each pulling site. Participants who identified as non-binary (*n=*4) or who did not identify gender (*n=*1) were excluded from gender analyses due to the small sample sizes.

Cohen’s *d* effect sizes were calculated for t-tests and pairwise comparisons using the formula *d* = 2*t* /√(*df*). For chi-square tests, Phi (φ) coefficients are reported as effect sizes and were calculated using the formula φ = √(*X*2/*n*) (Fritz et al., 2012; Tomczak & Tomczak, 2014). Effect sizes for non-parametric tests were calculated using the formula *r* = Z/√*n* andconverted to Cohen’s d using *d =* 2*r /*√(1 – *r*2)(Tomczak & Tomczak, 2014).

**Study 1 Results**

**Sample Characteristics**

Demographics, descriptive data, and sample comparisons for Study 1 are shown in Table 1. The combined sample for Study 1 had a mean age of 33.41 (*SD=*10.98; range=18-61). Of these participants, 136 (88.9%) identified as women, 12 as men (7.8%), four as non-binary (2.6%), and one (0.7%) chose not to identify their gender. These participants were mostly White (84.3%); 11 identified their race as Black (7.2%), eight as Asian/Pacific Islander (5.2%), one as Hispanic (0.7%), and four did not report race (2.6%).

Sample comparisons found the online group included significantly more participants who identified their gender as non-binary as compared to the face-to-face group. There were significantly more Black participants in the face-to-face group compared to the online group. The online and face-to-face groups did not differ in terms of age, MGH-HS total scores, or MIST-A Focused scores. Online participants had significantly higher average MIST-A Automatic scores than face-to-face participants. Participants in the online group reported pulling from a significantly higher number of total bodily sites as compared to the face-to-face group. Sample comparisons for specific pulling sites can be seen in Table 2. Online participants were significantly more likely to report pulling from the pubic area, armpits, and legs as compared to face-to-face participants. Online participants were also significantly more likely to report pulling from the beard/mustache, nipples, stomach/back, nose, cheek/chin, and other people.

**Pulling Sites**

Frequencies and gender comparisons for each pulling site are shown in Table 2. Participants reported pulling from an average of 2.61 (*SD=*1.76) bodily sites. The most frequently reported pulling sites were the scalp, eyebrows, eyelashes, and pubic area. Other reported sites included armpits, legs, cheek/chin, nipples, stomach/back, arms, beard/mustache, nose, other people, pets, and chest.

**Comparisons by Pulling Site**

***Scalp***

Individuals who pulled hair from their scalp (*n=*108) were older (*M=*34.64, *SD=*11.21) than participants who did not pull from their scalp (*M=*30.39, *SD=* 9.90), *t*(150)=-2.46, *p=*.015, *d=*0.40. Significantly more participants who pulled from the scalp were women (vs. men; see Table 2). Of participants who pulled from their scalp, 32.4% also pulled from their eyebrows, which is lower than the 77.8% of non-scalp pullers who also pulled their eyebrows (*X*2(1, 153)=26.35, *p<*.001, φ=0.42). Similarly, scalp pullers were less likely to also pull from their eyelashes as compared to non-scalp pullers (33.3% vs. 73.3%, respectively; *X*2(1, 153)=20.53, *p<*.001, φ=0.37).

***Eyebrows***

Participants who pulled from their eyebrows (*n=*70) pulled from a higher number of total bodily sites (*M=*3.50, *SD=*1.80) compared to those who did not report pulling from their eyebrows (*M=*1.87, *SD=*1.32), *t*(151)= -8.55, *p<*.001, *d=*1.39. Those who pulled from their eyebrows also had a lower MIST-A Automatic score (*M=*26.33, *SD=*6.66) than participants who did not report pulling from this site (*M=*29.26, *SD=*8.415), *F*(1, 148)= 6.09, *p=*.015, *d*=0.33. Participants who pulled from their eyebrows were more likely to also pull from their eyelashes (77.1% of eyebrow pullers vs. 18.1% of non-eyebrow pullers; *X*2(1, 153)=53.52, *p<*.001, φ=0.59). Of those who pulled from their eyebrows, 50.0% also pulled from their scalp, which is less than the 88.0% of non-eyebrow pullers (*X*2(1, 153)=26.35 *p<*.001, φ=0.42).

***Eyelashes***

Participants who reported pulling from their eyelashes (*n=*69) pulled from a higher number of total bodily sites (*M=*3.41, *SD=*1.64) than those who did not endorse pulling from their eyelashes (*M=*1.96, *SD=*1.58), *t*(151) = -8.29, *p<*.001, *d=*1.35. Of participants who pulled from their eyelashes, 78.3% also pulled from their eyebrows, which is higher than the 19.0% of non-eyelash pullers who pulled from their eyebrows (*X*2(1, 153)=53.52, *p<*.001, φ=0.59). Eyelash pullers were less likely to also pull from their scalp (52.2%) as compared to non-eyelash pullers (85.7%), *X*2(1, 153)=20.53, *p=*.001, φ=0.37),

***Pubic Area***

Individuals who pulled hair from their pubic area (*n=*52) were younger (*M*=29.88, *SD=*8.90) than those who did not report pulling from this site (*M=*35.19, *SD=*11.53), *t*(150)= 2.27, *p=*.025, *d=*0.37. Participants who pulled from this site had lower MIST-A Automatic scores (*M=*26.65, *SD=*7.88) than those who did not (*M=*28.57, *SD=*7.70), *F*(1,146)=7.17, *p=*.008, *d=*0.41. These participants also reported pulling from a higher total number of bodily sites (*M=*4.17, *SD=*1.88) than those who did not endorse pulling from their pubic area (*M=*1.81, *SD=*0.99), *t*(151)=-7.38, *p<*.001, *d=*1.20. Participants who pulled from their pubic area were more likely also to pull from their legs (30.8%) compared to those who did not pull from their pubic area (5.0%), *X*2(1, 153)=19.32, *p<*.001, φ=0.36. Participants who pulled from their pubic area were also more likely to pull from their armpits than those who did not pull from this site (19.2% vs. 1.0%, respectively), *X*2(1, 153)=17.12, *p<*.001, φ=0.33. Participants who pulled from the pubic area were more likely to also pull from their arms (11.5%) than non-pubic area pullers (3.0%), *X*2(1, 153)=4.55, *p*=.033, φ=0.17.

**Study 2** **Methods**

**Participants**

Study 2 utilized data from the AEBT Stimulus Control Form that was used in both the face-to-face and online treatment studies as part of the AEBT treatment protocol. The sample for Study 2 comprised a subset of Study 1 participants from both the face-to-face and online groups who completed this form. The AEBT Stimulus Control Form was used in the first AEBT treatment session of the face-to-face study and in the second AEBT treatment module of the online study. Study 2 included 44 participants from the face-to-face group who were randomized to receive AEBT and completed the first treatment session. Study 2 also included 21 participants from the online group who completed the second module of the web-based AEBT program.

**Measures**

***AEBT Stimulus Control Assessment Form***

Participants in the face-to-face group completedthe Stimulus Control Assessment Form with their clinician in the participant’s first AEBT session. The form first asks participants to list all sites of the body from which they currently pull (e.g., scalp, eyelashes/brows, pubic region, etc.). For each pulling site endorsed, participants then indicated (i.e., “yes” or “no”) whether they pulled from that site in predetermined settings (i.e., in the bedroom, in the bathroom, while watching TV, while reading, “other”). Participants could write in “other” settings where they pulled from that site. The most reported “other” settings included in the car and at work.For the present study, write-in “other” responses were coded and analyzed.

As an example, if a participant reported pulling from their scalp and eyebrows, the participant would use the form to first report the settings in which they pull and the tools they use to pull hair from their scalp. Next, the participant would report the settings in which they pull and the tools they use to pull hair from their eyebrows.

***Online AEBT Stimulus Control Assessment Form***

Participants in the online group completed a modified AEBT Stimulus Control Assessment Form as part ofthe second module of the online AEBT treatment program. Participants first reported the top three sites from which they pulled hairs. For each pulling site endorsed, participants were asked to identify the settings and tools that made them more likely to, or that helped them to pull from that specific bodily site. Participants chose from a list of predetermined settings (i.e., watching TV, reading, certain positions in bed, being in the bathroom, “other setting”). Participants could then write in the other settings they pulled from. These settings were also coded and analyzed. The most common “other settings” were in the car/driving and at work/studying. Participants also selected tools (i.e., tweezers, mirrors, needles or pins, other tools) they used to pull from the specific site.For example, if a participant reported pulling from their eyebrows, eyelashes, and pubic area, they would answer a question about the settings and tools that made them more likely or helped them to pull from their eyebrows specifically. Next, they would respond to the same question about settings and tools, but regarding pulling from their eyelashes. The participant would then answer the same questions about settings and tools associated with pulling from their pubic area.

**Data Analysis**

Comparisons between the face-to-face and online groups were conducted to examine differences in demographics and study variables. Differences in age, MGH-HS, total pulling sites, total pulling settings, and total pulling tools were examined using Independent-Samples Mann-Whitney U Tests, as these variables were not normally distributed. Differences in MIST-A Automatic and MIST-A Focused were analyzed using independent samples t-tests. Differences in gender and pulling sites endorsed were examined using Chi-square tests of independence.

Descriptive statistics were calculated for the relevant settings and tools for the most common pulling sites (scalp, eyebrows, eyelashes, and pubic area). Kruskal–Wallis tests were used to examine if settings and tools differed across pulling sites.

**Study 2 Results**

**Sample Characteristics**

Demographics, descriptive data, and sample comparisons for Study 2 are shown in Table 3. The sample for Study 2 had a mean age of 33.03 (*SD=*10.52; range = 18-60) and most participants identified as women (89.2%; 7.7% men; 3.1% non-binary). Of Study 2 participants, 54 identified their race as White (83.1%), six as Black (9.2%), two as Asian/Pacific Islander (3.1%), and three chose not to report race.

Compared to the online subgroup, fewer participants identified as Asian/Pacific Islander and more participants chose not to report race in the face-to-face subgroup. The face-to-face and online subgroups used for Study 2 did not differ in terms of age, gender, MGH-HS total scores, MIST-A Automatic scores, MIST-A Focused scores, number of pulling settings endorsed, or number of pulling tools endorsed (*p* values > .05; see Table 3). Study 2 participants from the online group endorsed a higher number of total bodily pulling sites as compared to the face-to-face group. Study 2 online participants were also more likely to report pulling from the pubic area, *X*2(1, 65)=16.75, *p<*.001, φ=0.51, as compared to those from the face-to-face group. Regarding specific pulling settings, participants from the face-to-face sample were more likely to endorse pulling while in the car, *X*2(1, 65) = 6.46, *p=*.011, φ=0.32, as compared to the online sample.

**Pulling Descriptive Data**

Descriptive data for pulling locations and tools for all sites and each specific site can be seen in Table 4. Participants reported pulling from an average of 2.75 (*SD=*1.88) bodily sites. The most frequently reported pulling sites for Study 2 were the scalp (*n=*44; 67.7%), eyebrows (*n=*33; 50.8%), eyelashes (*n=*33; 50.8%), and pubic area (*n=*32; 49.2%). Participants reported pulling in an average of 3.60 (*SD=*1.39) unique settings across all pulling sites. Participants most frequently reported pulling while in the bedroom and while watching TV. Other pulling settings, in order of frequency, included while reading, in the bathroom, at work, and while in the car. Of Study 2 participants, 56.9% reported using tools to pull hair. The most common tools were tweezers and mirrors, while fewer participants reported using needles.

**Pulling Settings and Tools by Pulling Site**

***Scalp***

Individuals most commonly reported scalp pulling while watching TV and in the bedroom. This was followed by reading, in the car, in the bathroom, and at work. Comparisons of pulling sites showed that scalp pulling occurred in more locations than pubic pulling, *t*(115)=33.21, *p=*.001, *d=*0.63, or eyebrow pulling, *t*(115)=18.48, *p=*.016, *d=*0.46. Across settings, scalp pulling was more likely to occur while watching TV as compared to pubic pulling, *t*(115)=27.24, *p=*.003, *d=*0.58, or eyebrow pulling, *t*(115)=16.40, *p=*.015, *d=*0.47. While reading, pulling was more likely to occur from the scalp than the pubic area, *t*(115)=31.36, *p<*.001,d=0.69. In the car, scalp pulling was more likely than eyebrow pulling, *t*(115)=21.33, *p<*.001, *d=*0.71, eyelash pulling, *t*(115)=20.23, *p=*.001, *d=*0.64, or pubic pulling, (*t*(115)=28.75, *p<*.001, *d=*0.71. Additionally, while less common, some participants reported pulling scalp hair using mirrors or tweezers.

***Eyebrows***

For eyebrow pulling, the most common setting was the bathroom, followed by the bedroom. Some individuals reported eyebrow pulling while reading and watching TV. Participants less frequently reported eyebrow pulling while working or in the car. Site comparisons showed that while reading, pulling was more likely to occur from the eyebrows, *t*(115)=24.11, *p=*.011, *d=*0.49, as compared to the pubic area. More than half of these participants used tweezers or mirrors to pull their eyebrows, while only one reported using needles. More tools were used when pulling from the eyebrows as compared to the scalp, *t*(115)=-20.96, *p=*.004, *d=*0.56. Pulling with tweezers was more common for eyebrows as compared to scalp hair, *t*(115)=-22.93, *p<*.001, *d=*0.67, and mirrors were used more often for eyebrow pulling as compared to pubic pulling, *t*(115)=28.96, *p=*.002, *d=*0.59.

***Eyelashes***

Individuals who pulled from their eyelashes reported doing so most frequently while watching TV, in the bathroom, in the bedroom, and while reading. Less commonly, eyelash pulling occurred at work and while in the car. Comparisons across pulling sites showed that eyelash pulling was significantly more common than pubic pulling while watching TV, *t*(115)=20.81 *p=*.032, *d=*0.41; and while reading, *t*(115)=25.56, *p=*.008, *d=*0.51. Over half of these participants reported using mirrors and tweezers when pulling their eyebrows, and one reported using needles. More tools were reported for eyelash pulling as compared to scalp pulling, *t*(115)=-20.63, *p=*.004, *d=*0.53. Using tweezers was more common for eyelashes than scalp pulling, *t*(115)=21.49, *p=*.002, *d=*0.60, and mirrors were more commonly used for eyelashes as compared to the pubic area, *t*(115)=29.65, *p=*.002, *d=*0.59.

***Pubic Area***

The most common setting for pubic pulling was in the bathroom. A few individuals reported pubic pulling in the bedroom or while watching TV. One reported pulling while at work, and no participants reported pubic pulling while reading or while in the car. Site comparisons showed that in the bathroom, pulling from the pubic area was more likely than pulling from the scalp, *t*(115)=-29.55, *p=*.001, *d=*0.63, eyebrows, *t*(115)=-23.40, *p=*.014, *d=*0.47, or eyelashes, *t*(115)=-23.26, *p=*.017, *d=*0.46. Most participant who pulled from their pubic area reported using tweezers when pulling from this site, while only three used needles, and one used mirrors. Site comparisons showed that using needles was more likely when pulling from the pubic area as compared to the scalp, *t*(115)=-13.27, *p<*.001, *d=*0.71, eyebrows *t*(115)=-11.41, *p=*.003, *d=*0.57, or eyelashes, *t*(115)=-11.14, *p=*.005, *d=*0.54.

**Discussion**

Although past research has examined the phenomenology of trichotillomania and attempted to clarify symptom profiles, few studies have explored differences in trichotillomania based on bodily pulling site. We investigated potential clinical, individual, and contextual differences as a function of pulling site in a large sample of treatment-seeking adults with trichotillomania. The aim of Study 1 was to provide phenomenological data on pulling sites and examine whether individuals who pull hair from certain bodily sites differed in clinical and individual characteristics. The objective of Study 2 was to describe contextual variables that are relevant for specific pulling sites and evaluate differences in these variables based on pulling site.

Pulling sites endorsed by this sample are consistent with previous findings. As with past research in clinical and non-clinical samples, the scalp, eyebrows, eyelashes, and pubic area were the most common pulling sites (Christenson et al., 1993; du Toit et al., 2001; Lochner et al., 2010). As seen in other studies, participants recruited online were more likely to report pulling from the pubic area (Bottesi et al., 2016; Wetterneck et al., 2006). The online group in our study also reported pulling sites that no participants from the face-to-face group endorsed, including cheek, chin, nose, pets, and other people. It is possible that the anonymity of responding online led to more truthful and open answers, and pulling from sensitive or less common sites may have been underreported during in-person data collection. Geographic regions from which data were collected and years data were collected may have also impacted these differences. Results from Study 1 also showed that participants who pulled from their eyelashes were more likely to also pull from their eyebrows, and vice versa. Additionally, those who reported pulling from the pubic area were more likely to also pull from the underarms, arms, and legs.

An examination of individual characteristics revealed that scalp pullers tended to be older than non-scalp pullers. This finding was somewhat unexpected, as the scalp is the most frequently reported pulling site across adults, adolescents, and children with trichotillomania (Flessner et al., 2009; Franklin et al., 2011; Panza et al., 2013). Results also showed that participants who pulled from the pubic area were younger than those who did not pull from this site. Similarly, a study examining trichotillomania presentation across age cohorts showed that more adolescents and young adults (vs. middle-aged and older adults) reported the pubic area was their most frequent pulling site (Flessner et al., 2009). Although reasons for this are unclear, it is possible that cohort differences in approaches to grooming and hygiene practices could have led to these results (Deans et al., 2023). Additionally, it should be considered that our sample included adults aged 18 to 61, so these findings are not reflective of pediatric trichotillomania, in which pubic pulling is less common (Panza et al., 2013).

Regarding gender, women were more likely to pull from the scalp as compared to men, aligning with previous findings in a clinical sample (Lochner et al., 2010). Some prior research did not find gender differences in scalp pulling (Duke et al., 2009a; Ghisi et al., 2013), but this discrepancy may be related to the use of non-clinical samples in these studies. Consistent with past findings, men were more likely to pull from the beard/mustache area and chest (Duke et al., 2009a; Ghisi et al., 2013; Lochner et al., 2010). Our data also indicated that men were more likely to pull from the arms and legs.

Examining clinical characteristics across pulling sites, trichotillomania symptom severity did not differ based on pulling site. In contrast, a large internet-based study found that pulling from the scalp was associated with a higher MGH-HS score (Woods et al., 2006). We also compared the level of automatic and focused pulling by pulling site. Participants who pulled from the eyebrows and pubic area had lower levels of automatic pulling as compared to participants who did not report pulling from these sites. There were no differences in level of focused pulling. In comparison, a non-clinical study found that eyelashes were a more common site for focused pullers as compared to automatic pullers, with no other pulling site differences between the automatic and focused groups (Duke et al., 2009b). The inconsistencies between these findings and the present data could be explained by our use of a clinical sample and that we analyzed automatic and focused pulling as continuous constructs rather than dichotomous categories.

Study 2 provided a more nuanced picture of contextual variables (such as settings and tools) related to pulling sites in trichotillomania. Overall, the locations in which participants reported pulling were congruent with those found in past research, including the bedroom, bathroom, and car (Christenson et al., 1993; Duke et al., 2009a; Duke et al., 2009b). This sample also endorsed pulling in similar situations, such as while reading, watching TV, driving, and working (Bottesi et al., 2016; Ghisi et al., 2013). Most participants in this study reported using at least one tool to pull hair, including tweezers, mirrors, and, less commonly, needles. We found that 45% of participants used tweezers to pull, which is higher than past findings in clinical samples (16%; Bottesi et al., 2016). Few other studies have reported tool use during pulling, but the common use of tools in our sample aligns with clinical reports of trichotillomania (Mansueto et al., 1997).

Expanding on past research, we explored relevant settings, activities, and tools for distinct pulling sites. We found that some settings were more relevant for certain bodily pulling sites. While watching TV and while in the car, scalp pulling was more common than pulling from other sites. In the bathroom, pulling was most likely to occur from the pubic area. Additionally, scalp pulling occurred in a greater number of settings as compared to eyebrow and pubic pulling. Regarding tools, participants were more likely to report using needles to pull from the pubic area than from other sites. Tweezers were used more when pulling from the eyebrows, eyelashes, and pubic area, but not the scalp. Mirrors were more commonly used for eyelashes, eyebrows, and scalp.

The differences in relevant contextual variables across pulling sites might reflect context-dependent learning processes in trichotillomania. Our results suggest that pulling is sensitive to contextual factors, and certain settings and stimuli may become cues that induce and maintain hair pulling from specific bodily sites. Prior research has found that individuals with trichotillomania experience more frequent and intense pulling urges under certain conditions (Roberts et al., 2013), and it is possible that this extends to certain bodily pulling sites as well.

These findings have important clinical implications. First, although not the focus of the current study, the discrepancies between our face-to-face and online groups may be relevant to treating clinicians. The online group reported a higher number of total sites, was more likely to report pulling from the pubic area, and endorsed less common sites (e.g., pets, other people). This suggests that patients may not be forthcoming in reporting all pulling sites when being asked in a face-to-face setting. Clinicians might consider explicitly asking whether a patient pulls from specific pulling sites rather than asking open-ended questions about pulling or simply assuming that their main sites are their only sites.

Most participants in the present sample pulled from more than one site, and we found patterns in what combinations of sites individuals pulled from. These results can also provide guidance for clinicians. It may be relevant to inquire about additional pulling sites if a patient presents with only one pulling site. Additionally, if a patient reports pulling from their pubic area, our findings indicate it would be relevant to ask whether they also pull from their underarms, arms, and legs. Our results could also be important for preventive purposes. For instance, if a patient pulls only from their eyelashes, our results suggest they may be more likely to start pulling from their eyebrows as well.

The exploration of contextual variables as a function of pulling site in Study 2 also has treatment implications. For example, behavior therapy for trichotillomania typically involves a functional assessment of contextual variables (e.g., settings, tools) that trigger or maintain pulling in trichotillomania (Franklin et al., 2011; Snorrason et al., 2015). The nuances between pulling sites shown in our study underscore the importance of conducting a thorough functional assessment of unique variables for each client and each pulling site. Another key component of behavior therapy is implementing stimulus control interventions to address these variables. A better understanding of how contextual factors differ as a function of pulling sites can inform the development of effective stimulus control techniques.

These results should be interpreted with consideration of certain limitations. First, the face-to-face and in-person groups varied in some characteristics. However, we controlled for sample differences in our analyses, reducing the chance that sample differences affected the results. Additionally, the sample comprised mostly women. While this is common in trichotillomania research, the gender makeup of our sample limits the generalizability of results to individuals who identify as male or non-binary. Also, the slightly younger age of our sample (*M*=33.41) may limit the generalizability of our findings to older adults with trichotillomania. Further, the Stimulus Control Assessment Form used in this study has not yet been validated as a research measure. This form was created for a trichotillomania treatment study as a functional assessment measure to aid therapists in generating hypotheses about variables contributing to patients’ hair pulling. Future studies should evaluate the reliability and validity of this tool. Lastly, site-specific data for Study 2 was only available for a subset of Study 1 participants and thus led to a smaller sample size.

This research study also has notable strengths. We examined a large treatment-seeking sample of adults with clinician-confirmed trichotillomania diagnoses. The present study also expanded on past research by examining the contextual variables that are related to pulling from specific bodily sites.

Overall, these results provide a detailed examination of trichotillomania as a function of pulling sites. A clearer picture of the nuances of symptom presentation offers valuable clinical information. Our findings emphasize the importance of conducting a thorough functional assessment and developing individualized stimulus control interventions. Additionally, our study can guide future research. For example, while this study focused on settings, activities, and tools as contextual triggers for pulling, future work could explore whether other types of triggers (e.g., physiological sensations, negative emotions, characteristics of the hair; Wetterneck et al., 2020) are uniquely associated with different pulling sites. Studies could also test if other individual factors, such as mobility or ability, are related to the bodily sites that an individual pulls from. Future research should continue to investigate differences across potential subgroups of trichotillomania, which may lead to a more comprehensive conceptual framework of trichotillomania pathology.

**Declarations**

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**Ethics approval**: Data analyzed in this study were collected as part of two randomized clinical trials examining the efficacy of psychotherapy for adults with trichotillomania. All procedures performed in studies involving human participants were in accordance with the ethical standards of the Institutional and/or National Research Committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The data collection procedures for the in-person trial were approved by Institutional Review Boards at both the University of Wisconsin-Milwaukee and Texas A&M University. The data collection procedures for the online trial were approved by the Institutional Review Board at Utah State University.

**Animal Rights**

No animal studies were carried out by the authors for this article.

**Consent to participate**: Informed consent was obtained from all individual participants included in the study.

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**Table 1**

*Study 1: Sample Demographics and Descriptive Data*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Face-to-Face Group (*n=*92) | Online Group (*n=*61) | SampleComparisons  |
|  | *M* or *n* | *SD* or % | *M* or *n* | *SD* or % | *p* value |
| Age | 34.93 | 12.65 | 31.07 | 7.26 | .250 |
| Gender |  |  |  |  | .041 |
|  Women | 85 | 92.4% | 51 | 83.6% |  |
|  Men | 7 | 7.6% | 5 | 8.2% |  |
|  Non-binary | 0 | 0% | 4 | 6.6% |  |
|  Not reported | 0 | 0% | 1 | 1.6% |  |
| Race |  |  |  |  | .001 |
|  White | 77 | 83.7% | 52 | 85.2% |  |
|  Black | 11 | 12.0% | 0 | 0% |  |
|  Asian/Pacific Islander | 1 | 1.1% | 7 | 11.5% |  |
|  Hispanic | 0 | 0% | 1 | 1.6% |  |
|  Not Reported  | 3 | 3.3% | 1 | 1.6% |  |
| MGH-HS | 16.99 | 4.65 | 18.00 | 4.24 | .241 |
| MIST-A Automatic | 26.87 | 8.55 | 29.53 | 6.24 | .040 |
| MIST-A Focused | 45.94 | 15.97 | 48.58 | 12.34 | .282 |
| Total Pulling Sites | 2.04 | 1.21 | 3.48 | 2.08 | <.001 |

*Note.* MGH-HS = Massachusetts General Hospital Hairpulling Scale; MIST-A = Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version

**Table 2**

*Study 1: Pulling Site Frequencies and Comparisons*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | In total sample (*n=*153) | Women (*n=*136) | Men (*n=*12) | Non-binary or not reported (*n=*5) | Gender Comparisons (Women vs. Men) | Face-to-face (*n=*92) | Online (*n=*61) | Sample Comparisons (Face-to-face vs. Online) |
| *X*2 | *p* | Phi | *X*2 | *p* | Phi |
| Scalp | 108 (72%) | 100 (74%) | 5 (42%) | 3 (60%) | 5.43 | .020 | 0.19 | 63 (68%) | 45 (74%) | 0.50 | .482 |  |
| Eyebrows | 70 (46%) | 64 (47%) | 5 (42%) | 1 (20%) | 0.13 | .720 |  | 41 (45%) | 29 (48%) | 0.13 | .718 |  |
| Eyelashes | 69 (46%) | 64 (47%) | 3 (25%) | 2 (40%) | 2.17 | .141 |  | 41 (45%) | 28 (46%) | 0.03 | .871 |  |
| Pubic | 52 (34%) | 43 (32%) | 5 (42%) | 4 (80%) | 0.51 | .476 |  | 16 (17%) | 36 (59%) | 28.33 | <.001 | 0.43 |
| Legs | 21 (14%) | 17 (13%) | 4 (33%) | 0 (0%) | 3.93 | .047 | 0.16 | 8 (9%) | 13 (21%) | 4.93 | .026 | 0.18 |
| Nipples | 12 (8%) | 11 (8%) | 0 (0%) | 1 (20%) | 1.05 | .306 |  | 1 (1%) | 11 (18%) | 14.57 | <.001 | 0.31 |
| Cheek/Chin | 12 (8%) | 8 (6%) | 2 (17%) | 2 (40%) | 2.04 | .154 |  | 0 (0%) | 12 (20%) | 19.64 | <.001 | 0.36 |
| Armpit | 11 (7%) | 10 (7%) | 0 (0%) | 1 (20%) | 0.95 | .331 |  | 3 (3%) | 8 (13%) | 5.34 | .021 | 0.19 |
| Stomach/Back | 9 (6%) | 8 (6%) | 0 (0%) | 1 (20%) | 0.75 | .388 |  | 2 (2%) | 7 (11%) | 5.73 | .017 | 0.19 |
| Arms | 9 (6%) | 4 (3%) | 4 (33%) | 1 (20%) | 19.92 | <.001 | 0.37 | 4 (4%) | 5 (8%) | 0.98 | .322 |  |
| Beard/Mustache | 8 (5%) | 4 (3%) | 4 (33%) | 0 (0%) | 19.92 | <.001 | 0.37 | 1 (1%) | 7 (11%) | 7.99 | .005 | 0.23 |
| Nose | 6 (4%) | 5 (4%) | 1 (8%) | 0 (0%) | 0.62 | .433 |  | 0 (0%) | 6 (10%) | 9.42 | .002 | 0.25 |
| Other People | 4 (3%) | 4 (3%) | 0 (0%) | 0 (0%) | 0.36 | .547 |  | 0 (0%) | 4 (7%) | 6.20 | .013 | 0.20 |
| Pets | 2 (1%) | 2 (1%) | 0 (0%) | 0 (0%) | 0.18 | .672 |  | 0 (0%) | 2 (3%) | 3.06 | .080 |  |
| Chest | 1 (1%) | 0 (0%) | 1 (8%) | 0 (0%) | 11.41 | <.001 | 0.28 | 0 (0%) | 1 (2%) | 1.52 | .218 |  |

**Table 3**

*Study 2: Sample Demographics and Descriptive Data*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Face-to-face Group (*n=*44) | Online Group(*n=*21) | Sample Comparisons |
|  | *M* or *n* | *SD* or % | *M* or *n* | *SD* or % |  *p* value |
| Age | 34.14 | 11.79 | 30.71 | 6.86 | .178 |
| Gender |  |  |  |  | .102 |
|  Women | 41 | 93.2% | 17 | 81.0% |  |
|  Men | 3 | 6.8% | 2 | 9.5% |  |
|  Non-binary | 0 | 0% | 2 | 9.5% |  |
|  Not reported | 0 | 0% | 0 | 0% |  |
| Race |  |  |  |  | .034 |
|  White | 35 | 79.5% | 19 | 90.5% |  |
|  Black  | 6 | 13.6% | 0 | 0% |  |
|  Asian/Pacific Islander | 0 | 0% | 2 | 9.5% |  |
|  Hispanic | 0 | 0% | 0 | 0% |  |
|  Not Reported  | 3 | 6.8% | 0 | 0% |  |
| MGH-HS | 16.86 | 4.81 | 17.95 | 4.24 | .376 |
| MIST-A Automatic | 25.27 | 8.54 | 28.33 | 4.12 | .169 |
| MIST-A Focused | 45.64 | 16.03 | 50.43 | 7.47 | .239 |
| Total Pulling Sites | 2.14 | 1.32 | 4.05 | 2.25 | .001 |
| Total Pulling Settings | 3.82 | 1.33 | 3.14 | 1.42 | .105 |
| Total Pulling Tools | 0.95 | 0.94 | 1.33 | 1.39 | .357 |

*Note.* MGH-HS = Massachusetts General Hospital Hairpulling Scale; MIST-A = Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version

**Table 4**

*Study 2: Pulling Site Descriptive Data*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | All sites (*n=*65) | Scalp (*n=*44) | Brows (*n=*31) | Lashes (*n=*27) | Pubic (*n=*13) |
|  | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % |
| Setting |  |  |  |  |  |  |  |  |  |  |
|  Bedroom | 47 | 71.2% | 28 | 63.6% | 14 | 45.2% | 14 | 51.9% | 4 | 30.8% |
|  Watching TV | 46 | 69.7% | 31 | 70.5% | 13 | 41.9% | 16 | 59.3% | 3 | 23.1% |
|  Reading | 36 | 54.6% | 24 | 54.5% | 13 | 41.9% | 12 | 44.4% | 0 | 0.0% |
|  Bathroom | 36 | 54.6% | 18 | 40.9% | 16 | 51.6% | 14 | 51.9% | 12 | 92.3% |
|  Work | 24 | 36.4% | 13 | 29.5% | 9 | 29.0% | 8 | 29.6% | 1 | 7.7% |
|  Car | 27 | 40.9% | 22 | 50.0% | 4 | 12.9% | 4 | 14.8% | 0 | 0.0% |
| Tools |  |  |  |  |  |  |  |  |  |  |
|  Tweezers | 30 | 45.5% | 8 | 18.2% | 18 | 58.1% | 15 | 55.6% | 9 | 69.2% |
|  Needles | 4 | 6.1% | 0 | 0.0% | 1 | 3.2% | 1 | 3.7% | 3 | 23.1% |
|  Mirrors | 30 | 45.5% | 17 | 38.6% | 18 | 58.1% | 16 | 59.3% | 1 | 7.7% |
|  | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Total settings | 3.60 | 1.39 | 3.09 | 1.44 | 2.23 | 1.69 | 2.52 | 1.87 | 1.54 | 0.88 |
| Total tools | 1.08 | 1.11 | 0.57 | 0.76 | 1.19 | 0.95 | 1.19 | 0.96 | 1.00 | 0.82 |